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David Johnston Research + Technology Park Impact study

June 2013

DRAFT FINAL REPORT

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Executive summary

Background

The David Johnston Research + Technology Park is one of the fastest growing research parks in Canada and is located on the University of Waterloo's ("UW") North Campus. Designed to accommodate 1.2 million square feet of office space on 120-acres, and about 70% of the total planned space is currently occupied.

Study objectives

The specific objectives of this study included:

- Estimate the economic impact of the David Johnston Research + Technology Park;
- Design and administer survey to tenants of the David Johnston Research + Technology Park regarding the impact and importance of the David Johnston Research + Technology Park, to augment data being collected through the Association of Research Parks Canada (AURP Canada) survey;
- Analyze survey data collected at a high level;
- Assess the number of "technology transfer based spin-offs" that originated from UW.
- Summarize economic impacts and analysis of new survey questions (based on the above) in a final report. The report will be focused on presenting economic impact results, together with an additional section that highlights the results of the new survey questions as described above.

Summary

Economic impact of the David Johnston Research + Technology Park

The table below shows the current and potential future economic impact of the David Johnston Research + Technology Park on a facilitative and attributable basis. Facilitative economic impacts are those that the David Johnston Research + Technology Park has a role in generating and attributable economic impacts are those that would likely not exist, but for the David Johnston Research + Technology Park. Economic impact estimates illustrated below are based on the AURP Canada National Economic Impact Study and are indicative only.

Economic impact of the David Johnston Research + Technology Park

	Output (millions)	GDP (millions)	Labour income (millions)	Employment	Taxes (millions)
Current economic impacts:					
Facilitative	**$602**	**$428**	**$319**	**6,474**	**$59**
Attributable	**$150**	**$105**	**$79**	**1,645**	**$15**
Future economic impacts:					
Facilitative	**$906**	**$640**	**$480**	**9,892**	**$90**
Attributable	**$236**	**$165**	**$124**	**2,664**	**$23**

Survey results

Overall, the objective of the survey was to augment data collected via the AURP Canada survey by obtaining additional qualitative data and information regarding the impact and importance of the David Johnston Research + Technology Park. The following groups of companies were surveyed (the number of companies that responded to the survey in whole or in part is provided in parenthesis):

- David Johnston Research + Technology Park tenants (15);
- Accelerator Centre ("AC") graduates, clients and exits (23); and
- AC virtual clients (9).

In total, 47 completed or substantially completed survey responses were received. The three surveys administered were largely consistent with each other – only a handful of questions differed, reflecting the differences inherent in the three groups.

Key findings from the three surveys are listed below:

- Companies that responded to the survey represent a wide array of large and small companies; newly emerged and established/mature companies; and companies with varying levels of linkage to UW or Waterloo Region.
  - With respect to park tenants, 42.9% entered the David Johnston Research + Technology Park as an established Canadian company and 35.7% entered as a start-up. The remainder entered the park as a large multi-national company.
  - About 28.6% and 33.3% of AC clients and AC virtual clients responding to the survey self-identified as "pre-revenue" companies (i.e., no revenues). There were no park tenants that self-identified as having no revenues. However, 42.9% of park tenants responding to the survey indicated that they had revenues in the range of $1 to $1 million. Some 21.4% of park tenants responding to the survey indicated as having revenues in excess of $100 million.
- Graduates and clients of the AC indicated high levels of satisfaction regarding their experience at the AC.
  - One-third of AC clients and AC virtual clients that responded to the survey indicated that they graduated from the AC; two-thirds are current clients of the AC.
  - AC clients and AC virtual clients were asked to rank their experience at the AC on a scale of one to ten (where one equals poor and ten equals excellent). The average score of AC clients and AC virtual clients that responded to the survey was nine out of ten – indicating high levels of satisfaction with the AC. Comments received from AC clients and AC virtual clients echo these rankings.
- Companies responding to the survey indicated that the David Johnston Research + Technology Park and UW are highly important to their ongoing operations.
  - On a scale of one to five (where one equals not important and five equals critically important), 58.4% of park tenants responding to the survey ranked UW's importance as a four or five out of five.
  - Using the same scale, 48.6% of AC clients and AC virtual clients responding to the survey ranked the AC and/or the David Johnston Research + Technology Park as four or five out of five.
  - Companies were also asked to rank the importance of various attributes provided by research parks. Responding park tenants and AC clients indicated that "affiliation with highly focused community of like-minded companies and individuals"; "being affiliated with a world class institution"; and "access to high skilled labour graduating from UW" as the most important attributes.
  - Research parks also provide a host of business support services. Companies that responded to the survey indicated the following as being most important: "mentorship", "finding investors/access to financing" and "marketing".

- Many companies that responded to the survey indicated that they plan on increasing R&D expenditures and plan on expanding by adding new locations.
  - About 61.8% of park tenants and AC clients indicated that they plan on expanding R&D expenditures over the next five years (77.3% of AC clients and 33.3% of park tenants).
  - Many companies are also considering expansion: 16.7% of park companies; 72.7% of AC clients and 55.6% of AC virtual clients plan on expanding operations by establishing new locations (particularly over the next five years).
  - Of the companies that plan on expanding, 62.8% plan on establishing new locations in Canada.

Spin-off companies

As part of this study, PwC was asked to estimate the number of "technology transfer" spin-off companies that originated from UW. A survey of 720 technology companies (42% participation rate) in the Waterloo Region indicated that there are 29 companies in the region that consider themselves UW technology transfer spin-off companies (what we refer to as Level 1 spin-off companies). Broadening the definition to include companies that were established by UW faculty/staff and/or through contract research suggests that there is a further 167 companies in the Waterloo Region Innovation Ecosystem that consider themselves UW spin-off companies (Level 2 spin-off companies).

1. Introduction

Background

PwC was engaged by the Association of University Research Parks Canada ("AURP Canada") to estimate the economic impact of technology and research parks in Canada on a national and regional basis. As part of this project, individual technology and research parks were provided an opportunity to obtain a separate breakout of impacts for their specific park. This report provides estimates of the David Johnston Research + Technology Park's economic impact and other relevant information.

The David Johnston Research + Technology Park is one of the fastest growing research parks in Canada and is located on the University of Waterloo's ("UW") North Campus. Designed to accommodate 1.2 million square feet of office space on 120-acres, and about 70% of the total planned space is currently occupied.

Study objectives

The specific objectives of this study are outlined below:

- Estimate the economic impact of the David Johnston Research + Technology Park based on the methodology and data collected as part of the work completed for AURP Canada (i.e., economic impact of university research parks in Canada).
- Obtain additional survey questions from the University of Waterloo ("UW") for David Johnston Research + Technology Park tenants and develop and implement a survey based on these questions.
- Analyze responses to new questions. The analysis was to be primarily focused on presenting survey results in a visually impactful way (tabular or graphic form as appropriate), and commenting on the key overarching messages that emerge from this set of questions (but not including a detailed analysis of the meaning or significance of each individual question). The mandate did not include detailed analysis of each question and/or cross-tabulations of the survey data.
- Assess the number of "technology transfer based spin-offs" across Canada that originated from UW.
- Summarize economic impacts and key themes from the high level analysis of new survey questions in a final report.

Overview of our approach

The table below summarizes our overall study approach.

Overview of our approach

Phase	Description
Data collection	• Research and technology park operating expenditures, capital spending and size (in terms of square feet) data and other related information was obtained from research and technology parks administrators and managers. • A data collection survey was developed in collaboration with AURP Canada. The primary objective of the survey was to obtain data and information from companies and other organizations resident in the parks that would enable us to assess economic impacts on a facilitative and attributable basis. Profile-related data was also obtained to assess emerging trends. • Separate surveys were developed for David Johnston Research + Technology Park tenants and graduates and current clients of the Waterloo Accelerator Centre. • A database of companies located in research and technology parks in Canada was obtained from AURP Canada and categorized and organized by PwC. This list of companies was used as our participant list for the survey. This list was further augmented and enhanced by PwC research. • Once finalized, the survey and participant list was loaded into our online survey tool and initial communications (including instructions) were sent to survey participants. • A database of the survey data was then created to facilitate analysis of the data and to assess economic impacts.
Estimate economic impact and analysis	• Financial data obtained from the survey was checked for reasonableness, but was not independently verified and/or audited. • An economic impact model was then created using the financial data obtained and Statistics Canada Input-Output tables (additional data was also obtained from Statistics Canada). • An econometric model was used to estimate the proportion of the facilitated economic impact that was attributable to the existence of university research and technology parks. • Economic impacts were then extrapolated to the wider population of companies located in university parks in Canada on a regional basis. • Future economic impacts were projected using data obtained from research and technology park administrators and managers regarding the future size and scope of each research and technology park in Canada. • Survey data was also analyzed to assess emerging trends in university research and technology parks. • Economic impact estimates for the David Johnston Research + Technology Park were then estimated based on the aggregate economic impact estimates.
Reporting	• We consolidated key findings into a draft final report that was reviewed with AURP Canada. • This report was finalized based on comments received from AURP Canada.

Study limitations

PwC has relied upon the completeness, accuracy and fair presentation of all the information, data, advice, opinions or representations obtained from various sources which were not audited or otherwise verified. These sources (collectively, the "Information"), include:

- AURP Canada;
- Data obtained from companies located in research and technology parks responding to the survey;
- Information from the relevant literature; and
- Other publicly available studies, data and information from relevant websites.

The findings in this report are conditional upon such completeness, accuracy and fair presentation of the Information, which has not been verified independently by PwC. Accordingly, we provide no opinion, attestation or other form of assurance with respect to the results of this study.

PwC reserves the right at its discretion to withdraw or make revisions to this report should we be made aware of facts existing at the date of the report that were not known to us when we prepared this report. The findings are as of the date hereof and PwC is under no obligation to advise any person of any change or matter brought to its attention after such date, which would affect the findings and PwC reserves the right to change or withdraw this report.

Input-output analysis (used to estimate economic impacts) does not address whether the inputs have been used in the most productive manner or whether the use of these inputs in this industry promotes economic growth by more than their use in another industry or economic activity. Nor does input-output analysis evaluate whether, when or where these inputs might be employed elsewhere in the economy if they were not employed in this industry at this time. Input-output analysis reports the direct and indirect economic impacts which can reasonably be expected to result in the economy when these inputs are used in this industry, based on historical relationships within the economy.

Expenditure and employment data obtained from companies located within university research and technology parks that responded to and completed the survey was used to estimate the overall economic impact of university research and technology parks in Canada. We obtained a participation rate that enabled meaningful analysis of the data, but did not enable us to assert that our sample was statistically representative of the population. Accordingly, extrapolated economic impact results are only indicative (i.e., an approximate estimate); actual economic impacts may differ from those presented in this report. Any quote or reference made by a third party concerning the indicative economic impact estimates developed in this report should also provide the appropriate context regarding how these estimates were developed.

This information has been prepared solely for the use and benefit of, and pursuant to a client relationship exclusively with AURP Canada. PwC disclaims any contractual or other responsibility to others based on its use and, accordingly, this information may not be relied upon by anyone other than AURP Canada.

Any use that a third party makes of this report or reliance thereon, or any decision made based on it, is the responsibility of such third party. PwC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken, based on this report.

2. Methodology and data

Introduction

This section of our report outlines and describes our economic impact methodology and data used to estimate economic impacts that are facilitated by and attributable to the existence of the David Johnston Research + Technology Park.

Economic impact methodology

The most widely-used approach to estimating economic impacts is to apply input-output analysis. This approach applies multipliers obtained from Statistics Canada to expenditures to generate a set of economic impacts. The fundamental philosophy behind economic impact analysis is that changes in expenditures are multiplied throughout the economy. An increase in spending on some goods and services generates a need for additional goods and services, and by using this approach it is possible to track and assess this cascading effect through an economy.

Common metrics of economic impacts include output or spending, value-added or GDP, government tax revenues, and employment. These are described in the table below.

Measures of economic activity

Economic activity measure	Description
Spending (output)	Represents aggregate spending by businesses, governments and consumers on goods and services in an economy. Spending is the broadest measure of economic activity.
GDP (value-added)	GDP or value-added is a more specific measure of economic activity relative to spending. GDP removes spending on goods and services purchased from outside of Ontario (in this case) and only accounts for spending on final (or finished) goods and services.
Wages and salaries	Wages and salaries is an even narrower measure of economic activity and represents labour income generated by workers.
Employment	Employment represents the number of jobs generated on a full-time or part-time basis.
Government tax revenues	For the purposes of this study, government tax revenues represent Federal and Provincial taxes resulting from income taxes and indirect taxes on consumption and production (i.e., HST). Corporate taxes are not included.

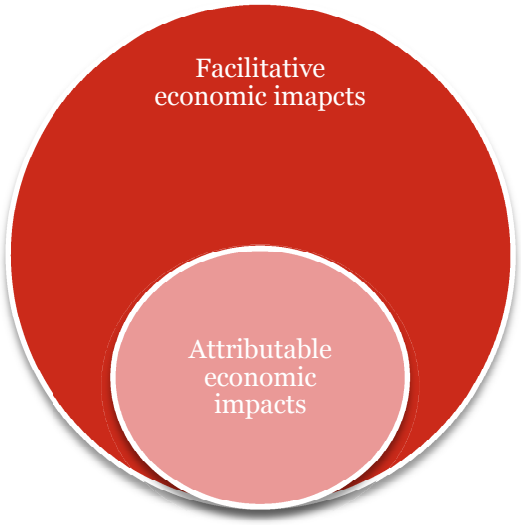
Economic impacts are typically estimated at the direct and indirect levels:

- Direct impacts are changes that occur in “front-end” businesses (i.e., companies located in university research and technology parks in this case) that initially make expenditures and receive operating revenue as a direct consequence of operations and activities conducted.
- Indirect impacts arise from changes in activity for suppliers of the “front-end” businesses such as suppliers of computer or laboratory equipment.

- The total economic impact equals the direct plus the indirect economic impact.

University research and technology parks however are not totally responsible for the entire economic impacts generated by companies located in the parks. Indeed, only a portion of the economic impacts facilitated by research and technology parks can be directly attributed to the existence of the parks. Accordingly, our approach to economic impact analysis distinguishes between facilitative and attributable economics impacts. As demonstrated in the figure below, attributable economic impacts generally form a subset of the facilitative economic impact.

Relationship between facilitative and attributable economic impacts



These terms are further described and defined in the table below.

Facilitative and attributable economic impacts

	Description
Facilitative economic impacts	Facilitative economic impacts are those impacts that research and technology parks play a role in generating. In this case, facilitative economic impacts (combined direct and indirect) would result from total expenditures of companies located in university research and technology parks. Only those expenditures undertaken by company operations within each park are used to assess facilitative economic impacts.
Attributable economic impacts	As illustrated above, the attributable economic impact comprises a portion of the facilitative economic impact. Attributable economic impacts are those that would not exist but for the existence of university research and technology parks. While some companies could exist without research and technology parks, other companies depend critically on being located within a park. Economic impacts generated by these latter companies would therefore be more attributable to the existence of research and technology parks than the former companies.

Approach to estimate attributable economic impacts

At a high level, our approach to estimating attributable economic impacts includes asking companies a set of questions to assess how important their ongoing operations are to being located within a research and technology park. Asking companies directly about this and relying on this information for the purposes of assessing attribution would potentially result in biased results – companies would likely overstate the importance of the research and technology park to their ongoing operations, particularly if they are receiving in-kind or various financial benefits.

To control for this, we developed a set of specific questions to enable us to more precisely assess the degree of attribution. For example, companies were asked to assess and rank how important collaboration with other companies fostered by being located within a research and technology park is to their ongoing operations. Using responses to this question and others like it, an econometric model was developed to assess how important each factor is to a respondent locating at a university research and technology park. This model was then applied to each company's responses to the relevant questions to estimate a unique attribution factor for each company responding to the survey.

Extrapolation approach

Approximately 850 companies were invited to participate in the survey, and responses were obtained from 156 companies, resulting in a survey participation rate of close to 20%. However, desktop research and research conducted by AURP Canada indicated that the number of companies located in research and technology parks could be greater than 1,500. Accordingly, while we obtained a meaningful number of responses, we did not receive enough responses to assert that we have a random sample of the population of companies located in university research and technology parks in Canada or on a regional basis. Therefore, extrapolated economic impact estimates are indicative only (i.e., approximate). In other words, if we would have obtained more responses to the survey we would likely have estimated different economic impact results, and likely different results to the questions in the survey.

The extrapolation approach employed is described below:

- Economic impacts were first estimated for companies that provided data via the survey.
- We then calculated an economic impact per employee on a national basis based on data we received from the survey.
- AURP Canada provided us with data on the total number of employees for each university research and technology park in Canada. AURP Canada obtained company level employment data through direct contact with research and technology park executives. This employment data was aggregated on a regional basis (i.e., Western Canada, Ontario, Quebec and Atlantic Canada).
- Economic impacts were then extrapolated on a national and regional basis based on the number of employees located in research and technology parks in Canada and in each region.

Projecting future economic impacts

Part of our study scope also included projecting future economic impacts associated with university research and technology parks in Canada. The approach we employed is described below:

- Data was obtained from AURP Canada regarding the current and future size of each university research and technology park in Canada in terms of square feet.
- An economic impact per square foot was then calculated on a regional basis.
- Future economic impacts were then calculated by multiplying the economic impact per square foot by the future square footage of all research and technology parks within a specific region.

Estimating economic impacts of the David Johnston Research + Technology Park

The economic impact specific to the David Johnston Research + Technology Park was estimated by multiplying the economic impact of research parks in Ontario by the share of David Johnston Research + Technology Park employees relative to the total number of employees in research parks across Ontario. This is consistent with the approach that was used to estimate the economic impact of research parks in Canada (as per the AURP Canada National Economic Impact Study).

3. Economic impact of the David Johnston Research + Technology Park

Introduction

This section of the report shows economic impact estimates of the David Johnston Research + Technology Park. Economic impact estimates are provided for standard measures of economic activity and on a facilitative and attributable basis. Future economic impact based on David Johnston Research + Technology Park expansion plans are also provided. Refer to the previous section of this report for a description of the approach employed and for definition of key terms. Economic impact estimates are indicative only and are based on the approach and data employed for the AURP Canada National Economic Impact Study.

Economic impact estimates

Current economic impact

The table below shows the current economic impact of the David Johnston Research + Technology Park to Canada.

Current economic impact of the David Johnston Research + Technology Park

	Output (millions)	GDP (millions)	Labour income (millions)	Employment	Taxes (millions)
Facilitative economic impact:					
Direct	$372	$268	$239	4,480	$43
Indirect	$230	$159	$80	1,994	$17
Total	**$602**	**$428**	**$319**	**6,474**	**$59**
Attributable economic impact:					
Direct	$93	$66	$59	1,157	$11
Indirect	$57	$39	$20	488	$4
Total	**$150**	**$105**	**$79**	**1,645**	**$15**

Future economic impact

The table below shows the future economic impact of the David Johnston Research + Technology Park to Canada based on expansion plans on at the research park.

Future economic impact of the David Johnston Research + Technology Park

	Output (millions)	GDP (millions)	Labour income (millions)	Employment	Taxes (millions)
Facilitative economic impact:					
Direct	$562	$402	$360	6,905	$65
Indirect	$344	$238	$120	2,987	$25
Total	**$906**	**$640**	**$480**	**9,892**	**$90**
Attributable economic impact:					
Direct	$147	$104	$93	1,897	$17
Indirect	$89	$61	$31	767	$6
Total	**$236**	**$165**	**$124**	**2,664**	**$23**

4. Survey results

Introduction

This section of the report illustrates the survey data and information collected. The surveys were designed to Three related surveys were sent to three specific groups of companies:

- Park companies – tenant companies that are currently located on the David Johnston Research + Technology Park.
- AC clients – companies that are current clients or graduated from the Waterloo Accelerator Centre.
- AC virtual clients – companies that are virtual clients of the Waterloo Accelerator Centre.

The three surveys were largely consistent with each other (i.e. the same set of questions were asked). Accordingly, the survey data was merged into one master database and survey results are presented for the three groups of companies. In some cases, certain questions were not posed to one or two of the groups of companies. In these cases, the tables that illustrate the survey results are marked with an "N/A".

In total, 47 completed or substantially completed survey responses were received. The number of responses from each group is provided below:

- David Johnston Research + Technology Park tenants – 15
- Accelerator Centre ("AC") graduates, clients and exits – 23
- AC virtual clients – 9

It is important to note that not all survey participants answered every question in the survey.

Survey results by group

Survey results from the three groups of companies are tabulated and illustrated below.

Company profile

Where is your company's head office located?

	In Canada, not within a research park	Outside of Canada	Within the David Johnston Research + Technology Park
Park companies	42.9%	7.1%	50.0%
AC clients	N/A	N/A	N/A
AC virtual clients	N/A	N/A	N/A
Total	**42.9%**	**7.1%**	**50.0%**

How long has your company been in business?

	Less than 1 year	1 to 2 years	2 to 3 years	3 to 5 years	5 to 10 years	More than 10 years
Park companies	7.1%	7.1%	0.0%	7.1%	14.3%	64.3%
AC clients	13.0%	30.4%	26.1%	8.7%	21.7%	0.0%
AC virtual clients	22.2%	11.1%	44.4%	22.2%	0.0%	0.0%
Total	**13.0%**	**19.6%**	**21.7%**	**10.9%**	**15.2%**	**19.6%**

How long has your company been located in the David Johnston Research + Technology Park?

	Less than 1 year	1 to 2 years	2 to 3 years	3 to 5 years	5 to 10 years	More than 10 years
Park companies	14.3%	14.3%	0.0%	42.9%	28.6%	0.0%
AC clients	28.6%	33.3%	33.3%	4.8%	0.0%	0.0%
AC virtual clients	14.3%	14.3%	0.0%	42.9%	28.6%	0.0%
Total	**19.6%**	**21.7%**	**10.9%**	**15.2%**	**13.0%**	**19.6%**

At what stage of your company's development did you enter the David Johnston Research + Technology Park?

	As a large multi-national Canadian company	As a large multi-national foreign company	As an established Canadian company	As a start-up
Park companies	7.1%	14.3%	42.9%	35.7%
AC clients	N/A	N/A	N/A	N/A
AC virtual clients	N/A	N/A	N/A	N/A
Total	7.1%	14.3%	42.9%	35.7%

What are your company's revenues for 2012?

	$0, pre-revenue company	$1 to $1M	$1M to $5M	$5M to $10M	$10M to $20M	$20M to $100M	Greater than $100M
Park companies	0.0%	42.9%	21.4%	14.3%	0.0%	0.0%	21.4%
AC clients	28.6%	61.9%	0.0%	0.0%	4.8%	4.8%	0.0%
AC virtual clients	33.3%	66.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	20.5%	56.8%	6.8%	4.6%	2.3%	2.3%	6.8%

Does your company current fund research at UW?

	No, do not currently fund research at UW	Yes, currently fund research at UW
Park companies	78.6%	21.4%
AC clients	77.3%	22.7%
AC virtual clients	88.9%	11.1%
Total	**80.0%**	**20.0%**

What is your company's total R&D expenditure for 2012?

	$0, no R&D	$1 to $1M	$1M to $5M	$5M to $10M	$10M to $20M	$20M to $100M	Greater than $100M
Park companies	64.3%	7.1%	7.1%	7.1%	7.1%	0.0%	7.1%
AC clients	45.0%	55.0%	0.0%	0.0%	5.0%	5.0%	0.0%
AC virtual clients	55.6%	22.2%	22.2%	0.0%	0.0%	0.0%	0.0%
Total	**53.5%**	**27.9%**	**7.0%**	**2.3%**	**4.7%**	**2.3%**	**2.3%**

What is your company's R&D expenditure for 2012 at the David Johnston Research + Technology Park?

	$0, no R&D	$1 to $1M	$1M to $5M	$5M to $10M	$10M to $20M	$20M to $100M	Greater than $100M
Park companies	50.0%	7.1%	7.1%	0.0%	7.1%	14.3%	14.3%
AC clients	9.5%	61.9%	9.5%	4.8%	0.0%	14.3%	0.0%
AC virtual clients	11.1%	66.7%	0.0%	0.0%	0.0%	22.2%	0.0%
Total	**22.7%**	**45.5%**	**6.8%**	**2.3%**	**2.3%**	**15.9%**	**4.6%**

What percent of the year do you spend on sourcing funds, product development and other business activities?

	Average percent of time spent sourcing funding	Average percent of time spent developing products/services	Average percent of time doing other business activities
Park companies	N/A	N/A	N/A
AC clients	27.4%	68.8%	19.0%
AC virtual clients	30.7%	64.4%	15.0%
Total	**28.3%**	**67.5%**	**17.7%**

Relationship to UW, the Waterloo Accelerator Centre and Waterloo Region

Are you a graduate of UW?

	No, did not graduated from UW	Yes, graduated from UW
Park companies	64.3%	35.7%
AC clients	54.6%	45.5%
AC virtual clients	77.8%	22.2%
Total	**62.2%**	**37.8%**

Do you live in Waterloo Region?

	No, did not live in Waterloo Region	Yes, live in Waterloo Region
Park companies	7.1%	92.9%
AC clients	19.1%	81.0%
AC virtual clients	22.2%	77.8%
Total	**15.9%**	**84.1%**

Are you a client or graduate of the Waterloo Accelerator Centre?

	Accelerator Centre Client	Accelerator Centre Graduate	Neither
Park companies	N/A	N/A	N/A
AC clients	62%	38%	0%
AC virtual clients	78%	22%	0%
Total	**67%**	**33%**	**0%**

Rate your experience at the Waterloo Accelerator Centre.

	Average rating at the Waterloo Accelerator Centre (10 = excellent and 1 = poor)
Park companies	N/A
AC clients	9.0 out of 10.0
AC virtual clients	8.9 out of 10.0
Total	**9.0 out of 10.0**

Respondent comments regarding experience at the Waterloo Accelerator Centre (anonymous).

- "The most significant benefit of our relationship with the AC was the network of advisors that we were able to form."
- "Providing equal opportunity to everyone with an idea and the chance to make it happen – the opportunity to 'believe'."
- "We are a client of the Accelerator Centre and have been impacted and influenced by a range of resources as well as tenant clients in strategizing our business and implementing best practices that we have learned during the last two years."
- "The Accelerator Centre is a world class facility incubating promising businesses. It has helped our company get off the ground and grow over the past two plus years."
- "I came to Canada from the United States because of the Accelerator Centre ... the Accelerator Centre is simply the best incubator out there."
- "The mentors and connections have been extremely helpful, especially given that I chose to move to Waterloo specifically to work on my business and didn't have any 'base' in the region."
- "The level of engagement between the AC and their clients is exceptional, the programs they offer (e.g., Lunch & Learn, seminars), the mentorship available and the networking opportunities are all outstanding! And, because they don't have an unmanageable amount of clients, each company gets the necessary amount of attention."
- "The Accelerator Program brings together world class resources that greatly enhance a start-ups chance of success. Our company has greatly benefited from access to industry research, mentoring and being able to work in a very motivating atmosphere."

Impact of UW, the David Johnston Research + Technology Park and the Waterloo Accelerator Centre

Does your affiliation with the David Johnston Research + Technology Park/Waterloo Accelerator Centre enable you to attract and retain highly skilled labour?

	No, does not enable us to attract/retain high skilled labour	No, enable us to attract/retain high skilled labour	No opinion
Park companies	13%	73%	13%
AC clients	23%	50%	27%
AC virtual clients	11%	78%	11%
Total	**17%**	**63%**	**20%**

How did your company start-up (percent of all companies that responded to the survey, companies were able to mark all that apply)?

	IP/technology licensed from UW	UW faculty started company	UW staff started company	UW undergrad started company	UW graduates started company
Park companies	0.0%	28.6%	7.1%	7.1%	7.1%
AC clients	0.0%	9.1%	4.6%	27.3%	13.6%
AC virtual clients	4.6%	0.0%	0.0%	22.2%	33.3%
Total	**2.2%**	**13.3%**	**4.4%**	**20.0%**	**15.6%**

Did you use the services at the Waterloo Commercialization ("WatCo") office or did you commercialization on your own?

	Yes, used WatCo services for commercialization	No, commercialized on own	Other
Park companies	20.0%	80.0%	0.0%
AC clients	44.4%	33.3%	22.3%
AC virtual clients	100.0%	0.0%	0.0%
Total	**50.0%**	**38.9%**	**11.1%**

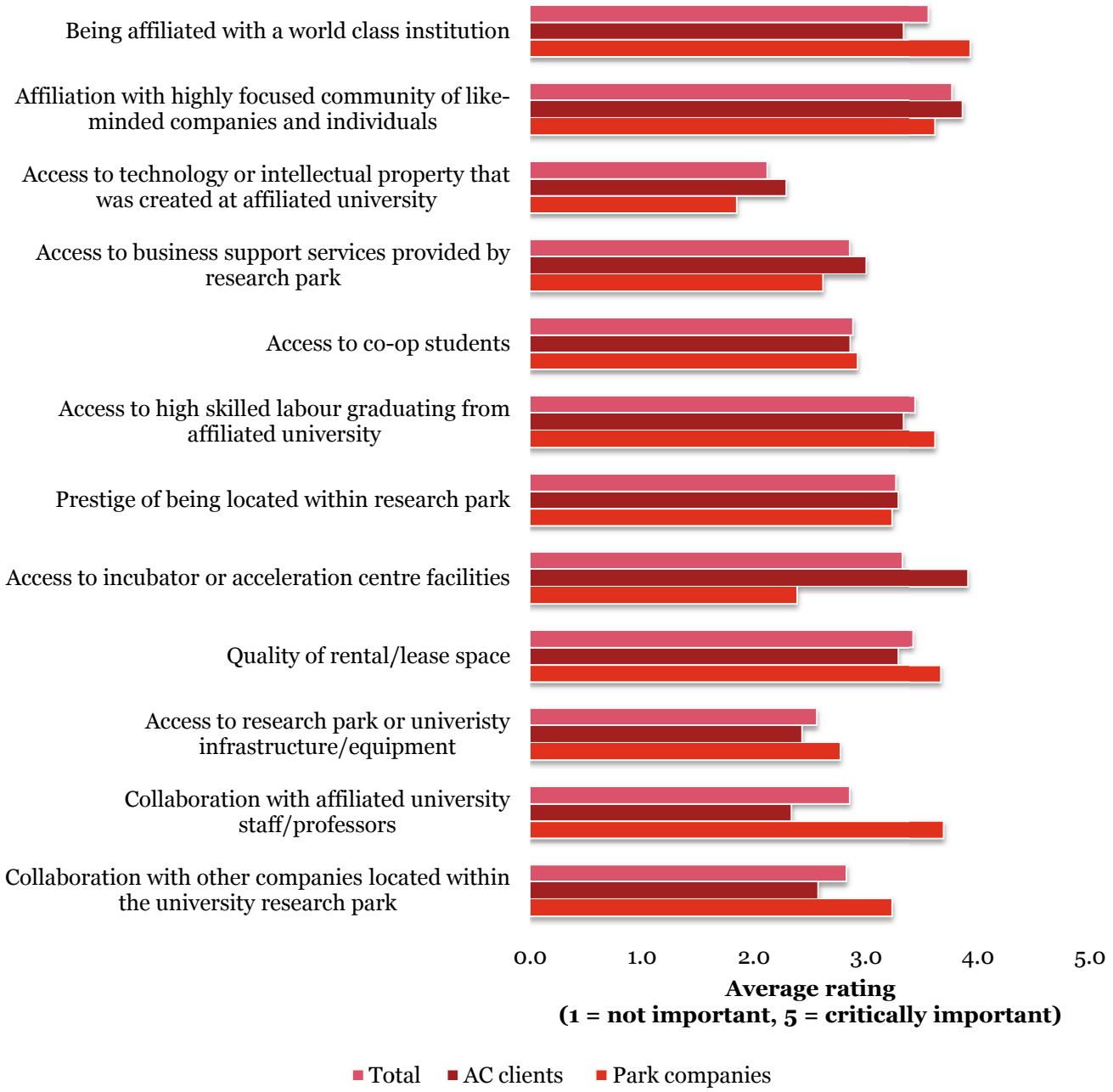
Rate the overall importance of David Johnston Research + Technology Park/Waterloo Accelerator Centre to your company's ongoing operations.

	1 - not important	2	3	4	5 - critically important
Park companies	N/A	N/A	N/A	N/A	N/A
AC clients	4.6%	4.6%	31.8%	50.0%	9.1%
AC virtual clients	23.1%	15.4%	30.8%	30.8%	0.0%
Total	**11.4%**	**8.6%**	**31.4%**	**42.9%**	**5.7%**

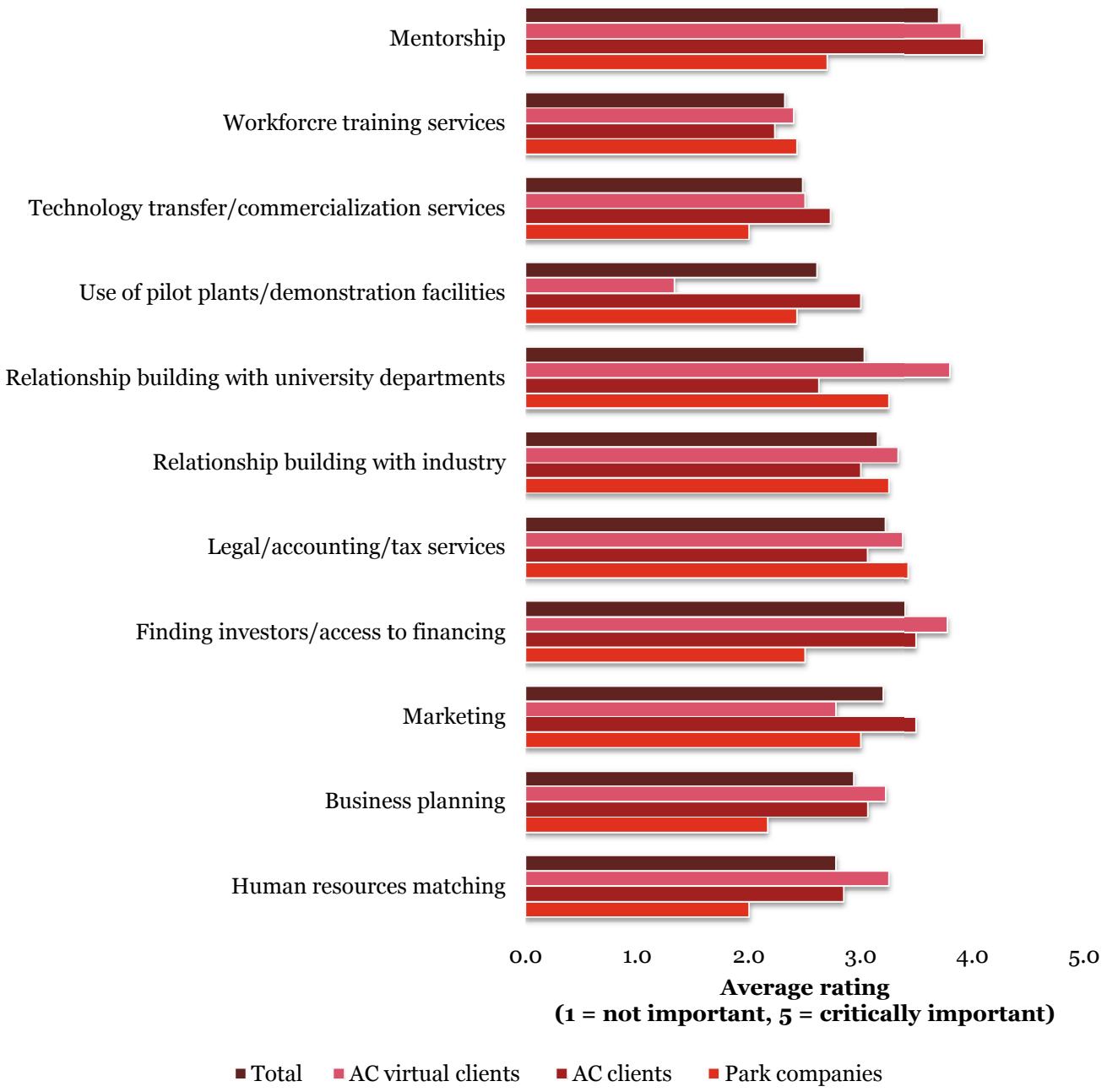
Rate the overall importance of UW to your company's ongoing operations.

	1 - not important	2	3	4	5 - critically important
Park companies	16.7%	0.0%	25.0%	41.7%	16.7%
AC clients	22.7%	4.6%	36.4%	22.7%	13.6%
AC virtual clients	0.0%	22.2%	22.2%	44.4%	11.1%
Total	**16.3%**	**7.0%**	**30.2%**	**32.6%**	**14.0%**

Rank and assess on a scale of 1 to 5 the following attributes/services provided by research parks to the on-going operations of your company (average)



Rank and assess on a scale of 1 to 5 the following business support services provided by research parks to the on-going operations of your company (average)



Exports

What is your company's experience exporting products and/or services?

	Actively exports	Has never exported	Plans to export in the short- or medium-term	Occasionally exports
Park companies	25.0%	58.3%	8.3%	8.3%
AC clients	36.4%	31.8%	22.7%	9.1%
AC virtual clients	44.4%	33.3%	22.2%	0.0%
Total	**34.9%**	**39.5%**	**18.6%**	**7.0%**

Where does your company export (percent of all companies that responded to the survey, companies were able to mark all that apply)?

	Park companies	AC clients	AC virtual clients	Total
United States	25.0%	63.6%	55.6%	**51.2%**
Mexico	18.2%	11.1%	8.3%	**14.0%**
Brazil	25.0%	22.7%	11.1%	**20.9%**
Russia	8.3%	18.2%	0.0%	**11.6%**
India	25.0%	22.7%	11.1%	**20.9%**
China	25.0%	13.6%	11.1%	**16.3%**
Europe (not including Russia)	16.7%	50.0%	11.1%	**32.6%**
Asia (not including India or China)	16.7%	22.7%	11.1%	**18.6%**
Latin America (not including Mexico or Brazil)	8.3%	18.2%	11.1%	**14.0%**
Australasia	25.0%	27.3%	11.1%	**23.3%**
Africa	8.3%	22.7%	11.1%	**16.3%**

Future R&D expenditures

Does your company plan on increasing, maintaining or decreasing current R&D expenditure levels over the next 5 years?

	Increase	Maintain	Decrease
Park companies	33.3%	66.7%	0.0%
AC clients	77.3%	22.7%	0.0%
AC virtual clients	N/A	N/A	N/A
Total	**61.8%**	**38.2%**	**0.0%**

Will your presence within a research park enable you to do more R&D over the next 5 years than otherwise?

	Yes, presence at research park enables more R&D	No, presence at research park does not impact R&D	Do not know
Park companies	25.0%	16.7%	58.3%
AC clients	22.7%	36.4%	40.9%
AC virtual clients	N/A	N/A	N/A
Total	**23.5%**	**29.4%**	**47.1%**

Expansion plans

Do you plan on expanding current business operations by establishing new locations?

	Yes, plan on expanding	No, do not plan on expanding	Do not know
Park companies	16.7%	41.7%	41.7%
AC clients	72.7%	4.6%	22.7%
AC virtual clients	55.6%	11.1%	33.3%
Total	**53.5%**	**16.3%**	**30.2%**

If you plan on expanding, where will you likely expand (percent of all companies that responded to the survey, companies were able to mark all that apply)?

	Within Ontario	Within Canada (not Ontario)	Outside of Canada
Park companies	41.7%	16.7%	0.0%
AC clients	68.2%	27.3%	45.5%
AC virtual clients	33.3%	0.0%	66.7%
Total	**53.5%**	**18.6%**	**37.2%**

If you plan on expanding, when will you likely expand?

	Within the next year	Over the next one to five years	Over the next five to ten years	Do not know when
Park companies	0.0%	85.7%	0.0%	14.3%
AC clients	45.0%	50.0%	5.0%	0.0%
AC virtual clients	37.5%	62.5%	0.0%	0.0%
Total	**34.3%**	**60.0%**	**2.9%**	**2.9%**

Are you considering a new spin-off or venture in the next five years?

	No, do not plan on launching a new spin-off/venture in the next five years	Yes, plan on launching a new spin-off/venture in the next five years
Park companies	N/A	N/A
AC clients	50.0%	50.0%
AC virtual clients	44.4%	55.6%
Total	**48.4%**	**51.6%**

If you plan on establishing a new spin-off or venture, do you plan on remaining in Waterloo Region?

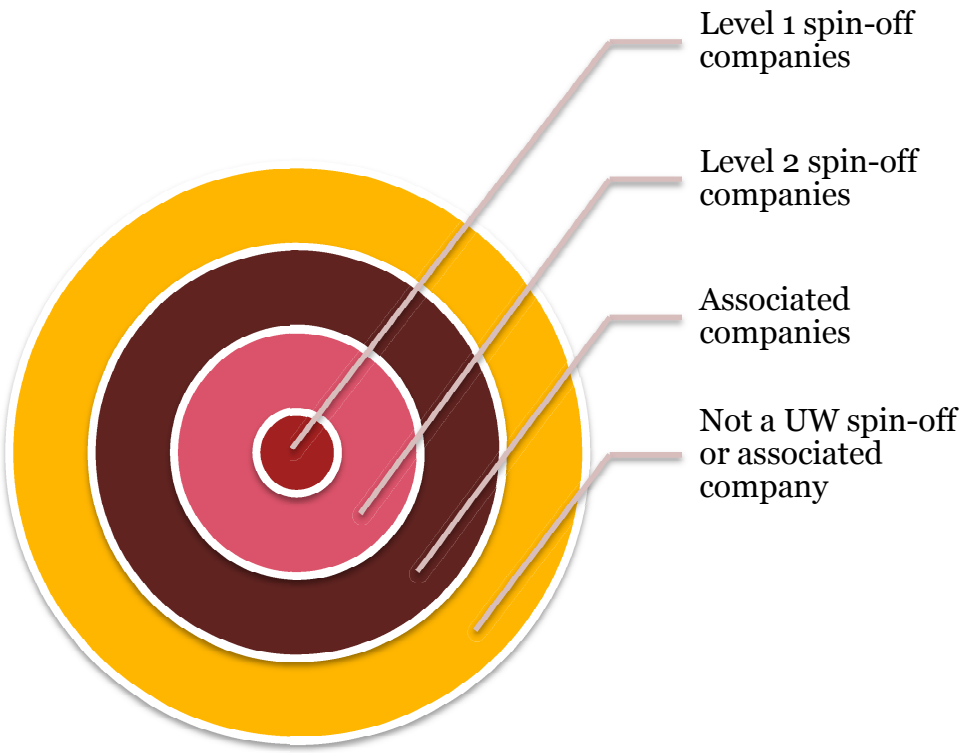
	No, do not plan on remaining in Waterloo Region	Yes, plan on remaining in Waterloo Region
Park companies	N/A	N/A
AC clients	11.8%	88.2%
AC virtual clients	14.3%	85.7%
Total	**12.5%**	**87.5%**

5. UW spin-off companies

Approach

As part of this study, PwC was asked to estimate the number of "technology transfer" spin-off companies that originated from UW. Working with UW and Communitech, a survey of 720 technology companies located in Waterloo Region was conducted from March 19, 2013 to April 10, 2013. This survey was structured to obtain the necessary data to enable estimation of the UW's overall economic impact and to assess the number of UW "spin-off" companies. Responses to various questions to the survey enabled us to assert whether (a) a company is a UW "spin-off" company and (b) what kind of "spin-off" company. The following diagram and table illustrates the definitions used to classify companies in the Waterloo Innovation Ecosystem.

Relationships between spin-off and associated companies



Company type	Definition
Level 1 spin-off companies	• Company created by technology licensed from UW (i.e., "Technology Transfer Company"). • Definition is consistent with the definition of a spin-off company used by the Association of University Technology Managers. • Represents the narrowest definition of a "spin-off company".
Level 2 spin-off companies	• Level 2 spin-off companies are a broader definition of a "spin-off company". • Includes companies created through venturing (i.e., where university faculty launches a new company) and/or via contract research.
Associated companies	• Companies that are not Level 1 or Level 2 spin-off companies, but

Company type	Definition
	indicated they benefit from locating close to UW (e.g., to take advantage of critical mass of high skilled talent in and around UW).

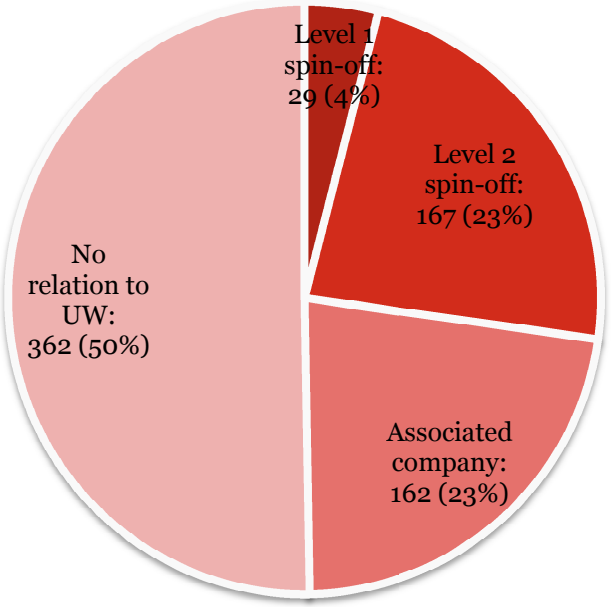
Based on responses to the survey responding companies were slotted into one of the three categories listed above. If a company did not fit into one of the three categories then they were classified as a "not a UW spin-off or associated company". The distribution of spin-off/associated companies based on the sample that responded to the survey was then extrapolated to the population (720 companies) to estimate the number of Level 1 spin-off companies, Level 2 spin-off companies and the number of associated companies.[1]

Number of spin-off and associated companies

Of the 720 technology companies in the Waterloo Region about 50% are estimated to have some level of association with UW, which includes:

- 29 Level 1 spin-off companies;
- 167 Level 2 spin-off companies; and
- 162 associated companies.

Number of UW spin-off and associated companies in Waterloo Region



[1] Prior to extrapolating sample results to the broader population we tested the sample to assess the degree of sample selection bias. In this context, sample selection bias occurs if companies that have a higher degree of affinity to UW (which are more likely to be Level 1 spin-off, Level 2 spin-off and associated companies) responded to the survey relative to companies that have a lower degree of affinity to UW (which are more likely to be companies that are not related to UW). If this were true and a higher proportion of Level 1 spin-off, Level 2 spin-off and associated companies answered the survey then extrapolating results based on the survey participation rate would overestimate the number of Level 1 spin-off, Level 2 spin-off and associated companies. To test this we obtained a listing of known Level 1 spin-off companies (for which we expect sample selection bias to be most prevalent, because they likely have a higher degree of affinity to UW) from UW and mapped this against the survey responses. The participation rate for this group was close to the participation rate for the survey (indeed it was lower), which lead us to assert that there was no evidence of sample selection bias. Accordingly, the participation rate was used to extrapolate results.