September 2015

Economic Impact Analysis of the University of Saskatchewan

Final Report

Prepared for—

University of Saskatchewan
Institutional Planning and Assessment
105 Administration Place
Saskatoon, SK S7N 5A2

Prepared by—

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RTI INTERNATIONAL

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SECTION PAGE

SECTION PAGE

FIGURE NUMBER PAGE

TABLE NUMBER PAGE

Executive Summary

The University of Saskatchewan was established in 1907 to support the educational and economic development of a young province. Since that time, more than 100 years later, the university has educated generations of students, established Saskatoon as a centre of science and learning, and made enduring contributions to Saskatchewan's socioeconomic vitality.

About 40% of Saskatchewan's university-educated population—more than 62,000 people—earned their post-secondary degrees at the U of S. Collectively, these alumni earn $1,176 million more in salaries per year because of their university education. That education creates a cycle of higher productivity, higher earnings and more money being spent locally. This in turn helps create opportunities for others and nurtures a more diverse and creative economy. About 74% of alumni who have graduated since 2000 live in Saskatchewan today.

The university has emerged as one of Saskatchewan's engines for economic diversification and growth. Through the strength of its educational programs and research facilities, the U of S attracts new talent, research and business to the province that otherwise would not come to Saskatchewan. At the same time, the university creates opportunities for local people and businesses who might leave the province or have less work.

In 2014, about $1.2 billion of Saskatchewan's $83 billion economy, or about 1.5 per cent, was tied to the U of S. This significant impact is the result, in part, of more than half of the university's revenue coming from sources other than the provincial government, including from industry and non-provincial sources, most of which is spent locally on wages, goods and services. This local spending ultimately supports 11,842 jobs across the province. Thus, not only does the university bear great responsibility for meeting the province's workforce needs, but its operations and research activity carry significant weight in the regional economy.

To put some context around these numbers, the per capita impact of the U of S on the provincial economy ranks first or second among Canadian universities, depending on the measure. Universities use different methods to calculate economic impact, making interpretation of impact data challenging. By bringing analyses into greater alignment it becomes apparent that, while the U of S is among Canada's smaller research-intensive universities, its impact and significance for the province is greater than many of its peers.

A significant part of the university's contribution is found in the research and innovation portfolio. Annual research funding for the U of S has nearly doubled in the last 10 years to nearly $200 million. Significant investments have been received in key areas of importance globally and locally, including crop development, water security, food security, the Canadian Light Source and infectious disease research at VIDO-InterVac.

The university has six signature areas of special focus: Aboriginal engagement and scholarship, agriculture, energy and mineral resources, one health, synchrotron sciences and water security. These signature areas align well with the province's priorities, and are of great importance beyond Saskatchewan's borders. Among the many areas to which the U of S has made major contributions are socially inclusive research practices, sound stewardship of natural resources, and an expansion of the variety of crops that can be grown in the province and these crops' resiliency to a changing climate.

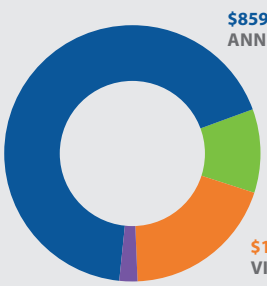
Universities are critical assets for social and cultural impact and economic development in the 21st century, and the importance of the U of S to the Saskatchewan economy will become more pronounced as the knowledge intensity of

all economic sectors—agriculture, health care, education, energy, mining, business—grows. The university leadership and community members face decisions about what kind of place they want the U of S to be in the future, and how they will honour its past. The university must strike balance between being an institution for the province and a preeminent research university, adaptive but adherent to a core sense of purpose, and a trusted research partner while preserving academic freedom.

Whether people are presently connected to the university by virtue of their position as a student, employee or faculty member, or whether they are alumni, donors or simply a Saskatchewan resident, it was apparent to this research team that people in the province have great passion for this institution.

ECONOMIC IMPACT HIGHLIGHTS

$1.2641 BILLION IN EXPENDITURES



- $859.5 M — ANNUAL EXPENSES
- $243.7 M — STUDENTS' LIVING EXPENDITURES
- $132.9 M — VISITORS' TRAVEL EXPENDITURES
- $28 M — NEW CAPITAL SPENDING

INCREASES SASKATCHEWAN'S ECONOMY (GDP) BY **$1.2 BILLION**

INCREASES CANADA'S ECONOMY (GDP) BY **$1.5 BILLION**

NEARLY **$200 MILLION** IN ANNUAL RESEARCH FUNDING

40% OF SASKATCHEWAN GOVERNMENT FUNDING RETURNED TO PROVINCE THROUGH TAXATION ($201 MILLION IN 2013/14)

PEOPLE

30,000 FACULTY, STAFF AND STUDENTS

40% OF SK RESIDENTS WITH DEGREES ARE ALUMNI

NEARLY **62,000** U OF S ALUMNI LIVE IN SK

57% OF INTERNATIONAL GRADUATES SINCE 2000 STAYED IN SK

87% OF ABORIGINAL GRADUATES SINCE 2000 LIVE IN SK

EMPLOYMENT

11,842 U OF S RELATED JOBS IN SK

18,154 U OF S RELATED JOBS NATIONWIDE

STUDENTS

23,800 STUDENTS FROM OVER 100 COUNTRIES

OVER **2,300** ABORIGINAL STUDENTS

OVER **3,900** GRADUATE STUDENTS

OVER **3,300** INTERNATIONAL STUDENTS

1
Introduction

The University of Saskatchewan was founded in 1907 to support the educational and economic development of a newly created province. Saskatchewan's early leadership countered the province's distance from Canada's major population centres by creating an institution to meet Saskatchewan's unique combination of needs:

- expanding opportunity for people through teaching and learning,
- supporting rural communities through service, and
- advancing agriculture—the cornerstone of the province's economic foundation.[1]

More than a hundred years later, the U of S has educated successive generations of Saskatchewan people, is a globally preeminent institution in agricultural sciences, and has established Saskatoon as a centre of science and learning. The U of S has expanded from its beginnings in the College of Agriculture and the College of Arts and Science into one of the most comprehensive institutions of higher education in Canada (see Figure 1).

When classes are in session, the U of S is the fifth largest population centre in the province, with more than 30,000 people studying and working on the eastern bank of the South Saskatchewan River. Each year, hundreds of researchers in academia and industry travel to Saskatoon from around the world to engage in discovery and knowledge sharing, attracted to the U of S' faculty and to unique Canadian research centres like the Canadian Light Source and VIDO–InterVac, the Vaccine and Infectious Disease Organization–International Vaccine Centre.

The university is tightly woven into the fabric of the province. At least 40% of Saskatchewan residents with university degrees received their degrees from the U of S. The economic activity catalyzed by the university contributes at least $1.2 billion to Saskatchewan's economy. This is fully 1.5% of the province's gross domestic product (GDP), the common measure of the size of an economy. By way of comparison, agriculture on its own accounted for 11% of GDP.[2]

[1] Barnhart, G. 2015. The People's University.

[2] If one accounted for ties between agriculture and other industries, the amount of provincial GDP linked to agriculture would be much larger than 11%.

Figure 1. Overview of the University of Saskatchewan

OVER 23 ,000 STUDENTS FROM MORE THAN 100 COUNTRIES

A LOW 17:1 STUDENT TO FACULTY RATIO

ANNUAL REVENUE OF $1 BILLION

15 HUSKIES ATHLETICS TEAMS AND OVER 120 CHAMPIONSHIPS

OVER 120 GRADUATE DEGREE PROGRAMS

NEARLY 200 UNDERGRADUATE PROGRAM OPTIONS

13 COLLEGES, 3 INTERDISCIPLINARY GRADUATE SCHOOLS AND 6 AFFILIATED OR FEDERATED COLLEGES

2,000 STUDENTS WHO SELF-IDENTIFY ABORIGINAL ANCESTRY

$39.1 MILLION IN ANNUAL SCHOLARSHIPS AND BURSARIES

ABOUT US

The U of S is an environment where curiosity leads to discovery. We develop technologies and policies that protect our health and improve quality of life. We understand and sustain the resources—minerals, energy, food and water—that are critical to our world. We examine history, we observe the present and we influence the future. Our campus is a lively place with space for art, living, eating and sport, designed for the community of people who live, work, study and play at the U of S.

HISTORICAL HIGHLIGHTS

1907: University Act established the U of S

1908-1937: First president Walter Murray

1912: First convocation of seven students

1912: First issue of The Sheaf published

1912: First Huskies team

1917: First Alumni Association formed

1952: First PhD granted

2011: U of S became a member of the prestigious U15 research university group

SIGNATURE AREAS OF RESEARCH

Aboriginal Peoples: Engagement and Scholarship

Agriculture: Food and Bioproducts for a Sustainable Future

Energy and Mineral Resources: Technology and Public Policy for a Sustainable Environment

One Health: Solutions at the Animal-Human-Environment Interface

Synchrotron Sciences: Innovation in Health, Environment and Advanced Technologies

Water Security: Stewardship of the World's Freshwater Resources

UNIQUE CENTRES

Canadian Light Source—Canada's only facility for synchrotron light research

Global Institute for Water Security—supporting sustainable use of the world's water resources and protection against natural hazards such as flood and drought

Vaccine and Infectious Disease Organization and International Vaccine Centre—one of the largest vaccine research and teaching facilities in North America

U of S Health Sciences—creating a new standard for interprofessional health education, research and practice

Global Institute for Food Security—developing Saskatchewan-led solutions to feed a growing world population

Sylvia Fedoruk Canadian Centre for Nuclear Innovation—supporting global leadership in nuclear research, development and training

1.1 THE CATALYTIC ROLE OF UNIVERSITIES IN ECONOMIC DEVELOPMENT

The U of S has been an economic asset for the province for more than a century. During this time, the role of universities in regional development has evolved. The mission to teach and develop the next generation of business, cultural, public, and scientific leaders remains the central focus. However, economies have transformed dramatically, thriving much more on knowledge-intensive activities, thereby elevating the importance of knowledge institutions as critical economic drivers and partners.[3]

Universities now play a more prominent role in driving innovation and increasing economic opportunity. Regional economies that embrace innovation stay globally competitive because they help position industries and the labour force to adapt and reinvent by linking research to practice. Innovators are attracted to (and remain in) artistically-vibrant and culturally-diverse communities. Universities through their curricula, programming, and practices anchor vibrant communities.

The important relationship between universities and the regional economy is exemplified in the way the University of Saskatchewan and the province of Saskatchewan embraced innovation for agriculture in their earliest days. The Global Institute for Water Security, the Canadian Centre for Health and Safety in Agriculture, and the Social Science Research Laboratory are other important examples at the U of S.

Research shows that as knowledge-intensive industries flourish, job creation in other sectors increases across all ranges of disciplines and levels of education.[4] Even Saskatchewan's traditional industries—agriculture, minerals, and energy—are becoming more knowledge and technology intensive, and the province has ambitious plans for economic diversification and population growth.

In short, the role of the University of Saskatchewan in the province's regional economy is more important than ever. Education, industry, and community partnerships that facilitate idea exchange, research, and artistic work are critical factors for economic competitiveness. The U of S must build on its core strengths and elevate its role in the regional economy to ensure its students and the province maintain their competitiveness. The university must maintain its dedication to research and teaching excellence, through rigourous curricula, its signature research areas, and future investments. It must also invest in community engagement, creativity, and socially-inclusive programs that strengthen its ties to the community and the province. It must also communicate its role as a partner in regional development.

1.2 ANALYSIS OBJECTIVES

The University of Saskatchewan commissioned this independent analysis of the university's contributions to the Saskatchewan economy with three principal objectives:

1. quantify the economic impact of university, student, and visitor spending on the Saskatchewan economy;
2. quantify the wage premium associated with a U of S education and the broader contribution of the university to the labour force; and
3. characterize the broader socioeconomic contributions of the university's research portfolio.

This analysis is an opportunity for the U of S to take stock of where it is today and to understand how it is positioned to contribute to Saskatchewan, to Canada, and internationally

[3] Bok, D. 2013. Higher Education in America. Princeton University Press; Tornatzky, L. and E. Rideout. 2014. Innovation U 2.0: Reinventing University Roles in a Knowledge Economy; and Hall, B., A. Link, and J. Scott. 2003. Universities as Research Partners. *The Review of Economics and Statistics*, 85(2):485-491.

[4] Moretti, E. 2012. *The New Geography of Jobs*. Mariner.

going forward. It was prepared by RTI International, an independent non-profit research institute. Founded over 55 years ago by three research universities—Duke University, North Carolina State University, and the University of North Carolina at Chapel Hill—RTI is the anchor institution of Research Triangle Park, North Carolina. For the University of Saskatchewan, RTI assembled staff with backgrounds in economics, regional planning, and economic development. This team brought together complementary perspectives important to shape a stronger understanding of the U of S and its role in the Saskatchewan economy.

1.3 REPORT OVERVIEW

This report is organized as follows.

Section 2 describes the economic impact the U of S has on gross domestic product, employment, labour incomes, and public finances. For a frame of reference, it also compares the impact of the U of S on Saskatchewan with the impact other universities have on their provincial economies.

Section 3 quantifies the change in U of S graduates' earning power because of their qualifications.

Section 4 analyzes the university's contributions to the provincial labour force. It also quantifies the role of the U of S in attracting new talent to Canada from abroad.

Section 5 is a high-level overview of the U of S' $200 million annual research portfolio. It also describes how research and knowledge in the six signature research areas at the U of S is being translated into economic value for Saskatchewan, Canada, and the globe.

Section 6 presents summary comments about the economic impact of the U of S and recommendations from interviews with 37 community and academic leaders in Saskatchewan.

Colleges and Schools at the University of Saskatchewan

College of Agriculture and Bioresources
College of Arts and Science
Edwards School of Business
College of Dentistry
College of Education
College of Engineering
School of Environment and Sustainability
College of Graduate Studies and Research
College of Kinesiology
College of Law
College of Medicine
College of Nursing
College of Pharmacy and Nutrition
School of Physical Therapy
School of Public Health
Johnson-Shoyama Graduate School of Public Policy
Western College of Veterinary Medicine

Federated and Affiliated Colleges

Briercrest College
St. Thomas More College
Horizon College & Seminary
Saskatoon Theological Union
Gabriel Dumont Institute of Métis Studies & Applied Research
St. Peter's College
Centre for Continuing and Distance Education

2

Contribution to the Regional Economy: A Macroeconomic Perspective

The University of Saskatchewan generated $1.2 billion in GDP for Saskatchewan in 2013/14. To put this value in context, the entire provincial economy is $83.2 billion, meaning that around 1.5% of the economy is directly or indirectly linked to just one institution.

An economy grows when more spending (i.e., research revenue, sales of goods and services) is attracted to it than leaves it. From a public sector perspective, the U of S expands the Saskatchewan economy because each year it attracts millions of dollars of new investment, research funding, and student spending to the province while serving as a force for the retention of existing talent and money. The presence of the university helps buttress and diversify the economy, spur social and technological innovation, and provide economic opportunity for residents and businesses.

Two real-world measures that evidence the impact of the university are employment and labour income. The U of S supports 11,842 jobs across Saskatchewan (2.1% of provincial employment), both at the university and with local businesses. These jobs paid $634 million in annual wages (2.4% of provincial totals).

2.1 HOW REGIONAL ECONOMIC IMPACT IS MEASURED

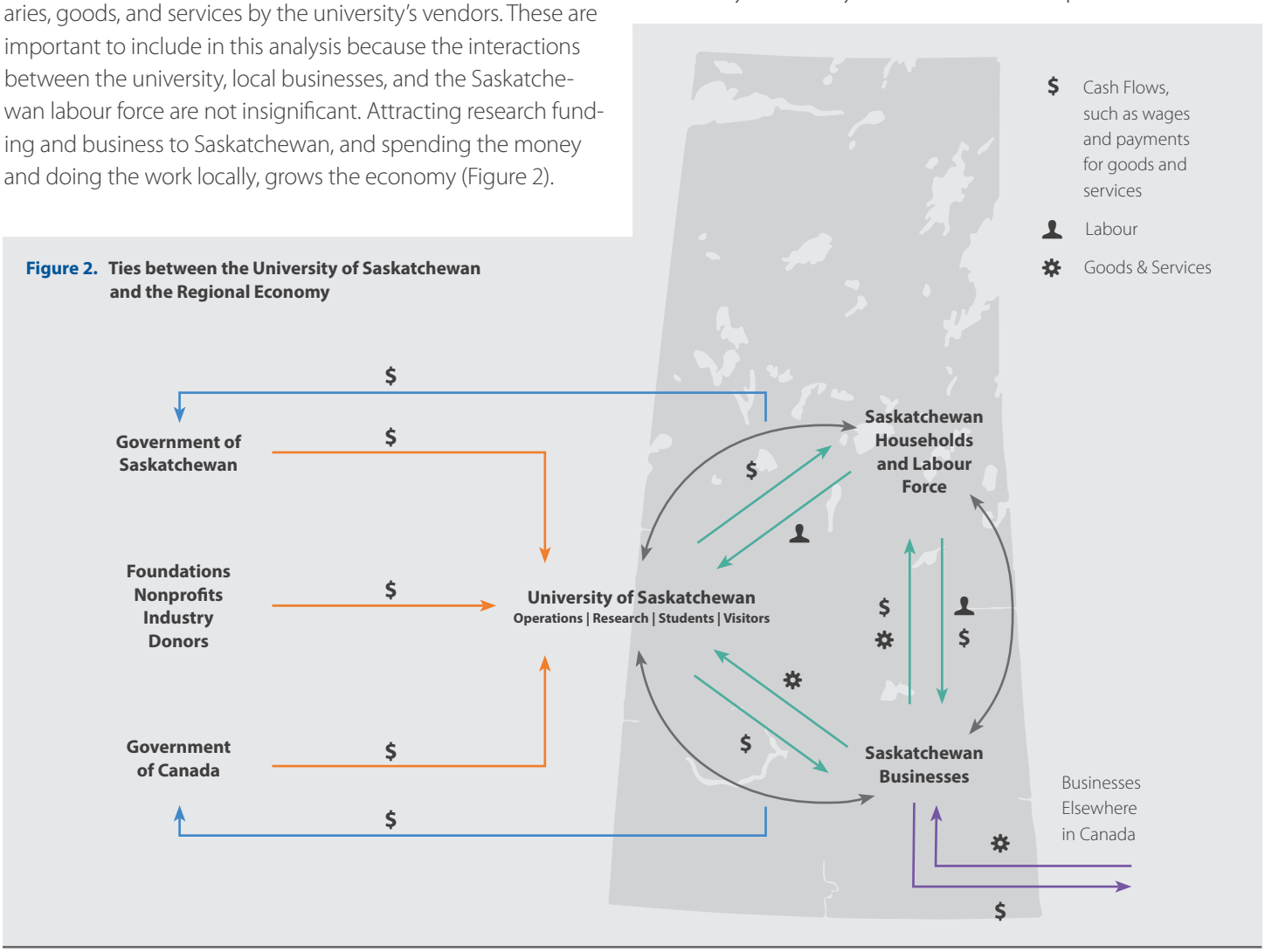
To measure the economic significance of day-to-day university operations, policy analysts often emphasize the direct financial resources spent by the institution. It is common to communicate the annual value of salaries paid to faculty and staff or the value of goods and services purchased from local businesses. Although understanding and communicating information from university financial statements is important, this does not convey information related to the secondary ties with Saskatchewan's economy.

Secondary ties[5] include spending by students and visitors, spending by university employees, and spending on local salaries, goods, and services by the university's vendors. These are important to include in this analysis because the interactions between the university, local businesses, and the Saskatchewan labour force are not insignificant. Attracting research funding and business to Saskatchewan, and spending the money and doing the work locally, grows the economy (Figure 2).

RTI examined the comprehensive spending patterns catalyzed by the U of S using input-output analysis. Input-output analysis is a well-known and reliable methodology with a long history in economics. The economist who created this analysis framework received the Nobel Prize in Economic Science for it. The economic impact results presented in this chapter were prepared using the framework and the official interprovincial version of the Canadian Input-Output Model developed by Statistics Canada. Technical detail about how this study was conducted can be found in the Technical Appendix.

[5] Secondary ties are alternately referred to as indirect and induced impacts.

Figure 2. Ties between the University of Saskatchewan and the Regional Economy



2.2 SPENDING CATALYZED BY THE U OF S

The total amount of initial spending triggered by the U of S for 2013/14 is $1,264.1 million. This spending includes:

- university expenses (e.g., salaries, goods, services),
- new university capital expenditures,
- student living expenditures, and
- visitor travel expenditures.

Table 1 provides a breakdown of this spending, the components of which are discussed further below.

2.2.1 University Consolidated Expenses

The largest and most important category of spending is the university's annual expenses, which were $859.5 million in 2013/14 (68% of the $1,264.1 million).

Because input-output analysis analyzes actual spending patterns, our focus is on annual expenses and not on annual revenues. There are lags between when funds are received and when funds are spent. Not all revenues are spent right away. For the year ended April 30, 2014, the most recent year for which final data were available, the U of S reported total consolidated revenue of $1,018.5 million (Figure 3). If the analysis used revenue to estimate university spending, it would overstate economic impacts.

Table 1. Expenditures Related to the University of Saskatchewan

UNIVERSITY OF SASKATCHEWAN		STUDENTS	VISITORS
Annual Expenses[a]	**New Capital Expenditures[b]**	**Living Expenditures[c]**	**Travel Expenditures[c]**
• Salaries and employee benefits • Operational supplies and expenses • Cost of goods sold, equipment, maintenance, rent, travel, and other • Scholarships, bursaries, and prizes • Utilities • Amortization	• New construction	• Local transportation • Books, supplies, and computers • Telecommunications • Rent • Food • Entertainment	• Entertainment • Taxi or vehicle rental • Accommodations • Food and beverages • Entertainment
$859.5 million	**$28.0 million**	**$243.7 million**	**$132.9 million**
Total: $1,264.1 million			

Sources: [a]2013/14 University of Saskatchewan Annual Financial Report (Page 9). [b]Facilities Management Division. [c]Estimated (see Technical Appendix).

The largest component of the university's $859.5 million in expenses are payments for employee salaries and benefits valued at $534.7 million. The U of S is one of Saskatchewan's largest employers with over 6,200 people employed full-time or part-time in colleges, schools, and administrative units. If one adds so called "casual employees", who work small numbers of hours per week, employment increases to 7,911 people.

Other major university expenses are operational supplies and equipment, scholarships, bursaries and prizes, and utility expenses (Table 2). Greater detail on university expenses can be found in the 2013/14 University of Saskatchewan Annual Financial Report.

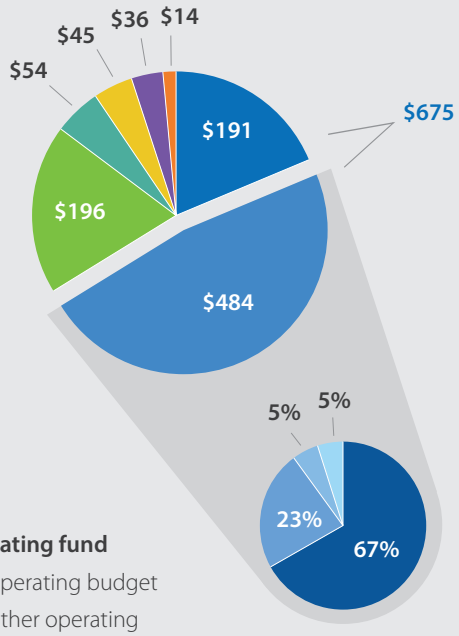
Table 2. University Expenses and Employees

EXPENSES	VALUE
Salaries and Employee Benefits	$534.7 million
Operational Supplies and Expenses	$136.8 million
Costs of goods sold, equipment maintenance, travel, and other	$50.8 million
Scholarships, bursaries, and prizes	$39.1 million
Utilities	$25.0 million
Amortization	$73.1 million
Total	**$859.5 million**
Number of People Employed	**6,203[a]**

[a]As of November 2014, 7,911 people were employed at the U of S. Excluding casual employees, this number is 6,203 employees. Full-time equivalents (FTE) is a more accurate assessment of employment, however modeling systems and macroeconomic data report persons employed and not FTE, thus persons employed, or "jobs", is presented here. The 2013/14 FTE count for the U of S was 5,433.4 FTE.
Source: University of Saskatchewan Data Warehouse.

Figure 3. University Consolidated Revenue, 2013/14 (Million $)

$1.02 billion consolidated revenue 2013-14



Operating fund
- Operating budget
- Other operating

Other funds
- Research fund
- Ancillary fund
- Endowment fund
- Capital fund
- Student financial aid fund

Operating budget revenue
- Provincial government grant
- Tuition
- Investment income
- All other

Source: 2013/14 University of Saskatchewan Annual Financial Report.

2.2.2 New Construction and Capital Investment

According to the U of S Facilities Management Division, capital investment associated with new construction expenditures during 2013/14 amounts to $28.0 million (2% of $1,264.1 million).[6] This investment includes new buildings on campus including residences, laboratories, classrooms, and student spaces.[7]

New construction expenditures for projects underway or being completed during 2013/14 included $15.5 million on the Health Sciences project, $8.0 million on the Saskatchewan Centre for Innovations in Cyclotron Science, and $4.5 million on the Gordon Oakes Redbear Student Centre.[8]

2.2.3 Student Spending

Nearly 24,000 students attended the U of S during the 2013/14 academic year (Table 3), about 78% of whom were undergraduates. The total value of student living expenses was estimated to be $243.7 million (19% of $1,264.1 million).

Living expenses were estimated using information about the student population and average student room and board expenditures obtained from Affordability and Accessibility Surveys.

Table 3. Number of University Students by Origin, Academic Year 2013/14

	NUMBER
International	3,348
Out of Province	4,030
Saskatchewan	16,397
Total	**23,788[a]**

[a] Includes 13 students who were undeclared. Source: University of Saskatchewan Data Warehouse. Year End snapshot data prepared by Information and Communications Technology—Reporting and Data Services.

2.2.4 Visitor Spending

The total value of visitor spending was estimated to be $132.9 million (11% of $1,264.1 million). Estimated visitor spending was reviewed with Tourism Saskatoon's analysis of tourism in Saskatoon and was determined to be reasonable. During 2012, 2.8 million visitors travelled to Saskatoon on overnight and same-day trips and generated about $505.3 million in consumer spending in the Saskatoon region.[9] Saskatoon has grown by more than 10% since 2012, and comparing 2014 U of S estimates to 2012 data for the region overestimates the percentage contribution the U of S makes. However, one could approximate that about one fifth of visitor spending of visitor spending in the Saskatoon region relates to the U of S.

A unique partnership between the University of Saskatchewan, the Government of Saskatchewan and the City of Saskatoon helped create the Meewasin Valley Authority, an agency dedicated to conserving the cultural and natural resources of the South Saskatchewan River valley. Students, faculty and university administrators contribute to the authority through leadership roles and research initiatives.

6 Facilities Management Division, email communication 4/14/2015, U of S 2013-14 Vendor Payments on New Construction.xls

7 Spending for new construction and capital investment is capitalized and is not reflected in the university's annual expenses.

8 2013/14 University of Saskatchewan Annual Financial Report (page 18).

9 Tourism in Saskatoon: A Summary of Tourism in 2012 (May, 2014).

2.3 TOTAL ECONOMIC IMPACT

The U of S expands the Saskatchewan economy by retaining spending in the province—by holding on to highly-qualified personnel, students, and sponsored research, for example—and by attracting research, investment, students, and visitors from elsewhere in Canada and from abroad. Total economic impact includes not only the spending described above, but also the secondary impacts that occur as university employees spend their salaries and Saskatchewan businesses hire employees and consume goods and services in order to supply the university.

The total contribution to Saskatchewan's GDP is $1.2 billion—about 1.5% of the entire provincial economy (Tables 4 and 5). As will be discussed later, in terms of the relative magnitude of the contribution of a university to the provincial economy, the U of S appears to have one of the largest regional impacts of universities in western Canada.[10]

Our analysis shows that more people are working in Saskatchewan because of the university—11,842 jobs, or 2.1% of all jobs in the province, are directly or indirectly created or retained because of the university. If we only consider all jobs in Saskatoon, the share of the jobs increases to 6.1%. The Saskatchewan Plan for Growth set a goal that 60,000 more people will be working in Saskatchewan by 2020. Over the next 5 years, by expanding its educational programs, attracting more students to Saskatchewan, and growing its research portfolio the university can help Saskatchewan achieve this goal.

The total wages and salaries earned was $634 million. After considering all wages and salaries in Saskatchewan, we found that U of S directly or indirectly contributes 2.4% to the total salary and wage base of the province.

Table 4. Summary Economic Impact of the U of S on the Saskatchewan Economy, 2013/14

CATEGORY	GROSS DOMESTIC PRODUCT (GDP) (MILLION)	WAGES AND SALARIES (MILLION)	JOBS
	GDP is a measure of the overall size of the economy	*Value of wages and salaries earned*	*Number of jobs*
University Annual Expenses	$953	$556	9,533
Student and Visitor Expenditures	$234	$70	2,166
University New Construction Spending	$19	$8	143
Total	**$1,206**	**$634**	**11,842**

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

[10] Our analysis focuses on the impact on GDP, not on gross output or revenue. Gross output includes substantial double counting.

Table 5. Size of U of S Impact Relative to the Saskatchewan Economy, 2013/14

ECONOMIC INDICATOR	U OF S VALUE[a] (MILLION)	VALUE FOR SASKATCHEWAN (MILLION)	U OF S SHARE OF SASKATCHEWAN ECONOMY
Gross Domestic Product (GDP)	$1,206	$83,121[b]	1.5%
Wages and Salaries	$634	$26,924[b]	2.4%
Jobs	11,842	555,300[c]	2.1%

Sources: [a]RTI analysis based on Statistics Canada Interprovincial Input-Output (2010) model results. [b]Government of Saskatchewan Bureau of Statistics, Ministry of Finance. Saskatchewan Provincial Economic Accounts, December 2014; [c]Government of Saskatchewan Bureau of Statistics, Economic Review 2013.

The university's economic effects extend to the national economy as well. The U of S procures goods and services from outside of the province, as do some of the university's local suppliers, generating economic activity in other provinces. From a national perspective, spending related to U of S contributes $1.5 billion to Canadian GDP and $771 million in wages and salaries (Table 6).

More people are working in Canada because of U of S—18,154 jobs are directly or indirectly created or retained nationwide. This means that the U of S supports an additional 6,300 jobs elsewhere in Canada.

Table 6. Summary Economic Impact of the U of S on the Canadian Economy, 2013/14

CATEGORY	GROSS DOMESTIC PRODUCT (GDP) (MILLION)	WAGES AND SALARIES (MILLION)	JOBS
	GDP is a measure of the overall size of the economy	*Value of wages and salaries earned*	*Number of jobs*
University Annual Expenses	$1,150	$643	13,622
Student and Visitor Expenditures	$296	$116	4,264
University New Construction Spending	$29	$13	267
Total	**$1,475**	**$771**	**18,154**

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

2.4 COMPARISON TO OTHER UNIVERSITIES' IMPACT

We compared the results for the U of S with those of other Canadian universities to better gauge estimated impacts and provide additional context. Different universities have used different approaches and measures to quantify their economic impact, which impedes good comparison. However, by creating a level playing field and focusing only on input-output analysis related effects, a reasonable comparison is possible (see Technical Appendix).

Several universities' impact analyses emphasize their institutions' contributions to provincial GDP. These analyses include those for:

- Dalhousie University,
- University of Manitoba,
- University of Regina,
- University of Saskatchewan, and
- Western University.

Per capita GDP is an important measure of a province's average standard of living. Because Alberta and British Columbia are significantly more populous than Saskatchewan and Manitoba, to make fair interprovincial comparisons we need to account for differences in population by dividing the reported total gross output reported by the economic impact studies by the population. As shown in Figure 4, among the universities compared, the standard of living increases ranged from $113 to $1,148 per person, with U of S delivering one of the highest increases in Canada.

Many studies focused on total business revenue effects ("gross output") and did not consider university contribution to GDP. Our study for the University of Saskatchewan does not have gross output as a primary economic impact indicator because there is substantial double counting in gross output measures. Double counting occurs because if Firm A buys from Firm B to make a product, gross output will count as revenue Firm A's sale of the product and the revenue that Firm B received from Firm A. GDP reflects value-added, which is the value added to Firm A's product contributed by both Firm A and Firm B. There is no double counting in GDP.

Universities focusing on gross impact included:

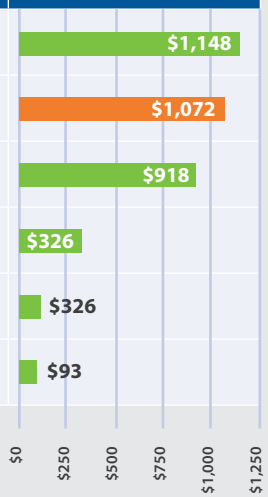
- University of Alberta,
- University of British Columbia,
- University of Calgary,
- University of Manitoba,
- University of Toronto, and
- Simon Fraser University.

Our comparison reveals that U of S has the largest per capita impact at $1,522 per person. An important take-away is that, although the U of S is smaller in size than most of its peers in the U15, its relative importance to its provincial economy is greater.

A new home for a recently refurbished Heintzman baby grand piano has provided entertainment for the many people who pass through the College of Arts and Science daily. Situated under the arts ramp, the piano is there for anyone who wants to sit down and play, whether or not they are music students.

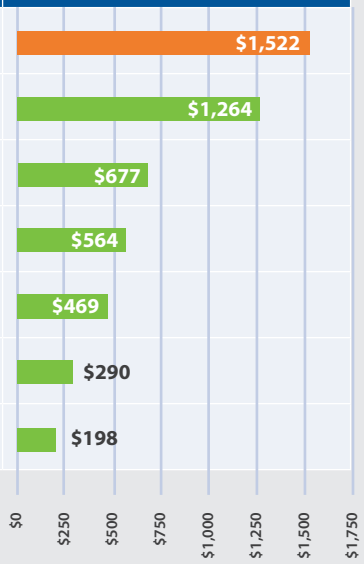
Figure 4. Comparison of the Contributions Canadian Universities Make to their Provincial Economies (GDP or Gross Output)

	PROVINCE	YEAR OF ANALYSIS	ESTIMATED GDP IMPACT ($ MILLION) [a]	PROVINCIAL POPULATION IN YEAR OF ANALYSIS [b]	PROVINCIAL GDP ($ MILLION) IN YEAR OF ANALYSIS [c]	GDP PER CAPITA [a]
Dalhousie University	Nova Scotia	2010	1,081	942,073	37,073	$1,148
University of Saskatchewan	Saskatchewan	2014	1,206	1,125,410	83,121	$1,072
University of Manitoba	Manitoba	2009	1,110	1,208,589	50,636	$918
University of Regina	Saskatchewan	2011	348	1,066,349	74,605	$326
Western University	Ontario	2013	1,525	13,550,929	695,705	$326
University of Ottawa	Ontario	2011	1,229	13,263,544	658,635	$93



The University of Saskatchewan contributes $1,072 per capita to provincial gross domestic product.

	PROVINCE	YEAR OF ANALYSIS	ESTIMATED BUSINESS REVENUE IMPACT [a]	PROVINCIAL POPULATION IN YEAR OF ANALYSIS [b]	REVENUE PER CAPITA
University of Saskatchewan	Saskatchewan	2014	1,713	1,125,410	$1,522
University of Manitoba	Manitoba	2009	1,698	1,208,589	$1,264
University of Alberta [c]	Alberta	2010	2,734	3,732,573	$677
University of British Columbia [c]	British Columbia	2008	2,670	4,349,412	$564
University of Calgary [c]	Alberta	2010	1,894	3,732,573	$469
Simon Fraser University [c]	British Columbia	2013	1,352	4,582,625	$290
University of Toronto [d]	Ontario	2013	2,677	13,550,929	$198



Some universities report impact not in terms of their contribution to the real economy, but in terms of gross revenues received by organizations in the provincial economy[e]

a Dollar values are in real 2014 terms. See Technical Appendix for conversion procedures.

b Population estimates are for the year of analysis to account for population growth. For example, the UBC study was conducted for 2007, when BC had a smaller population than it did in 2012, the year for which the Simon Fraser study was conducted.

c Provincial GDP for year of analysis, presented in 2014 dollars.

d This university assumed its impact was 1.5 times its estimated spending. See Technical Appendix.

e This approach often includes substantial double counting because it does not net out transfer of value between organizations within the provincial economy, such as one business procuring inputs from another in order to supply a university.

2.5 FISCAL IMPACT ANALYSIS

The economic activity catalyzed by the U of S generates tax revenues for the province, raising the question of to what extent does the tax revenue generated offset the province's annual investment in the university. The answer is about 40%—for every $1 appropriated for the U of S 40 cents is returned to the public coffers.

Financial operating results for the fiscal year that ended April 30, 2014 show that the Government of Saskatchewan provided $500.9 million in support to the U of S, principally through the annual operating grant. This accounted for 49% of university revenue for 2013/14 ($1,018.6 million), meaning that for every $1 of provincial support the U of S brings in more than $1 of support from other sources. The U of S uses provincial support to meet its educational mission, to conduct priority research in the provincial interest, and to generate leverage that helps capture research funding from federal and non-federal sources.

The economic activity created provincial personal income tax revenue ($136.5 million) and indirect tax revenue ($64.5 million) that totaled $201.0 million.

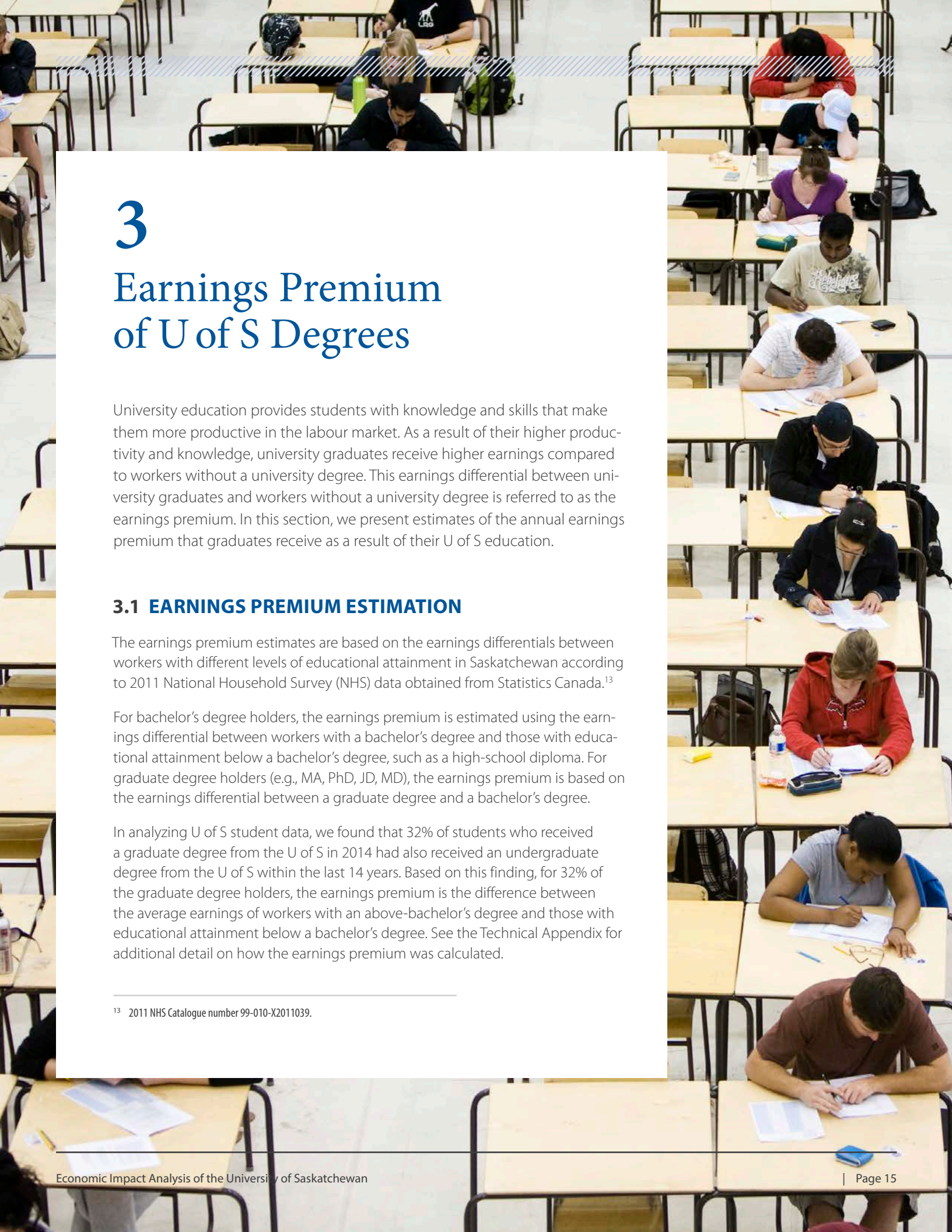
Comparing the $500.9 million appropriated for the U of S to the $201.0 million returned through provincial income and other taxes, the net impact to Saskatchewan public finances is $299.9 million. Thus, 40% of the province's costs for the University are returned to Saskatchewan's coffers (Table 7).

Table 7. Estimated Fiscal Impact for the Government of Saskatchewan, 2013/14

SOURCE	EXPENDITURE CATEGORY			TOTAL (THOUSAND)
	ANNUAL EXPENSES (THOUSAND)	STUDENT AND VISITOR EXPENSES (THOUSAND)	NEW CONSTRUCTION EXPENSES (THOUSAND)	
Total provincial funding including operating grant: $500.9 Million				
Personal Income Tax	$119,664	$15,085	$1,710	$136,460
Indirect Taxes	$36,633	$26,710	$1,176	$64,518
Total	**$156,297**	**$41,795**	**$2,886**	**$200,978**
Impact of U of S on public finances, net of tax revenues: $299.9 million. For every $1 appropriated for the U of S, 40 cents is returned to the public coffers.				

Sources: RTI analysis based on Statistics Canada Interprovincial Input-Output (2010) model results. 2013/14 University of Saskatchewan Annual Financial Report.

[12] Reported value of revenue received from grants and contracts: Government of Saskatchewan, 2013/14 University of Saskatchewan Annual Financial Report (Page 6).



3

Earnings Premium of U of S Degrees

University education provides students with knowledge and skills that make them more productive in the labour market. As a result of their higher productivity and knowledge, university graduates receive higher earnings compared to workers without a university degree. This earnings differential between university graduates and workers without a university degree is referred to as the earnings premium. In this section, we present estimates of the annual earnings premium that graduates receive as a result of their U of S education.

3.1 EARNINGS PREMIUM ESTIMATION

The earnings premium estimates are based on the earnings differentials between workers with different levels of educational attainment in Saskatchewan according to 2011 National Household Survey (NHS) data obtained from Statistics Canada.[13]

For bachelor's degree holders, the earnings premium is estimated using the earnings differential between workers with a bachelor's degree and those with educational attainment below a bachelor's degree, such as a high-school diploma. For graduate degree holders (e.g., MA, PhD, JD, MD), the earnings premium is based on the earnings differential between a graduate degree and a bachelor's degree.

In analyzing U of S student data, we found that 32% of students who received a graduate degree from the U of S in 2014 had also received an undergraduate degree from the U of S within the last 14 years. Based on this finding, for 32% of the graduate degree holders, the earnings premium is the difference between the average earnings of workers with an above-bachelor's degree and those with educational attainment below a bachelor's degree. See the Technical Appendix for additional detail on how the earnings premium was calculated.

[13] 2011 NHS Catalogue number 99-010-X2011039.

Table 8. Average Earnings Premium for 2014 Graduates

	AVERAGE ANNUAL EARNINGS WITH A U OF S DEGREE	AVERAGE ANNUAL EARNINGS WITHOUT A U OF S DEGREE	EARNINGS PREMIUM, PER DEGREE
All degrees	**$60,241**	**$40,930**	**$19,311**
By gender			
Female	$53,102	$32,156	$20,946
Male	$71,385	$54,625	$16,760
By ethnic origin			
Aboriginal	$57,169	$37,173	$19,996
Non-Aboriginal	$60,638	$41,426	$19,212
By degree level			
Under-graduate	$58,277	$37,986	$20,291
Graduate	$68,328	$53,050	$15,278

Note: Average earnings premium is estimated based on 2014 graduates living in Saskatchewan. All earnings premium estimates are presented in 2014 dollars. Alumni data are obtained from the University of Saskatchewan. Other data sources are obtained from Statistics Canada and include the 2011 National Household Survey and CANSIM Table 326-0021.

3.2 EARNINGS PREMIUM FOR 2014 GRADUATES

In 2014, 3,899 students received a bachelor's degree or higher from the U of S (Table 9). Once in the labour force, these students are estimated to earn an annual earnings premium of about $75 million.

About $63.6 million of the $75 million is estimated to accrue to the 3,291 graduates living in Saskatchewan. This dollar value represents the additional contribution that the 2014 graduates will make to the Saskatchewan economy as a result of their U of S education when they enter the labour force.

About 85% of the earnings premium of the 2014 graduates remaining in Saskatchewan is estimated to be captured by those graduating from an undergraduate program.[14]

The Social Sciences Research Laboratories (SSRL), created with support from the U of S, the Government of Saskatchewan and the Canada Foundation for Innovation, crosses disciplines in its collaborative research projects that gather valuable information while providing hands-on experience to students. Rethink Research, a recent event held by the SSRL, brought top researchers in a variety of areas to the U of S.

[14] $53.7 million divided by $63.6 million

3.2.1 Earnings Premium for Female Graduates

Table 9 also presents the distribution of the 2014 annual earnings premium across gender and ethnic groups.

The U of S graduated significantly more women than men in 2014. Female graduates remaining in Saskatchewan are estimated to receive about $42 million of the total earnings premium. They represent 61% of graduates but accrue 66% of the earnings premium.

3.2.2 Earnings Premium for Aboriginal Graduates

Aboriginal graduates in Saskatchewan will earn an estimated $7.9 million in additional earnings. The average U of S Aboriginal graduate is estimated to earn $19,996 more per year[15] than an Aboriginal person without a university degree. The same analysis for non-Aboriginals reveals a difference of $19,212 per year,[16] meaning that on the average a U of S degree has a greater impact on the earnings potential for Aboriginals than non-Aboriginal people.

As written in the Bridging the Aboriginal Education Gap in Saskatchewan, "Aboriginal people earn less than non-Aboriginal people, on average. But the difference largely disappears for higher levels of education. Consequently, Aboriginal people receive a double benefit from education (Page 22)."[17]

Table 9. Total Earnings Premium of 2014 Graduates

	ALL 2014 GRADUATES		2014 GRADUATES LIVING IN SASKATCHEWAN	
	NUMBER OF GRADUATES	ANNUAL EARNINGS PREMIUM	NUMBER OF GRADUATES	ANNUAL EARNINGS PREMIUM
Total	**3,899**	**$75,132,423**	**3,291**	**$63,554,006**
By gender				
Female	2,354	$48,903,860	2,006	$42,017,442
Male	1,545	$26,228,563	1,285	$21,536,564
By ethnic origin				
Aboriginal	426	$8,500,701	394	$7,878,446
Non-Aboriginal	3,473	$66,631,722	2,897	$55,675,560
By degree level				
Undergraduate Program	3,007	$61,520,366	2,648	$53,730,131
Graduate Program	892	$13,612,057	643	$9,823,875

Note: Data presented in this table only include alumni with a bachelor's or higher degree. All earnings premium estimates are presented in 2014 dollars. Alumni data are obtained from the University of Saskatchewan. Other data sources are obtained from Statistics Canada and include the 2011 National Household Survey and CANSIM Table 326-0021. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

[15] $7,878,446 divided by 394 graduates.

[16] $55,675,561 divided by 2,898 graduates.

[17] Howe (2011) uses different assumptions than are used in this work. However, the overall conclusions are similar. See Howe, Eric. 2011. Bridging the Aboriginal Education Gap in Saskatchewan. Saskatoon, SK: Gabriel Dumont Institute.

3.3 EARNINGS PREMIUM FOR ALUMNI LIVING IN SASKATCHEWAN, AGED 25 TO 64

Next, we estimated the annual earnings premium received by all U of S graduates between the ages of 25 and 64 and living in Saskatchewan.[18] In 2014, 61,886 U of S alumni are estimated to live in Saskatchewan, and approximately 83% (51,436) are estimated to participate in the labour force (Table 10).

The annual earnings premium accruing to the alumni in the Saskatchewan labour force in 2014 is estimated to be about $1.2 billion. Alumni of undergraduate programs are estimated to receive about 89% ($1 billion) of the total annual earnings premium associated with U of S education. Female alumni in the Saskatchewan labour force are estimated to earn 53% ($617 million) of the annual earnings premium.

Aboriginal alumni working in Saskatchewan are estimated to earn about $52 million of annual earnings premium of the total. Relative to their peers without university degrees, non-Aboriginals earn an additional $22,992 per year[19] and Aboriginals earn an additional $20,404 per year.[20]

Aggregate results for Aboriginal alumni must be interpreted cautiously because many students' Aboriginal status was unknown or unreported until very recently. It was only in the winter of 2013 that a concerted effort was made through the *I Declare* initiative to record all students' Aboriginal status. It is likely that many Aboriginal alumni are included in the total for non-Aboriginal people.

Table 10. Total Earnings Premium of Graduates Aged 25–64 in Saskatchewan, 2014

	NUMBER OF GRADUATES AGED 25–64 LIVING IN SASKATCHEWAN	NUMBER OF GRADUATES AGED 25–64 IN THE SASKATCHEWAN LABOUR FORCE	ANNUAL EARNINGS PREMIUM
Total	**61,886**	**51,436**	**$1,176,009,480**
By gender			
Female	35,365	27,830	$617,434,923
Male	26,521	23,606	$558,574,556
By ethnic origin			
Aboriginal	3,021	2,549	$52,008,595
Non-Aboriginal	58,865	48,887	$1,124,000,886
By degree level			
Undergraduate Program	53,815	44,687	$1,049,884,479
Graduate Program	8,071	6,749	$126,125,001

Note: Data presented in this table only include alumni with a bachelor's or higher degree. All earnings premium estimates are presented in 2014 dollars. Alumni data are obtained from the University of Saskatchewan. Other data sources are obtained from Statistics Canada and include the 2006 Census (catalogue number 97-563-XCB2006054), CANSIM Table 326-0021, and CANSIM Table 282-0002. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

[18] This date range was limited to 25 through 64 because of data availability from Statistics Canada.

[19] $1,124,000,886 divided by 48,887.

[20] $52,008,595 divided by 2,549.

4

Contribution to Saskatchewan's Talent Supply

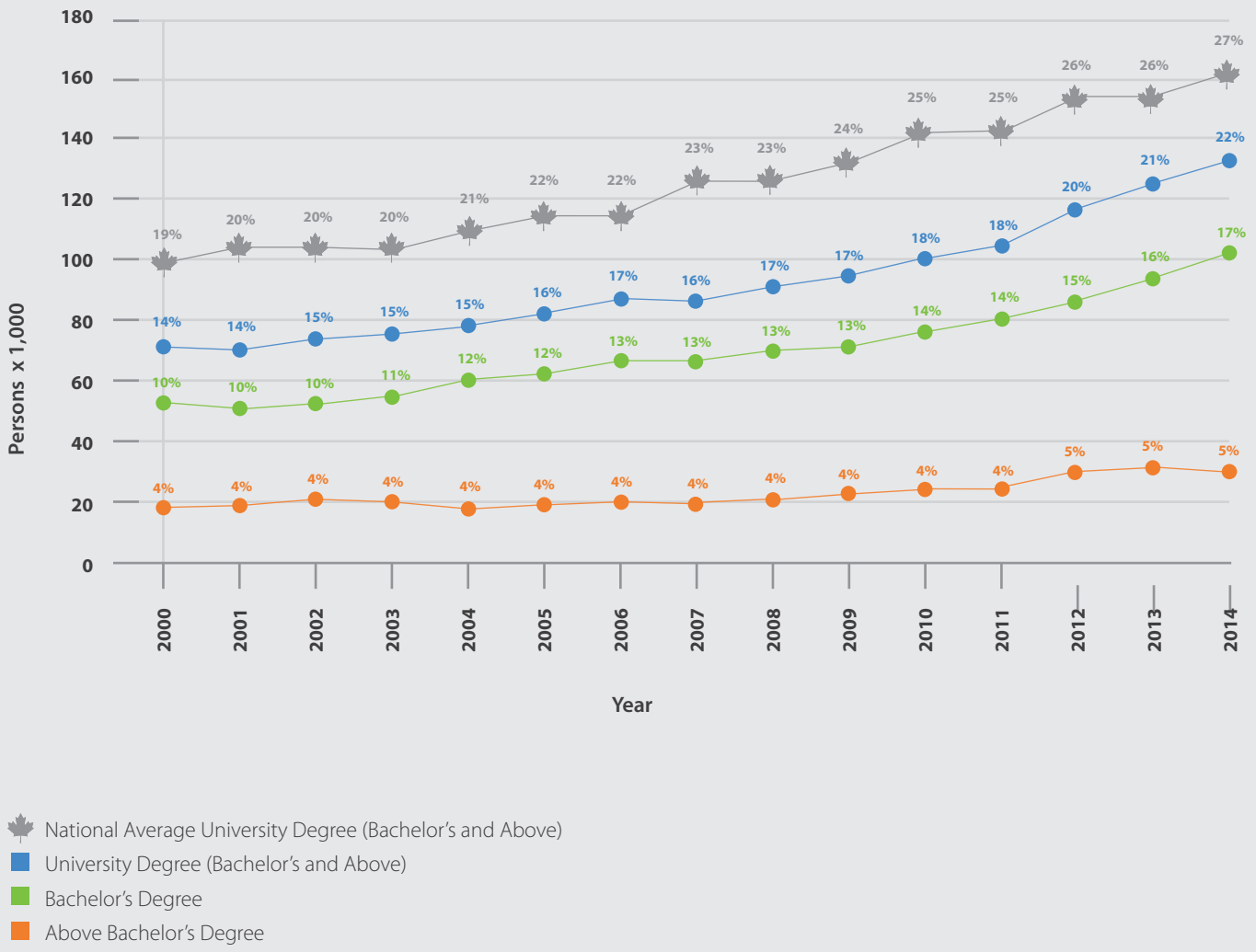
Workers with a university degree play an increasingly important role in the Saskatchewan economy. The Saskatchewan labour force currently numbers 555,300 people. Between 2000 and 2014, the number of workers with at least a bachelor's degree increased by 87%, from about 71,000 to 132,000 (Figure 5). This increase outpaced the growth in the overall size of the labour force: the proportion of workers with at least a bachelor's degree increased from 14% to 22% (Figure 6).

The U of S has been a major source of skilled workers in Saskatchewan. Of the 132,000 labour force participants with a university degree in Saskatchewan in 2014, more than 51,000 (39%) are estimated to be U of S alumni. Indeed, U of S alumni are likely to constitute more than 39%. Some data underlying this arithmetic are constrained to persons only between the ages of 25 and 64 and there are U of S alumni outside of this age range working in the province today.

This section reviews how the U of S has also been an important contributor to the growth of Saskatchewan's skilled labour force since 2000, including

- building the provincial talent supply,
- attracting international students to the province,
- providing education aligned with Saskatchewan's workforce needs, and
- retaining graduates in Saskatchewan after graduation.

Figure 5. **Number and Percentage of People in the Saskatchewan Labour Force with University Degrees**



Totals may differ from sums due to independent rounding.

Statistics Canada CANSIM Table 282-0004 - Labour force survey estimates (LFS), by educational attainment, sex and age group, annual (persons unless otherwise noted)

4.1 BUILDING THE PROVINCIAL TALENT SUPPLY

Between 2000 and 2014, the annual number of degrees, diplomas, and certificates conferred by the U of S has increased by 20% from 3,572 in 2000 to 4,290 in 2014 (Table 11). The largest percentage increases in the number of degrees awarded were observed in master's, doctorate, and professional degree programs.[20]

The percentage of the degrees that were awarded to alumni currently residing in Saskatchewan varies across degree levels and types, with the highest retention rate observed in undergraduate program degrees (79%) and the lowest observed in graduate program degrees (63%).

Note that these data concern the number of degrees conferred, and one individual (i.e., graduate) may receive multiple degrees from the U of S over his or her lifetime. The next section will review the number of graduates.

With about 2,000 self-declared Aboriginal students, Aboriginal student success continues to be a top priority, during both the transition to university and their time as a student. The University Community of Aboriginal Nursing (UCAN) in the College of Nursing provides a network of support, and programs like ITEP and SUNTEP educate the next generation of First Nations teachers, many of whom stay in or return to their home communities in Saskatchewan.

4.1.1 Degrees Conferred to Aboriginal Students

The number of degrees awarded to Aboriginal and international students has increased significantly since 2000. Between 2000 and 2014, the U of S has conferred 4,465 to Aboriginal students. During this time, the annual number of degrees awarded to Aboriginal students has increased over eightfold, from 53 in 2000 to 456 in 2014. (However, as described in Section 3, it must be remembered that the Aboriginal status of many students remains unknown, especially for the period before the *I Declare* initiative was launched in 2012/13.) About 87% of degrees awarded to Aboriginal graduates were awarded to people who are estimated to be currently residing in Saskatchewan.

4.1.2 Degrees Conferred to International Students

The annual number of degrees, diplomas, and certificates awarded to international students almost tripled from 224 in 2000 to 653 in 2014. The U of S has conferred 4,889 to international students since 2000, and about 58% of these are awarded to students who are estimated to continue to live in Saskatchewan.

[20] Data presented in this report may be slightly different than similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

Table 11. Degrees, Diplomas, and Certificates Conferred to U of S Graduates, 2000-2014

	NUMBER OF DEGREES AWARDED BETWEEN 2000 AND 2014 (A)	NUMBER OF DEGREES AWARDED IN 2000 (B)	NUMBER OF DEGREES AWARDED IN 2014 (C)	% CHANGE IN NUMBER OF DEGREES AWARDED BETWEEN 2000 AND 2014 ((C-B)/B)	NUMBER OF DEGREES AWARDED IN 2000–2014 TO GRADUATES LIVING IN SK (D)	% NUMBER OF DEGREES THAT ARE AWARDED TO GRADUATES LIVING IN SK (D/A)
Total	**55,636**	**3,572**	**4,290**	**20%**	**42,158**	**76%**
By degree level						
Undergraduate program	43,419	2,817	3,182	13%	34,093	79%
Graduate program	9,245	496	892	80%	5,851	63%
Non-degree program	2,972	259	216	-17%	2,214	74%
By degree type						
Bachelor's	39,694	2,616	2,786	6%	32,046	81%
MD, DVM, DMD, JD	2,825	145	306	111%	1,376	49%
Master's	7,705	382	749	96%	4,963	64%
PhD	1,360	69	142	106%	747	55%
Post-graduate degrees, diplomas, certificates	180	45	1	–98%	142	79%
Undergraduate and non-degree diplomas, certificates	3,872	315	306	–3%	2,884	74%

Source: Institutional Data of University of Saskatchewan. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

4.2 PROVIDING EDUCATION ALIGNED WITH SASKATCHEWAN'S WORKFORCE NEEDS

The U of S' contribution to the provincial talent supply in Saskatchewan has also been aligned with the workforce needs of the province's key industries. Figure 6 presents employment data for the province by industry sector.

Every year, thousands of new U of S graduates enter the labour force, equipped with the cutting-edge knowledge and the relevant skills needed in Saskatchewan's economy. Table 12 presents a distribution of the degrees awarded to U of S graduates since 2000 across fields of study.

Comparisons between Figure 6 and Table 12 are difficult because university students, especially those in the social sciences, business, and the humanities but also in other disciplines graduate with skills that are transferable across industries and job functions.[21] However, it is not unreasonable to draw some inferences from the data at a high level.

Trade and health care are Saskatchewan's largest industries in terms of employment. These industries have experienced employment growth of 11% and 38%, respectively, since 2000 (Figure 6). The U of S is an important supplier of talent to both of these industries as 31%[22] of the 55,636 degrees it has conferred since 2000 are awarded in the fields of health professions and business-related services (Table 12). In addition, 7% (3,633) of the U of S degrees awarded since 2000 have been in biological and biomedical sciences, further supporting the workforce needs of Saskatchewan's health-care industry.

Other major industries in Saskatchewan are agriculture and educational services, which collectively employed 87,700 individuals in Saskatchewan in 2014 (Figure 6). Between 2000 and 2014, the U of S awarded 2,984 degrees (5% of awarded degrees) in agriculture. The U of S is also a major contributor to the supply of educators in the province with 8,478 (15%) of its degrees since 2000 awarded in the education field.

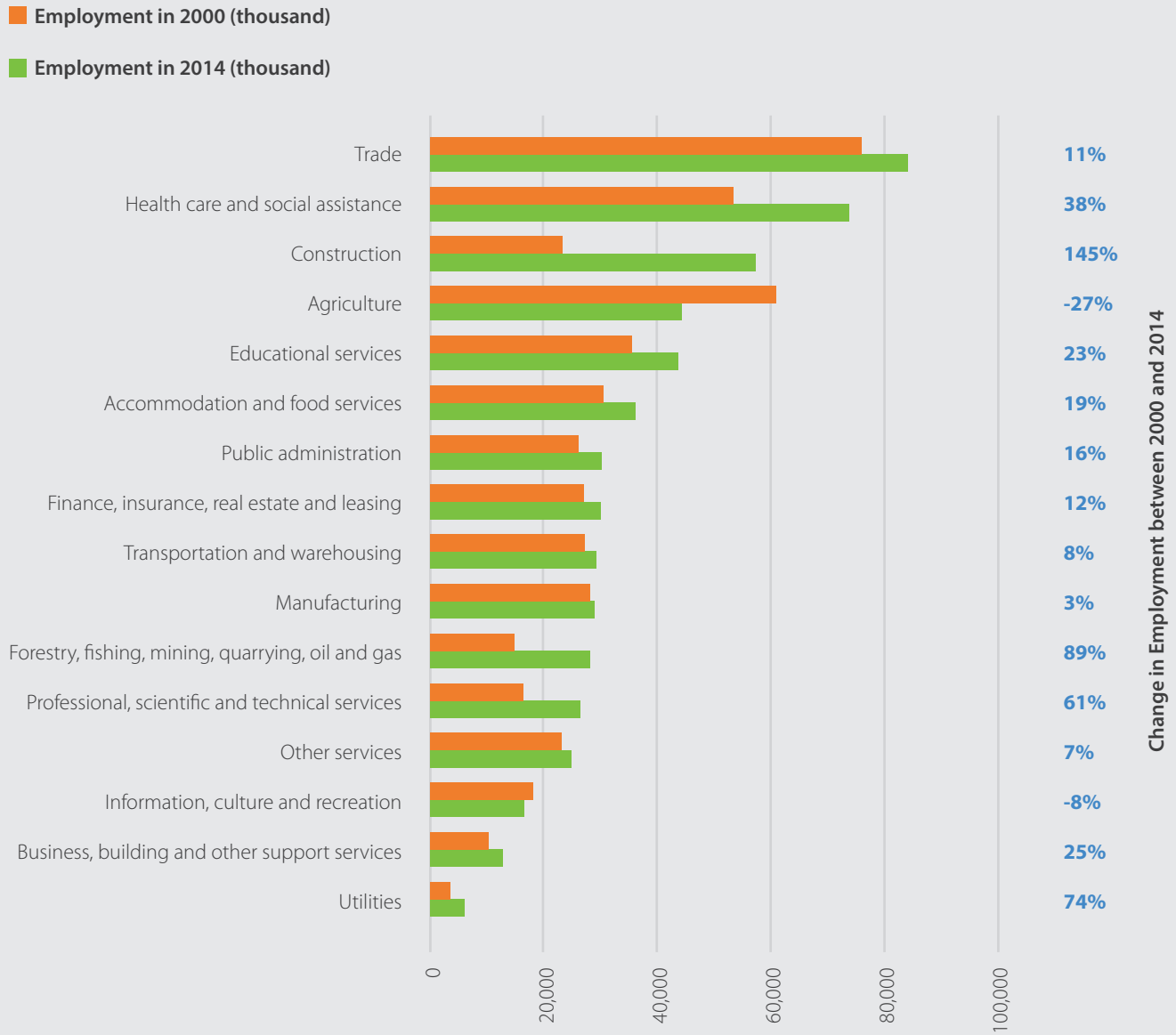
In addition, a significant portion of U of S graduates are trained in social sciences and engineering with degrees in each of these fields constituting about 8% of all degrees conferred since 2000.

The International Minerals Innovation Institute (IMII) is a partnership between industry, government and post-secondary institutions in Saskatchewan. By prioritizing the training and education of students who will someday play a role in the mining sector, the IMII supports the resource-based economy of the province.

[21] This is in contrast to, for example, advanced degrees in medicine, degrees in education, or even associate's degrees conferred by technical colleges were the degree conferred is closely aligned with employment data.

[22] 17% plus 14%

Figure 6. Distribution of Employment in Saskatchewan by Industry, 2014



Source: Data Source: Statistics Canada, CANSIM Table 282-0012.

Table 12. Degrees, Diplomas, and Certificates Awarded, by Field of Study, 2000-2014

FIELD OF STUDY	NUMBER OF DEGREES AWARDED BETWEEN 2000 AND 2014	% OF TOTAL NUMBER OF DEGREES
Health professions and related clinical sciences	9,462	17%
Education	8,478	15%
Business, management, marketing and related support services	7,750	14%
Engineering	4,485	8%
Social sciences	4,194	8%
Biological and biomedical sciences	3,633	7%
Agriculture, agriculture operations and related sciences	2,984	5%
English language and literature/letters	1,942	3%
Psychology	1,895	3%
Parks, recreation, leisure and fitness studies	1,608	3%
Legal professions and studies	1,488	3%
Computer and information sciences and support services	1,377	2%
Physical sciences	1,186	2%
Visual and performing arts	934	2%
History	887	2%
Other fields of study	621	1%
Natural resources and conservation	529	1%
Area, ethnic, cultural and gender studies	452	1%
Family and consumer sciences/human sciences	372	1%
Philosophy and religious studies	332	1%
Mathematics and statistics	270	0.5%
Architecture and related services	240	0.4%
Aboriginal and foreign languages, literatures and linguistics	196	0.4%
Public administration and social service professions	174	0.3%
French language and literature/letters	147	0.3%
Total	**55,636**	**100%**

Source: Institutional Data of University of Saskatchewan. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

The U of S requested a specific break down of degrees for health-related fields since 2000 (Table 13). About 47% of the 9,462 health-related degrees awarded by the U of S since 2000 were for Bachelor of Science (BSc) in Nursing. Among other large degree categories are BSc in Pharmacy, Doctor of Veterinary Medicine, and Doctor of Medicine, each constituting 9.5%–11.9% of the health-related degrees awarded since 2000. Overall, 74% of the degrees related to health professions are awarded to graduates who live in Saskatchewan.

The number of degrees related to health professions increased by 75% from 469 in 2000 to 820 in 2014. The majority of this increase has been fueled by a 168% increase in the BSc in nursing degrees awarded during the same time period. The increase in U of S' production of degrees related to health professions in the last 14 years has mirrored the increase in the size of the Saskatchewan labour force in health occupations. Between 2000 and 2014, the Saskatchewan labour force in health occupations increased by 49% (from about 28,000 to 41,800).[23]

Table 13. Degrees, Diplomas, and Certificates Awarded, Health Profession Summary, 2000–2014

	NUMBER OF DEGREES AWARDED BETWEEN 2000 AND 2014 (A)	% OF ALL HEALTH-RELATED DEGREES AWARDED 2000-2014 (A/9,462)	NUMBER OF DEGREES AWARDED IN 2000 (B)	NUMBER OF DEGREES AWARDED IN 2014 (C)	NUMBER OF DEGREES AWARDED IN 2000-2014 TO GRADUATES LIVING IN SK (D)	% NUMBER OF DEGREES THAT ARE AWARDED TO GRADUATES LIVING IN SK (D/A)
Total	**9,462**	**100**	**469**	**820**	**7,020**	**74%**
By degree level						
Bachelor of Science in Nursing	4,444	47.0	133	356	4,049	91%
Bachelor of Science in Pharmacy	1,125	11.9	77	82	806	72%
Doctor of Veterinary Medicine	1,003	10.6	68	76	254	25%
Doctor of Medicine	894	9.5	55	85	591	66%
Doctor of Dental Medicine	383	4.1	22	26	210	55%
Master of Science	295	3.1	15	23	181	61%
Master of Nursing	240	2.5	11	22	217	90%
Bachelor of Science in Physical Therapy	239	2.5	29	-	187	78%
Master of Public Health	235	2.5	-	79	136	58%
Master of Physical Therapy	228	2.4	-	41	199	87%
Doctor of Philosophy	167	1.8	12	16	100	60%
Master of Veterinary Science	112	1.2	12	5	30	27%
Certificate in Health Care Administration	62	0.7	33	-	36	58%
Bachelor of Science in Medicine	16	0.2	2	-	10	63%
Certificate in Global Health	14	0.2	-	8	12	86%
Post-Graduate Degree Specialization Diploma	5	0.1	-	1	2	40%

Source: Institutional Data of University of Saskatchewan. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

[23] Statistics Canada, CANSIM Table 282-0010.

4.3 RETAINING GRADUATES IN SASKATCHEWAN

The U of S has developed programs that seek to educate and retain students in province to build its human capital and retain its investment in education. For example, the Edwards School of Business launched a cooperative program to provide undergraduates with hands-on training with Saskatchewan businesses. Over one third of students participate in the program, most have job offers before they graduate, and over time 85%–90% of participating students remain in the province. The business school has also developed programs that provide a master's of business administration to graduate students in law, veterinary medicine, and engineering. This helps ensure that graduates with exemplary technical skills develop business acumen, with the aim towards meeting the entrepreneurship and management talent needs of the province.

Most U of S graduates since 2000 are estimated to have remained in Saskatchewan after graduation. Since 2000, 49,921 students have received degrees from U of S and 30,895 of them (62%) are estimated to participate in the Saskatchewan labour force in 2014 (Table 14). There are variations according to highest level of educational attainment from the U of S, for example:

- 64% for undergraduates,
- 53% for those with graduate degrees, and
- 57% for those from non-degree programs.

Almost 8% of the students who graduated between 2000 and 2014 (3,823 out of 49,921) are Aboriginal. Of the 3,823 Aboriginal students, 3,325 (87%) are estimated to live in Saskatchewan, and 2,771 (72%) are estimated to participate in the labour force.

Table 14. U of S Graduates (since 2000) Living and Working in Saskatchewan, 2014

	ALL GRADUATES	GRADUATES LIVING IN SASKATCHEWAN IN 2014		GRADUATES IN SASKATCHEWAN LABOUR FORCE IN 2014	
	NUMBER OF GRADUATES	NUMBER OF GRADUATES	% OF ALL GRADUATES WITHIN CATEGORY	NUMBER OF GRADUATES	% OF ALL GRADUATES WITHIN CATEGORY
Total	**49,921**	**37,034**	**74%**	**30,895**	**62%**
By degree level					
Undergraduate program	37,964	29,290	77%	24,445	64%
Graduate program	8,968	5,605	63%	4,752	53%
Non-degree program	2,989	2,139	72%	1,698	57%
By degree type					
Bachelor's	34,911	27,829	80%	23,189	66%
MD, DVM, DMD, JD[a]	3,053	1,462	48%	1,257	41%
Master's	7,544	4,834	64%	4,102	54%
PhD, Doctor of Science	1,382	750	54%	635	46%
Post-graduate degrees, diplomas, certificates	42	21	49%	15	36%
Undergraduate and non-degree diplomas, certificates	2,989	2,139	72%	1,698	57%

[a]Medicine (MD), veterinary medicine (DVM), dentistry (DMD), law (JD). Source: Institutional Data of University of Saskatchewan. Data may differ from similar data reported by U of S information systems because of extensive data cleaning undertaken in this work.

4.4 ATTRACTING INTERNATIONAL STUDENTS TO SASKATCHEWAN

The U of S also plays an important role in attracting international newcomers to Saskatchewan. Since 2000, the U of S has awarded degrees to 4,525 international students, who constitute about 9% of all graduates between 2000 and 2014.

About 57% of these international students (2,569) are estimated to have remained in Saskatchewan following graduation, and 48% (2,171) are estimated to be participating in the labour force today.

The U of S appears to do a good job of introducing international students to life in Canada. A campus climate survey conducted for the U of S revealed that a great majority of international students are comfortable at the U of S (78%), are satisfied to very satisfied with their educational experience (71%), and would recommend the U of S to others (74%). Over 80% of international students rated the International Student and Study Abroad Centre as an important and helpful campus resource.

The Immunization and Injection Training Program is a recent undertaking created in response to the change in the scope of practice for pharmacists in Saskatchewan. Working with the College of Nursing, the College of Pharmacy and Nutrition is providing the necessary training to pharmacists in Saskatoon and Regina, including our most recent pharmacy graduates.

5

Impact of University Research

This section reviews the University of Saskatchewan's research portfolio and how the university converts that portfolio into economic and social value for the province. The focus is not on cataloging the many activities of a major research institution. Rather, it aims to assess why the research matters and how the way in which the U of S pursues research amplifies its impact. We do this by using the six signature research areas as a lens into the interconnections between teachers, students, community, and industry.

5.1 RESEARCH REVENUE

Annual research funding for the U of S has nearly doubled in the last 10 years from just over $100 million to nearly $200 million (Figure 7).

At almost 43% ($84 million), the largest share of research revenue for 2013/14 was from industry, foundations, research collaborations, and government funders other than the federal or provincial government. The indication is that the U of S is retaining and attracting funding to the province that otherwise would likely be expended elsewhere. It also suggests that the university has significant experience in applied research, particularly when one considers that it excels at commercializing its research portfolio, as discussed later in this section. For example, the College of Agriculture and Biosciences estimates that it has 700 unique research accounts per year, and that two-thirds of its 300 employees are fully supported by its research revenue.

The provincial government has also been a significant U of S research funder (26%, or $50.6 million), providing research support to leverage private sector and federal funds as well as to support research in line with Saskatchewan's priorities.

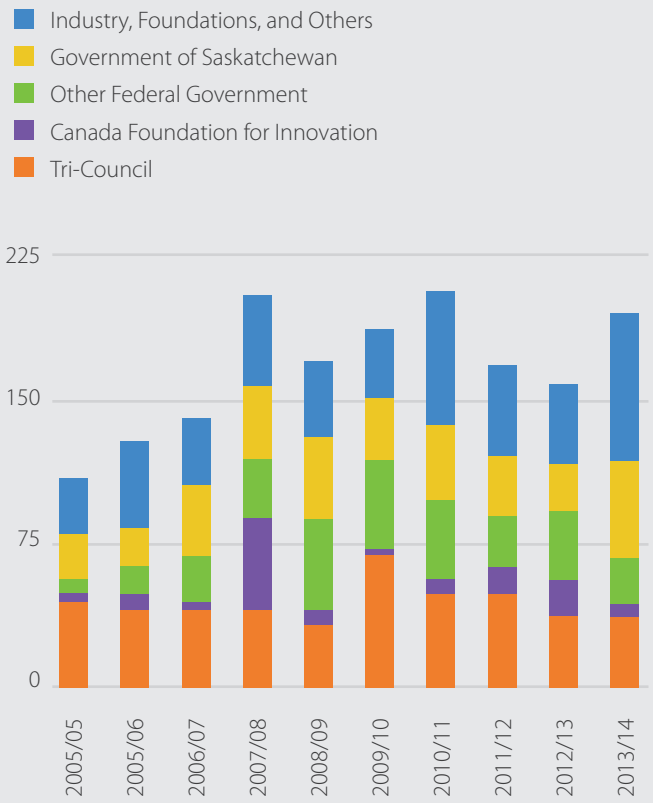
Recent years have seen some notable investments:

- Final installments were received from the Government of Saskatchewan and Western Economic Diversification for the $25.0-million Saskatchewan Centre for Cyclotron Sciences and associated laboratory facility that is under construction on campus.
- In 2012 the Global Institute for Food Security (GIFS) was launched with initial commitments of up to $35 million from PotashCorp and $15 million from the province over the next seven years. Viterra Inc. also invested $2 million, becoming the lead grain industry partner.
- Viterra, Inc. invested $5.0 million in the Crop Development Centre (CDC) to enhance the CDC's success in wheat research and breeding.
- Large investments by the Canada Foundation for Innovation (CFI) were received in 2007/08 for major research infrastructure projects at the Vaccine and Infectious Disease Organization–International Vaccine Centre (VIDO-InterVac) and the Canadian Light Source (CLS) facility and beamline expansion.

Slightly more than 30% ($61 million) of U of S research revenue for 2013/14 was from federal government sources, principally the Natural Sciences and Engineering Research Council of Canada (NSERC), the Social Sciences and Humanities Research Council of Canada (SSHRC), and the Canada Institutes of Health Research (CIHR).[24] Research revenue from these traditional funding sources are flat to slightly declining, and stand in contrast to the strength of research support from other sources.

This Tri-Council funding trend has real implications for attracting federal government support for faculty recruitment and retention. In 2000, the Government of Canada created the Canada Research Chairs (CRC) program, a permanent program to establish 2,000 research professorships—Canada Research Chairs—in eligible degree-granting institutions across the country. The CRC program invests $300 million per year to attract and retain some of the world's most accomplished and promising minds in. Allocation of Chairs to individual universities is based on the funding awarded to the institution from the three federal granting agencies—CIHR, NSERC, and SSHRC—in the three years prior to the year of the allocation.

Figure 7. Research Revenue by Funding Source (Million $)



Source: U of S Annual Reports.

[24] It is important to note that the universities revenue recognition policy can make year-to-year comparisons difficult, as the timing of the revenue recording fluctuates based on the timing of the funding confirmation. For example the revenue from the indirect costs program (ICP) is not counted in 2011/12 and is instead counted in 2012/13. Funding for major capital projects, including building research infrastructure such as VIDO-InterVac, also significantly impacts year-to-year comparisons.

As can be seen in Table 15, the University of Saskatchewan has the smallest allocation of CRC holders of any institution in the U15: 14 Tier 1 chairs and 16 Tier 2 chairs for a total of 30 CRC positions.[25] (The U15 is Canada's association of research-intensive universities.) Growing the research portfolio, particularly with CIHR, would allow the university to leverage federal funding to attract top talent and expand the teaching and research mission of the university.

The U of S does hold 2 of the 23 chairs in the Canada Excellence Research Chairs (CERC) program. The CERC Program offers eligible Canadian degree-granting institutions the opportunity to establish highly funded research chairs in research areas that are of strategic importance to Canada. CERC awards are tenable for seven years and are not renewable. For each chair awarded in the 2012 competition, the university receives from the CERC program an amount up to $10 million over seven years, and must ensure 100% in matching funds over the same period (excluding Tri-Council and CFI funds). Institutions may request less than $10 million over the seven years.

Table 15. U15 2014 Canada Research Chair Allocation

INSTITUTION	TIER 1	TIER 2	TOTAL
University of Toronto	127	128	**255**
University of British Columbia	90	92	**182**
McGill University	77	80	**157**
University of Alberta	52	55	**107**
Université de Montréal	49	51	**100**
Université Laval	40	41	**81**
University of Ottawa	37	38	**75**
McMaster University	36	36	**72**
University of Calgary	33	34	**67**
University of Waterloo	32	33	**65**
Western University	31	33	**64**
Queen's University	24	26	**50**
Dalhousie University	22	25	**47**
University of Manitoba	21	22	**43**
University of Saskatchewan	14	16	**30**

Source: Canada Research Chairs. Results of the 2014 Re-allocation. Available at http://www.chairs-chaires.gc.ca/program-programme/allocation-attribution-eng.aspx.

5.2 SIGNATURE RESEARCH AREAS

The U of S has six signature research areas of outstanding achievement enabled by its research capacity, investments, history, and sense of place. These are

- Aboriginal peoples,
- agriculture,
- energy and mineral resources,
- one health,
- synchrotron sciences, and
- water security.

These signature areas cut across the university, collecting faculty, facilities, and students from many colleges into shared initiatives.

[25] Tier 1 chairs, tenable for seven years and renewable, are for outstanding researchers acknowledged by their peers as world leaders in their fields. For each Tier 1 Chair, the university receives $200,000 annually for seven years. Tier 2 chairs, tenable for five years and renewable once, are for exceptional emerging researchers, acknowledged by their peers as having the potential to lead in their field. For each Tier 2 Chair, the university receives $100,000 annually for five years. Tier 2 Chairs are not meant to be a feeder group to Tier 1 Chairs. The intent of Tier 2 Chairs is to provide emerging researchers with support that will kick-start their careers.

It is impossible in this report to encapsulate the full breadth and quality of work each faculty member undertakes: this section therefore is organized using the intersections and areas of particular strength.

A $37.2 million grant from the Canada First Excellence Research Fund awarded in July 2015 to look at food security—the largest federal grant ever awarded to a single university—exemplifies how the U of S' signature areas are interrelated. Over the next 50 years, farmers will need to grow more food than has cumulatively been grown since humankind emerged. The central focus of the grant is the Phenotyping and Imaging Research Centre, which will make possible the development of sustainable new crop varieties with specific desired traits at a previously unimaginable speed and scale. The seven-year effort will transform crop breeding and provide innovative solutions to national and global food security.

Led by the GIFS, the project will involve researchers from across the U of S, including the Colleges of Agriculture and Bioresources, Engineering, Pharmacy and Nutrition, Veterinary Medicine, Arts and Science, and the Johnson-Shoyama Graduate School of Public Policy. In addition, the CLS will be used to study soil and nutrient uptake in plants, the cyclotron at the Sylvia Fedoruk Canadian Centre for Nuclear Innovation will create radioisotopes for biological imaging, and the Global Institute for Water Security will support research at the nexus of water and agricultural practice.

5.2.1 Aboriginal People: Engagement and Scholarship

Given current population trends, by 2050 half of Saskatchewan's population could be of Aboriginal ancestry, underscoring the importance of research and service programs as well as the redesign of educational practices to bolster equity and inclusion initiatives. Aboriginal alumni currently only number 3,000 (5% of total), but current enrollment stands at about 2,000 and the university has taken steps to redesign its programs and extend its operations to increase inclusion. (As described in Section 3, the true number of Aboriginal alumni is unknown.) There are pressing issues of disparity and inequality that a social asset like U of S can and should address.

The undercurrent of U of S and its Aboriginal community partners' strategy is two-way learning, where the university shares its programming and communities share their knowledge and resources. The aim is to increase awareness and understanding, raising collective knowledge while innovating inclusive ways of learning.

For example, in the College of Arts and Science, Keith Carlson, Professor of History and Research Chair in Aboriginal and Community-Engaged History, has established relationships with the Salish people on the Pacific coast and the Cree and Métis peoples of the prairies. Whereas it used to be common for research teams to engage communities in their research, these communities often did not receive communications about the findings or assist in guiding research questions. In contrast, Professor Carlson leads students and communities in community-directed research projects. Research questions are elicited from Aboriginal communities, and then teams of senior researchers, students, and community participants conduct the studies and review findings collaboratively.

The Johnson-Shoyama Graduate School of Public Policy is a partnership between the University of Saskatchewan and University of Regina, with a home on both campuses. PhD student Danette Starblanket recently received a $20,000 Queen Elizabeth II Centennial Aboriginal Scholarship, to continue her research into the Idle No More movement and how it affected government policy and practice in Canada.

The Native Law Centre has been at the nexus of education, service, and scholarly research since 1975, and the Aboriginal Education Research Centre since 2005.The Department of Indigenous Studies brings elders into the classroom to further its mission to understand indigenous societies from within.

Professional colleges have launched programs designed to meet the needs of Aboriginal students that differ from those of other students. For more than 40 years, the College of Education has run the Indian Teacher Education Program (ITEP), supported by U of S operating funding and assistance from Indian and Northern Affairs Canada. Initially planned as a certificate program, ITEP evolved into a four-year degree program that provides the training, tools, and foundation in teaching theory and research that First Nations educators need. The objective is to expand the population of Aboriginal educators and to deliver inclusive education and encourages the appreciation of Aboriginal students for their cultural heritage. ITEP has community programs in Battleford, Beardy's and Okemasis, Big River, Onion Lake, and Thunderchild as well as at Aurora College in Fort Smith. A companion program, the Saskatchewan Urban Native Teacher Education Program (SUNTEP), was established for Métis and non-status Aboriginal students who wish to teach at the elementary, middle year, or secondary levels.

The College of Nursing has expanded its footprint from Saskatoon, Regina, and Prince Albert to include La Ronge, Île-à-la-Crosse, and Yorkton, permitting students to complete their degrees using a mix of in-person, practicum, and distance learning tools without leaving their communities and responsibilities. More than 150 students are enrolled in the University of Saskatchewan Community of Aboriginal Nursing program.

The Edwards School of Business launched the Aboriginal Business Administration Certificate that supports students by allowing them to begin training in regional colleges to bridge gaps they may have in their education or receive a training certificate and then transfer with credit into the bachelor of commerce program.

Through its research, service, and educational programming, the U of S translates knowledge into practice and serves as a force for positive change.

5.2.2 Agriculture: Food and Bioproducts for a Sustainable Future

Perhaps in no other research area has the economic impact of the U of S been as profound as in agriculture. The university was launched with a specific mandate to serve the agricultural and economic development needs of the province, and for decades has been a leader in agricultural sciences and biosciences. The following highlights evidence the university's contribution to Saskatchewan's socioeconomic well-being and growth.

The mission of the Crop Development Centre (CDC) is "to improve economic returns for farmers and the agriculture industry of Western Canada by improving existing crops, creating new uses for traditional crops, and developing new crops." Over more than 40 years, the CDC has developed over 400 varieties of seeds adapted to the climatic and soil conditions of the prairies. These include wheat, barley, oat, flax, and pulse varieties. The CDC's research translated into major crop diversification and a recent impact assessment estimated the returns on research programs supporting the CDC to range from 13:1 to 20:1.[26]

The newest asset in Saskatchewan agricultural innovation is the Global Institute for Food Security (GIFS)—a signature research initiative that received $35 million from PotashCorp, $15 million from the Government of Saskatchewan, and $2 million from Viterra, Inc. GIFS's focus is on research, training, and education to provide much-needed technological, economic, nutritional and environmental improvements to the food supply system.

One objective of GIFS is to attract top researchers to Saskatchewan to complement existing capacity and leverage assets like the Canadian Light Source and the Cyclotron to expand the province's competitive advantage. GIFS is recruiting a CERC holder in food security, which would bring $10 million in match-

[26] KPMG LLP. 2013. Evaluation of the Strategic Research Program and Agriculture Development Fund. Prepared for the Saskatchewan Ministry of Agriculture.

ing funds to the U of S from the federal government to invest in research infrastructure. It is also in the process of hiring other leading experts to come to Saskatoon, build teams, and support the expansion of socially-important and commercially relevant research.

GIFS will lead the expansion of the U of S into such topics as how soil and water quality affect the nutritional value of crops and the developmental biology of seeds, all with the aim of improving food security in the developing and developed world. It will also be pioneering "digital agriculture"—the interface between bioinformatics, genomics, imaging, and the agricultural sciences.

The contributions by the U of S extend beyond research. Outreach and service offer the opportunity for learning and practical experiences, which characterizes the institution as much as the applied research portfolio. For example:

The Crop Development Centre (CDC) is a field crop research organization within the Department of Plant Sciences in the College of Agriculture and Bioresources. Over 40 years, the CDC has released over 400 new crop varieties, diversifying crop farming across Saskatchewan and beyond. Working in collaboration with the private and public sectors, the CDC provides educational opportunities while also providing real-world solutions.

- The Canadian Centre for Health and Safety in Agriculture works with farming communities in Saskatchewan and across Canada on work practices that reduce injuries, keep farmers productive, and avoid health care costs and lost productivity.
- The College of Agriculture and Biosciences disseminates best practices and guidance for low till, no till, and zero till land management practices for the prairies.
- The Western College of Veterinary Medicine (WCVM) travels to all areas of the province to treat more than 30,000 animals per year. The WCVM Veterinary Medical Centre is the main referral hospital for the prairies and sees an additional 13,000 animals per year.

Agriculture is becoming more knowledge- and capital-intensive, and the application of science and technology to farming practices and the suite of products and services surrounding these practices is essential to sustainable, environmentally sensitive food production.

5.2.3 Energy and Mineral Resources: Technology and Public Policy for a Sustainable Environment

Like agriculture, energy and mineral resources are pillars of the Saskatchewan economy. Saskatchewan is a major producer of uranium, potash, coal, and iron ore, and along with the economic advantages of exploiting that mineral wealth comes the responsibility to manage and safeguard the environment. It is also important to use extracted resources to their full social advantage, which means developing new applications, products, and technologies that increase Saskatchewan's value-add to mineral wealth and provide expanded economic opportunities for people and businesses.

The investment in the Sylvia Fedoruk Canadian Centre for Nuclear Innovation was made as a bold step to expand Saskatchewan's position of being a leading uranium supplier to also include being a leader in the development of nuclear science

for the greater public good. The Fedoruk Centre convenes and supports the Canadian research community in:

- advancing nuclear medicine, instruments, and methods;
- advancing knowledge of materials through nuclear techniques for applications in energy, health, environment, transportation, and communication;
- improving safety and engineering of nuclear energy systems, including small nuclear reactors; and
- managing the risks and benefits of nuclear technology for society and our environment.

Nuclear medicine accounts for $23 million of the centre's $33 million research portfolio.

The U of S is a key partner in the International Minerals Innovation Institute (IMII)—a consortium of post-secondary educational institutions, major minerals companies, and government that pools research dollars, builds human capital, and innovates best practices. Corporate partners include Agrium, BHP Billiton, Cameco, K+S Potash, Mosaic Potash, North Rim Exploration, and PotashCorp.

Labour shortages, shifts in the location of corporate research centres, and the accelerating knowledge-intensity of the minerals industry catalyzed collective action to ensure that Saskatchewan does not fall behind in global competitiveness. Co-operative approaches are a hallmark of Saskatchewan and a key to the province's competitiveness in minerals innovation. The IMII strategy is to create leverage for corporate partners by co-ordinating research and development in the common interest. By pooling resources and leveraging university research expertise, companies are able to receive $8 to $12 worth of research for every $1 they invest.

Under the IMII, the U of S has reactivated its mining engineering program by drawing on its chemical, geological, and mechanical engineering capabilities. The U of S is collaborating with Saskatchewan Polytechnic and the University of Regina to develop a range of educational and training programs at different educational levels that meet the needs of Saskatchewan businesses.

Mining, nuclear medicine, and nuclear safety raise important public policy questions about fairness, environmental justice, and sustainability. There needs to be better integration between research institutes and public policy. To this end, the Johnson-Shoyama Graduate School of Public Policy, the International Centre for Northern Governance and Development, and the School of Environment and Sustainability, among others, are social assets for understanding the social, legal, and cultural implications of science and technology, not only in minerals and nuclear sciences but also in other U of S signature research areas.

Funding from the Natural Sciences and Engineering Research Council and industry partner Federated Cooperatives Limited is supporting research into sustainable methods of remediating underground sites contaminated with diesel or gasoline, of which they are more than 30,000 in Canada. Projects like this one help bring together researchers and real-world problems, leading to solutions with big impact.

5.2.4 One Health: Solutions at the Animal-Human-Environment Interface

U of S signature research areas are not isolated from each other: they are linked and take advantage of a unique combination of talents and assets. What does it mean to have:

- one of the best colleges of agriculture and bioscience worldwide,
- a leading college of veterinary medicine and a medical school,
- the Fedoruk Centre for nuclear innovation, which is now home to a newly constructed cyclotron that will produce medical isotopes for patient care,
- the Canadian Light Source for examining molecular structures, and
- the VIDO-InterVac with more than 65 PhD-level researchers working in human and animal infectious diseases?

This combination uniquely positions U of S for pioneering research at the interface between human, animal, and ecosystem health. "One health" is the recognition that health for all species is inextricably linked to challenges such as emerging diseases, water and food safety, and environmental degradation. Building our understanding of this interface is incredibly important for Saskatchewan because of the economic base in agriculture and minerals and the changes in the ecosystem expected because of climate change.

VIDO-InterVac is a Canadian signature research centre that attracts infectious disease, animal health, and biopharmaceutical research to Saskatoon. It conducts contract research with more than 125 different corporate and government clients from around the globe. Its post-graduate training programs develop ambassadors for Saskatchewan—researchers that go on to work with clients around the world but who maintain their connections to VIDO through scholarship and partnership. Connected to the Western College of Veterinary Medicine, VIDO-InterVac has commercialized eight vaccines, including six that are considered world firsts. It has a staff of nearly 200 people and research revenues of $17 million per year. VIDO-InterVac is a significant contributor to the University's exemplary performance in licensing and licensing income.

The Saskatchewan Centre for Cyclotron Science will support nuclear medicine, medical imaging, and research for human, animal, and crop health through the production of short-lived medical isotopes. These radioactive isotopes are necessary for advanced imaging techniques and radiotherapies to treat cancers and other ailments.

Over the next 50 years, due to a growing world population, farmers will need to produce more food than has been cumulatively grown since humankind emerged. A $37.2-million Canada First Excellence Research Fund (CFREF) grant, one of only five given to Canadian universities, will support research into solutions. The U of S will work with on- and off-campus facilities and partners to transform crop breeding and help feed a growing world.

5.2.5 Synchrotron Sciences: Innovation in Health, Environment, and Advanced Technologies

Synchrotrons generate extraordinarily brilliant light—1 million times brighter than sunlight—that can be manipulated and shone on objects and materials to analyze their microstructures and chemical properties. A synchrotron can produce more powerful images than can be produced by MRI.

The centrepiece of synchrotron sciences is the Canadian Light Source (CLS)—one of Canada's signature scientific research facilities and a joint investment between the CFI, Western Economic Diversification, NSERC, National Research Council, CIHR, the Government of Saskatchewan, and the University of Saskatchewan.

This $305-million dollar research facility has attracted millions of dollars of scientific research to Saskatoon, hosted thousands of researchers from around the globe, and employs more than 200 science, engineering, and technology professionals. Operating expenditures for 2013/14 were $28.9 million, less than 15% of which was contributed by U of S. The balance of operating funds are from industrial users—the CLS has a goal of 25% industry usage—and a broad consortium of federal, provincial, and university users.

The CLS provides a platform that enables a wide variety of research in many fields, including:

- chemical and materials science,
- life sciences (e.g., medicine, biology),
- earth and environmental sciences, and
- industrial sciences.

Research platforms like the CLS allow companies like Cameco, Areva, Chevron, Lorax Environmental Services, and many confidential users to understand materials properties and design and develop new products and solutions.

5.2.6 Water Security: Stewardship of the World's Freshwater Resources

The Saskatchewan River is the lifeblood of the prairies, and it is essential to understand how climate change, land management practices, and mining affect water security. Directed by Howard Wheater, the first U of S CERC holder, the Global Institute for Water Security brings together expertise to monitor, understand, and protect water resources through advanced research in engineering, environmental science, and social sciences.

Professor, Wheater relocated to Saskatchewan from the United Kingdom, and seeded by $30 million in federal, provincial, and university support, has developed an interdisciplinary team of 70 faculty and 50 students to vastly expand Saskatchewan's capacity to safeguard and sustainably manage its freshwater resources.

Since it was launched in 2011, the GIWS has:

- worked with industry to understand water security issues surrounding oil sands, uranium, and other natural resource development projects, particularly as pertains to management of brines, fracking fluids, and carbon sequestration projects;
- analyzed issues related to water futures, costs, and benefits of different water use scenarios;
- worked with First Nations communities to consult on land development practices that are compatible with managing ecosystems at the border between the prairies, wetlands, and the boreal forest; and
- implemented state-of-the-art monitoring systems on the Saskatchewan River Basin to improve the ability to predict river flows and improve understanding of how water quality and river basin ecosystems respond to climate change.

The Global Institute for Water Security, the School of Environment and Sustainability, and the Department of Drama collaborated on a play, Downstream*, to disseminate research findings to broad audiences. It was presented as forum theatre to engage audience members and encourage them to interact with research findings through storytelling.*

5.3 COMMERCIALIZATION OF UNIVERSITY RESEARCH

By number of students and annual research expenditures, the U of S is one of the smallest institutions in the U15. However, when one adjusts for these factors and considers the extent to which the university commercializes and earns income on the fruits of past research, the U of S is a U15 leader.[27] This is despite the fact that it has comparatively little research support from CIHR.

The U of S is a leader in:

- the number of new licenses issued per $100 million in research expenditure,
- gross licensing income per $1 million in research expenditure, and
- the number of cumulative active licenses per $100 million in research expenditures (Figure 8).

The engines of the university's past commercialization success are in the College of Agriculture and Biosciences, the Crop Development Centre, the College of Engineering, VIDO-InterVac, and the Western College of Veterinary Medicine. The U of S has had particular success in licensing its vaccine and myriad seed and crop science technologies. The markets for these technologies are difficult for start-up companies, and the majority of university intellectual property is licensed to established companies in Saskatchewan and beyond.

Since the 1970s, 53 companies have formally emerged from the U of S, including SED Systems and Vecima Networks. Many more have been started by U of S graduates, though without a formal linkage to U of S research and technology. The U of S also supports technology start-ups in Saskatchewan that have some university association (founded by alumni, students, etc.) with the Industry Liaison Office's TechVenture Challenge, a business plan competition that supports entrepreneurs and leads to a $50,000 prize each year. Seventeen additional start-ups are involved in the TechVenture Challenge.

Innovation Place is Saskatchewan's network of university-related technology parks, with facilities in Saskatoon, Regina, and Prince Albert. The mission of the organization is to support the growth and success of Saskatchewan's technology sector, and it fulfills this mission through the technology parks. They manage specialized buildings primarily for technology companies and the service organizations that support them.

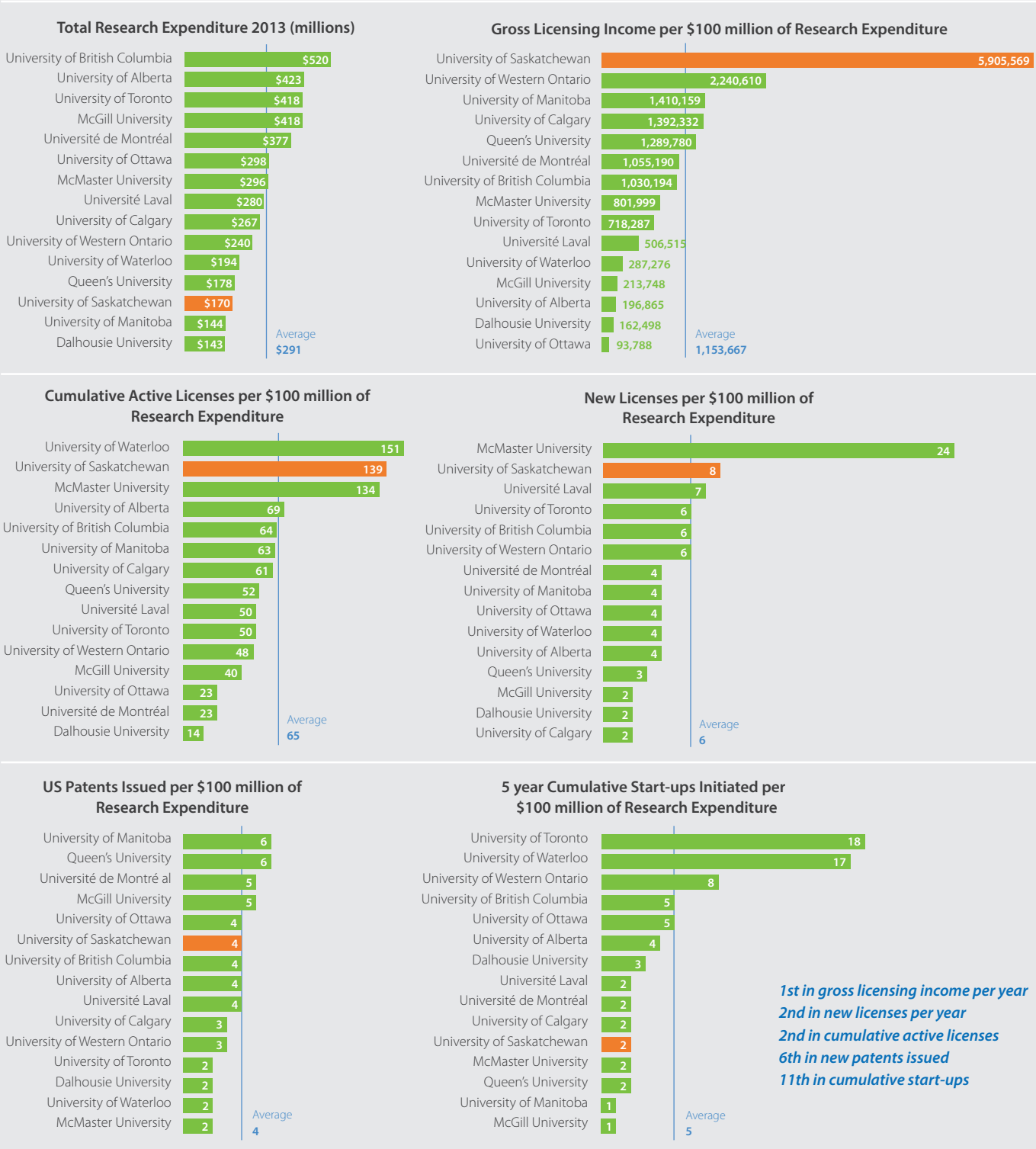
The Saskatoon campus of Innovation Place, which is linked to the University of Saskatchewan, has 118 tenants, and 2,600 employees. The Saskatoon campus leverages the university's strength in agriculture, information technology, and environmental and life sciences, along with the strengths of the nearby federal and provincial agencies.

Going forward, the challenge for the U of S is not only to continue to convert existing research into new products and services, but to accelerate and expand that portfolio as the university reaps the rewards of new signature investments.

[27] The data in this section are from the Association of University Technology Managers and are for 2013, the last year for which comparative data are available.

Figure 8. Commercialization of University Research

Although the University of Saskatchewan is one of the smaller members of the U15 group of Canadian research universities, as measured by research expenditures (2013)*, it is a leader in the commercialization of its innovation.



* Last year for which comparison data are available. Source: Association of University Technology Managers.

6
Recommendations

RTI conducted interviews with 37 community, business, and academic leaders in Saskatchewan. The primary purpose of these interviews was to elicit insight from a diverse set of representatives in order to contextualize the findings from the quantitative analysis. Over the course of our discussions, several themes became apparent, with common perspectives on and recommendations for the U of S being echoed by people with starkly different responsibilities and lived experiences.

Above all, it was evident that the U of S is a well-respected and beloved institution. Successive generations of Saskatchewan people have been educated at what is the premier educational institution in the province. Faculty and community leaders are deeply fond of the university, proud of its contributions and possess a sense of ownership and responsibility for the larger role the university plays for Saskatchewan.

The knowledge, innovations, and service contributions of this institution have had tangible impacts on the development of the province and the lives of its people. Consider, for example, that the WCVM treats thousands of animals per year at locations across the province, or that faculty members provide technical assistance to First Nations communities in land-rights resolution, and that crop development research has taken Saskatchewan from having no commercial pulse crops to a leading exporter of lentils and chickpeas.

As the knowledge intensity of the economy increases and solutions are sought to the pressing problems of the day, the significance of the U of S to the province and its influence on the economy will become even more immediate. The commentary in this section offers constructive insights and support for the university to better understand its role in regional development moving forward.

6.1 SELECTED INTERVIEW THEMES REGARDING THE U OF S AND REGIONAL DEVELOPMENT

Our interviews revealed tremendous gratitude for and celebration of the U of S in the Province of Saskatchewan. In addition, we noted four themes within the university community about the role of the U of S in regional economic development. These themes are not negative, but do warrant further exploration because they suggest an institution that is cognizant of its economic heft and that is engaged in an internal dialogue about how best to meet the needs of the province.

Our view is that these themes touch on important issues of a changing role in regional development, the duality of being a local and a global institution, the culture of teaching and research, and ensuring academic freedom. Bridging the gap between any underlying specious tensions will bring cohesion to the campus, thereby enhancing the university's impact and effectiveness over the long run.

The four themes we wish to highlight from our interviews are:

- Being a local university for the province and a globally-preeminent research institution: how does the university continue to focus on the socioeconomic needs of the province while also investing in research on the world's most pressing problems?
- Being adaptive and entrepreneurial while adhering to the core sense of purpose: how does the U of S remain "the people's university" as it grows and adapts in a dynamic and global economy?
- Balancing academic freedom and independence with sponsored research: how do we ensure that safeguards for scientific integrity and academic freedom are maintained? Sponsored research is in the public interest and can co-exist with publicly supported research, but how is the appropriate balance maintained?
- Being bold and being humble: how does the U of S reconcile large investments and risk taking with prairie cultural traits (e.g., humility, frugality)?

One interviewee said that "the U of S has an 'either/or' perspective. It needs to be converted to an 'and' perspective." The U of S has the opportunity to embrace and address each of these themes.

6.2 RECOMENDATIONS

Observations from qualitative interviews offer insights and recommendations that can assist the U of S in amplifying its impact in the future.

First, the U of S can foster greater understanding within the university community to generate awareness that the U of S, as a portfolio of knowledge assets, can and should embrace both sides of the seeming duality evident in the interview themes.

Second, the U of S can embrace its role in Western Canada's economic and social development.

Third, the U of S has the opportunity to increase support for social and venture entrepreneurship in the province.

Fourth, the U of S can embrace and communicate its successes in teaching, academia, leading-edge science, economic development and community service. Communicating more directly and clearly will help showcase how the university is proactively leading the province.

6.2.1 Cultivate a Shared Understanding of the Varied Roles of the U of S

The U of S can take steps to build on its existing strengths in economic and community development.

The U of S is an institution of national significance. The university has competed for and secured a collection of Canadian signature research institutes and centres based on the strength of its faculty and research. Many of the challenges faced in Saskatch-

ewan are also faced in other regions, and the U of S has the knowledge assets that can address these problems. Searching for solutions and addressing problems provides learning opportunities and grows the region's human, social and economic capital. Both local and global orientations are fostered by the university.

The U of S would do well to increase its basic research funding from the Tri-Council, especially CIHR, and foundations. A larger publicly supported basic research portfolio would increase the long-term impact of the university while also balancing research of commercial relevance.

The university is an autonomous, independent organization. And yet, global research universities always work closely with industry. Engaging in sponsored research and partnering with industry helps colleges ensure that their degree programs are attuned to market needs while also affording the opportunity to engage in research with immediate impact. To improve outcomes in labour market development and knowledge translation, in many disciplines there is no better way than to stay attuned to market demands for training and research.

The university has many opportunities for enhancing the impact of its teaching and research programs. Working with the private- and not-for-profit sectors provides the opportunity to conduct research with immediate impact and provide real-world learning experiences for students. It creates a feedback loop that can calibrate course curricula and, like the Edward's School of Business' cooperative program for undergraduate business majors, it creates employment pathways for students.

6.2.2 Embrace the University's Role in Regional Economic Development and Community Engagement

As documented in this report, the U of S is an institution with $1 billion in annual revenue, contributes 1.5% of Saskatchewan's GDP, and is a leader in the commercialization of its research.

This university has a deep social consciousness and strong sense of place, as well as a legacy in cooperatives, technology development, community service and outreach. Marrying this culture and cooperative way of working with the realities of the 21st century economy gives the U of S the unique opportunity to be a pioneer and a model for others in this arena.

The Province of Saskatchewan is looking to the university to help diversify and expand the economic base, attract new residents, and train the workforce to meet emerging skills requirements. The university is a knowledge asset that can further the economic growth and diversification of a province heavily dependent on agriculture and mineral resources. In the current economic climate, knowledge creation and translation is critical to competitiveness, and the success of the U of S, as other universities in Canada, is interconnected with the success of community and industry.

There is also a great opportunity for the university to help facilitate entrepreneurship in the region. The university can build on the strength of its relationships with business and industry and ensure training, research, and development are synergistic with provincial and regional priorities.

The university plays an important role in the social and cultural fabric of the province. As a social and community asset, the university can be a force for equity, responsible and sustainable management, and the exploration of important cultural and public policy issues that inevitably arise as economies expand. Moreover, the university must continue to build its outreach and programming with Aboriginal communities locally, and Indigenous communities globally.

An interviewee in government noted that "Saskatchewan is about creating and growing, and it needs the university to be a driver." The University of Saskatchewan's impact and importance to the future of the province present a vital opportunity for economic, social and community development and engagement. Given the culture of the U of S, how the U of S goes about its role in regional development is as important as what it does.

6.2.3 Expand Support for Social and Venture Entrepreneurship

There is a great opportunity for the university to enhance the social and venture entrepreneurial culture in Saskatchewan. Entrepreneurship is equally about innovating and develop-

ing new ways of working and creating opportunity through new ideas and solutions as it is about commercializing a new technology. Entrepreneurship is not limited to business or engineering students starting up a company. An anthropologist or historian launching a cultural impact assessment service is as much of an entrepreneur as a biologist commercializing a novel medical device.

As a large institution, the university fosters the flow of ideas and the types of exchanges that help innovation and entrepreneurship flourish. The university can play a leading role in spurring Saskatchewan's entrepreneurial culture by incorporating entrepreneurship across all disciplines. The sponsorship of business plans and case competitions, for instance through the Johnson-Shoyama Graduate School of Public Policy, and drop-in centres and idea labs like the Social Science Research Laboratory, and business incubation and acceleration programs like the W. Brett Wilson Centre for Entrepreneurial Excellence help members of the university community develop or explore their ideas and contribute to Saskatchewan's development, growth and prosperity.

6.2.4 Simplify and Broaden Communications

While hallmarks of prairie culture include grit and pluck, they also include humility and frugality for withstanding during trying circumstances. And, in the words of one business leader, "it would serve the university well to raise its profile and enhance its global orientation…we cannot fly under the radar any longer."

A predominant theme of our interviews was that the university may be too reluctant to promote itself and its outstanding accomplishments, such that Saskatchewan is unaware that not all communities have a university as unique as the U of S. The university should ramp up its communication about its successes. One interviewee summarized this sentiment by saying "The U of S needs to think about and communicate what we are doing collectively for the province, the country and the world."

The university and the province should proactively communicate and celebrate the accomplishments of the U of S to diverse audiences. This is no small task, but we are confident that for such a beloved university, with the talent, resources, and commitment within and outside the institution, by emphasizing the themes described above the university can communicate clearly what it is, where it stands, who it serves, and how it serves.

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Technical Appendix

A.1 INPUT-OUTPUT MODELING APPROACH

RTI examined U of S human resource, purchasing, and student enrollment systems using a quantitative model representing the Saskatchewan and Canadian economies—the interprovincial version of the Canadian Input-Output modeling system.

Input-output analysis is a well-known and reliable methodology with a long history in economics; the economist who created the framework received the Nobel Prize in Economic Science for this work. For this study, we use the methodology as applied in the official Canadian Input-Output model developed by Statistics Canada. Full documentation of this model is provided in the User's Guide to the Canadian Input Output Model.[1]

It is important to note that input-output analysis, alternately referred to as social accounting multiplier analysis, was used in this study because it produces the practical macroeconomic contribution data that the U of S sought in order to understand its relationship to regional economy. Social accounting multiplier analyses, which often denominate results in employment, gross product, and labor income, for instance, assess resource reallocation or engagement within certain geographic boundaries. A new facility employs or could employ so many people, for example. These analyses are worthwhile studies at the regional level to assess effectiveness in gainfully employing existing resources or measuring the extent to which one subnational region attracts resources from another.[2]

In public-sector analyses of university research and development (R&D) outcomes, however, the primary objective is not to review resource reallocation but rather to determine how that R&D translates into meaningful value—enhanced efficiency in resource allocation, improved productivity, and the availability of novel products and services that enhance quality of life. Social accounting analyses by definition are incapable of quantifying these benefits. If we were evaluating the broader social benefits of university research alternate methods would have been employed.

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[1] Industry Accounts Division System of National Accounts, Statistics Canada, 2009.

[2] O'Connor, A. and A. Link. 2013. *Pilot Socioeconomic Impact Analysis of CFI and CIHR Funding: Medical Imaging R&D*. Prepared for the Canada Foundation for Innovation and the Canadian Institutes of Health Research.

Our study for the U of S raises the bar for transparency and quality of future input-output studies. To accomplish this, we took the following steps:

- Used the official Interprovincial Canadian Input-Output Model for all input-output analysis. Only three of eight studies prepared for other universities that we reviewed had directly used the simulation model.
- Described in detail how the inputs for the model were prepared and what the sources were (including sources for all data or the assumptions made).
- Accounted for in-province and out-of-province spending patterns.
- Avoided the analysis of gross output because of the substantial amount of double counting included, by design, in this measure.
- Provided the U of S input spreadsheet that was used in the runs in the Canadian Input-Output Model. One can independently replicate the study, change assumptions in the study, or prepare future studies that are internally consistent with the existing study.
- Provided the U of S output spreadsheets that were generated by the Interprovincial model Canadian Input-Output Model. This includes over 200 result tables.
- Provided an independent analysis and interpretation of the key economic indicators (GDP, wages and salaries, and jobs) obtained from the model.

A.2 U OF S FINANCIAL OVERVIEW

We obtained the total revenue and expenses data from the 2013/14 University of Saskatchewan Annual Financial Report (page 6 and 9) (Tables A-1 and A-2). Employment data are in Table A-3.

Table A-1. U of S Total Consolidated Revenue, 2013/14

Revenue	Value
Grants and contracts: Government of Saskatchewan	$500.9 million
Student fees	$127.4 million
Sales of services, products, and other	$98.6 million
Grants and contracts: Government of Canada	$69.3 million
Other governments and non-government grants	$85.1 million

Revenue	Value
Investment income	$83.3 million
Gifts, grants and bequests	$29.3 million
Other Income	$24.7 million
Total Revenue	$1,018.6 million

Source: 2013/14 University of Saskatchewan Annual Financial Report (Page 6).

Table A-2. U of S University Total Annual Expenses, 2013/14

Expenses	Value
Salaries and employee benefits	$534.7 million
Operational supplies and expenses	$136.8 million
Costs of goods sold, equipment maintenance, rental, travel, and other	$50.8 million
Scholarships, bursaries, and prizes	$39.1 million
Utilities	$25.0 million
Amortization	$73.1 million
Total Expenses	$859.5 million

Source: 2013/14 University of Saskatchewan Annual Financial Report (Page 9).

Table A-3. U of S University Total Employees, 2013/14

	Number
Headcount, including casual employees	7,911
Headcount, excluding casual employees	6,203
Full-time equivalents[a]	5,433.4

[a] For example, if you have 5 people working half time, you would have a headcount of 5 but the FTE would be 2.5. Also, FTEs are annualized, meaning if one person works full time for six months the headcount is 1, but the FTE is 0.5.

A.3 NEW CONSTRUCTION AND CAPITAL INVESTMENT

We obtained capital investment expenditures from the university's Facilities Management Division. This includes new buildings on campus including residences, laboratories, classrooms, and student spaces. According to the 2013/14 University of Saskatchewan Annual Financial Report (Page 18), new construction expenditures for 2013/14 included $15.5 million on the Health Sciences project, $8.0 million on the

Saskatchewan Centre for Innovations in Cyclotron Science, and $4.5 million on the Gordon Oakes-Red Bear Student Centre.

A.4 STUDENT SPENDING

We obtained the student attendance data presented in Table A-4 from the University of Saskatchewan Data Warehouse, Year End Snapshot Data Prepared by Information and Communications Technology–Reporting and Data Services. Identifying new student spending coming to the province and student spending is difficult to precisely quantify. For example, students living at home may not pay rent. Yet, they still consume utilities, goods, and services procured by the household. Excluding student spending from students living within the province or that continue to live at home would overlook the fact that many of these students are likely to leave the province to attend other schools if a university of equivalent caliber was not available. In our *Summary of Total Economic Impacts of University of Saskatchewan-Related Expenditures* we provided a breakout of the impacts by source so readers can evaluate and use alternative assumptions about student spending. Our view is that we are measuring gross impacts throughout this report and including local student spending is part of gross impact measurement.

Table A-4. Number 0f University Students by Origin: Academic Year 2013/14

Origin	Number
International	3,348
Out of Province	4,030
Saskatchewan	16,397
Total	23,788[a]

[a] Includes 13 students who were undeclared. Source: University of Saskatchewan Data Warehouse. Year End snapshot data prepared by Information and Communications Technology—Reporting and Data Services.

Estimation Method

Living expenses were estimated using information about the student population and average student room and board expenditures obtained from affordability and accessibility surveys. Average per student spending for room (8-month academic year) was $650 per month. Average per student

spending for board (food, cable, phone, entertainment, other) (8-month academic year) was $630 per month.

Total student spending:

Total Students × Monthly Living Expenses per month × Academic Months

23,797 × $1,280 × 8 = $243.7 million

For the interprovincial version of the Canadian Input-Output modeling system, we allocated the total estimated student living expenditures ($243.7 million) across the following categories as follows:

- Local transportation: 6%
- Books, supplies, computers: 15%
- Telecommunications: 3%
- Accommodation: 49%
- Food: 20%
- Leisure: 7%

The percentages were calculated using data from the latest published economic impact study by Western University.[3] This study that also uses the interprovincial version of the Canadian Input-Output modeling system. This information is summarized in Table A-5.

Table A-5. Distribution of Estimated Student Spending by Spending Category, 2013/14

Spending Category	Reported Value Western University (million)	Western University (percent)	Estimated Value U of S (million)
Local transportation	$17.2	6%	$14.3
Books, supplies, computers	$43.1	15%	$35.9
Telecommunications	$9.6	3%	$8.0
Accommodation	$144.0	49%	$119.9
Food	$57.6	20%	$48.0

[3] KPMG Management Consulting, 2015.

Spending Category	Reported Value Western University (million)	Western University (percent)	Estimated Value U of S (million)
Leisure	$21.2	7%	$17.6
Total	$292.7	100%	$243.7

Source: RTI analysis of Western University EIA (2015, Figure 32).

A.5 VISITOR SPENDING

We discussed visitor spending patterns with Tourism Saskatoon and reviewed their recent summary of tourism in Saskatoon. Detailed statistics or survey data for all U of S-related visitors were not available. As a result, we estimated visitor spending using existing methodologies. As discussed below, the total value was estimated to be $132.9 million (Table A-6).

Estimation Method

Given the uncertainty associated with the visitor spending methodology, RTI conducted a validation exercise by contacting Tourism Saskatoon and comparing the final estimated value ($132.9) with overall tourism spending reported in their recent summary of tourism in Saskatoon. Personal email communications with Tourism Saskatoon suggested the estimate seemed reasonable given currently available data and knowledge of the industry. During 2012, 2.8 million visitors travelled to Saskatoon on overnight and same-day trips and overall tourism generated about $505.3 million in consumer spending in Saskatoon.[4] The current estimate ($132.9 million) means that approximately one quarter of visitor spending in Saskatoon relates to the U of S.

Total Visitors:

Number of Undergraduates × average visitors per undergraduate

18,463 × 8 = 147,704

The ratio of total university related visitors to the number of undergraduates (8) was taken from the University of Calgary

[4] Tourism in Saskatoon: A Summary of Tourism in 2012 (May, 2014).

economic impact analysis (Office of Institutional Analysis, 2013).

Total Visitor Spending:

Number of visitors (147,704) × length of stay × average spending per day.

147,704 × 3 x $300 = $132.9

The number of days (3) and spending per day ($300) were assumed values based on our review of existing studies (Office of Institutional Analysis, 2013 and Briggs & Jennings, 2012).

For the interprovincial version of the Canadian Input-Output modeling system, we allocated the total estimated visitor spending ($133.3 million) across the following categories as follows:

- Retail: 15%
- Taxi: 5%
- Vehicle rental: 10%
- Accommodations: 41%
- Food and beverages: 21%
- Entertainment: 8%

The percentages were also calculated using data from the latest published economic impact study of Western University (2015, Figure 33).

Table A-6. Distribution of Estimated Visitor Spending by Spending Category, 2013/14

Spending Category	Reported Value Western University	Western University (percent)	Estimated Value U of S
Retail	$6.7	15%	$19.3
Taxi	$2.4	5%	$6.9
Vehicle rental	$4.8	10%	$13.8
Accommodations	$19	41%	$54.7
Food and beverages	$9.5	21%	$27.3
Entertainment	$3.8	8%	$10.9
Total	$46.2	100%	$132.9

Source: RTI analysis of KPMG Management Consulting (2015, Figure 33).

A.6 INTERPROVINCIAL VERSION OF THE CANADIAN INPUT-OUTPUT MODELING SYSTEM

RTI used the official interprovincial version of the Canadian Input-Output modeling system to analyze impacts and user's guide. The guide provides basic overview of the model requirements.

RTI developed and prepared all spending estimates described above as model input, reviewed crosswalks for typical university studies, approved the final input numbers, and reviewed and analyzed the model output. Three model runs were performed for 1) changes in intermediate inputs, 2) personal expenditures, and 3) in gross fixed capital formation (See Tables A-7 and A-8).

The user's guide, model input data, and model output results (including tax data) were provided to U of S Institutional Planning and Assessment in compressed electronic form as part of this report, which includes over 200 tables.

After consultation with Statistics Canada, personal income tax data was calculated by multiplying the ratio of personal income taxes to compensation of employees between 2010 and 2013 (21.5%)[5] and the wage and salaries. All other fiscal impacts were derived directly from the IO model.

After consultation with Statistics Canada, total job impacts were calculated by multiplying the ratio of 2009 total compensation per job ($50,507) to 2009 total compensation per job ($67,068). This adjustment (0.75) accounts for differences in labor productivity assumption in the IO model year and the spending year. Put another way, this method only accounts for real job increases.

[5] The value of provincial personal income taxes and compensation of employees data was provided by Statistics Canada. Table 384-0040 - Current accounts - Households, provincial and territorial, annual.

Table A-7. Economic Impact of a University in Saskatchewan: Proposed Shock values—Shock on Intermediate Inputs

Input-Output Commodity Classification (IOCC) at the D Level			2011 Input Structure for IO Industry GS611300—Universities		Proposed Shock Values
No.	Code	Title	($'000,000)	Shares	($'000)
29	ENE211102	Natural gas	161	0.2421	6,053
30	ENE211103	Natural gas liquids and related products	40	0.0602	1,504
45	ENE221100	Electricity	370	0.5564	13,910
47	MPS221301	Water delivered by water works and irrigation systems	28	0.0421	1,053
48	MPS221302	Sewage and dirty water disposal and cleaning services	2	0.0030	75
49	ENE221303	Steam and heated or cooled air supply services	2	0.0030	75
69	MPS23D000	Repair construction services	515	0.0675	12,654
104	MPG31A002	Fabrics	1	0.0001	25
137	MPG323001	Printed products	28	0.0037	688
140	ENE324111	Gasoline	830	0.1087	20,394
142	ENE324113	Light fuel oils	97	0.0127	2,383
147	MPG3241B0	Lubricants and other petroleum and coal products	15	0.0020	369
148	MPG325101	Petrochemicals	9	0.0012	221
159	MPG325500	Paints, coatings and adhesive products	9	0.0012	221
170	MPG326109	Plastic products, not elsewhere classified	6	0.0008	147
206	MPG332A01	Hand tools and cutlery (except precious metal)	1	0.0001	25
210	MPG332A09	Fabricated metal products, not elsewhere classified	2	0.0003	49
224	MPG334102	Computers and computer peripheral equipment	2	0.0003	49
277	MPG339904	Other stationery supplies	14	0.0018	344
278	MPG339905	Signs	2	0.0003	49
279	MPG339909	Other miscellaneous goods	56	0.0073	1,376
294	MPS484001	Moving services (used goods)	5	0.0007	123
295	MPS484002	General freight truck transportation services	8	0.0010	197

(continued)

Table A-7. Economic Impact of a University in Saskatchewan: Proposed Shock values—Shock on Intermediate Inputs (cont.)

Input-Output Commodity Classification (IOCC) at the D Level			2011 Input Structure for IO Industry GS611300—Universities		Proposed Shock Values
No.	Code	Title	($'000,000)	Shares	($'000)
296	MPS484003	Specialized freight truck transportation services	7	0.0009	172
298	MPS48A001	Interurban and rural bus passenger transportation services	6	0.0008	147
299	MPS48A002	School bus service	101	0.0132	2,482
300	MPS48A003	Other transit and ground passenger transportation services	11	0.0014	270
312	MPS49A000	Postal, courier, parcels and messenger delivery services	128	0.0168	3,145
314	MPS493002	Warehousing and storage services (except grain storage)	17	0.0022	418
315	MPG511111	Newspapers, print and electronic	59	0.0077	1,450
317	MPG5111A1	Periodicals, print and electronic	138	0.0181	3,391
318	MPG5111A2	Books, print and electronic	199	0.0261	4,890
319	MPG5111A3	Other published products	2	0.0003	49
323	MPS5121A1	Movies, television programs and videos	5	0.0007	123
324	MPS5121A2	Motion picture and video production and related services	43	0.0056	1,057
327	MPS512201	Music and audio works	2	0.0003	49
333	MPS517001	Wired telephone services	119	0.0156	2,924
334	MPS517002	Wireless telephone services	113	0.0148	2,777
336	MPS517004	Internet access services	20	0.0026	491
337	MPS518000	Data processing, hosting, and related services	11	0.0014	270
338	MPS519001	Subscriptions to Internet sites and contents	3	0.0004	74
340	MPS519009	Other information services	9	0.0012	221
352	MPS524102	Accident and sickness insurance services	1	0.0001	25
353	MPS524103	Automotive insurance services	9	0.0012	221
354	MPS524104	Property insurance services	31	0.0041	762
355	MPS524105	Liability and other property and casualty insurance services	18	0.0024	442

(continued)

Table A-7. Economic Impact of a University in Saskatchewan: Proposed Shock values—Shock on Intermediate Inputs (cont.)

Input-Output Commodity Classification (IOCC) at the D Level			2011 Input Structure for IO Industry GS611300—Universities		Proposed Shock Values
No.	Code	Title	($'000,000)	Shares	($'000)
363	MPS531102	Rental of non-residential real estate	224	0.0293	5,504
366	MPS532100	Motor vehicle rental and leasing services	52	0.0068	1,278
367	MPS532A01	Computer equipment rental and leasing services	3	0.0004	74
368	MPS532A02	Office machinery and equipment rental and leasing services (except computer equipment)	94	0.0123	2,310
369	MPS532A03	Commercial and industrial machinery and equipment renting and leasing services	42	0.0055	1,032
370	MPS532A09	Other goods rental and leasing services	12	0.0016	295
372	MPS541100	Legal services	43	0.0056	1,057
373	MPS541200	Accounting and related services	81	0.0106	1,990
374	MPS541300	Architectural, engineering and related services	90	0.0118	2,211
375	MPS541400	Specialized design services	2	0.0003	49
378	MPS541503	Computer systems design and related services (except software development)	31	0.0041	762
379	MPS541600	Management, scientific and technical consulting services	153	0.0200	3,759
383	MPS541901	Photographic services	9	0.0012	221
385	MPS541909	Other professional, scientific and technical services	50	0.0065	1,229
388	MPS561100	Office administrative services	12	0.0016	295
389	MPS561300	Employment services	5	0.0007	123
390	MPS561400	Business support services	9	0.0012	221
392	MPS561600	Investigation and security services	78	0.0102	1,917
393	MPS561700	Services to buildings and dwellings	328	0.0430	8,059
394	MPS561A00	Facilities and other support services	5	0.0007	123
395	MPS562000	Waste management and remediation services	62	0.0932	2,331

(continued)

Table A-7. Economic Impact of a University in Saskatchewan: Proposed Shock values—Shock on Intermediate Inputs (cont.)

Input-Output Commodity Classification (IOCC) at the D Level			2011 Input Structure for IO Industry GS611300—Universities		Proposed Shock Values
No.	Code	Title	($'000,000)	Shares	($'000)
398	MPS610003	Tuition and similar fees for universities	41	0.0054	1,007
403	MPS621A01	Other health practitioner services	12	0.0016	295
410	MPS71A001	Admissions to live sporting events	1	0.0001	25
411	MPS71A002	Admissions to live performing arts performances	1	0.0001	25
412	MPS71A003	Sport and performing arts event organization services	2	0.0003	49
415	MPS71A006	Licensing of rights to use copyrighted works and media rights	3	0.0004	74
417	MPS71A008	Heritage institution services	10	0.0013	246
418	MPS713A00	Amusement and recreation services	3	0.0004	74
423	MPS722001	Prepared meals	167	0.0219	4,103
425	MPS811100	Motor vehicle repair and maintenance services	10	0.0013	246
426	MPS811A00	Other repair and maintenance services	23	0.0030	565
427	MPS812200	Funeral services	9	0.0012	221
428	MPS812300	Laundry and dry-cleaning services	28	0.0037	688
431	MPS812A09	Other personal and personal care services	22	0.0029	541
432	MPS813000	Other membership services	199	0.0261	4,890
437	FIC110000	Repair and maintenance	395	0.0517	9,706
438	FIC120000	Operating supplies	1,021	0.1337	25,087
439	FIC130000	Office supplies	678	0.0888	16,659
440	FIC210000	Advertising, promotion, meals and entertainment	212	0.0278	5,209
441	FIC220000	Travel, meetings and conventions	823	0.1078	20,222
467	PRM500000	Wages and salaries	14,927	0.8616	460,717
468	PRM600000	Supplementary labour income	2,397	0.1384	73,983
470	PRM800000	Gross operating surplus	10,554	1.0000	112,200
	Total				859,500

Table A-8. Impact of a University in Saskatchewan: Proposed Sock Values—Shock on Personal Expenditures and Gross Fixed Capital Formation

Input-Output Commodity Classification (S-Level)			Shock on Household Consumption		Shock on GFCF
				Values	
No.	Code	Title	Shares	($'000)	($'000)
14	M23B0	Non-residential buildings		0	28,000
17	M31C0	Food and non-alcoholic beverages	0.7500	36,012	0
30	M334C	Computer and electronic products	0.5000	17,964	0
35	M3B00	Other manufactured products and custom work	1.0000	19,288	0
38	M4B00	Transportation and related services	1.0000	21,247	0
40	M51E0	Published and recorded media products	0.5000	17,964	0
41	M5170	Telecommunications	1.0000	8,003	0
44	M53D0	Real estate, rental and leasing and rights to non-financial intangible assets	1.0000	133,859	0
52	M7100	Arts, entertainment and recreation services	1.0000	28,612	0
53	M7200	Accommodation and food services	0.2500	94,050	0
Total				**377,000**	**28,000**

Sources: RTI analysis and Statistics Canada Interprovincial Input-Output (2010) model inputs

A.7 COMPARISON TO OTHER UNIVERSITIES' IMPACT ANALYSES

In this section we compare and contrast the results for the U of S with studies prepared for other Canadian universities to assess the relative impact of the U of S on the province. Because different universities used different methods and indicators, we focused on the economic effects through total university-related spending and only examined measured input-output analysis effects.

Some studies focused on total business revenue effects, or gross output, and did not consider university contribution to GDP.[6] These included:

[6] Our study for the University of Saskatchewan does not focus on these types of effects because there is often substantial double counting.

- University of Calgary (Office of Institutional Analysis, 2013; pp:10,11, and 13),
- University of British Columbia (Sudmant, 2009; pp:10-13),
- University of Alberta (Briggs and Jennings, 2012; pp:7-9),
- University of Manitoba (PriceWaterhouseCoopers, 2009; p:3), and
- Simon Fraser University (Sun and Naqve, 2014;p.i)

Because Alberta and British Columbia are significantly more populous than Saskatchewan, to make fair provincial comparisons we needed to account for differences in population by dividing the reported total gross output reported by the economic impact studies by the population. This adjustment reveals that the U of S has the largest impact at $1,576 per person (expressed in 2014 dollars) (see Table A-9).

Other universities' impact analyses present universities' impact on provincial GDP:

- Dalhousie University (Gardner Pinfold, 2011; p:10),
- University of Manitoba (PriceWaterhouseCoopers, 2009; p:3,
- University of Regina (Conference Board of Canada, 2013; p:ii), and
- Western University (KPMG Management Consulting, 2015; p:6).

Per capita GDP, is an important measure of a province's average standard of living. As shown in Table A-10, standard of living increases ranged $113 to $1,148 for comparator universities, with the U of S delivering one of the highest standard of living increase at $1,072 per person.

Table A-9. Business Revenue per Person (Gross Output ÷ Population) Provided by University-Related Spending (2014 Dollars)

University	Province	Year	Business Revenue Impact (million)	Population	Per Capita Revenue Impact	Price Index 2014 = 113	Per Capita Revenue Impact ($2014)
University of Saskatchewan	Saskatchewan	2014	$1,713	1,125,410	$1,522	113.0	$1,522
University of Manitoba	Manitoba	2009	$1,528	1,208,589	$1,264	101.7	$1,405
University of Alberta	Alberta	2010	$1,750	3,732,573	$469	104.4	$508
University of British Columbia	British Columbia	2008	$2,455	4,349,412	$564	103.9	$614
University of Calgary	Alberta	2010	$2,526	3,732,573	$677	104.4	$733
Simon Fraser University	British Columbia	2013	$1,328	4,582,625	$290	111.0	$295

Sources: RTI analysis based on Statistics Canada Interprovincial Input-Output (2010) model results, government statistics, and review of Other University Impact Studies
Statistics Canada. Table 051-0001—Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual (persons unless otherwise noted)
Statistics Canada. Table 380-0102—Gross domestic product indexes, annual (2007=100 unless otherwise noted)

Table A-10. Standard of Living Increases Provided by University-Related Spending (2014 Dollars)

University	Province	Year	GDP Impact (million)	GDP (million)	Share of Provincial GDP	Population	Per Capita GDP Impact	Price Index 2014= 113	Per Capita GDP Impact ($ 2014)
University of Saskatchewan	Saskatchewan	2014	$1,206	$83,121	1.5%	1,125,410	$1,072	113.0	$1,072
Dalhousie University	Nova Scotia	2010	$999	$37,073	2.7%	942,073	$1,060	104.4	$1,148
University of Manitoba	Manitoba	2009	$999	$50,636	2.0%	1,208,589	$827	101.7	$918
University of Regina	Saskatchewan	2011	$332	$74,605	0.4%	1,066,349	$311	107.9	$326
Western University	Ontario	2013	$1,498	$695,705	0.2%	13,550,929	$111	111.0	$113

Sources: RTI analysis based on Statistics Canada Interprovincial Input-Output (2010) model results, government statistics, and review of Other University Impact Studies
Statistics Canada. Table 051-0001—Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual (persons unless otherwise noted)
Government of Saskatchewan Bureau of Statistics, Ministry of Finance. Saskatchewan Provincial Economic Accounts, December 2014
Statistics Canada. Table 384-0037—Gross domestic product, income-based, provincial and territorial
Statistics Canada. Table 380-0102 - Gross domestic product indexes, annual (2007=100 unless otherwise noted)

A.8 WAGE PREMIUM ESTIMATION

The earnings premium estimates are based on the earnings differentials between workers with different educational attainment in Saskatchewan according to the 2011 National Household Survey (NHS) data obtained from Statistics Canada. The earnings premium for bachelor's degree holders is estimated using the earnings differential between workers with a bachelor's degree and those with educational attainment below a bachelor's degree. For graduates with professional undergraduate degrees, such as MD, DMD and DVM, the earnings premium is based on the earnings differential between workers with a degree above a bachelor's degree and those with the highest degree below a bachelor's degree.

The earnings premium that graduate degree (e.g., MA, PhD) holders receive as a result of their U of S education depends on whether or not they also received their undergraduate degrees from the U of S. We found that 32% of those who received a graduate degree from the U of S in 2014 had also received an undergraduate degree from the U of S in the prior 14 years. Based on this finding, we assumed in our earning premium estimation that for 32% of the graduate degree holders, the earnings premium is the difference between the average earnings of workers with an above-bachelor's degree and those with educational attainment below a bachelor's degree. For the remaining portion of the graduate students, earnings premium is based on the earnings differential between a graduate degree and a bachelor's degree. Graduates of non-degree programs are not included in our earnings premium estimation. All estimates are based on gross annual earnings, adjusted for inflation and expressed in 2014 dollars.

We calculated the earnings differentials for each degree type by gender and age category and used the gender-age-specific earnings differentials to estimate the earning premium received by U of S graduates. In estimating the earnings premium for 2013 and 2014 graduates, we used the earnings differentials for the 25-44 age category for all graduates regardless of their age. In estimating the earnings premium for all alumni between 25 and 64, we used the following age categories that available in 2011 NHS employment income statistics based on the age of the graduate: 25-44, 45-64. We also took into account the age-specific 2014 labour force participation rates in Saskatchewan

when estimating the earnings premium for all graduates aged 25-64.

Table A-11. Total Number of Graduates by Year, Degree Level, and Degree Type

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Total number of graduates	2,964	2,898	2,925	3,004	3,000	3,071	3,010	3,177	3,226	3,372	3,312	3,616	4,010	4,178	4,158	49,921
By degree level																
Graduate program	426	428	409	467	461	477	484	524	563	587	705	766	856	923	892	8,968
Non-degree program	253	222	253	217	174	153	169	165	127	151	111	225	279	231	259	2,989
Undergraduate program	2,285	2,248	2,263	2,320	2,365	2,441	2,357	2,488	2,536	2,634	2,496	2,625	2,875	3,024	3,007	37,964
By degree type																
Bachelor's	2,131	2,090	2,118	2,130	2,205	2,276	2,192	2,311	2,368	2,451	2,247	2,355	2,593	2,734	2,710	34,911
MD, DVM, DMD, JD	154	158	145	190	160	165	165	177	168	183	249	270	282	290	297	3,053
Master's	343	362	341	396	396	391	410	415	463	482	593	645	754	804	749	7,544
PhD, Doctor of Science	253	222	253	217	174	153	169	165	127	151	111	225	279	231	259	2,989
Post-graduate degrees, diplomas, certificates	75	61	63	62	63	82	72	108	99	105	112	119	102	117	142	1,382
Undergraduate and non-degree diplomas, certificates	8	5	5	9	2	4	2	1	1	0	0	2	0	2	1	42

Table A-12. Total Number of Degrees/Diplomas/Certificates Awarded by Year, Degree Level, and Degree Type

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Total number of degrees/diplomas/ certificates	3,572	3,635	3,734	3,646	3,735	860	3,679	3,866	3,880	4,028	3,884	4,095	4,363	4,369	4,290	55,636
By degree level																
Graduate program	496	490	485	478	498	310	524	550	586	655	718	773	864	926	892	9,245
Non-degree program	259	282	245	199	166	38	192	173	146	149	145	279	266	217	216	2,972
Undergraduate program	2,817	2,863	3,004	2,969	3,071	512	2,963	3,143	3,148	3,224	3,021	3,043	3,233	3,226	3,182	43,419
By degree type																
Bachelor's	2,616	2,675	2,781	2,786	2,877	503	2,760	2,913	2,937	2,994	2,688	2,688	2,848	2,842	2,786	39,694
MD, DVM, DMD, JD	145	145	173	150	152	1	154	163	153	160	257	278	289	299	306	2,825
Master's	382	395	382	393	411	262	441	439	483	548	605	651	757	807	749	7,705
PhD, Doctor of Science	69	63	65	65	70	44	74	110	99	107	112	120	103	117	142	1,360
Post-graduate degrees, diplomas, certificates	45	32	38	20	17	4	9	1	4	0	1	2	4	2	1	180
Undergraduate and non-degree diplomas, certificates	315	325	295	232	208	46	241	240	204	219	221	356	362	302	306	3,872

Table A-13. Total Number of Degrees/Diplomas/Certificates Awarded by Year and Field of Study

Field of Study	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Aboriginal and foreign languages, literatures and linguistics	9	4	22	8	18	3	11	9	12	19	12	13	20	15	21	196
Agriculture, agriculture operations and related sciences	233	282	254	206	184	28	189	180	200	189	192	179	235	216	217	2,984
Architecture and related services	10	6	8	15	14	5	6	17	20	17	19	26	21	20	36	240
Area, ethnic, cultural and gender studies	22	32	31	57	52	12	36	25	39	24	21	31	16	27	27	452
Biological and biomedical sciences	234	214	221	215	260	56	230	270	260	287	275	283	279	284	265	3,633
Business, management, marketing and related support services	519	544	535	511	495	118	534	558	531	536	490	573	601	610	595	7,750
Computer and information sciences and support services	127	161	126	113	122	26	93	94	71	80	77	60	65	106	56	1,377
Education	639	617	622	591	541	117	547	558	562	601	579	577	612	665	650	8,478
Engineering	278	267	289	309	269	60	302	281	327	330	330	334	382	383	344	4,485
English language and literature/letters	117	114	135	134	126	31	126	125	75	76	115	208	222	141	197	1,942
Family and consumer sciences/human sciences	9	31	26	23	24	7	26	28	32	31	25	25	24	32	29	372
French language and literature/letters	6	6	16	14	16	5	16	9	10	7	9	8	11	8	6	147
Health professions and related clinical sciences	469	507	550	543	589	137	552	632	695	761	713	767	849	878	820	9,462

(continued)

Table A-13. Total Number of Degrees/Diplomas/Certificates Awarded by Year and Field of Study (continued)

Field of Study	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
History	54	71	77	71	87	29	83	65	53	58	43	63	40	52	41	887
Legal professions and studies	111	89	98	99	109	3	91	106	100	116	102	108	107	120	129	1,488
Mathematics and statistics	12	13	15	11	14	6	16	25	18	25	32	15	29	15	24	270
Natural resources and conservation	30	33	25	16	25	5	14	27	24	41	34	56	81	57	61	529
Other fields of study	17	17	31	28	28	7	36	59	59	72	44	54	62	56	51	621
Parks, recreation, leisure and fitness studies	92	74	87	106	133	25	117	115	142	117	109	108	123	117	143	1,608
Philosophy and religious studies	29	15	26	28	31	8	22	35	29	20	21	24	19	11	14	332
Physical sciences	54	56	60	66	54	17	71	98	69	114	115	106	103	101	102	1,186
Psychology	168	118	133	120	139	28	141	144	145	137	122	116	120	116	148	1,895
Public administration and social service professions	4	4	4	1	8	0	4	7	7	13	17	30	27	24	24	174
Social sciences	271	289	285	292	327	106	344	343	323	300	316	253	263	251	231	4,194
Visual and performing arts	58	71	58	69	70	21	72	56	77	57	72	78	52	64	59	934

Table A-14. U of S Degrees/Diplomas/Certificates Related to Health Professions

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Total number of degrees/diplomas/ certificates	469	507	550	543	589	137	552	632	695	761	713	767	849	878	820	9,462
By degree type																
Bachelor of Science in Nursing	133	209	235	243	270	104	240	303	367	414	356	387	409	418	356	4,444
Bachelor of Science in Pharmacy	77	66	71	72	82	0	73	85	88	78	91	86	85	89	82	1,125
Doctor of Veterinary Medicine	68	72	72	68	72	0	70	71	68	71	70	73	76	76	76	1,003
Doctor of Medicine	55	56	53	54	56	1	56	64	59	60	57	72	82	84	85	894
Doctor of Dental Medicine	22	17	48	28	24	0	28	28	26	29	28	27	26	26	26	383
Master of Science	15	13	18	18	15	10	21	18	19	18	20	30	22	35	23	295
Master of Nursing	11	4	7	12	20	11	15	15	16	15	14	25	27	26	22	240
Bachelor of Science in Physical Therapy	29	32	30	26	34	1	27	30	30	0	0	0	0	0	0	239
Master of Public Health	0	0	0	0	0	0	0	0	5	7	18	15	58	53	79	235
Master of Physical Therapy	0	0	0	0	0	0	0	0	0	38	41	34	41	33	41	228
Doctor of Philosophy	12	3	5	7	8	4	13	11	12	18	13	13	14	18	16	167
Master of Veterinary Science	12	3	5	13	4	6	9	7	5	13	5	4	8	13	5	112
Certificate in Health Care Administration	33	29	0	0	0	0	0	0	0	0	0	0	0	0	0	62
Bachelor of Science in Medicine	2	3	5	2	4	0	0	0	0	0	0	0	0	0	0	16
Certificate in Global Health	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	14
Post Graduate Degree Specialization Diploma	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	5

A.9 RESEARCH PORTFOLIO DATA

The time trend in research revenue is presented in Table A-15.

Table A-16 lists the University of Saskatchewan Canada Research Chair (CRC) members and their disciplines. The allocation of chairs is based on the amount of funding that each university receives from the Tri-Council. The funds are summed over the previous three years and the portion of granting agency support that each eligible institution holds in this grand total determines the number of Chairs allocated.

Table A-16. University of Saskatchewan CRC Members

Name	Tier	Research Discipline
Sylvia Abonyi	2	Anthropology
Daniel Béland	1	Sociology
Lawrence Brawley	1	Psychosocial Behavioral Research - General
Dean Chapman	1	Multidisciplinary Health Research
Ravindra Chibbar	1	Plant and Tree Biology
Ken Coates	1	Political Science
David Cooper	2	Life Sciences Related to Human Health and Disease
Miroslaw Cygler	1	Biochemistry
Ajay K. Dalai	1	Chemical Engineering
Erika Dyck	2	History
Graham N. George	1	Biochemistry
John Paul Giesy	1	Analytical Chemistry
Philip J. Griebel	1	Multidisciplinary Health Research
Markus Hecker	2	Evolution and Ecology
Akira Hirose	1	Physics
Safa O. Kasap	1	Electrical and Electronic Engineering
Timothy Kelly	2	Polymer Chemistry
Alexander Moewes	1	Condensed Matter Physics
Dwight Newman	2	Law
Maria Soledade C. Pedras	1	Organic Chemistry

Name	Tier	Research Discipline
Ingrid J. Pickering	1	Earth Science
John W. Pomeroy	1	Hydrology
Bogdan Popescu	2	Cell Biology
Jean-Pierre St. Maurice	1	Space Science
Jerzy Szpunar	1	Mechanical Engineering
Catherine Trask	2	Musculo-Skeletal
John Tse	1	Materials Science and Technology
Qiaoqin Yang	2	Materials Science and Technology

Table A-17 shows the CRC allocation by research funder from the Tri-Council. The allocation may not line up with the totals in the previous table because of the allocation of special chairs is not included. Medical research is a very significant research revenue contributor at most U15 universities. It is anticipated that with a number of initiatives underway to build greater research capacity in the university's health sciences—including the completion of the Heath Science complex and restructuring funding arrangements in the College of Medicine—research revenue as a percentage of total university revenue will move closer to the U15 average.

Table A-17. U15 2014 CRC Allocation by Funding

Institution	NSERC		CIHR		SSHRC	
	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2
University of Saskatchewan	9	10	2	3	3	3
University of Manitoba	9	10	8	8	4	4
Dalhousie University	11	12	8	8	3	4
Queen's University	14	14	6	7	4	5
University of Western Ontario	13	13	13	14	5	6
University of Waterloo	25	25	2	3	5	5
University of Calgary	16	17	13	13	4	4
McMaster University	15	15	17	17	4	4
University of Ottawa	12	12	17	18	8	8

Institution	NSERC		CIHR		SSHRC	
	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2
Laval University	18	18	16	16	6	7
University of Montreal	11	12	28	29	10	10
University of Alberta	28	29	17	18	7	8
McGill University	26	27	40	41	11	12
University of British Columbia	36	37	39	40	15	15
University of Toronto	39	39	69	70	19	19

Every individual university is allowed to change the tier or the research area of a limited number of their allocations. For instance, a university may choose to change two Tier 2 Chairs into a Tier 1 Chair or change a Tier 1 Chair into two Tier 2 Chairs. They may also change an NSERC Chair to a CIHR Chair, or a CIHR Chair to an SSHRC Chair, etc. When a Chair is reverted to its original tier or research area as allocated in the calculation, the flex move is given back to the university. Currently, U of S has 28 CRC members with 19 of them in Tier 1 positions and 9 in Tier 2.

The research impact that the University of Saskatchewan has can be examined through the use of data from the Association of University Technology Managers (AUTM). Using the AUTM STATT database, RTI analyzed the effect of research expenditure on various measures such as licensing activity and income and start-ups across all of the U15 (Canada's association of elite research universities). Table A-18 summarizes several key measures, in 2013, which the AUTM data tracks for the University of Saskatchewan.

Table A-18. University of Saskatchewan AUTM Data, 2013 Only

Metric	Value
Total Research Expenditures, per AUTM ($M)	$170
Licenses	13
Cumulative Active Licenses	236
License Income: Gross Received ($M)	$10
Patent Applications: Total Filed	25
U.S. Patents Issued	7
Start-ups Initiated	0

Source: Association of University Technology Managers

September 2015

Economic Impact Analysis of the University of Saskatchewan

Final Report

RTI International is a trade name of Research Triangle Institute.