Western University

Economic Impact Study
Final Report
January 2015

Prepared by KPMG MANAGEMENT CONSULTING
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1 Executive Summary

Introduction

Western University (Western) welcomed its first students in 1878, and is deeply embedded in the social and economic fabric of London, Ontario. The University has a large geographical presence, and has been named among Canada’s Top 100 Employers for the past two years.

After more than 135 years of proud history, Western’s 36,000 students, 6,200 faculty and staff and 277,000 alumni continue to make significant contributions to academia and society around the world.

Western has three affiliated colleges; Brescia University College, Huron University College and King’s University College. These campuses are located in London but are considered to be outside the scope of this assessment.

Study Objective

The primary objective of this study is to estimate the economic impact of Western’s activities from enrolment, employment, innovation, commercialization of new discoveries and company creation within a local, regional and national context.

Study Highlights

The following is a summary of the total key quantifiable impacts made by Western based on 2012-13 data:

- $7.43 billion estimated impact of improvement in earnings by Western alumni living in Ontario in 2013
- $2.06 billion estimated annual cumulative contribution to GDP due to productivity gains from research
- $1.62 billion contribution to Canadian GDP on an ongoing basis due to expenditures related to Western
- $0.15 billion contributions to GDP in 2012-13 due to capital investment

$11.3 billion impact due to Western University

1 All references to faculty and staff numbers throughout this document are expressed in full-time equivalent (FTE) positions.
The following is a summary of the key quantifiable impacts made by Western on the **London area**:

![Impact Diagram]

**Economic Impact through Operating Expenditures**

Western spends approximately $1 billion annually as a result of its ongoing operations. In addition, as a result of the presence of the University, expenditures are made by other organizations and individuals that would otherwise not have been made in its absence. These expenditures contribute to the economy through various expenditures on goods and services as well as the creation of jobs locally, provincially and nationally.

For this report, the following types of expenditures were analyzed to estimate the economic impact of Western:

- $960 million in Western’s operating expenditures and those of related entities;
- $293 million in living expenses of students originating from outside of London and the surrounding areas; and
- $46 million brought into the local economy by visitors to Western as a result of an estimated 190,000 visitor-nights in London.

Expenditures by and as a result of Western have a significant impact on the national, provincial and local economies in terms of both employment and contribution to GDP. In total, Western creates approximately **15,480 jobs** and contributes approximately **$1.62 billion in value-added** to the Canadian economy on an ongoing basis.

A large majority of the impacts created by Western accrue to London and surrounding areas. In particular, 10,840 of the 15,480 total jobs created accrue to London and surrounding areas. Similarly, about 70 per cent of the value-added impact, or $1.07 billion, accrues to London and surrounding areas.

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2Full-time equivalents.
### Expenditures

<table>
<thead>
<tr>
<th></th>
<th>Expenditures ($ millions)</th>
<th>Total Value-Added ($ millions)</th>
<th>Labour Income ($ millions)</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing operating expenditures</td>
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<td>$808</td>
<td></td>
<td>10,840</td>
</tr>
</tbody>
</table>

**Economic Impact through Capital Investment**

Similarly, Western makes a significant investment in various types of capital including new construction, major building renovations, housing renovations, as well as utilities and infrastructure projects. In 2012-13, Western invested $137 million in capital expenditures for the construction of new facilities, renewal of existing facilities and purchases of furniture and equipment.

Capital investment by Western created about **1,560 person-years of employment** and contributed an additional **$146 million to GDP** in Canada in fiscal year 2012-13. The vast majority of capital expenditures were made to vendors in the local areas. These expenditures had an estimated impact of **1,340 person-years of employment** and contributed **$120 million to GDP** in the London area.

**Economic Impacts through Innovation and Entrepreneurship**

**Research**

In the 2012-13 academic year, Western and affiliates received more than **$245 million in research funding** from government, industry, donors and internal sources. The funding received for research and innovation activities in 2012-13 is equivalent to 2.3 per cent of the total employment income in London, and 31 per cent of the operating budget of the City. Western is becoming an increasingly attractive environment for research, witnessing an **11 per cent increase in research funding since 2009**. This aligns with the view held by stakeholders that Western’s most valuable and attractive asset is its multidisciplinary research capabilities.

While government agencies provide nearly two-thirds of research funds, corporations are the fastest growing source of funds. Western has been able to attract an increasing amount of funding from corporations over the last few years, as seen in a 52 per cent increase in corporate funding between 2009 and 2012. This provides evidence Western has created an attractive environment for investment into research and innovation.
The recent trend in research funding at Western is shown in the graph below.

![Research Funding Graph]

Source: Western University.

Research grants and contracts cast a wide net of influence throughout the University. Examples of the more tangible contributions include the Fraunhofer Project Centre for Composites Research at Western University, London Medical Innovation & Commercialization (LMIC) Network, and Southern Ontario Smart Computing and Innovation Platform (SOSCIIP).

Another way to estimate the impact of research is through productivity gains in the Ontario economy as a result of the research conducted and knowledge transmitted. The approach involves estimating the share of research and development taking place in Ontario through universities, and Western as a share of those universities, and applying it to the growth in GDP due to productivity gains. Using this approach, research undertaken at Western is estimated to have an annual cumulative contribution of $2.06 billion to GDP in Ontario at the present time; $720 million of that impact is estimated to accrue to London.

**Commercialization**

The commercialization of innovative technologies through patents, licenses, research joint ventures and spin-off companies has increased substantially in North America and Europe in the last decade. Commercialization at Western has followed this trend. WORLDDiscoveries® is the business development arm of London’s research institutions, providing a bridge from local innovation and invention to global industry. As a partnership led by Western University in collaboration with the Robarts Research Institute and Lawson Health Research Institute, WORLDDiscoveries® leverages the partners’ collective industry connections, market knowledge and business development expertise to help local researchers and inventors commercialize their discoveries through patents, licensing agreements and the creation of spin-off companies. Since 2009, WORLDDiscoveries® has pursued industrial partnerships throughout Asia, established three satellite offices in China, and secured more than $4 million in new investment that has led to the creation of two new joint venture companies in Southwestern Ontario and the expansion of four labs at the University.

Since 2008, Western has generated nearly $23 million in royalty and license income. In total, Western holds 198 patents and more than 100 active licenses.

**Impact on Businesses and Organizations**

Stakeholders interviewed as part of this study highlighted three primary mechanisms through which Western supports existing businesses: access to leading researchers and students; business development expertise for start-ups and small and medium enterprises (SMEs); and access to physical facilities that may otherwise be out of reach for individual companies.

Leading-edge facilities, researchers and guidance are found in Western’s two Research Parks. Studies have shown university-led research parks can enhance regional economic growth and make markets more competitive through knowledge spill-over between universities and tenant firms. Western’s Research Parks are considered to be among the region’s most attractive features for SMEs currently operating in London or considering relocating to the city. In a recent survey, UBI Index ranked Western’s Research Parks 22nd in the Global Top 25 University Business Incubators of 2014.
Company Creation

In addition to Western’s success in commercializing technologies through patents and licenses, the University has recognized the need to aid its aspiring entrepreneurs in capturing the full value of their innovative ideas. This has been further amplified with the creation of WORLDDiscoveries® in 2008 with an objective to facilitate the creation of 12 spin-off companies by 2012. In all, 15 companies were guided from the research lab to the commercial market in this timeframe.

The entrepreneurial spirit is also rooted in the student body, as shown through Western's new E3 (Entrepreneurial Engagement and Economic Development) program. This grassroots initiative guides students in developing small businesses, and has helped launch 25 companies.

Additional Social and Economic Impacts

Human Capital

Through a strategic analysis of job demands and emerging market trends, Western has been able to foster human capital development in response to local, regional, and international contexts.

The development and acquisition of human capital helps local economies respond to existing needs and create new opportunities. Specifically, Western graduation rates closely match regional demand for employees in health care, professional services and in the financial sector. Measured through additional earnings, it is estimated that in 2013 Western alumni living in Ontario had improved their earnings by almost $5.0 billion as a result of their education at Western. Of this total, approximately 23 per cent accrues to those living in the City of London. The estimated total direct, indirect and induced impacts of this additional income is $7.43 billion in Ontario and $1.71 billion in London.

In a global context, more than 16,000 Western graduates have taken their talents to international markets and communities, allowing for the creation of an extensive global network of alumni. This influence may be best represented by graduates of the Ivey Business School, who are currently occupying leadership roles in 102 countries.

Supporting the Needs of the Community

Students, staff, faculty and alumni participate in local community engagement activities, on and off campus, to enrich both their ‘Western Experience’ and the community around them. Western plays an important role in the economic and social development of the London area. Part of this role is opening its resources to the community, including the skills, talent and commitment of its students.

Western is home to many public- and community-based partnerships providing community-accessible services including health, legal and educational supports. These services draw on the professional expertise of Western’s faculty, staff and students.

Western also undertakes many community-based research activities. Led by faculty members, these activities study some of society’s most complex problems ranging from obesity to dementia, built environment to homelessness, food security to Indigenous knowledge. Western’s inclusive community-based research activities are shaping public policy through collaboration. Drawing on faculty expertise, Western boosts numerous research-based, publicly accessible centres and research labs. These centres publish leading practices, provide research based tools, collaborate with
London and surrounding area service providers and disseminate findings across Canada and around the world to better policy, service delivery and research.

Western promotes quality of life in the community by making its space and student resources available to outside groups to host or benefit from Western-led events and activities. Drawing thousands to Western’s campus annually, programmed events and activities provide vital services to families and youth by enhancing their physical wellbeing as well as to professionals building and maintaining their networks. Access to Western occurs throughout the school year and during the summer months.

**Summary of Impacts**

With diverse academic programming, strong research capacity, 36,000 students and 6,200 faculty and staff and an expansive alumni network, Western makes a significant contribution to the local, provincial and national economies. This is demonstrated through both economic and social impacts created as a result of Western’s operating and capital expenditures, student and visitor spending, innovation and entrepreneurial initiatives, productivity gains, human capital development and community involvement.

- Western generates approximately **15,480 jobs** and contributes about **$1.62 billion** in value-added to the Canadian economy on an ongoing basis;
- Capital investments by Western created about **1,560 person-years of employment** and contributed an additional **$146 million** to GDP in Canada in the fiscal year 2012-13;
- Research undertaken at Western is estimated to have an **annual cumulative contribution of $2.1 billion** to GDP in Ontario at the present time, as a result of productivity gains made through research conducted and knowledge transmitted;
- Since 2008, Western has generated **nearly $23 million** in royalty and licensing income;
- It is estimated that in 2013, the impact of improved annual earnings by Western alumni living in Ontario was about **$7.43 billion** as a result of their university education at Western.

**Total impact of $11.3 billion.**
2 Introduction and Overview of Western University

Western University opened its doors in 1878, embarking on a journey to become a name recognized for academic excellence in London, Ontario, and across Canada. After more than 135 years of proud history, its 36,000 students and 6,200 faculty and staff continue to make significant contributions to academia and society around the world.

2.1 Introduction

From April to June 2014, KPMG LLP was engaged by Western to undertake an economic impact study in order to determine the estimated economic impact from Western’s activities within and related to higher education, through enrolment, employment, innovation, commercialization of new discoveries and company creation within a local, regional and national context.

These impacts are described in the following chapters:

- Chapter 3: Economic Impact through Expenditures, including operating, recurring minor capital and major capital expenditures and their impact on employment and the economy, as well as the impact made through expenditures of non-local students and visitors;
- Chapter 4: Economic Impacts through Innovation and Entrepreneurship, including the impact of research commercialization at Western as well as the impact of the University on businesses and other organizations;
- Chapter 5: Additional Social and Economic Impacts, including Western’s contribution to human capital development and contributing to supporting the needs of the community.

KPMG also performed quantitative and qualitative analyses, document review, secondary research and interviews with internal and external stakeholders (see Appendix 2 – List of External Stakeholders Interviewed) to assess these areas of impact. The 2012-13 fiscal year was the base year for data collection, however, where appropriate, calendar and academic years closest to the base year were also used.

2.2 Overview of Western University

Location and History

Western is deeply embedded in the social and economic fabric of London, Ontario. The University has a large geographical presence, and has been named among Canada’s Top 100 Employers for the past two years.3

Western has three affiliated colleges: Brescia University College, Huron University College and King’s University College. These campuses are located in London, but are considered to be outside the scope of this assessment.

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3 Canada’s Top 100 Employers 2014, www.canadastop100.com
Proud Tradition in Research and Innovation

Western’s ambition of being a global research leader stems from its pursuits in multi-disciplinary progress and innovation. As an outcome of the 2013 strategic planning process, Western has identified key research areas. They include:

- Neuroscience/Brain and Mind
- Biomedical Imaging
- Materials and Biomaterials
- Wind Engineering & Natural Disaster Mitigation
- Environmental Sustainability & Green Energy
- Planetary Science & Exploration
- Philosophy of Science
- Musculoskeletal Health
- Big Data Synergy
- Advanced Manufacturing

While Western’s external partners play an integral role in both research and education, some of the most promising research and innovations emanating from Western have resulted from work conducted by internal interdisciplinary research centres and institutes. The diagram below provides four examples of how the University has funnelled its resources to bring together leaders from a variety of disciplines to pursue strategic initiatives.

Figure 1: Multidisciplinary Research at Western

Source: Western University 2014 Strategic Research Plan Summary.
Programs and Faculties

Western’s extensive selection of postsecondary programs is offered through 11 Faculties and more than 400 specializations, majors and minors at the undergraduate level. Modular degree programs such as those in the Faculties of Arts & Humanities and Social Science offer flexibility and inter-departmental course selection. Other programs such as Engineering are more structured, while concurrent programs are offered to students pursuing degrees in Business, Law, Engineering and many other areas. There are nine broad programs at the undergraduate level, and five programs that require two to four years of study prior to enrolment, known as second-entry programs. This program structure is presented in the table below.

Figure 2: Structure of First-Year Programs at Western

<table>
<thead>
<tr>
<th>First-Entry Undergraduate Programs</th>
<th>Second-Entry Undergraduate Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Arts &amp; Humanities</td>
<td>• Business</td>
</tr>
<tr>
<td>• Information &amp; Media Studies</td>
<td>• Dentistry</td>
</tr>
<tr>
<td>• Music</td>
<td>• Medicine</td>
</tr>
<tr>
<td>• Engineering</td>
<td>• Education</td>
</tr>
<tr>
<td>• Management &amp; Organizational Studies</td>
<td></td>
</tr>
<tr>
<td>• Social Science</td>
<td></td>
</tr>
<tr>
<td>• Health Sciences</td>
<td></td>
</tr>
<tr>
<td>• Science</td>
<td></td>
</tr>
<tr>
<td>• Medical Sciences</td>
<td></td>
</tr>
</tbody>
</table>

Source: Western University Programs and Faculties, http://welcome.uwo.ca/

Western’s goal of becoming a top global educational institution requires it be a destination-of-choice for graduate students. Accordingly, 145 master’s and doctoral programs are offered, providing the opportunity to pursue more than 170 fields of research ranging from Marketing to Planetary Physics. Specialized schools such as the Ivey Business School, Western Law and the Schulich School of Medicine & Dentistry continue to receive widespread recognition. Each Faculty also offers graduate degrees at Western.

Student Body, Academic Achievement, and University Rankings

Western’s diverse student body continues to expand in response to the social and economic demands for postsecondary education. More than 2,700 international students are currently studying at Western, comprising approximately 10 per cent of the student population. Total student enrolment in the 2013-14 academic year is presented in the table below.
Figure 3: Western Student Population

<table>
<thead>
<tr>
<th>Student Status</th>
<th>Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full-Time (2013-14)</strong></td>
<td></td>
</tr>
<tr>
<td>Undergraduates</td>
<td>22,530</td>
</tr>
<tr>
<td>Medical Residents</td>
<td>853</td>
</tr>
<tr>
<td>Graduate</td>
<td>5,003</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>28,386</td>
</tr>
<tr>
<td><strong>Part-Time (2013-14)</strong></td>
<td></td>
</tr>
<tr>
<td>Undergraduates</td>
<td>5,768</td>
</tr>
<tr>
<td>Medical Residents</td>
<td>0</td>
</tr>
<tr>
<td>Graduate</td>
<td>765</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,533</td>
</tr>
<tr>
<td><strong>Continuing Education</strong></td>
<td>1,347</td>
</tr>
<tr>
<td><strong>All Students</strong></td>
<td><strong>36,266</strong></td>
</tr>
</tbody>
</table>

Source: Western University Student Demographics.

The growth in the Western student population is illustrated in the chart below, which displays the annual increase in undergraduate full-time students in comparison to the undergraduate student population in Ontario. Between 2007 and 2012, enrolment at Western grew by 11 per cent.

Figure 4: Full-Time Undergraduate Enrolments, 2007 – 2013

Sources: Western University Office of Institutional Planning and Budgeting; Council of Ontario Universities.

Western seeks to attract and retain highly qualified students each year. The results of this pursuit are the second highest average entering grade (88.9 per cent) for Ontario universities and second highest first-year retention rates (92 per cent). Upon graduation, these students will join Western’s 277,000 alumni, including an expansive global network of 18,700 international alumni.

Attracting excellent students is only the first step in the multi-year process to encourage the development of ‘global-ready citizens’ at Western. Students and graduates continue to recognize the value of this process and the benefits of a Western education. The following diagram depicts a sample of the recognition and praise that Western has received from alumni and the public.
Focus on Growth

In an effort to build upon its status as one of Canada’s premier postsecondary institutions and become a top global institution, growth at Western has taken place in all aspects of student life and university operations. Three overarching goals have guided Western down this path:

■ Recruit and retain the world’s brightest students;
■ Enhance the value of a Western degree; and
■ Enable faculty, students and alumni to find solutions to complex challenges around the globe.4

The University is working to expand its educational reach, explore new and innovative research opportunities, attract more international students, and continue to pursue valuable partnerships and collaborations. To illustrate the growth of Western in the last decade, the diagram below depicts a snapshot of diverse growth indicators.

Figure 6: Western Growth Indicators, 2002-03 – 2012-13

Source: Western University Performance and Activity Indicators 2013; Western Office of Institutional Planning and Budgeting.

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4 Achieving Excellence on the World Stage, 2014 Western University Strategic Plan.
Moreover, Western is in the midst of a $750-million fundraising campaign (called the Be Extraordinary Campaign), the largest fundraising effort in the University’s history. The campaign, which ends in 2017, has raised $488.3 million as of April 30, 2014 and received $69.6 million in donations for the 2013-14 fiscal year, surpassing its target of $65 million.

The largest portion of the funds raised will be dedicated to student awards and programs. The other priorities include funding for research and academic programs, recruitment and retention of top faculty and researchers as well as infrastructure and facilities upgrading.
3 Economic Impact through Expenditures

The economic impact of ongoing spending related to Western included the creation of about 15,480 full-time jobs and an estimated $1.62 billion contribution to GDP in 2012-13. Capital investment in 2012-13 contributed about 1,560 person years of employment and had a $146 million contribution to GDP in 2012-13.

3.1 Introduction

Western spends approximately $1 billion annually as a result of its ongoing operations. In addition, expenditures are made by other organizations and individuals as a result of the presence of the University which would otherwise not have been made in its absence.

These expenditures contribute to the economy through various expenditures on goods and services as well as the creation of jobs locally, provincially and nationally.

3.2 Methodology

To assess the economic impact of Western through expenditures, KPMG employed economic input-output modelling which is used to estimate the employment and GDP impacts of various types of expenditures such as salaries and wages, purchase of goods and services, any indirect taxes and depreciation.

Economic impact is commonly measured in terms of employment and value-added (contribution to GDP). Value-added measures economic value created through the production of goods and services. It is the value a producer adds to its intermediate inputs by producing its own outputs.\(^5\) Value-added is expressed in dollars. To estimate employment impacts, the full- and part-time jobs in each industry, and permanent and temporary employment, are converted into the equivalent of full-time jobs, and are expressed in terms of full-time equivalent (FTE) positions.\(^5\)

Value-added impacts are composed of labour income, business and government income. The value-added and employment impacts are further categorized as direct, indirect or induced.

- Direct impacts capture the labour income paid to Western faculty and staff, any indirect taxes and depreciation paid by Western;
- Indirect impacts are generated by the production of goods and services by direct and indirect suppliers to Western. Induced impacts are those resulting from re-spending of direct and indirect labour income generated. For example, direct labour income includes the salaries, wages and benefits paid to Western faculty and staff, while indirect labour income is paid to employees of direct and indirect suppliers to Western; and
- Induced labour income reflects the impact of the spending of salaries and wages earned by Western faculty and staff, and employees of suppliers.

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\(^6\) Ibid.
For this report, the following four types of expenditures were analyzed to estimate the economic impact of Western:

- Western’s operating expenditures and those of related entities (such as the University Students’ Council, Society of Graduate Students) including salaries and benefits, purchases of goods and services, etc. for teaching, research, administrative and ancillary operations;
- Capital expenditures for the construction of new facilities, renewal of existing facilities and purchases of furniture and equipment;
- Living expenses of students originating from outside of London and the surrounding areas; and
- Expenditures of visitors to Western.

KPMG undertook an analysis of the economic impact of these expenditures on the Ontario economy using the most recent (2010) version of the Statistics Canada Interprovincial Input-Output Model.

### 3.3 Summary of Expenditures

#### 3.3.1 Operating Expenditures of Western and Related Entities

Western spends more than $1 billion annually to operate the University and other organizations it controls including related entities. In 2012-13, Western spent approximately $578 million on salaries and benefits; $102 million on building, land and site services; $54 million on furniture and equipment purchases; $25 million on utilities; and a remaining $248 million on other operational expenditures. This latter total includes recurring minor capital expenditures such as library acquisitions and computer equipment.

**Figure 7: Summary of Western Operating Expenditures ($ millions)**

Source: Western University as provided to the Council of Ontario Universities.

Approximately $70 million in scholarships, fellowships and bursaries have been excluded from this analysis to avoid double-counting – the impacts of the spending of these funds is reflected through Western’s operating spending and student living expenditures.

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7 Source: Western University as provided to the Council of Ontario Universities.
An additional $23 million was spent on related organizations that would not otherwise exist in the absence of Western. These include the University Students’ Council, Society of Graduate Students and HBA and MBA Student Associations.

3.3.2 Capital Investment

Each year, Western also invests in various capital projects and purchases. In 2012-13, Western made approximately $137 million in capital investments, excluding carrying costs and debt repayments. Capital investments included:

■ Construction of new buildings, additions to existing buildings and other new facilities;
■ Major building renovations, upgrading and new installation of utilities and other infrastructure;
■ Renewal and modernization of classrooms, laboratories, libraries and other space for instruction and research;
■ Various maintenance and modernization projects;
■ Housing renovations; and
■ Capital expenditures on ancillaries such as hospitality services, the bookstore, parking services, etc.

The total amount includes only major capital expenditures and does not include recurring minor capital expenditures that are already captured under operating expenditures.

3.3.3 Student Expenditures

Approximately 84 per cent of full-time students originate from locations outside London and surrounding areas. These students bring with them a need for accommodations, food, transportation, supplies and other items that result in an influx of dollars into the local economy. Consequently, these students generate additional economic impacts in the local economy from their living expenses. The total living expenditures of students originating from London and the surrounding areas were not included in this analysis; however, expenses associated with attending Western (i.e. books and supplies, transportation) were included.

As described, the total living expenses for full-time students were estimated to be about $292.7 million in 2012-13. Please see Appendix 1 for details of the basis of the expenditure estimate.

3.3.4 Visitor Expenditures

Each year, Western welcomes visitors from outside London for a variety of events and purposes such as conferences, campus visits, international delegations, convocations, Homecoming as well as arts and athletic events. An estimated 190,000 visitor-nights are spent in London as a result of these various events which brought an estimated $46 million into the local economy in 2012-13.

3.3.5 Summary of Expenditures

The following table summarizes the expenditures that were analyzed to determine the impact of Western on the national, provincial and local economy. The expenditures described are for 2012-13, the most recent data available.

8 Operating expenditures include both spending by Western University and related entities, and exclude transfers and scholarships, bursaries, etc.
3.4 Summary of Economic Impact due to Operating Expenditures

Expenditures by and as a result of Western have a significant impact on the national, provincial and local economies both in terms of employment and value-added. In total, Western creates approximately 15,480 jobs\(^9\) and contributes about $1.62 billion in value-added to the Canadian economy on an ongoing basis. The majority of those jobs and value-added – 95 and 68 per cent – accrues to Ontario and London/surrounding areas, respectively.

The table below summarizes the economic impact of expenditures described in the following sections.

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**Figure 9: Summary of Expenditures, and Value-Added and Employment Impacts Related to Western (2012-13)**

<table>
<thead>
<tr>
<th></th>
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<th>Total Value-Added ($ millions)</th>
<th>Labour Income ($ millions)</th>
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<tr>
<td><strong>Canada Total</strong></td>
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<td></td>
<td><strong>15,480</strong></td>
</tr>
<tr>
<td><strong>Ontario Total</strong></td>
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<td>$999</td>
<td></td>
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<td><strong>London and Surrounding Area Total</strong></td>
<td>$1,068</td>
<td>$808</td>
<td></td>
<td>10,840</td>
</tr>
</tbody>
</table>

Note: Totals may not add due to rounding.

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\(^9\) All job figures shown in sections 3.4 and 3.5 are in terms of full-time equivalent (FTEs) positions.
3.5 Economic Impact of Ongoing Expenditures

3.5.1 Impact on Value-Added and Employment

In this section, the impacts of annual operating expenditures, student and visitor spending are described in terms of employment and value-added as estimated using the Statistics Canada Input-Output model.

Expenditures related to Western were estimated to generate approximately 15,480 jobs in Canada including 14,200 in Ontario. Western directly employed a total of about 6,200 faculty, and administrative and support staff in 2012-13. Indirectly, about 2,050 jobs were generated/supported among suppliers and suppliers to suppliers to Western as a result of operating expenditures. An additional 3,470 jobs were created as a result of student living and visitor expenditures. Induced impacts resulting from spending of salaries and wages by Western faculty and staff as well as direct and indirect suppliers resulted in an additional 3,750 jobs in Canada.

The figure below summarizes the employment impact of expenditures related to Western:

Figure 10: Employment Impact of Operating, Student Living and Visitor Expenditures

<table>
<thead>
<tr>
<th>Canada Employment</th>
<th>2012-13</th>
<th>Annual Operating Expenditures</th>
<th>Student Living Expenditures</th>
<th>Visitor Expenditures</th>
<th>Canada Total</th>
<th>Ontario Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>6,200</td>
<td>1,810</td>
<td>450</td>
<td></td>
<td>8,460</td>
<td>8,440</td>
</tr>
<tr>
<td>Indirect</td>
<td>2,050</td>
<td>1,060</td>
<td>160</td>
<td></td>
<td>3,270</td>
<td>2,720</td>
</tr>
<tr>
<td>Induced</td>
<td>3,030</td>
<td>600</td>
<td>120</td>
<td></td>
<td>3,750</td>
<td>3,040</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,280</strong></td>
<td><strong>3,470</strong></td>
<td><strong>730</strong></td>
<td></td>
<td><strong>15,480</strong></td>
<td><strong>14,200</strong></td>
</tr>
</tbody>
</table>

Note: (a) Totals may not add due to rounding.  
(b) Includes impacts of expenditures of related entities.  
(c) Jobs are expressed in terms of full-time equivalent positions.  

The expenditures that were analyzed related to Western contributed about $1.62 billion to GDP in Canada including $1.50 billion in Ontario. In particular, $1.06 billion of labour income, $431 million of annual business income, and $128 million in government income\(^{10}\) were generated in Canada.

Figure 11: Value-added Impact of Operating, Student Living and Visitor Expenditures ($ millions)

<table>
<thead>
<tr>
<th>Ontario Value-added</th>
<th>2012-13</th>
<th>Annual Operating Expenditures</th>
<th>Student Living Expenditures</th>
<th>Visitor Expenditures</th>
<th>Canada Total</th>
<th>Ontario Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labour Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>$580.9</td>
<td>$74.7</td>
<td>$16.8</td>
<td></td>
<td>$672.5</td>
<td>$674.8</td>
</tr>
<tr>
<td>Indirect</td>
<td>$119.6</td>
<td>$62.2</td>
<td>$8.5</td>
<td></td>
<td>$190.3</td>
<td>$160.2</td>
</tr>
<tr>
<td>Induced</td>
<td>$162.9</td>
<td>$31.3</td>
<td>$6.2</td>
<td></td>
<td>$200.4</td>
<td>$163.9</td>
</tr>
<tr>
<td><strong>Sub-total Labour Income</strong></td>
<td><strong>$863.3</strong></td>
<td><strong>$168.2</strong></td>
<td><strong>$31.6</strong></td>
<td></td>
<td><strong>$1,063.2</strong></td>
<td><strong>$998.9</strong></td>
</tr>
</tbody>
</table>

\(^{10}\)Government income does not include income taxes paid to the provincial or federal governments.
### Ontario Value-added

<table>
<thead>
<tr>
<th></th>
<th>2012-13</th>
<th></th>
<th>Student Living Expenditures</th>
<th></th>
<th>Visitor Expenditures</th>
<th></th>
<th>Canada Total</th>
<th>Ontario Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Operating Expenditures</td>
<td>Student Living Expenditures</td>
<td>Visitor Expenditures</td>
<td>Canada Total</td>
<td>Ontario Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Business Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>$83.1</td>
<td>$64.2</td>
<td>$7.4</td>
<td>$154.7</td>
<td>$149.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>$56.6</td>
<td>$34.6</td>
<td>$5.5</td>
<td>$96.8</td>
<td>$73.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>$144.6</td>
<td>$29.3</td>
<td>$5.8</td>
<td>$179.8</td>
<td>$145.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-total Business Income</td>
<td>$284.4</td>
<td>$128.1</td>
<td>$18.7</td>
<td>$431.2</td>
<td>$368.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Government Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>$1.7</td>
<td>$28.6</td>
<td>$1.8</td>
<td>$32.0</td>
<td>$35.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>$14.2</td>
<td>$1.9</td>
<td>$0.8</td>
<td>$16.9</td>
<td>$19.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>$73.5</td>
<td>$4.9</td>
<td>$1.0</td>
<td>$79.4</td>
<td>$74.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-total Government Income</td>
<td>$89.4</td>
<td>$35.4</td>
<td>$3.5</td>
<td>$128.4</td>
<td>$130.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,237.1</td>
<td>$331.8</td>
<td>$53.9</td>
<td>$1,622.8</td>
<td>$1,497.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
(a) Totals may not add due to rounding.
(b) Includes impacts of expenditures of related entities.

**Source:** KPMG analysis based on Statistics Canada Interprovincial Input-Output (2010) model results.

### 3.5.2 Assessment of Local Impacts

Typically, an institution of higher learning has a significant economic impact on the economy of the local area in which it operates. In particular, Western has a significant impact on the local economy due to jobs being created in London and purchases made from local suppliers of goods and services.

The figure below identifies the elements of the overall economic impact that were used to estimate impacts accruing to London and surrounding areas and the associated assumptions.

**Figure 12: Components of Overall Economic Impact from Ongoing Expenditures Used in Local Analysis and Assumptions Made**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Operating Expenditures</th>
<th>Student Spending</th>
<th>Visitor Spending</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct</strong></td>
<td>• All direct employment is within London and area</td>
<td>• 90 percent of student spending is within London and area</td>
<td>• All visitor spending is within London and area</td>
</tr>
<tr>
<td><strong>Indirect</strong></td>
<td>• The impact of actual expenditures made by Western on suppliers within London and area</td>
<td>• The provincial I/O model does not allow estimation of local indirect impacts</td>
<td>• The provincial I/O model does not allow estimation of local indirect impacts</td>
</tr>
<tr>
<td><strong>Induced</strong></td>
<td>• Induced impacts of spending by faculty and staff residing in London and area.</td>
<td>• Assuming vendor staff live in London and surrounding areas in same proportion as Western faculty and staff</td>
<td>• Assuming vendor staff live in London and surrounding areas in same proportion as Western faculty and staff</td>
</tr>
</tbody>
</table>
Analysis shows 31 per cent of Western’s purchases of goods and services are made from vendors in London and surrounding areas. This represents expenditures of about $118 million. Similarly, approximately 90 per cent of Western faculty and staff reside within the local area and, therefore, spend a significant amount of their incomes there. Western spent a total of approximately $538 million in salaries, wages and benefits for faculty and staff living in London and surrounding areas.

The figure below summarizes the local employment impact of expenditures related to Western. A large majority of jobs created/maintained by Western accrue to London and surrounding areas. In particular, 10,840 jobs of the 15,480 total jobs created accrue to London and surrounding areas. This number represents about 70 per cent of the total employment impact of Western in Canada.

Figure 13: Total Employment Impact of Western Annual Operating, Student and Visitor Expenditures on the Economy of London and Surrounding Areas

<table>
<thead>
<tr>
<th></th>
<th>2012-13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>8,260</td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>1,940</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,840</td>
<td></td>
</tr>
</tbody>
</table>

Note: (a) Totals may not add due to rounding.  
(b) Includes impacts of expenditures of related entities.  
(c) Jobs are expressed in terms of full-time equivalent positions.


Similarly, approximately 70 per cent of the value-added impact accrues to London and surrounding areas. In particular, 80 per cent of the labour impacts accrue to London and surrounding areas and 70 per cent of the business income impact for a total impact of $1.07 billion. Figure 14 below summarizes the local value-added impact of expenditures related to Western.

Figure 14: Total Value-added Impact of Western Annual Operating, Student and Visitor Expenditures on the Economy of London and Surrounding Areas ($ millions)

<table>
<thead>
<tr>
<th></th>
<th>2012-13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labour Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>$667.0</td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>$37.1</td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>$103.9</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total Labour Income</strong></td>
<td>$808.0</td>
<td></td>
</tr>
<tr>
<td><strong>Business Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>$149.4</td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>$17.6</td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>$92.9</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total Business Income</strong></td>
<td>$259.9</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,067.9</td>
<td></td>
</tr>
</tbody>
</table>

Note: (a) Totals may not add due to rounding.  
(b) Includes impacts of expenditures of related entities.

3.6 Economic Impact of Capital Investment

3.6.1 Impact on Value-Added and Employment

Each year, Western makes a significant investment in various types of capital including new construction, major building renovations, housing renovations, as well as utilities and infrastructure projects. The $136.5 million investment in 2012-13, led to the impacts described below.

The capital investments by Western in 2012-13 are estimated to have created 1,440 person-years of employment in Ontario, a total of 1,560 in Canada. This investment created total value-added of $128.9 million in Ontario ($145.6 in Canada). The $128.9 million value-added impact in Ontario includes:

- Labour income of $90.0 million
- Business income of $29.3 million
- Government income of $9.6 million through indirect taxes.

Analysis shows approximately 93 per cent of Western capital expenditures were made to vendors in London and surrounding areas. This represents expenditures of about $127 million. As a result, it is estimated that capital expenditures created approximately 1,340 person-years of employment and $120 million in value added in the London area.

The following figure shows the details of employment and value-added in both Ontario and Canada as a result of Western’s investment in capital in 2012-13.

**Figure 15: Employment and Value-added ($ millions) of Capital Expenditures in 2012-13**

<table>
<thead>
<tr>
<th>Person-years of Employment</th>
<th>Value-added ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>London Area</td>
<td>230</td>
</tr>
<tr>
<td>Ontario</td>
<td>250</td>
</tr>
<tr>
<td>Canada</td>
<td>340</td>
</tr>
<tr>
<td>Direct Suppliers</td>
<td>780</td>
</tr>
<tr>
<td>Indirect Suppliers</td>
<td>840</td>
</tr>
<tr>
<td>Induced</td>
<td>730</td>
</tr>
</tbody>
</table>

4 Economic Impacts through Innovation and Entrepreneurship

In 2012-13, Western attracted more than $245 million in external research funding and earned $5.4 million in commercialisation revenue.

4.1 Overview of Innovation and Entrepreneurship at Western

In its 2014 Strategic Plan, Achieving Excellence on the World Stage, Western described its commitment to research and innovation through its first strategic priority, entitled Raising our Expectations: Create a world-class research and scholarship culture. To support this priority, Western outlined key initiatives it plans to undertake, including selective investments in interdisciplinary areas of strength, increased focus on research inputs and outcomes and partnerships with other institutions and communities.

In the Introduction and Overview to Western section of this report (Page 10), a description of Western’s research strengths was provided. Many of the stakeholders consulted for this study noted the University’s leadership is determined to translate its scientific research into business and social endeavours. While academic programming and student education should remain a priority, stakeholders recognized universities can also be successful through encouraging entrepreneurship and creating companies. Moreover, stakeholders identified the research capacity of Western as attractive for businesses considering locating in the region or forming partnerships near the University. The following diagram provides an illustration of the numerous research groups linked to Western’s key research areas.

Source: Western University 2014 Strategic Research Plan Summary.
The following sections will describe the impact of these initiatives on research, innovation and entrepreneurship in the region.

### 4.2 Research

Advanced research requires significant resources from universities, but can also be a source of substantial funding and associated revenue. As Western strives to become a global leader in multidisciplinary research, the financial impacts of this pursuit can be felt much closer to home. This section will outline the resources provided to Western to conduct research, as well as the tangible benefits from research activities.

#### 4.2.1 Sources and Magnitude of Research Funding

Funding for research, entrepreneurship and innovation at Western is drawn from government agencies, international institutions, private donations, industry and internal sources. In the 2012-13 academic year, these sources provided \$245.4 million in research funding to Western (including research funding for hospitals affiliated with Western).\(^{11}\)

This value represents a significant contribution to both the University and the broader community. The funding received for research and innovation activities in 2012-13 is equivalent to 2.3 per cent of the total employment income in London,\(^{12}\) and 31 per cent of the operating budget of the City.\(^{13}\)

Government grants are the primary source of research funding at most postsecondary institutions in Canada.\(^{14}\) This funding typically flows through granting agencies which provide resources to help facilitate advancements in specific research areas. The most prominent national funding agencies are Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada (NSERC) and Social Science and Humanities Research Council (SSHRC), known collectively as the Tri-Council.

Western’s research activities have been successful in attracting government funding, which comprises two-thirds of all research grants for the University. In 2010-11, Western received 9.4 per cent of NSERC’s allocation for Ontario, and it received 7.3 per cent of Ontario Research Fund (ORF) funding between 2006 and 2011.\(^{15}\) The source of Western’s 2012-13 research revenue is shown in the graph below.

**Figure 16: Sources of Research Revenue to Western, 2012-13**

![Graph showing sources of research revenue](image)

Source: Western University.

\(^{11}\) Provided by Western University.

\(^{12}\) Statistics Canada National Housing Survey, 2011.

\(^{13}\) City of London 2014 Budget documents.


\(^{15}\) NSERC Awards Database. ORF Open Data.
Research grants from private sources and corporations comprise the second largest source of funding at Western. Foundations, associations and societies provided $36.8 million, while corporations contributed $46.6 million, in the 2012-13 academic year. Western has been able to attract an increasing amount of funding from corporations over the last several years, as seen in a 52 per cent increase in corporate funding between 2009 and 2012. This success is illustrated in the graph below.

![Figure 17: Funding from Corporations, 2009-10 to 2012-13](image)

Corporations provide in-kind contributions and also engage in contract research with the University. An increasing amount of funding from corporations signifies an attractive environment for investment into research and innovation. Soliciting industry funding and collaboration is a key component of Western’s *Partnership with Impact* goal which provides guidance for its 2014 strategic plan. Several examples of how Western has capitalized on industry partnerships are provided in the following section.

Sources of funding revenue include research grants for clinical trials, which totalled $15.7 million, and foreign grants, which totalled $1.4 million, in 2012-13. Clinical trials have shown a substantial increase since the economic recovery began in 2009-10, rising by 208 per cent in the last five years.16

Internal resource allocation is another component of funding for research, innovation and entrepreneurship. In 2012-13, $14.3 million was drawn from research funds and operating funds within the University to support research opportunities. University operating funds are sourced primarily from tuition fee revenue and general government funding.

For every dollar of research expenditure from internal sources, Western was able to capture an additional $16.16 from external sources. This research multiplier points to the efficiency of resource collection and allocation, as well as the magnitude of funding for the University and its partners.

### 4.2.2 Impact of Research Funding

To highlight the impact of funding provided from the sources noted above, the following projects provide a sample of the research and innovation opportunities that were made possible through continued investment in this area.

- **Fraunhofer Project Centre for Composites Research at Western University (FPC @ Western).** This joint-venture between Western and Fraunhofer-Gessellschaft and other German partners provides an example of Western’s expanding global reach as well as its pursuit of strengthened industry partnerships. The goal of this undertaking is to accelerate the development cycle for new products and to accelerate the adoption of advanced composites technologies by

---

16 Western University
North American industry. External funding for the project was provided by FedDev Ontario ($13.7 million), Ontario Research Fund ($2 million) and industry partners ($5 million).17

**London Medical Innovation & Commercialization (LMIC) Network.** In an effort to bring together clinicians, scientists, entrepreneurs and industry leaders, Western has spearheaded the development of the LMIC Network. This enterprise will be a multi-disciplinary endeavour organized to translate medical research into market-ready applications. Involving a partnership between Western, London’s hospital network, the City of London as well as federal and provincial governments, this project is valued at nearly $125 million and could contribute as much as $60 million annually to the local economy.18

**Southern Ontario Smart Computing and Innovation Platform (SOSCIP).** The SOSCIP, a research consortium with Western at its core, was established in April 2012. SOSCIP pairs academic and industry researchers with high-performance computing to analyze big data. Consortium members include the IBM Canada Research and Development Centre and seven Ontario universities, led by Western and the University of Toronto. Other participants include McMaster, Queen’s, University of Ontario Institute of Technology, Ottawa and Waterloo.

SOSCIP pairs state-of-the-art high-performance computing hardware at the University of Toronto with open-source cloud computing and agile computing infrastructure at Western to better manage and apply big data to solve complex research challenges. Together, the two universities and their consortial partners focus the infrastructure at each location on research related to cities, healthcare, water conservation, energy monitoring and management and agile computing. In London, the SOSCIP cloud system is now the largest in Canada.

IBM Canada contributed a landmark $65 million of computers and software to Western that provides researchers and scientists with the leading-edge research tools, in the form of analytics software, necessary to fully utilize and accelerate the processing capabilities of the revolutionary hardware. IBM business analytics software will help London companies and Western researchers extract relevant data, analyze it and create pertinent reports through a web-based, service-oriented architecture while the IBM DB2 database software will offer the University a virtual computer lab for multiple workloads on distributed systems, producing unparalleled efficiencies for users and storage.

Stakeholders consulted by KPMG consistently noted that Western’s research capabilities were among its most significant assets. While fields such as engineering, biomedical engineering, neuroscience and orthopaedics were commonly cited as areas of expertise, there was nearly unanimous consensus in the belief that innovative approaches to multi-disciplinary research will yield the greatest return for Western.

Western’s goal of ranking 2nd in provincial research funding will require a 35 per cent increase from the current level. Through its strategic plan, Western has presented a guiding framework for turning this goal into reality, and demonstrates a potential to magnify the benefits to the University and surrounding area.

### 4.2.3 Economic Impact of Western University’s Research Results

An approach to estimating the economic impact of research results on the economy was developed by Fernand Martin19 and has been used by a number of universities to estimate their particular contribution to GDP growth20. The approach suggests the impact of research on the economy is reflected through productivity gains made as a result of the research conducted and knowledge transmitted. The approach involves estimating the share of research and development taking place in

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17 Western News, http://communications.uwo.ca
18 London Medical Innovation and Commercialization Network, 2014
20 The approach has been used by University of British Columbia, University of Victoria, University of Alberta, Simon Fraser University and the University of Ottawa.
Ontario through universities, and Western as a share of those universities, and applying it to the growth in GDP due to productivity gains.

The following steps have been used in estimating the impact of Western research based on Martin’s approach:

- Calculating GDP growth between 1971 and 2012\(^{21}\);
- Estimating the contribution of productivity to GDP growth: The OECD estimates 20 per cent of growth in GDP is attributable to Total Factor Productivity (TFP)\(^{22}\). This factor has been used in the calculations shown below;
- Subtracting the contribution of knowledge created in other provinces and countries;
- Determining the share of research and development that takes place at Ontario’s universities; and
- Determining the share of research that takes place at Western from among Ontario’s universities.

The following table presents the results of this analysis using Martin’s approach as applied to Ontario and more specifically the estimated impact of research at Western to GDP growth in Ontario. The analysis estimates that the cumulative impact of research at Western since 1971 has added $2.06 billion to Ontario’s annual GDP.

### Figure 18: Economic Impact of Western Research Results

<table>
<thead>
<tr>
<th>Description</th>
<th>$ millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth in Ontario since 1971(^a)</td>
<td>$438,218</td>
</tr>
<tr>
<td>Growth attributable to Total Factor Productivity (X 20 percent)(^b)</td>
<td>$87,644</td>
</tr>
<tr>
<td>Exclusion of international and other provincial R&amp;D effects (X 69 percent)(^c)</td>
<td>$60,474</td>
</tr>
<tr>
<td>Share of Ontario R&amp;D by Ontario Universities (X 34 percent)(^d)</td>
<td>$20,561</td>
</tr>
<tr>
<td>Share of Ontario University R&amp;D by Western (X10 percent)(^e)</td>
<td>$2,056</td>
</tr>
</tbody>
</table>

Sources: KPMG analysis using the following:
\(a\). Statistics Canada. CANSIM Tables 384-0038, 384-0015, 326-0021
\(d\). Statistics Canada “Gross Domestic Expenditures on Research and Development in Canada (GERD), and the Provinces - National estimates 2003-2013 / Provincial estimates 2007 to 2011”, Table 2.1 (Provincial distribution of gross domestic expenditures on research and development, by performing sector, 2011), November 2013
\(e\). Council of Ontario Finance Officers

To estimate the impact of research productivity gains at a local level (London), Martin’s approach was taken a step further as done in one other similar study\(^{23}\). In particular, London’s share of Ontario’s GDP was used as a proxy for London’s share of Ontario’s multi-factor productivity growth. It was assumed that London represents about 3.5% of Ontario’s GDP. The following table presents the results of this analysis to estimate the impact of research at Western to GDP growth in London. The analysis estimates that the cumulative impact of research at Western since 1971 has added $720 million to London’s annual GDP.

---

\(^{21}\) 1971 has been typically used as a baseline year in similar studies due to limitations in availability of comparable data for previous years.
Figure 19: Economic Impact of Western Research Results on London

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth in Ontario since 1971^a</td>
<td>$438,218</td>
</tr>
<tr>
<td>Growth attributable to Total Factor Productivity (X 20 percent)b</td>
<td>$87,644</td>
</tr>
<tr>
<td>Exclusion of international and other provincial R&amp;D effects (X 69 percent)c</td>
<td>$60,474</td>
</tr>
<tr>
<td>Share of Ontario R&amp;D by Ontario Universities (X 34 percent)d</td>
<td>$20,561</td>
</tr>
<tr>
<td>Share of London TFP growth (proxy is London’s share of Ontario’s GDP)e</td>
<td>3.5%</td>
</tr>
<tr>
<td>Estimated London Total Factor Productivity</td>
<td>$720</td>
</tr>
<tr>
<td>Share of university R&amp;D by Western (X100 percent)f</td>
<td>$720</td>
</tr>
</tbody>
</table>

Sources: KPMG analysis using the following:

a. Statistics Canada. CANSIM Tables 384-0038, 384-0015, 326-0021
d. Statistics Canada “Gross Domestic Expenditures on Research and Development in Canada (GERD), and the Provinces - National estimates 2003-2013 / Provincial estimates 2007 to 2011”, Table 2.1 (Provincial distribution of gross domestic expenditures on research and development, by performing sector, 2011), November 2013
e. Conference Board of Canada
f. Council of Ontario Finance Officers

4.3 Commercialization

Strategic infrastructure investments, ongoing research funding and valuable industry partnerships have positioned Western to help translate innovative research into market-ready products and solutions. Commercialization activities bring tangible benefits to the University and industry stakeholders. This includes the licensing of innovative technologies and products as well as the creation of spin-off companies. The focus of this section is on licensing, inventions, patents and royalties. Spin-off company creation will be discussed in Section 4.4.

WORLDDiscoveries® is the business development arm of London’s research institutions, providing a bridge from local innovation and invention to global industry. As a partnership led by Western University in collaboration with the Robarts Research Institute and Lawson Health Research Institute, WORLDDiscoveries® leverages the partners’ collective industry connections, market knowledge and business development expertise to help local researchers and inventors commercialize their discoveries through patents, licensing agreements and the creation of spin-off companies.

These commercialization activities generate significant economic benefits while positioning Western among Canada’s top five research-intensive universities in three key areas:

- Creation and translation of new knowledge
- Education of Highly Qualified Personnel through our graduates;
- Development of commercial patents and licenses.

The local economy also benefits from WORLDDiscoveries® growing international presence. Since 2009, WORLDDiscoveries® has pursued industrial partnerships throughout Asia, established three satellite offices in China, and secured more than $4 million in new investment that has led to the creation of two new joint venture companies in Southwestern Ontario and the expansion of four labs at the University. Moreover, WORLDDiscoveries® is now expanding its regional impact by marketing technologies developed at universities in Guelph, Windsor, Toronto and the Ontario Institute of Technology in Oshawa.
Since 2008 through its WORLDiscoveries® business development office, Western generated nearly $23 million in royalty and license income and holds 198 patents and more than 100 active licenses.

The table below shows a sample of the many technologies that have been brought to market through the assistance of WORLDiscoveries®.

Figure 21: Overview of WORLDiscoveries’ Partnerships and Commercialized Technologies

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Media</td>
<td></td>
</tr>
<tr>
<td>Faculty of Information &amp; Media Studies</td>
<td>Training System for Ear Surgery</td>
</tr>
<tr>
<td>SHARCNET</td>
<td>Computer –Based Single-Pilot Rescue Management Training Program</td>
</tr>
<tr>
<td></td>
<td>Algorithmic Music Evolution Engine</td>
</tr>
<tr>
<td>Imaging / Simulation</td>
<td></td>
</tr>
<tr>
<td>Robarts Research Institute</td>
<td>Ghrelin Analogues as Molecular Imaging Probes</td>
</tr>
<tr>
<td>Lawson Imaging MR Systems Development Laboratory</td>
<td>A Fast Self-Contained Dose Optimization Module for Adaptive Radiation Therapy Treatment Planning</td>
</tr>
<tr>
<td>Department of Medical Biophysics</td>
<td>High Precision Radiostereometric Analysis System for Monitoring Micro-Movement in Orthopedic Implants</td>
</tr>
<tr>
<td>Biomedical Engineering - Imaging</td>
<td>Training System for Ear Surgery</td>
</tr>
<tr>
<td>Computer Vision</td>
<td>Kinetic Deconvolution Optical Reconstruction Algorithm for retrieving multiregional hemodynamic parameters from optical measurements</td>
</tr>
<tr>
<td>Research Group Centre for Imaging Technology Commercialization</td>
<td></td>
</tr>
<tr>
<td>Green Energy &amp; Environmental Remediation</td>
<td></td>
</tr>
<tr>
<td>Biotron Experimental Climate Change Research Centre</td>
<td>Novel Waste Water Treatment System</td>
</tr>
<tr>
<td>Institute for Chemicals and Fuels from Alternative Resources</td>
<td>Optimal Utilization of a Photovoltaic (PV) Solar Farm During Night-Time</td>
</tr>
<tr>
<td>Boundary Layer Wind Tunnel</td>
<td>Biological Nutrient Removal by Modified MBR System</td>
</tr>
<tr>
<td>WindEEE</td>
<td>Micro Pressure Sensor</td>
</tr>
<tr>
<td>Advanced Facility for Avian Research</td>
<td>Food-Grade Bacteria Species to Detoxify and Remove Heavy Metals from Humans</td>
</tr>
<tr>
<td>Medical Devices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrochemical Biosensor for the Detection of HIV Enzymes</td>
</tr>
<tr>
<td></td>
<td>Micro Pressure Sensor</td>
</tr>
<tr>
<td></td>
<td>New Powerful Tool for Monitoring of Kinase Activity</td>
</tr>
</tbody>
</table>

24 WORLDiscoveries® is the combined business development arm of Western University, Robarts Research Institute and the Lawson Health Research Institute.
### WORLDiscoveries Asia

In early 2009, WORLDiscoveries® began to explore the prospects of building partnerships with private and public sector players in Asia in response to the region’s growing interest in Canadian-based research discoveries. The specific goals of WORLDiscoveries® Asia (WD Asia) initiative were to:

1. Enhance the profile of Western and its affiliated research institutes with Asian-based industry;
2. Pursue collaborative research and commercialization opportunities between researchers and industry in Asia that would generate economic and societal returns to all stakeholders; and
3. Contribute to the local economy by attracting Asian-based businesses to invest in Ontario’s S&T sector.

To date, WD Asia has successfully negotiated 12 agreements over the past four years. These deals include the establishment of joint-venture companies, license agreements, research partnerships and product development agreements. The current value of the agreements reached by WD Asia since its inception now exceeds $6 million and are reflected in WORLDiscoveries® overall numbers. A sampling of the agreements include:

- An exclusive IP Licensing and Research Agreement with Tokyo-based Life Sciences conglomerate for antibody purification technology, with a potential value of more than $2 million. To date the deal has generated more than $500,000 in licensing revenue and new research investment into Dr. Shawn Li’s lab;
- A more than $2 million Chinese investment in the creation of Enable Technologies Inc., a local spin-off company developing 3D-ultrasound carotid scanning tools and technology. Enable Technologies Inc. is the first joint-venture, spin-off company ever created between a North American-based university and a Chinese industrial partner. To date, Enable has created eight jobs in London, Ont.;
- An exclusive IP Licensing and Research Agreement with Sinobioway Group, a Beijing-based Biotech conglomerate for regenerative medicine development. This deal will potentially bring in more than $1 million of licensing revenue over the next two to three years and stipulates a direct

25 WORLDiscoveries Annual Report 2013
investment of $10 million Renminbi (RMB) (approximately $1 million) into the development of a portfolio of central nerve regenerative drug compounds, developed by Robarts Research Institute scientist Dr. Arthur Brown;

- An exclusive IP licensing agreement with Jiangsu-based Targetpharma Laboratories for anti-fungal and wound healing therapies. Targetpharma is a spin-off company of Nanjing University and its CSO, Dr. Zichun Hua, is the associate dean of Faculty of Life Sciences at Nanjing University. This deal would generate $750,000 licensing revenue plus running royalty for the China market alone if the drug development work is successful; and

- An exclusive IP licensing agreement with Jiangsu-based Kunshan RNAi Institute for microRNA therapy for diabetic retinopathy. This worldwide deal will bring in immediate revenue of $100,000 in the first year and would generate multi-million dollar licensing revenue and running royalty upon successful drug development.

In an effort to expand both the new entity’s presence in Asia and its results, WD Asia opened the first North American technology transfer office of its kind in Mainland China. WD Asia selected the City of Nanjing in the Chinese Province of Jiangsu for several reasons. Jiangsu is home to China’s largest technology sector and has been a strong supporter of Sino-Canadian commercialization partnerships. Jiangsu is also the sister province to the Province of Ontario and Nanjing is the sister city of London, Ont. WD Asia also opened an office in Hong Kong to assist with additional outreach efforts throughout the region and provide a convenient and cost effective vehicle for Western-based industries and institutions to transact business with their counterparts on the mainland and other parts of Asia.

4.4 Impact on Businesses and Organizations

4.4.1 Support for existing businesses and attraction of new businesses

Another priority outlined in Western’s strategic plan is Mobilizing Knowledge. This refers to the University’s ambition to translate knowledge, strategies, policies and technologies into added value for society and the economy. Creating a productive research environment may be the first step in this process, but equally important may be the development of an environment that attracts and supports businesses, thereby providing an outlet for Western research and innovation to achieve its potential.

Western supports existing businesses by providing access to leading researchers, business development guidance for start-ups and SMEs, and access to physical facilities that may otherwise be out of reach for many companies.

Recognizing the need to amalgamate these functions, Western established two Research Parks, each of which offers meeting space, offices, industrial space and laboratories to promote innovation and collaboration. The park also attract researchers, start-up firms, SMEs, multi-national corporations and government partners. Discovery Park, established in 1991, is home to more than 70 tenants that collectively employ nearly 600 knowledge workers, and annually contributes an estimated $70 million to the local economy.

In a study on University spin-off company creation, Link and Scott (2005) observed that “parks enhance knowledge spill-overs between universities and tenant firms, and parks enhance regional economic growth and make markets more competitive”. This adds to evidence suggesting research and research parks can offer substantial benefits to entrepreneurs, established businesses and the local community. In June 2014, Western Research Parks was ranked 22nd in the world in 2014 by Swedish research company UBI Index in its Global Top 25 University Business Incubators.

The structure and offerings of each park at Western is presented in the figure below.

LANXESS Inc. demonstrates the attractiveness of the business environment created by Western. In 2009, LANXESS Inc. relocated its global research-and-development group, along with 120 employees, to a newly constructed addition to the Discovery Park at Western. This move was considered to be a considerable accomplishment as LANXESS Inc. is a $12-billion company and serves as the principal tenant in the building.\(^{27}\)

Stakeholders consulted for this study within the start-up and entrepreneurial field frequently cited the resources provided through WORLDiscoveries® and the Research Parks as not only critical to their success, but also as a major attraction for entrepreneurs in the province.

### 4.4.2 New company creation

Technology licensing has traditionally been the primary mechanism for academics and universities to capitalize on potential commercial revenues. There are many benefits to licensing, but, as Lockett and Wright (2005) noted, new technologies are not always easily patented, and universities may not be well-positioned to capture their full value.\(^ {28}\) As a result, the creation of spin-off companies to commercialize research and innovation at publicly funded institutions has experienced a rapid rise across North America and Europe.\(^ {29}\)

Among the benefits of spin-off companies is the potential for greater revenue than through other means of commercialization. A 2005 study found evidence that equity positions in university spin-off companies result in greater average return in the long run than the average return from a typical license.\(^ {30}\) A review of relevant literature suggests that the success of spin-off firms is dependent on several interconnected variables. These include:

- Emergence from a reputable research-intensive institution;
- Location in an established research park with access to faculty, students and research equipment;
- Support from venture capital finance; and

\(^{27}\) LANXESS, “LANXESS inaugurates largest Butyl Rubber R&D Centre in Canada”, June 24, 2014, The Convergence Centre, Western Research Parks, Western University.


Support from highly capable technology transfer officers with experienced in the process of creating spin-off firms.\textsuperscript{31} \textsuperscript{32}

While the first two factors are well-known, the last two highlight the undervalued need for broader business development support. This includes guidance on matters ranging from intellectual property protection to seeking out suitable investors.\textsuperscript{33}

In-line with the growing interest in university spin-off companies, Western established WORLDiscoveries\textsuperscript{\textregistered} in 2008 with the ambitious goal to facilitate the creation of 12 spin-off companies by 2012. This goal aligns with Western’s commitment to support and nurture faculty-based start-up companies.\textsuperscript{34} WORLDiscoveries\textsuperscript{\textregistered} exceeded this goal by developing 15 spin-off companies during this period and an additional company in 2013.\textsuperscript{35}

EK3 is an example of how the university’s business-support system can lead to positive outcomes for entrepreneurial students and faculty.

EK3 was founded by two students in the Faculty of Engineering in 1998 while pursuing their graduate degrees. During its early years, the company prospered in the Discovery Park through the delivery of customized digital marketing, known as narrowcasting. The company was soon able to give back to the University by opening up the EK3 Innovation lab in the engineering building in 2006.\textsuperscript{36} In 2013, Cineplex Inc. made a $78 million offer for the acquisition of EK3.

Evidence that an entrepreneurial culture is supported within the student community is seen through Western’s new E3 (Entrepreneurial Engagement and Economic Development) program – formally known as Biz Inc. This grassroots initiative is a new business venture support centre located on campus in Western’s Student Success Centre and administered through a partnership between Western and its University Students’ Council. The E3 program is tightly linked with Fanshawe College and the London Small Business Centre, and supported by a number of London’s entrepreneurial partners including Western Research Parks, TechAlliance, London Economic Development Corporation and numerous local business leaders/mentors. Since 2011, E3 through its predecessor Biz Inc. has facilitated the launch of more than 25 projects involving 40 students.\textsuperscript{37}

Multiple stakeholders noted the recent shift towards entrepreneurial activities that has taken place on campus. External stakeholders have taken notice of these activities and expressed a desire to continue to foster a relationship with Western and become more engaged in entrepreneurial projects.

\textsuperscript{33} Ibid. P. 1043.
\textsuperscript{34} Western University Strategic Plan 2014.
\textsuperscript{35} Association of University Technology Managers, Licensing Activity Survey, FY 2012.
\textsuperscript{36} Communications, University of Western Ontario, EK3 delivers peerless point of purchase info via video”. March 26, 2008.
5 Additional Social and Economic Impacts

5.1 Leading in Learning: Human Capital Development

The concept of individuals as human capital has been a guiding principal of public policy since the 1960s, and is the main premise of Human Capital Theory. As global markets have become more accessible and more influential domestically, it is important to strategically develop human capital within our universities. In analyzing this shifting understanding, author Patrick Fitzsimons writes, “A prominent explanation for that move is provided by a recent reformulation of Human Capital Theory which has stressed the significance of education and training as the key to participation in the new global economy.” This section will provide an overview of how Western fostered human capital development within a local, regional and international context.

The development and acquisition of human capital helps local economies respond to existing needs and create new opportunities. Audretsch et al. capture the latter portion of this sentiment when they write, “By providing highly skilled and well-educated students, cities help entrepreneurs find the necessary human capital, which will, subsequently, help develop new ideas and faster growth.” The authors are referring to the necessary provision of human capital to translate ideas into opportunities for employment, income and other tangible benefits. The entrepreneurial opportunities fostered by the development of human capital at Western and its affiliates are captured in section 5.4.

The other contribution of human capital development to a local economy is to meet existing demand for skills and resources. The figure below displays job demand in the local London market and the field of graduation for Western students. The percentage of job postings by each category was used as a proxy for local demand. The results indicate that Western is producing graduates in alignment with local job trends. As a result, there is an opportunity for the local economy to benefit from Western graduates, and this also indicates that there are jobs available for students who wish to remain in London upon graduation.

Figure 23: Local Job Demand and Graduate Occupations

Source: Canadian Business Magazine, KPMG analysis.

The proportion of graduates from each discipline at Western is also in alignment with other Ontario universities. Figure 24 shows a comparison between Western’s share of graduates in several fields and the provincial average for graduates in these fields. As expected, the share of health care and business students at Western is slightly higher than the provincial average, but a great amount of consistency can still be seen.

Figure 24: Graduate Occupations by NOC Category

![Graduate Occupations by NOC Category](image)

Note: Provincial average is based on available data for all Ontario universities.
Source: Western University, KPMG analysis.

The following figure provides a comparison of the mean salary of Western graduates five years out relative to Ontario and Canadian data for all employees in the same national occupation classification (NOC) categories. Western alumni earnings are similar to the provincial and national averages and higher on average in management, business and finance sectors. Given this data represents earnings of graduates after five years, it can be expected that these salaries will continue to increase over time.

Figure 25: Comparison of Mean Salary by NOC Category

![Comparison of Mean Salary by NOC Category](image)

Note: Results for Western are based on five-year data for 2007 graduates. Includes only those NOC categories where the number of Western alumni reporting full-time income was greater than 10.
Source: Western University, KPMG analysis.

Specific data with respect to graduates from the Ivey Business School further demonstrates the impact of Western alumni in the business and management communities at the local, national and international scale.
Figure 26: Ivey Business School Alumni Impacts

1 in 2 Ivey alumni hold senior management positions*

20% of the Profit 100 Fastest-Growing Companies are run by Ivey alumni

More than 23,000 Ivey alumni lead organization in 102 countries

Ivey has more emerging leaders on the Caldwell Partner’s Top 40 under 40 than any other business school

Ivey graduates earned the highest salary of Canadian business school graduates three years post-graduation as reported by the Financial Times Global MBA Ranking 2014

*47 percent of Ivey alumni hold the title of Chair, President, Senior Executive (C-Suite), Vice-President, Managing Director or Partner


More than 16,000 Western alumni are estimated to be living and working internationally, demonstrating the reach and impact of a Western education across the globe. According to a recent study, international students can have a significant positive benefit to a local community. Potential benefits include increased tourism, improved long-term international relations and greater global familiarity with local and domestic products and services. The intake of international students as well as a global professional network has allowed Western graduates to find positions around the world. The figure below illustrates this reach.

Figure 27: Western Alumni Living Internationally

Note: Based on living alumni with addresses, May 2014.

Source: Western University.

5.1.1 Human Capital Impact As Measured by Additional Earnings

Western supports the development of human capital through its range of academic programming at the undergraduate and graduate level as well as through its professional programs, including medicine, dentistry and law. The impact of this human capital is reflected in greater earnings for alumni as a result of their education at Western. In order to quantify this impact, the salary differentials between those people with postsecondary education and those with high school education only has been calculated for Western’s alumni population living in Ontario and the City of London.


41 Based on Statistics Canada 2006 Census data employment income groups for Ontario and the Government of Canada’s Job Bank for selected NOC occupations in Ontario
Based on a total active alumni population of more than 218,000\textsuperscript{42}, it is estimated that, in 2013, Western alumni living in Ontario had improved their earnings by almost $5 billion as a result of their university education received at Western. This is a reflection of higher wages earned by those with postsecondary education, including undergraduate and graduate education, as well as those in the medical, dental and legal professions, compared to those without such education. This estimate includes an adjustment to reflect possible unemployment among some graduates (see details in Appendix 1).

Based on postal code data available for Western’s alumni, it is estimated that 23 per cent of alumni live in the City of London and are directly contributing to the economy through the additional income they earn as a result of their postsecondary education at Western.

**Figure 28: Human Capital Impact as Measured by Additional Earnings in 2013 by Location**

<table>
<thead>
<tr>
<th></th>
<th>City of London</th>
<th>Total Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated additional income earned by Western alumni due to their education at Western (2013)</td>
<td>$1.14 billion</td>
<td>$4.95 billion</td>
</tr>
</tbody>
</table>

KPMG analysis based on data from Western University, Statistics Canada, Government of Canada Job Bank.

**Figure 29: Human Capital Impact as Measured by Additional Earnings in 2013 by Degree**

<table>
<thead>
<tr>
<th></th>
<th>Estimated additional income earned by Western alumni due to their education at Western (2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate (n=157,000)</td>
<td>$3,480 million</td>
</tr>
<tr>
<td>Graduate (n=28,000)</td>
<td>$343 million</td>
</tr>
<tr>
<td>Medicine and Dentistry (n=12,000)</td>
<td>$920 million</td>
</tr>
<tr>
<td>Law (n=4,800)</td>
<td>$209 million</td>
</tr>
</tbody>
</table>


In order to estimate the total direct, indirect and induced impact of this income on GDP, a multiplier is applied to the total additional earnings. In similar studies by Canadian universities, a multiplier of 1.5 is employed.\textsuperscript{43,44,45}

**Figure 30: GDP Impact of Additional Earnings in 2013 by Location**

<table>
<thead>
<tr>
<th></th>
<th>City of London</th>
<th>Total Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated impact of additional income earned by Western alumni due to their education at Western (2013)</td>
<td>$1.71 billion</td>
<td>$7.43 billion</td>
</tr>
</tbody>
</table>

Source: KPMG analysis based on data from Western University, Statistics Canada, Government of Canada Job Bank.

\textsuperscript{42} Based on available alumni demographics provided by Western University (total n=218,477).

\textsuperscript{43} Sudmant, W. “The Economic Impact of the University of British Columbia”, Planning and Institutional Research, University of British Columbia, September 2009.

\textsuperscript{44} Briggs, A., Jennings, J. “The Economic Impact of the University of Alberta: A Comparative Approach”, University of Alberta, September 2012.

5.2  Reaching Beyond Campus: Supporting the Needs of the Community

Students, staff, faculty and alumni participate in local community engagement activities, on and off campus, to enrich their Western experience and the community around them. These connections are vital to a student’s experience but also to the broader community. With more than 200 internal clubs, Western offers a wide range of services and programs designed to encourage personal growth, promote leadership, guide successful transitions, create lasting relationships in the surrounding community, provide community-based services and ignite active engagement.

Western plays an important role in the economic and social development of the London area. Part of this role is opening its resources to the community, including the skills, talent and commitment of its students.

5.2.1  Leading Local Services

Western is home to many public- and community-based partnerships. These partnerships provide community accessible services including health, legal and educational supports. These services draw on the professional expertise of Western’s faculty and students. The following table highlights some of Western’s professionally based public activities:

Figure 31: Local Services at Western

<table>
<thead>
<tr>
<th>Local Service</th>
<th>Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Centre for Activity and Aging</td>
<td>The Canadian Centre for Activity and Aging (CCAA), a not-for-profit national research and education centre within the Faculty of Health Sciences at Western, is Canada’s leader in current research and program development for improved physical ability and healthy aging for older adults. More than 500 London seniors participate in CCAA exercise classes each week, and annually, about 1000 people from across Canada are trained in CCAA leadership training courses.</td>
</tr>
<tr>
<td>Community Legal Services</td>
<td>Community Legal Services (CLS) is a non-profit organization funded by the Ontario Legal Aid Plan and Western, which provides free legal assistance and information to people who cannot afford a lawyer. CLS is staffed by Western Law students who work under the supervision of a Review Lawyer and the Director. More than 200 students work in the clinic over the course of the academic year under the supervision of five experienced lawyers.</td>
</tr>
<tr>
<td>Dental Outreach and Community Service</td>
<td>The Dental Outreach and Community Service program in the Schulich School of Medicine &amp; Dentistry provides free dental care to low income families who have no dental insurance and are clients of five local social agencies. Portable dental equipment donated to the program is brought into community centres. This is to address barriers to care (i.e. transportation, housing, language, finances, legal) that may otherwise prevent children and adults from receiving care. The program is managed entirely by volunteer dentists and hygienists, Schulich dental staff and students, and Fanshawe’s Hygiene program personnel and students. Within one year of its inception, 246 appointments were made and over 150 patients were seen at twelve locations.</td>
</tr>
<tr>
<td>Rise London</td>
<td>Through collaboration with the Ivey Business School and multiple community agencies in London, Rise Asset Development (Rise) is an avenue to economic independence through entrepreneurship for people who have mental health or addiction challenges.</td>
</tr>
</tbody>
</table>

In addition to the services mentioned above, Western is home to many community-based research activities and research labs. These activities led by faculty members study some of society’s most complex problems. Ranging from obesity to dementia, built environment to homelessness, food security to Indigenous knowledge, Western’s inclusive community-based research activities are shaping public policy through collaboration.
5.2.2 Supporting Community Events and Activities

Western promotes quality of life in the community by making its space and student resources available to outside groups to host or benefit from Western led events and activities. Every year, many programmed events and/or activities take place on campus.

Drawing thousands to Western’s campus annually, these programs provide vital services to families and youth by enhancing their physical well-being, and, to professionals building and maintaining their networks. Access to Western occurs throughout the academic year and over the summer months. A small portion of campus based community events and activities include:

- Don Wright Faculty of Music activities including Musical Futures Canada and the Western University Jazz Ensemble;
- Forest City Culture Crawl;
- Art in the Public Sphere;
- Annual public speakers series at the London Library;
- Sport Western camps (March Break and summer);
- Mustang Hockey Academy;
- Discovery Western engineering camps;
- Bit by Bit computer camps;
- Go ENG Girl;
- Public Nights at the Cronyn Observatory;
- Senior Alumni lecture series;
- Indigenous Track & Field Day; and
- McIntosh Gallery exhibitions.

5.2.3 Supporting Community-Based Research

Drawing on faculty expertise, Western boosts numerous research based publicly accessible centres and research labs. These centres publish leading practices, provide research based tools, collaborate with London and surrounding area service providers and disseminate findings across Canada and around the world to better policy, service delivery and research. Some of Western’s most recognized and community impactful centres are:

- Centre for Research & Education on Violence Against Women & Children
  - Western’s Centre for Research & Education on Violence Against Women & Children promotes the development of community-centred, action research on violence against women and children.
- Human Environments Analysis Laboratory
  - Human Environments Analysis Laboratory (HEALab) is a state-of-the-art, inter-disciplinary research lab dedicated to quantitative and qualitative research on cities, the built environment and critical public health issues.
- Indigenous Health Lab
  - Western’s Indigenous Health Lab work on community-based projects that enable Indigenous communities to address their environment and health concerns.
- Urban Development Research
  - Jason Gilliland, director of Western’s Urban Development Program, has several ongoing research projects impacting the local community. Specifically, his research looks at environmental influences on children’s health and quality of life issues, such as food security, physical activity, healthy bodyweight, and pediatric trauma, as well as various aspects of urban planning and development, urban design, housing, transportation and public health in Canadian cities.
6 Conclusion

With diverse academic programming, strong research capacity, 36,000 students and 6,200 faculty and staff and an expansive alumni network, Western makes a significant contribution to the local, provincial and national economies. This is demonstrated through both economic and social impacts created as a result of Western’s operating and capital expenditures, student and visitor spending, innovation and entrepreneurial initiatives, productivity gains, human capital development and community involvement.

The following is a summary of key quantifiable impacts made by Western:

■ Western generates approximately 15,480 jobs and contributes about $1.62 billion in value-added to the Canadian economy on an ongoing basis;

■ Capital investments by Western created about 1,560 person-years of employment and contributed an additional $146 million to GDP in Canada in the fiscal year of 2012-13;

■ Western translated its internal research investments into external funding by a research funding leverage value of $16.16;

■ Research undertaken at Western had an annual cumulative contribution of $2.1 billion to GDP in Ontario at the present time, as a result of productivity gains made through research conducted and knowledge transmitted;

■ Since 2008, Western generated nearly $23 million in royalty and licensing income;

■ In 2013, Western alumni living in Ontario improved their annual earnings by almost $5 billion as a result of their university education at Western. The total impact of these additional earnings is estimated at $7.4 billion.

In addition to the quantifiable impacts above, Western provides a number of other significant benefits to the communities it serves. Additional research and commercialization impacts are demonstrated through initiatives such as the Fraunhofer Project Centre for Composites Research at Western University, London Medical Innovation & Commercialization Network, the Southern Ontario Smart Computing and Innovation Platform, WORLDisc® business development office and Western’s Research Parks.

Western offers many public- and community-based partnerships, which provide community accessible services that benefit from the professional expertise of Western’s faculty and students. Moreover, on an annual basis, Western attracts thousands of visitors to its campus through programmed events and activities to families and youth and to professionals who are building and maintaining their networks.

These impacts will continue to be key to Western as it strives to achieve its strategic goals to strengthen and promote research opportunities, recruit, educate and retain highly qualified faculty, staff and students, encourage collaborative and interdisciplinary research models and develop the infrastructure and services to support these goals.
References


Media Relations, Western News. Western University.

NSERC Awards Database. ORF Open Data.


Sudmant, W. “The Economic Impact of the University of British Columbia”, Planning and Institutional Research, University of British Columbia, September 2009.


Appendix 1 – Calculation Details

I.1 Student Living Expenditures

The following table summarizes the calculation of student expenditures used in the analysis:

**Figure 32: Student Living Expenditure Calculations**

<table>
<thead>
<tr>
<th>2012-13</th>
<th>Spending Per Student (per term, $)</th>
<th>Total, Non-local Undergraduate (2 terms, $ millions)</th>
<th>Total, Non-local Graduate (3 terms, $ millions)</th>
<th>Total, Local (2 terms, $ millions)</th>
<th>Less Students in Residence ($ millions)</th>
<th>Total ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>19,000</td>
<td>5,000</td>
<td>4,400</td>
<td>5,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Transportation</td>
<td>300</td>
<td>11.4</td>
<td>4.5</td>
<td>1.3</td>
<td></td>
<td>17.2</td>
</tr>
<tr>
<td>Books, supplies, computers</td>
<td>750</td>
<td>28.5</td>
<td>11.3</td>
<td>3.3</td>
<td></td>
<td>43.1</td>
</tr>
<tr>
<td>Telecommunications (telephone, internet)</td>
<td>200</td>
<td>7.6</td>
<td>3.0</td>
<td>1.0</td>
<td></td>
<td>9.6</td>
</tr>
<tr>
<td>Accommodation</td>
<td>3,000</td>
<td>114.0</td>
<td>45.0</td>
<td>15.0</td>
<td></td>
<td>144.0</td>
</tr>
<tr>
<td>Food</td>
<td>1,200</td>
<td>45.6</td>
<td>18.0</td>
<td>6.0</td>
<td></td>
<td>57.6</td>
</tr>
<tr>
<td>Leisure</td>
<td>400</td>
<td>15.2</td>
<td>6.0</td>
<td></td>
<td></td>
<td>21.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,850</strong></td>
<td><strong>222.3</strong></td>
<td><strong>87.8</strong></td>
<td><strong>4.6</strong></td>
<td><strong>22.0</strong></td>
<td><strong>292.7</strong></td>
</tr>
</tbody>
</table>

Note: Totals may not add due to rounding.
Source: KPMG analysis based using data provided by Western University.

I.2 Visitor Expenditures

The following table summarizes the calculation of visitor expenditures used in the analysis:

**Figure 33: Visitor Expenditure Calculations**

<table>
<thead>
<tr>
<th>2012-13</th>
<th>Cost Per Person, Per Night</th>
<th>Number of Nights</th>
<th>Total ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>190,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>35</td>
<td></td>
<td>6.7</td>
</tr>
<tr>
<td>Taxi (half of visitors)</td>
<td>25</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>Vehicle Rental (half of visitors)</td>
<td>50</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>Accommodations</td>
<td>100</td>
<td></td>
<td>19.0</td>
</tr>
<tr>
<td>Food and Beverages</td>
<td>50</td>
<td></td>
<td>9.5</td>
</tr>
<tr>
<td>Entertainment</td>
<td>20</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>255</strong></td>
<td></td>
<td><strong>46.1</strong></td>
</tr>
</tbody>
</table>

Note: Totals may not add due to rounding.
Source: KPMG analysis based using data from the Ontario Ministry of Tourism, Culture and Sport and data provided by Western University.
I.3 Impact through the Development of Human Capital

To assess Western’s contribution to the development of human capital, KPMG estimated that 218,477 alumni were living in Ontario. This estimate was based on the most recent data available for alumni with addresses. Those alumni without addresses were categorized by geography based on the breakdown of alumni for which addresses were available. Overall, approximately 83 per cent of alumni were assumed to be living in Ontario.

Alumni were then categorized based on five types of degrees based on total alumni graduation data by Faculty as well as enrolment data from 1997 to 2013.

1. Completion of an undergraduate degree (~78 per cent)
2. Completion of a graduate degree (14 per cent)
3. Completion of a medical doctoral degree (~5 per cent)
4. Completion of a dentistry degree (~1 per cent)
5. Completion of a law degree (2 per cent)

For the first group, KPMG took the average salary differential between those with a bachelor’s degree and those with high school education in Ontario from the Statistics Canada 2006 Census\(^\text{46}\) (reported in 2005 dollars) and inflated it to 2013 dollars\(^\text{47}\). This was multiplied by the number of Western alumni living in Ontario with undergraduate degrees. In a similar fashion, for the second group, KPMG factored in the average salary differential between those with a post-bachelor’s degree and those with a bachelor’s degree in Ontario. This was multiplied by the number of Western alumni living in Ontario with a graduate degree. For the remaining three groups, median salary estimates for Ontario medical doctors, dentists and lawyers were retrieved from the Government of Canada’s Job Bank database\(^\text{48}\). Again the salary differential between those three professional degrees and the average salary for those with bachelor’s degrees was calculated and multiplied by the number of Western alumni living in Ontario holding each of the respective professional degrees.

Furthermore, KPMG assumed that 7.5 per cent of alumni were unemployed based on the 2013 unemployment rate for Ontario.

KPMG also used available address data for Western’s alumni to determine the impact of university education specifically on the City of London. Approximately 23 per cent of Ontario alumni were estimated to be living in London.


Figure 34: Impact of university education on human capital as measured by earnings differentials (in 2013 dollars)

<table>
<thead>
<tr>
<th>IMPACT OF UNDERGRADUATE DEGREE EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary differential between those with a bachelor’s degree and high school education</td>
<td>$22,141</td>
</tr>
<tr>
<td>Number of Western alumni with bachelor’s degree living in Ontario</td>
<td>157,046</td>
</tr>
<tr>
<td><strong>Total differential for Western alumni with undergraduate education</strong></td>
<td><strong>$3,477,190,157</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPACT OF GRADUATE DEGREE EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary differential between those with a post-bachelor’s degree and those with a Bachelor’s degree</td>
<td>$12,046</td>
</tr>
<tr>
<td>Number of Western alumni with a graduate degree living in Ontario</td>
<td>28,461</td>
</tr>
<tr>
<td><strong>Total differential for Western alumni with graduate degree education</strong></td>
<td><strong>$342,832,316</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPACT OF MEDICAL DOCTORAL EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary differential between those with medical doctoral degree and a bachelor’s degree</td>
<td>$78,239</td>
</tr>
<tr>
<td>Number of Western alumni with a medical doctoral degree living in Ontario</td>
<td>10,484</td>
</tr>
<tr>
<td><strong>Total differential for Western alumni with medical doctoral education</strong></td>
<td><strong>$820,222,006</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPACT OF DENTISTRY EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary differential between those with a dentistry degree and a bachelor’s degree</td>
<td>$59,296</td>
</tr>
<tr>
<td>Number of Western alumni with a dentistry degree living in Ontario</td>
<td>1,677</td>
</tr>
<tr>
<td><strong>Total differential for Western alumni with dentistry education</strong></td>
<td><strong>$99,412,671</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPACT OF LAW EDUCATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary differential between those with a law degree and a bachelor’s degree</td>
<td>$43,330</td>
</tr>
<tr>
<td>Number of Western alumni with a law degree living in Ontario</td>
<td>4,832</td>
</tr>
<tr>
<td><strong>Total differential for Western alumni with law education</strong></td>
<td><strong>$209,368,168</strong></td>
</tr>
<tr>
<td><strong>Total impact of Western’s education on alumni income in Ontario</strong></td>
<td><strong>$4,949,025,319</strong></td>
</tr>
</tbody>
</table>

Note: Totals may not add up due to rounding.
Appendix 2 – List of External Stakeholders Interviewed

The following external stakeholders were interviewed as part of this study:

■ Kapil Lakhotia, London Economic Development Council
■ Hank Vander Laan, Trojan Technologies
■ Councillor Matt Brown, City of London
■ Gerry Macartney, London Chamber of Commerce
■ Dr. Cal Stiller, Stilco
■ Steve Pellarin, London Small Business Centre
■ Mitch Baran, Trudell Medical
■ Leonardo Millon, Lifelike Biotissue
■ Glen Smeltzer, Biogenerator Inc.
■ Dr. Sandy Vascotto, Enable Simulation
■ Pat Horgan, IBM
■ Phil Hunt, London Health Sciences Centre
Appendix 3 – Timeline of Accomplishments at Western

The timeline below highlights several key accomplishments of Western faculty and alumni.

Figure 35: Western’s Timeline of Accomplishments

1878
The Western University of London Ontario welcomed its first students, with Arts, Divinity, Law and Medicine offered as the first four faculties.

1921
As a medical demonstrator working at Western, Frederick Banting conceives his ideas that led to the discovery of insulin with Charles Best.

1928
The first woman in Canada to earn a PhD in marine biology, Dr. Helen Battle joins Western’s Zoology department as an Assistant Professor.

1950s
Neurosurgeon Charles Drake develops and teaches his world-famous surgical techniques for repairing ruptured brain aneurysms at Western.

1965
Alan Davenport pioneers the science of wind engineering at the Boundary Layer Wind Tunnel; his research shapes the design some of the world’s largest and most famous buildings and bridges.

1976
Western alumna Roberta Jamieson becomes the first Aboriginal woman to graduate from a Canadian law school, launching a career of firsts as a leader and role model for all Canadians and First Nations peoples.

1992
In response to the global impact of HIV/AIDS, C. Yong Kang establishes a lab at Western where he develops a preventative vaccine for HIV, with potential to deliver a cure for millions worldwide.

2004
Staff member Bob Gough leads the creation of a multi-disciplinary teaching, research and development to help African communities grappling with high rates of HIV/AIDS infection.

2013
Forbes Magazine names World Health Organization Director-General and Western alumna Margaret Chan as the world’s 59th most powerful person.

2014
Former Western student, Writer-in-Residence, and honorary degree recipient Alice Munro becomes the first Canadian woman to win the Nobel Prize in Literature.

Source: Achieving Excellence on the World Stage, 2014 Western University Strategic Plan.
Appendix 4 – Acronyms

CIHR: Canadian Institutes of Health Research
NSERC: Natural Sciences and Engineering Research Council
ORF: Ontario Research Funds
OIT: Ontario Innovation Trust
CFI: Canada Foundation for Innovation
SSHRC: Social Sciences and Humanities Research Council
PREA: Premier’s Research Excellence Awards
ERA: Early Researcher Awards
MRI: Ministry of Research and Innovation
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