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Executive Summary

This is an update to the economic impact report produced in 2011. The original report provided measures of the economic impact of SFU for 2009/10, recognizing that there are numerous explicit and implicit impacts which are difficult to quantify (see Appendix). The same methodology was employed in this update. Results indicate an impact of \$4.72 billion by SFU on the local economy in fiscal year 2012/13 -- an increase of 29% from 2009/10 (summarized in Table 1).

about 3,000 students in 2009/10 to over 5,200 students in 2012/13. For the purposes of this update, we have maintained that 30% of FIC students' spending is attributable to SFU.

SFU Research The estimated impact of SFU research is based on Martin's (1998) methodology using total factor productivity.² SFU's research impact has grown by 52.0% due to an increase in the

APPENDIX

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Executive Summary

In merely four decades, Simon Fraser University (S

To estimate the income generated from increases in the skill base, this study follows Carr and Roessner (2002) to estimate the education premium - the differential earnings of a graduate from SFU. The estimate is based on calculating the net income of SF

3. Economic Impact of SFU

The estimated \$3,653 million total economic impact of SFU is composed of the direct and indirect impacts of spending and education premium, as well as an estimate of the impact of SFU Research (Table 1).

Table 1: Total Economic Impact 2009/10

Type of Expenditure	Direct Impact (\$M)	Indirect Impact (\$M)	Total (\$M)
SFU spending	439.0	219.5	658.5
Student spending	196.7	98.4	295.1

community); 2) supplies and other (including supplies for building construction, renovations and alterations); 3) scholarships and bursaries (for students on merit and need bases to attract or enable them to attend university); and 4) all other expenses (including amortization, professional services, cost of goods sold, utilities, and travel expenses).

Table 2 indicates that SFU spending in the local economy in the 2009/10 fiscal year is approximately \$439.0 million. It lists the direct spending by the four primary components and the percentage of spending that is considered "local" spending.⁶

Table 2 Direct SFU Spending

Spending Type	Direct Expenses (\$M)	Est. Local Expenditure (%)	Direct Local Income Generated (\$M)
Salaries & Benefits	333.4	98	326.7
Supplies & Other	53.8	78	42.0
		100	27.2
		35	43.1
			439.0

6.7 million in 2009/10. Table 3 shows the

\$193,900,000

\$2,000,000

Table 4: Spending of Full-Time Students

Student Type	Headcount	Monthly expenses (\$)	No. of Months	Spending (\$M)
Undergraduate	13,833	1,329	8	147.1
Graduate	5,685	1,329	8	60.4
Less payments to SFU				13.6
Total				193.9

Note: Estimates are based on 8 months of study because the majority of students register for two terms a year.

Continuing Studies Students

Every year thousands of courses, workshops, seminars, colloquia and conferences, round tables and dialogues are offered to the community by SFU Continuing Studies. In 2009/10, more than 1,300 non-Metro Vancouver residents registered for the offerings and contributed \$2.8 million to the local economy (see Table 5).

Table 5: Spending of Continuing Studies Students

Student Category	No of Students	Average Number of Days Students Meet for Class	Average Daily Spending (\$)	Estimated Total Spending (\$M)
BC (Non-GVRD)	693	3.7	54.24	0.1
Non-BC	208	3.2	122.68	0.1
International	420	50.2	122.68	2.6
Total	1,321			2.8

In 2009/10, 1,321 non-GVRD students came to SFU to attend continuing studies courses. Of these students, 693 were BC residents living outside Metro Vancouver, 208 were living outside BC, and 420 were international students.

For students living outside Metro Vancouver, we assume that they would commute to SFU and no overnight accommodation would be required. Their estimated daily expenditure is derived from domestic student spending and estimated at \$54.24 per day⁷. For out-of-province and international students, the daily rate of \$122.68⁸ is used.

Note that the numbers by student category above are a conservative estimate because they only include students with registration and residence information that were recorded by SFU. Many seminars and workshops hosted by SFU do not require such information from participants.

⁷ Estimated student cost per term from SFU Financial Aid is \$8,265 (<http://students.sfu.ca/financialaid/budget.html>). After excluding costs for tuition fees, books and supplies, this leaves an estimated cost of \$5,316 per term or \$1,329 per month.

⁸ Daily spending was derived from student semester spending of \$5,316. A semester can be 13 or 14 weeks long. For this study, 14 weeks was assumed.

⁹ This daily rate is based on Vancouver Economic Development's estimate of \$117.00 for 2006, adjusted to 2009 by applying an inflation rate based on the average Consumer Price Index (CPI) from 2006 to 2009. See <http://www.vancouvereconomic.com/page/tourism>

Table 9: Employment Income for Full-Time Employees by Age, Gender and Education Level

Age	Gender	Average Employment Income in 2009*			Income Differential	
		Certificate or Diploma Below Bachelors	Bachelor's	Above Bachelor	Bachelor's vs. Below Bachelor's	Above Bachelor's vs. Below Bachelor's
55-64	Male	\$57,652	\$106,671	\$21,983	\$49,020	\$64,331
	Female	\$39,482	\$62,907	\$78,044	\$23,425	\$38,563
45-54	Male	\$61,114	\$105,725	\$21,377	\$44,611	\$60,263
	Female	\$42,274	\$68,152	\$80,454	\$25,879	\$38,180
35-44	Male	\$55,702	\$87,966	\$104,585	\$32,264	\$48,883
	Female	\$39,556	\$62,746	\$73,645	\$23,190	\$34,088
25-34	Male	\$44,732	\$61,176	\$66,370	\$16,443	\$21,637
	Female	\$32,866	\$48,315	\$53,970	\$15,449	\$21,104

Source: Statistics Canada, 2006 Census of Population, Statistics Canada catalogue no. 97-563-XCB2006054

* Employment income is based on the 2005 average income of full-time employees adjusted to 2009 based on Consumer Price Index (CPI) from 2005 to 2009 from the Bank of Canada.

Since its inaugural year, SFU has graduated more than 100,000 alumni in the disciplines of arts and humanities, social sciences, education, applied sciences, science, and business. The estimated education premium for those graduates living in the Metro Vancouver area is approximately \$1,121 million based on their annual earnings in 2009 (Table 10).

Table 10: Education Premium for SFU Alumni

Credential	Education Premium (\$M)
PhD	33.9
Master	188.5
Graduate Diploma	22.8
Post Baccalaureate Diploma	36.5
Bachelor	783.0
Professional Development Program	56.6
Total	1,121.4

The calculation¹⁵ of the earnings differential between an individual with a bachelor's degree or higher and a person with an education below a bachelor's degree is based on data from the 2006 Statistics Canada Census. The census provides 2005 av

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Economic Impact of SFU (Updated to 2012/13)

for each fiscal year from 2004/05 to 2009/10. This gives clear evidence that SFU is a driver of business for those who aim to utilize and commercialize SFU research and development.

Table 11: SFU Research Activity

	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Total license income received (\$000)	343	183	300	339	360	1,457
License/option agreements	2	0	1	3	2	2
Total US patents issued	10	2	2	2	1	0
Total Start-up companies	1	0	2	3	0	2

Source: BCHeadset

A 2006 study by the Milken Institute investigated the commercialization performance of universities. The study evaluated universities in three stages: long-term (data from 1996 to 2004), short-term (data from 2000 to 2004), and a one-year snapshot (data from 2004). Universities were ranked, at each stage in: absolute terms (average of short- and long-term), normalization by million dollars of research expenditures, and productivity (e.g. patents filed per invention disclosure).

Based on this study, SFU had the highest ratio of invention disclosures per million dollar research expenditures between 2000 and 2004 amongst Canadian universities, as shown in Table 12. SFU's results indicate that its innovations are being recognized and valued, worthy enough to file for invention disclosures, which often leads to the filing of patents. The study also found that during the same time period, SFU and McGill University were the highest ranking Canadian institutions with a 0.14 ratio of patents issued per million dollar research expenditures. The University of Akron was ranked first with a ratio of 0.39, while Stanford University was ranked tenth with a ratio of 0.17.

Table 12: Innovation Pipeline Rankings: Invention Disclosures Per \$M Research Expenditures, 2000-2004

Rank	University	Country	Ratio
1	Brigham Young University	US	5.63
2	University of Akron	US	1.17
3	Michigan Technological University	US	1.14
4	Simon Fraser University	Canada	1.13
5	California Institute of Technology	US	1.12
6	East Carolina University	US	1.00
7	UTI Inc./University of Calgary	Canada	0.99
8	Arizona State University	US	0.94
9	Rice University	US	0.92
10	École de Technologie Supérieure	Canada	0.83

Source: *Mind to Market: A Global Analysis of University Biotechnology Transfer and Commercialization* by the Milken Institute

The Milken Institute findings were confirmed by Clayman, (2003, 2007). Clayman examined the transfer of technology from Canadian Universities to the private sector. Among Clayman's findings, based on 2005 data, was that SFU was one of the top ranking universities in terms of invention disclosures per million dollar expenditures (see Figure 2). See Appendix B for results from Clayman's 2007 report.

ReSearch Infosource, a Canadian consulting firm, ranked SFU 17th in 2009 amongst 45 research universities in Canada. ReSearch Infosource defines publications as articles, notes and reviews published by researchers affiliated with Canadian universities or research hospitals. They use approximately 9,900 peer-reviewed scientific international journals, covering different fields of natural science, health science and social science and humanities to source their data. Points are awarded to each university based on the total number of publications published by researchers affiliated with that particular university.

Knowledge Transfer and Start-ups

As discussed previously, one outcome of universities is a university educated workforce that contributes to the growth in the economy through increased earnings and spillover effects. In addition to these impacts, university graduates have the skills and knowledge to interpret the information of university research. Salter and Martin (2000) cite that "Information only becomes knowledge (and therefore valuable) when users have the capabilities to make sense of it; without these, information is meaningless." Further evidence that universities aid the transfer of knowledge to industry is discussed by McMahon (1992), who estimates that 73% of knowledge from university research is distributed into the economy through university graduates. Furthermore, members in the academic community such as faculty and university graduates help industry process the research to be better able to use it appropriately.

University research also enters industry by way of start-up companies. The 2006 Milken Institute study uses start-ups as a direct measure of the quality of university-based intellectual property. The study defines start-ups as the "establishment of companies dependent upon a university's technology for initiation." The study asserts that startups, created by members in the university community, give an indication of a university's capacity to innovate. Startups also give evidence that university technology and research is being transferred into industry for commercialization and ultimately economic growth. The Milken Institute study ranks SFU first when normalizing the number of startups by million dollar research expenditures (7(h)-.SJTJ ni anTD tu erswith I known()6(te)-4..5(Pipelik)2.1ne Rank6.3()JTJ...

Economic Impact of SFU Research using Total Factor Productivity

There is substantial evidence that SFU's research impacts economic growth. Table 15 shows the results of applying Martin's (1998) theory of total factor productivity to SFU research²³.

Table 15: The Economic Impact of SFU Research

GDP growth in BC since 1971	139,000,000,000
Growth attributable to Total Factor Productivity (TFP)	20%
TFP	27,800,000,000
Exclusion of foreign R&D effects (x 69%)	19,182,000,000
Share of R&D by BC Universities (x 37%)	7,097,340,000
Share of R&D by SFU (12%)	\$851,680,800

4. Other Impacts of SFU

SFU also makes an economic impact in Metro Vancouver in ways that are difficult to quantify due to lack of data and appropriate measurement techniques. Such impacts include: social impacts, community enhancement, building and developing sustainable communities, and national and global impacts.

4.1 Social Impacts

We have seen that SFU contributes to the economy through its spending, induced student and visitor spending, and research. We have also seen that by producing a university educated workforce, SFU enables university graduates to earn higher income, which further drives economical growth through available spending. But having a university degree has other impacts on society that are not easily measured such as better health, lower crime rates, and increased civic participation.

There are many studies that note the impact of education on health (Becker, 1993, Lleras-Muney, 2005, Grossman, 2005). Kenkel (1991) observed that the better educated are more likely to choose healthy lifestyles that generally lead to better health outcomes. The study notes that education is linked to better health choices such as reduced smoking, more exercise and lower alcohol consumption and that it is the understanding and use of health knowledge where the effects of education on health are most evident. A study conducted by Vafaei, Rosenberg, and Pickett (2000) notes that in both rural and urban regions, a higher percentage of individuals with post-secondary education is associated with better population health. Better population health means that a portion of taxpayers' dollars that would otherwise be spent on health care could be redirected to further education or to help the poor and homeless or other public services.

Higher education is also associated with lower criminal activity. Alstadaeter and Sievertsen (2009) note that higher education is related to less crime and lower incarceration rates. SFU research also plays a role in the reduction of criminal activity. Researchers in SFU's Criminology department are investigating online crimes such as money laundering, terrorism, and child pornography²⁴, with the goal of reducing cybercrimes. Faculty members are working to bring more public attention to these topics by organizing conferences and obtaining funds for further research. Other SFU researchers in the Faculty of Applied

²³ The application of Martin's total factor productivity theory to estimate SFU's research impact in this report is consistent with UBC's approach to estimate UBC's research impact. However, while UBC assumed its share of R&D is 70%, SFU's share is assumed to 12%, consistent with its share of research dollars among BC research universities.

²⁴ http://www.sfu.ca/pamr/media_releases/media_releases_archives/media_10050902.html

Sciences are also contributing to the fight against crime by utilizing nano-technology to produce anti-counterfeiting methods that can be applied to banknotes, authenticating legal documents, retail merchandise, concert tickets, and passports²⁵.

Higher education also enhances civic participation by: 1) increasing the quality of decisions made by the electorate in terms of selecting able leaders; 2) increasing the citizenry's ability to understand the issues and to hold government accountable for misconduct; and 3) increasing the effectiveness of their participation in the political process through enhanced knowledge, interest and involvement in political issues (Milligan, Moretti, and Oreopoulos, 2004). They report that in Canada, the probability of voting is 83% for high school drop outs, 84% for high school graduates, 86% for individuals with some post-high school education, and 90% for university graduates. Volunteering in the community is a key component of citizenship and plays a role in the impact to society. Williams et al. (2008) found that gender, university education, and household income all independently increase the likelihood of volunteerism.

4.2 Community Enhancement

SFU is an engaged partner within the local communities of Metro Vancouver. In 2009, SFU won the gold award from the Institute of Public Administration of Canada (IPAC)/Deloitte for public sector leadership in education, particularly noting our pioneering moves to become firmly rooted in the local community.

The SFU Gallery holds exhibitions free of charge all year round. It is estimated that a typical exhibition in the SFU gallery will be seen by 8,000 visitors. In addition, SFU Burnaby is home to the Museum of Archaeology and Ethnology which showcases artefacts from around the world, with a focus on British Columbia. Events and performances are often held at the Cornerstone open area, located at SFU Burnaby, and are open to students and community residents.

SFU offers free public lectures and a Philosophers•Café program which provide opportunity for local community members to discuss various social issues. SFU faculty and researchers participate in these events and engage with the community by providing their field-specific knowledge to the discussion. In 2009, Dr. Yosef Wosk, founder of the Philosophers•Café program, was awarded the British Columbia Achievement Award. The award recognizes British Columbians who go above and beyond in their dedication and service to others and who devote time and energy to making their communities more caring, dynamic, beautiful, healthy and unique.²⁶

Quite frequently, SFU community members are on the news, asked by the media as issues arise, to share their expert knowledge with the public on many subjects and issues: the HST, tuberculosis outbreak in Port Alberni, addiction to videogames, firearms, hospital emergency overflows, the Criminal Code and war-on-crime legislation, earthquakes and tsunamis are just some of them.

SFU Surrey is located in the hub of downtown Surrey and is a prime setting for community events as a

Goldcorp will allow SFU to further support its programs that encourage community engagement within

4.4 National and Global Impacts

SFU also plays a significant role on the national and international stages. This section provides a few examples of SFU's impact in the areas of monetary policy, education, pharmacep

need for more faculty positions, thereby adding to the employment and capital streams of the economy. As the world transitions from the industrial economy to the new knowledge economy, the demand for a university education workforce will grow, with the added benefits of earning higher income available for the local economy.

SFU's commitment to its students by providing quality faculty and facilities also has secondary benefits.

6. Appendix A

Alumni Education Premium by Credential

Age Group	Sex	Graduates	Net Income	Education Premium				Net Education Premium (2009)
				Per degree	Total	Work Participation	% in Metro Vancouver	
PhD								33,930,665.11
55-64	Male	192	85,255.69	40,932.84	7,859,104.3(32)-6.9a1596(2.74.33,4079,9511			

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