Global Entrepreneurship Monitor

GEM Report to the

University of Calgary

Community

2015

GEM REPORT TO THE UNIVERSITY OF CALGARY COMMUNITY 2015/2016

Cooper H. Langford
Peter Josty
Chad Saunders

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Why entrepreneurship? This analysis is designed to identify contributions from the University of Calgary community to innovative and productive entrepreneurship that can promote economic growth, job creation, sustainability, and quality of life.

Why GEM? Participation in the Global Entrepreneurship Monitor (GEM) brings the University's data into a rich national and international context of policies and circumstances. Uniquely, GEM paints a portrait of the individual as entrepreneur by detailing attitudes, activities, and aspirations.

ATTITUDES

The U of C community attitudes toward entrepreneurship are not unfavourable, but the strong Canadian public attitudes are moderated – perhaps by greater 'realism' - on estimates of opportunity and skills. Over half have of respondents have met entrepreneurs; over a quarter of respondents see good current opportunities, but nearly have responded "don't know" an entrepreneur. Forty percent believe they have the skills and knowledge to start a business, a substantial number but fewer than responded positively in the Alberta or Canada surveys. Intention to undertake an entrepreneurial venture within the next three years is, as might be expected, higher among students than it is in the general population.

ACTIVITY

In 2015-16, U of C community members are engaged in early-stage entrepreneurship at levels similar to populations in Alberta or Canada generally. This is good news since the provincial and national levels of activity stand first among developed countries in 2015 data. In Alberta in 2015 the rates of activity by women and men are virtually equal. In Canada rates for women are 80% of men's rates. The U of C community responses show a larger gap.

In the area of new ventures arising within established firms (employee entrepreneurship) the activity in the University was studied with a definition slightly different from the one used in the provincial or

national study. Activity for a "principal contractor" was added to the question of activity for a "principal employer" to capture information about consequences of university collaboration with outside organizations. A high level of these forms of "intrapreneurship" was identified. Faculty rates were higher than student rates, but not by a large margin. All three discipline areas; Health Sciences, Science and Engineering, and Social Science and Humanities are well represented. Health Sciences report the highest level of activity followed fairly closely by Social Sciences and Science and Engineering, in that order.

ASPIRATIONS

A final key aspect of early-stage entrepreneurship is the entrepreneur's aspirations. This has a great deal to do with the potential for impact on innovation, employment, export, and revenue growth. These issues are the subject of the role of entrepreneurs in the economy below.

ENTREPRENEURSHIP IN THE ECONOMY

Sectoral focus

GEM data divide initiatives into activity in four sectors: extractive (natural resources, agriculture), transformative (mainly manufacturing), business oriented services, and consumer oriented services. In Canada and in other developed countries, consumer oriented services tend to be the leading category. Although less so, this is true for Canada too. However, the University of Calgary data clearly indicate a focus on business oriented services with just over 50% of initiatives. In the context of recent research indicating the importance of knowledge intensive business services (KIBS) to innovation, this is an indicator of innovation potential.

Job creation

Job numbers reports are grouped: none, 1-5, 6-19, and 20 or over. In reports of current job levels there are some "no employee" initiatives, but aspirations for the status of the firm in five years indicate none of the reported start-ups intend to be self-employment ventures. Similarly, there are no reports of employment at the 20 or more level

now, but aspirations for five years hence find that approximately thirty percent target twenty or more jobs. These responses exceed rates of job aspirations reported for Alberta or the rest of Canada.

Market Innovation

Two questions in the survey probe the perceived novelty of the product or service, and the presence of competing firms offering similar products. The U of C entrepreneurs report in strikingly high numbers that no other firms offer the same product or service (almost 40%) and report a high level of uniqueness with respect to competing firms (25%).

Export Orientation

Export orientation is an indication of aspirations to operate in larger markets. This is likely to be a signal of productive entrepreneurship and innovation. More than 40% of U of C entrepreneurs report expecting more than 25% of revenue from exports and a majority of these expect to derive more than 75% from export.

Technology

One indicator of productivity and innovativeness is the use of up-to-date technology. New firms are asked to report use of technology introduced in the last year, or technology introduced in the past five years, or only older technology. Twenty-five percent University of Calgary entrepreneurs report using the newest technology, another forty percent report use of technology introduced in the last five years. In other jurisdictions, "only older technology" is the report from a majority of respondents. As well, U of C entrepreneurs are more likely to report initiatives classified as in high or medium technology industries (using OECD definitions).

GENDER

The lower rate of participation by women is related to a lesser confidence in skills and knowledge to start a business among all women respondents and an increased inhibition to start from fear of failure. Among motivations of women entrepreneurs "increase of

income" is less important than it is for men, as is "independence". A majority report mixed motives. Although these entrepreneurs reported an opportunity as the main driver of their initiative, the mixed motives may include a necessity dimension.

The fifth chapter summarizes an expert panel evaluation of the environment in alberta for support of the entrepreneurs.

CONCLUSIONS

Rates of entrepreneurial activity, especially in the "intrapreneurship" category are quite satisfactory. This is despite the fact that respondents do not express the sense of opportunity or confidence in their knowledge and skills to start a business.

The U of C activity is high on metrics of innovativeness.

RECOMMENDATIONS

University policy should support education for entrepreneurial thinking across the Campus, reflecting the wide distribution of entrepreneurial activity across the institution.

Steps are needed to ensure that women have as much access to information and education about entrepreneurship and the opportunities as men.

Ensure that students planning entrepreneurial activity can readily access community support organizations, especially on graduation.

The modality of entrepreneurship at the University is better captured in EEA (intrepreneurship) than TEA (early stage firm formation). The accomplishments of faculty in this sphere should be recognized.

1. INTRODUCTION

The University, entrepreneurship, and GEM

This is the first comprehensive survey of entrepreneurship in a university using GEM methodology. A representative random sample of students and a second sample of faculty were canvassed with a questionnaire, edited in a few places to enhance applicability to a university, from the 2015 international GEM survey as used for GEM Canada and GEM Alberta. It is known as the GEM *Adult Population Survey* (APS). The use of the GEM instrument provides the opportunity to benchmark with the Province as a whole, Canada nationally, and seventy other countries. In this report the University is treated first as a comprehensive community with data for both students and faculty jointly included in analysis. Where it is relevant and statistically feasible, some comparisons of student activity to faculty activity are provided, but in most cases differences are not large. Similarly, some analysis compares the activity in the major discipline groupings of natural sciences and engineering, humanities and social sciences, and health sciences. Again, differences are commonly not large.

The role and nature of entrepreneurship

Ahmed and Hoffman in their OECD publication, *A Framework for Addressing and Measuring Entrepreneurship*[1] give a goal oriented account of entrepreneurial activity as:

> ***Entrepreneurial activity*** *is the enterprising human action in pursuit of the generation of* ***value****, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.*

The goal of the activities highlighted in this is the creation of value. This view is expansive enough to include and champion all types of innovation, but a special place is reserved for those entrepreneurs who create new establishments, businesses or other ventures with the prospects of job creation and other values, as well. There is extensive and persuasive empirical evidence that entrepreneurship is indeed

a driver of job creation and economic growth[2] so contextualizing the University of Calgary activities within this value framework is enriching. (The definition used in GEM studies - below - answers the operational requirements of delimiting a survey).

The influential economist William Baumol[3] has pointed out that there are three types of entrepreneurship: *productive, unproductive, and destructive*. Productive entrepreneurship is that which has growth potential and produces significant innovations. It yields growth and quality of life benefits as well as jobs. Unproductive entrepreneurship simply reshuffles the locus of monetary accumulation. For example, it includes opening imitative consumer services businesses. Still, net employment may increase. Destructive entrepreneurship, such as criminal inventiveness, is outside the scope of GEM study. There is no rigid line between productive and unproductive types; more realistically, it may be a continuum with these as the end points. Nevertheless, the main interest in entrepreneurship study is understanding of the productive entrepreneurial process, which supports long-term, often transformative growth. Here attention centers on entrepreneurship in relation to innovation, where much innovation analysis has focused attention on only the knowledge creation inputs, R&D, and technology. Yet, it is clear that not all innovation is derived from technical inventiveness. Think of Tim Horton's coffee shops or the introduction of 'Medicare.' In fact, analysis of innovation shows that every success depends in large measure on non-technical social factors. Hall and Martin[4] point out that an innovation must pass four hurdles: technical feasibility, commercial viability, organizational capability, and social acceptability. They argue that uncertainty increases as we pass along this value-added chain from left to right. An entrepreneurial venture must succeed at each stage. In most cases, the major challenges arise after technical feasibility has been established.

1. INTRODUCTION

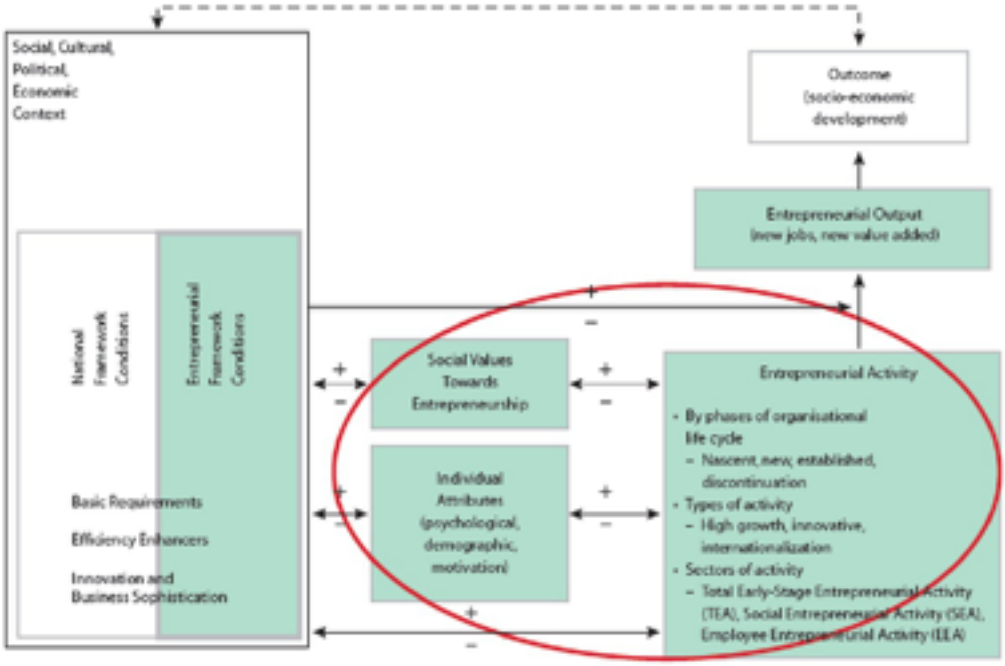
Why GEM?

First and foremost, GEM is a regional, national and global project. Participation in GEM brings the University into a rich context of data from Alberta, the rest of Canada, other participating Provinces. It also provides data from countries that cover a full spectrum of circumstances and policies. The uniqueness of GEM lies in the focus on the attitudes, aspirations and activity of *individual entrepreneurs*, and their surrounding populations, that are now recorded globally in a sixteen-year time series of adult population surveys (APS). There is no comparable source of such intimate information about the key actors. Every entrepreneur is a potential innovator, since an entrepreneurial initiative grows out of a new idea in some way. Most innovation literature offers analysis from the *firm* perspective. GEM brings the *individual initiator* back into focus. This is especially relevant to study of entrepreneurship in a university community.

Entrepreneurship, innovation, growth - the GEM model[5]

The interpretation of entrepreneurship from one perspective focuses on the individual entrepreneur with personal aspirations, capabilities and opportunities against an alternative framework focusing on human capital, policy, markets, finance, and culture. The GEM project regards entrepreneurship as *a process in a complex ecosystem* and examines individual entrepreneurs and ventures in this context. The GEM model is outlined in Figure 1.1

Figure 1.1. The GEM conceptual framework



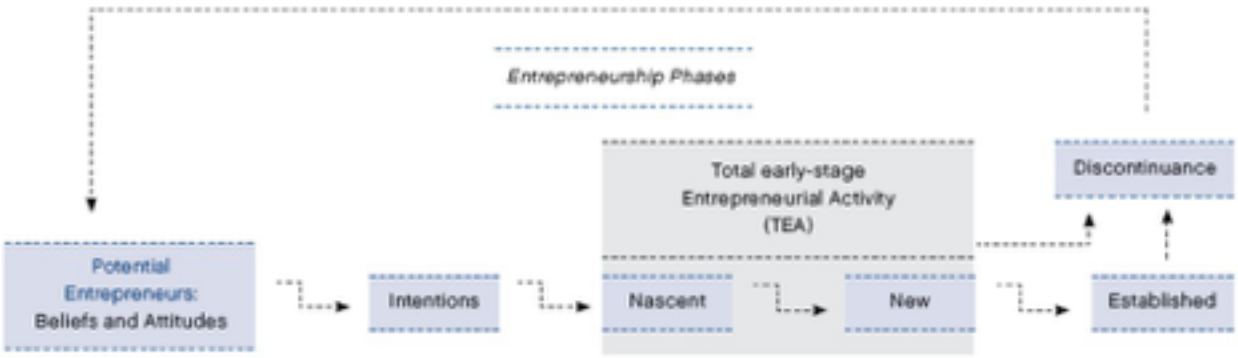
(Source: GEM Global Report 2014[7])

The area inside the red oval includes the aspects of entrepreneurial activity that are the subject of questions to entrepreneurs, and to the surrounding population about attitudes ("Social values", upper left) in the Adult Population Survey (APS). Within the red oval, in a first layer of the ecosystem, are questions addressed to all respondents that explore both general public attitudes toward entrepreneurship and general demographic characteristics. Moving to the left block outside the red oval, the top part refers to parts of the ecosystem determining the framework in which an entrepreneur must work, in the form of general national (regional) conditions specifically influencing entrepreneurship. For an Alberta institution, these are assessed in an expert panel survey that is reported in the 2015 GEM Alberta report and summarized in Chapter 5[i]. The lower part on the left refers to general socioeconomic conditions that, for example, determine the assignment of the jurisdiction to one of the three World Economic Forum categories of economy type – in this case primarily those associated with innovation and business sophistication

as core characteristics. Various sources, such as Statistics Canada data, are consulted to gather the required information. Businesses in an *innovation driven economy* (like Canada) are more knowledge intensive and the service sector figures more prominently in the economy. Entrepreneurship and innovation factors play a more dominant role in the development of these economies, but they still rely on a healthy profile of the basic resources requirements and efficiency enhancing factor characterized at the bottom left of the diagram as applying to economies at all stages of development.

Beyond the structural aspects, the GEM model also views entrepreneurship as a dynamic process in the ecosystem, occurring over different phases from intention to start, to just starting, to running new or established enterprises, and even to discontinuance. Given variable contexts and conditions, it is not inevitable that one phase leads directly to the next. Figure 1.2 shows the phases of entrepreneurship. In exploring the early phases, the GEM surveys assemble the critical individual level data not available from firm level numbers alone.

Figure 1.2. The phases of the entrepreneurial process



(Source: GEM Global Report 2011)

Research methodology and scope

Adult Population Survey (APS)

Using a web based survey approved for research involving human subjects, an independent polling firm, with the aid of the Office of Institutional Analysis and the Office of the Vice-President Research, selected a random sample of full time students and a similar sample of full time faculty members. Data were obtained to Identify gender of respondents and to indicate the faculty of primary affiliation. To create statistically useful discipline groupings, responses were grouped according to the research scope of major federal granting agencies: CIHR for health sciences; SSHRC for social sciences and humanities; and NSERC for science and engineering. These three groupings, however only identified discipline affiliations of respondents and bore no relation to research activity or absence thereof. The survey firm and the authors of this report had no access to the identities of the respondents. Participants responded to a series of detailed questions, phrased in everyday language. The same questions are used throughout the GEM International entrepreneurship project. The questions assess entrepreneurial *attitudes, activities*, and *aspirations*. These attempt to provide a profile of a representative cross section of the University.

With the common survey instrument in global use, it is possible to compare University of Calgary entrepreneurship data to Alberta data, to Canada as a whole data, and to other countries, in international data, on the 'working age' range of 18-64.[6] The comparative data may provide more valuable information than a standalone survey as a result of errors that arise in common.

Expert Survey (PES)

The GEM project also seeks to understand aspects of the larger environment in which the entrepreneur operates through a Provincial Expert Survey (PES)[7]. The expert survey probes the views of 36 experts, 4 each from 9 areas of expertise. The experts come from different professional perspectives related to entrepreneurship where they gain considerable knowledge of entrepreneurial activities. Nine areas of expertise are specified by GEM. The survey instrument presents a

series of statements reflecting the GEM perspective on conditions that would be supportive of entrepreneurship. The experts are asked to estimate the degree to which each is true for Alberta.

The nine major areas that create the framework in which entrepreneurs operate are explored by a set of questions. These areas are:

- *Financing,*
- *Governmental policies,*
- *Governmental programs,*
- *Education and training,*
- *Research and development transfer,*
- *Commercial infrastructure,*
- *Internal market openness,*
- *Physical infrastructure and,*
- *Cultural and social norms.*

Since the immediate jurisdictional environment of the University is the Province of Alberta, some results of the provincial expert survey for Alberta are reported here.

Standard Socioeconomic Data

Basic contextual data were obtained from Statistics Canada and OECD publications. Several other international, national, and provincial agencies publish relevant studies. Academic research was also reviewed. Relevant studies are cited in the report where information is drawn from them.

The three key indicators from the GEM survey probe:

1. **Entrepreneurial attitudes**
   - How strong is the perception of a culture of entrepreneurship?
2. **Entrepreneurial activity**
   - How much and what early-stage activity is occurring in the community population?
3. **Entrepreneurial aspiration**
   - What do the entrepreneurs seek to achieve?

The primary indicators for these categories paint a portrait that is unique to the GEM methodology, providing a better view of the individual entrepreneur acting in the community.

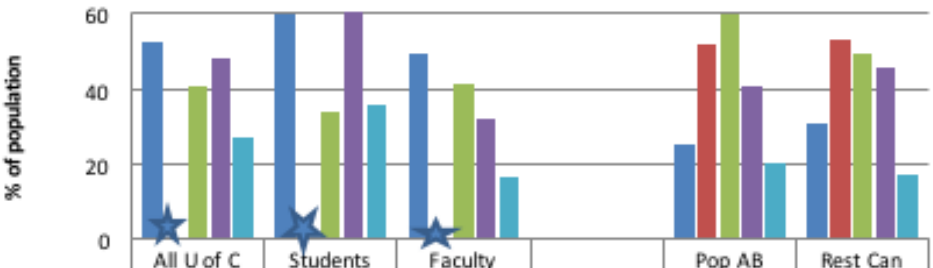
2.1. Attitudes

The attitude survey delivers two types of information. The random sample of the all full time members of the U of C community (divided into a faculty sample and a student sample) is used to assess the *climate and culture* for entrepreneurship. (It is also possible to assess attitudes of the early-stage entrepreneurs themselves).

Five attitudes toward entrepreneurship are represented in Figure 2.1 for the overall university community, the students, and the faculty. The results are compared to the Alberta (AB) population responses and those in the rest of Canada (rest CA). Reading left to right, first are those who report having met an entrepreneur within the last two years (Knoent), next the percent of respondents who see a good opportunity to start a business in the next six months (Opport), then whether respondents believe they have the skill and knowledge to start up a business (SuSkil), then for what percent would fear of failure inhibit a decision to start a business (FearFail), and finally those who foresee engaging in entrepreneurial activity within the next three years (FutSu). Percentages of responses favourable to entrepreneurship are reported for five respondent groups: all U of C respondents (All U of C), faculty respondents (Faculty), student respondents (Students), and for comparison data drawn from the 2015 Alberta Gem report to responses from the random sample of Alberta residents (Pop AB) and a similar sample from the rest of Canada (Rest Can).

2. THE PRACTICE OF ENTREPRENEURSHIP

Figure 2.1. Attitudes toward entrepreneurship



	All U of C	Students	Faculty		Pop AB	Rest Can
Knowent	53	60	50		25	31
Opport					52	53
SuSkil	41	34	42		60	50
FearFail	48	63	32		41	46
FutSu	27	36	17		21	17

The figure indicates that U of C respondents are more likely to have had exposure through acquaintance with an entrepreneur than the general population and students express intention to undertake future entrepreneurship at a higher rate than the general population. However, university respondents were distinctly less likely to identify good opportunity in the next six months and no percentage are reported in the table (★) or figure because of a *near 50% "don't know" response*. Students had a much lower estimate of their skills and knowledge required to start a business and faculty responses also below the reference populations by a statistically significant margin. These low levels readily explain the higher level inhibition from fear of failure reported among students.

Are the students really less entrepreneurially oriented than the general population? This is not consistent with the higher levels of plans for future entrepreneurial activity (FutSu). The responses claiming skill and knowledge to start a business reach 60% in Alberta and 50% in the rest of Canada. Are these high levels realistic, or are the student levels simply more realistic and informed than the general population responses? In either case, the data support a *need for education for entrepreneurship and entrepreneurial thinking to be widely available in the university*.

2. 2 Activity

2.2.1 Total early stage activity (TEA)

The critical measures of the circumstances of entrepreneurship leading to firm formation are those where action, with its risks, are reported. The heart of the GEM survey lies in the indicators that identify the ongoing level of early-stage start-up activity. In the broader GEM studies, comparisons among provinces, countries, and trends over time, provide the basic information for judging the outcomes of entrepreneurship policy. In the U of C 2015-2016 study they offer a first look at entrepreneurship on campus and provide a reference point for discussions of policy.

The analysis centres on two measures that are combined to produce a third called *the total early-stage activity (TEA)* that heads the tabulations below. The measures are:

1) The *nascent entrepreneurship rate*, the percentage of the population who are currently engaged in setting up a business that has not paid salary, wages, or other payments, to owners for more than three months.

2) The *new business ownership rate*, percentage of the same populations who are currently owner-managers of new businesses that have paid wages, salaries or any other payments to owners for more than three months but not more than 42 months.

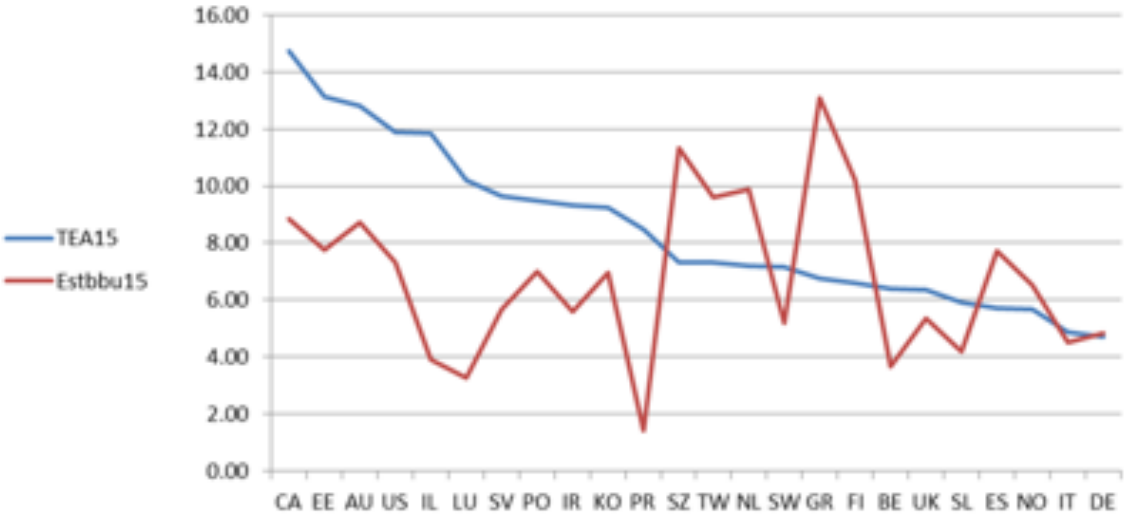
3) These two are combined (counting each individual only once) to yield an overall indicator, '***TEA***', *the total early-stage activity, or the entrepreneurship rate*.

Understanding of the TEA is enriched by an analysis of: (1) gender, and (2) opportunity *versus* necessity as the driver of entrepreneurship. Additionally, it is helpful to compare the early-stage entrepreneurship rate to the population segment that own or manage an established business in operation for over 42 months, although this is less relevant in the university setting. Given the random sample of the population, such respondents will predominately be owners and/or managers of small and medium size businesses that represent the next stage for the successful entrepreneurs.

2. THE PRACTICE OF ENTREPRENEURSHIP

To establish a broad reference point for evaluation of the results of the U of C study, it is useful to start with data drawn from the GEM Global 2015 Report[8]. GEM follows a division of global economies introduced by the World Economic Forum that identifies: *resource driven* economies dependent mainly on primary resources, *efficiency* driven economies driven primarily by the efficiency of production, and *innovation* driven economies with economic structures dependent primarily on knowledge and innovation. Roughly, TEA values decrease from resource economies where lower levels of development lead to reliance on entrepreneurship (necessity driven) for basic income, to innovation driven economies where employment is high and the less frequent entrepreneurship is driven primarily by entrepreneurs who identify opportunities in the economy. Canada is classed as an innovation driven economy. Figure 2.2 shows the trend in TEA values reported in 2015 for the major innovation driven economies.

Figure 2.2. TEA (as % Population) in major innovation economies.
TEA15 is the blue line. The red line (Estbus15) is the corresponding % of established businesses reported.

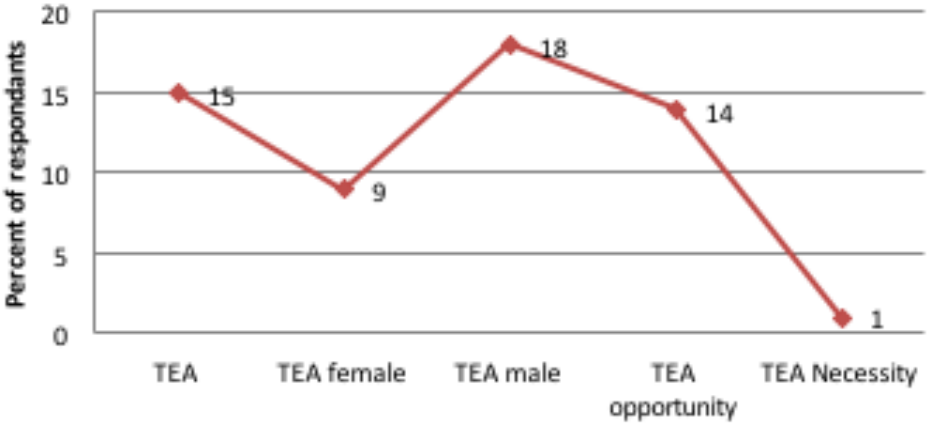


In 2015, as shown, Canada had the highest TEA among these developed countries. Other leaders were Estonia, Australia, and the US. The red line in the figure shows rates of reported established businesses (> 3.5 yr. old) mentioned above. Such businesses are mainly small and medium size, the graduates from the TEA stage. Note that the two trends are not closely correlated.

The overall University of Calgary total early stage activity is shown in Figure 2.3 where the distribution by gender and the role of the motives, opportunity and necessity are shown. The TEA for the full sample is indistinguishable from the 14.7%, rate for Canada in 2015 at 15%. The rate for the Province of Alberta for 2015 was also 15% (GEM Alberta Report, 2015). The rate for student respondents was 15.5% where the faculty respondent rate was 14.5%, within error of each other.

There is one major difference from Canada, Alberta, and the other leading countries. In Canada the rate of entrepreneurship by women was approximately 80% of that for men. In other leading countries women's entrepreneurship clusters around two-thirds of the rate for men (GEM Global Report, 2015). The 50% level from this survey is a matter for concern that will be examined further in Chapter 4. If we examine student responses compared to faculty responses, the rate for male faculty is lower than for male students by two percentage points, but the rate for female faculty is half the 11% rate for female students. The female student rate of 11% is comparable to female rates in other leading innovation economies. The female faculty rate is quite low, but the sample is small and the uncertainty large. The other interesting division is to examine the rates for the three major discipline areas: Health Sciences, Science and Engineering, and Social Sciences and Humanities. Numbers of entrepreneurs in each group are small enough to make uncertainties high.

Figure 2.3. Percentages of University of Calgary respondents reporting early stage entrepreneurship activity (TEA).



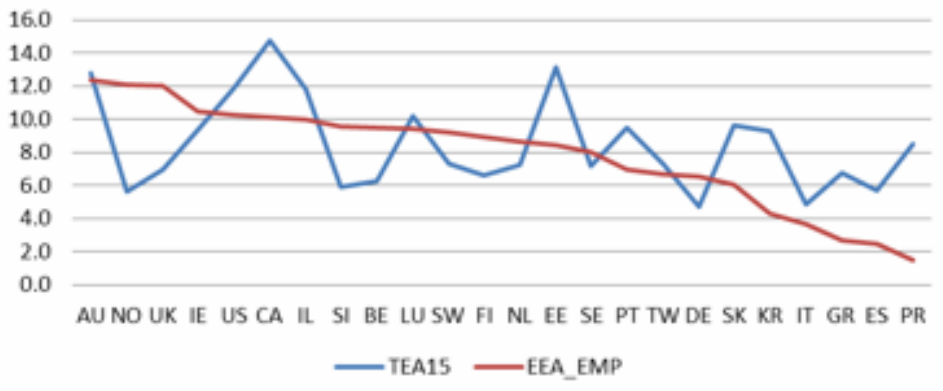
The final points in Figure 2.3 report on the role of opportunity among University entrepreneurs. As expected, the results are parallel to Alberta and Canada results, with opportunity far **greater than** necessity as the motive. Looking closely at motives for pursuing an opportunity is difficult because the factors vary greatly, but simple answer questions can probe some basic motives. Forty-eight percent of respondents indicated increase of income as a factor in opportunity, eighteen percent cited independence and thirty-two percent reported mixed motives. Anecdotally it can be noted that among open ended remarks about motivations we do find remarks like: "translating a basic discovery to a product" and "novel opportunity to really make a difference".

2.2.2 Employee Entrepreneurial Activity (EEA)

In contrast to the TEA in new independent business formation, there is a measure of the activity of employees involved in the start-up of a new venture for their principal employer firm. These initiators are described as 'intrapreneurs' or 'entrepreneurial employees.' The shorthand term here is EEA (for employee entrepreneurial activity) as a parallel to TEA (these populations can overlap). One important point is that opportunities are under the control of established firms and consequently dependent on firm strategies. This is one reason why TEA and EEA do not necessarily correlate. Figure 2.2 is similar to Figure 2.3

and shows the trend of EEA for the innovation (developed) economies. The red line shows the percentage EEA among those respondents currently employed (EMP) contrasted to the blue line reporting percentage TEA.

Figure 2.4 Percentage of the employed population (EMP) engaged in EEA (red)compared to percentage of TEA (blue) among innovation economy countries



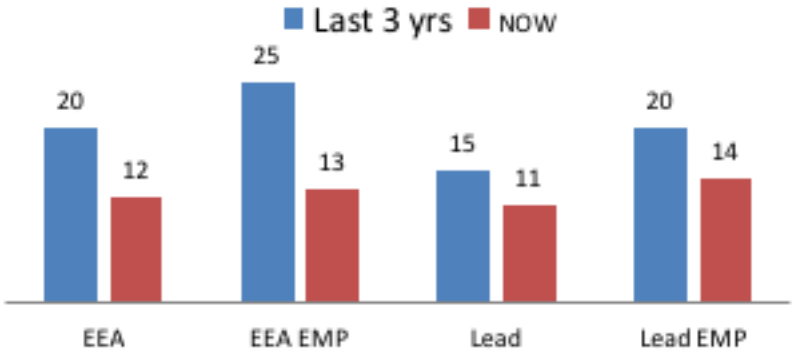
In the case of EEA, Australia is the leader and has closely matching values. However, a number of countries such as Norway, Finland, and the Netherlands have an EEA above the TEA. Canada is in sixth place with an EEA well below the TEA.

For the University study we have modified this variable somewhat. The university version adds to **principal employer** (only the University for Faculty respondents) activity for a **principal contractor** *in order to capture the role played by university teams in collaboration with the private or government sector*. Thus, EEA reported here will not be strictly comparable to the national values above.

Figure 2.5 Reports the modified EEA exploring activity by university community members in intrapreneurial efforts in established firms (EEA), presumably including large firms. The questions asked for activity within the last three years and that in the current year (NOW). It also asked whether the role included a leading (Lead) role. Even with allowance for the broadening of the definition, the overall reported rate of 20% of the total population is impressive. This rises

to 25% if only those reporting being employed fulltime are counted. A majority of these report playing a leadership role in the teams. Of the intrapreneurs, over 80% report participation in the idea development stage and over two-thirds report participation in the phase leading to implementation. The median team size reported is four.

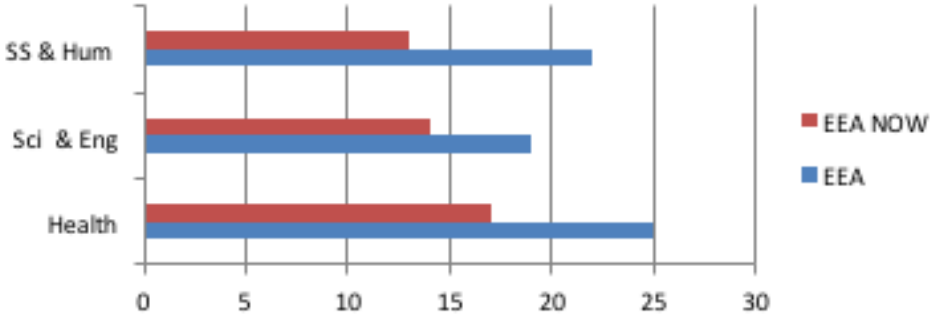
2.5. University EEA by employees and contractors.



As with TEA, there is not a large difference in overall EEA between faculty and student responses. In this case the faculty is more engaged, but only by 1.5 percentage points. A second interesting question is the level of engagement with firms as a function of the areas of faculty research. Since all faculty respondents and most students are not full time employees outside the University, EEA should reflect the relative levels of engagement and collaboration in innovation. Figure 2.6 shows percent of respondents reporting EEA (in last 3 years) by discipline groupings: health sciences (Health), science and engineering (Sci & Eng), and social sciences and humanities (SS & Hum).

The striking result is that there are no large differences in overall statistics. The three groups are nearly within statistical error of each other. Perhaps the values for the social sciences and humanities were not expected, but these results are supported by the faculty surveys of seven Canadian institutions by Hawkins *et al.*[9] However, the lead for the health sciences is probably significant.

Figure 2.6. Percentage of respondents involved in EEA by discipline area. NOW designates activity in the current year.



2.3 Aspirations

A final key aspect of early-stage entrepreneurship is the entrepreneur's aspirations. This has a great deal to do with the potential for impact on *innovation, employment, export*, and *revenue growth* (i.e. on the question of the extent of productive entrepreneurship). These aspirations are explored through a series of questions concerning expectations for firm performance after five years. The ambitions for the new businesses are probed with queries about: what fraction expects substantial job growth, what fraction will produce *new products and new markets*, and what fraction *will export*. The responses received are critical to evaluating the effects of entrepreneurship in the economy, which is the subject of the next chapter.

3. ECONOMIC IMPACT OF ENTREPRENEURS

The *entrepreneur* who was introduced to us by Joseph Schumpeter in the *'Theory of Economic Development'*[10] in 1911 is the committed agent of economic change, moving the economy into a new cycle. Entrepreneurial action can lead to job creation and innovation that can stimulate economic growth and, in favorable cases, sustainability and quality of life. The *entrepreneur* acts in various contexts: as the agent launching a new enterprise, as the champion of a new direction for an established firm, or as the innovator launching an initiative which delivers social impact. Thus, a more robust understanding of the role of the entrepreneur in the economy lays a critical foundation for the development of economic and social policy.

It is always important to remember that not all entrepreneurial efforts are constructive. *Baumol's* categories[5] distinguish productive from non-productive initiatives, where the first are seen as economically creative and the second as simply re-arranging the distribution of economic benefits. Clearly, the productive category is closely tied to innovation. The total entrepreneurship measures do not give indications of the degree to which a given effort has productive content. It was noted above that the less 'productive' may still have positive aspects, as for example, in job creation. Finally, of course, productive character does not guarantee socially beneficial outcomes.

Shane[11], in an award winning paper, shows that 'non-productive' entrepreneurship may even be economically negative (e.g. for growth where too much local competition is generated). He recommends that policy instruments be carefully designed to focus start-up support to those new businesses that have clear growth plans, and observes that 'picking winners' may be hard, but in many cases, identifying the non-productive is much more straightforward. "Policy… should stop subsidizing the formation of the typical start-up [and] focus on the subset…with growth potential."[11] It does not require "picking winners".

3. ECONOMIC IMPACT OF ENTREPRENEURS

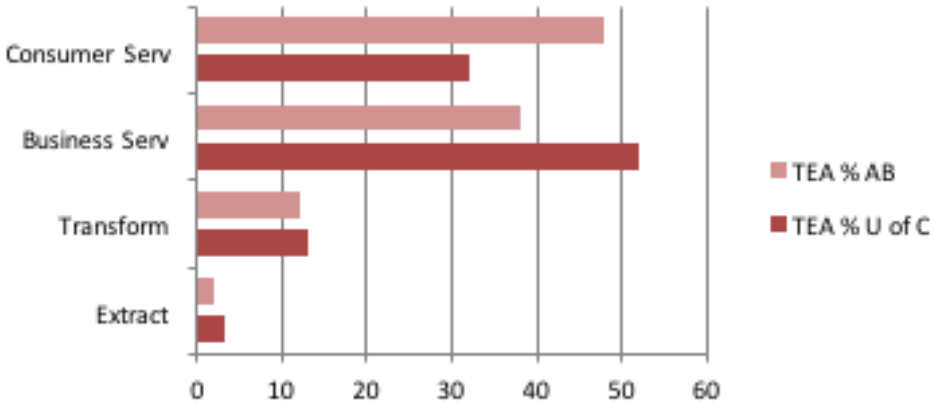
The aspects of economic roles considered here include:

- Sectoral focus
- Jobs creation and job aspirations
- Indicators of innovation
- Export orientation
- Uses of technology and technology status

3.1 Sectors

The subdivision of initiatives by sector in GEM is achieved by asking each respondent to describe the new business. Responses are then coded using four-digit international industry codes (ISIC). These codes are then grouped into four sectors that have statistically significant numbers of firms. These groupings are: *extractive (Extr)*, including mining and agriculture; *transformative (Transf)*, mainly manufacturing; *business oriented services (Bus Serv)*; and consumer oriented services (Cons Serv). As might be expected, the last of these is commonly the most populated. Data for 2015 activity in Alberta are compared to the University data in Figure 3.1 for the new initiatives of TEA.

Figure 3.1: Sector distribution (%) of 2015 early-stage entrepreneurs (TEA)



3. ECONOMIC IMPACT OF ENTREPRENEURS

The University community presents a striking contrast to the provincial data, and it would exhibit the same contrast if data for the rest of Canada or International data were shown. In most jurisdictions, the leading form of entrepreneurship is in consumer oriented services. At the U of C, business oriented services account for a majority of the reports. This is suggestive of innovation orientation since there is a lively literature on the innovative capacity of knowledge intensive business services (KIBS)[12] There are no large variations in sector distribution as function of the discipline area in the university among health sciences, science and engineering, or social sciences and humanities, but it may be interesting to note that response for social sciences and humanities reported just over sixty percent of initiatives in business oriented services.

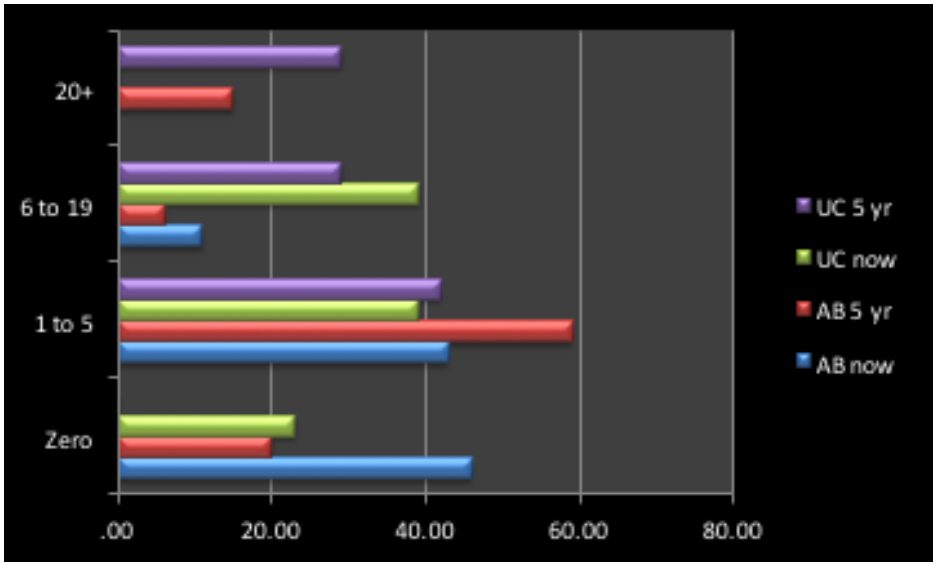
The category of business services merits some expanded analysis to characterize what activities it includes. For smaller samples (e.g. provinces, the university), further subdivision of the categories is not likely to yield statistically significant results. However, the four categories are constructed by grouping twelve categories that correspond to the most significant digit in the international standard industry codes (ISIC). To see what Business services means, we can see what it includes in the twelve categories of ISIC. Such areas as real estate and financial services, but they also have major components in professional services and businesses that support health, education, and government. To give an example, the 2015 GEM Canada Report[13] achieved good statistics by analyzing three years of national data for TEA sector activity in the twelve one digit ISIC categories. The leading sector is retail, hotel and restaurant (20%) that is grouped into *in consumer oriented services*, but the 'social' sector (17%) and professional services (15%) are the next in importance and are part of *business oriented services*. The emphasis on retail, hotel, restaurants, and businesses serving the social sector (education, health, government etc.) is not resolved by analysis of only four sectors.

3.2 Job creation and job aspirations

Job creation is a key target for entrepreneurship policy, yet globally a significant number of start-ups only plan self-employment. The latter are not necessarily unproductive. For example, the sector described above as professional services can include self-employment where the services support innovation and growth of other firms. Still the focus here will be on jobs created at start-up and, especially the *aspirations* for job levels to be reached after five years. The data are summarized in Figure 3.2 where data for U of C respondents are compared to results for the province in terms of both job levels at start-up and job aspirations for five years hence. Note that none of the U of C entrepreneurs who report no jobs at start-up wish to remain simply self-employed. Moreover, although none of the new firms have 20 or more employees now, nearly 30% aspire to that level after 5 years. In contrast fewer than 20% of the Alberta respondents in 2015 expected to reach that level and Alberta statistics were higher than those for the rest of Canada. These data suggest a high fraction of quite productive entrepreneurship from the U of C respondents.

These data have implications consistent with data from another question. This item asks if the five-year aspiration is to achieve employment of 10 or more with accompanying 50% growth. Twenty-three percent respond yes to this combined growth metric.

Figure 3.2 Job creation
Percentage of TEA entrepreneurs reporting jobs now, and after 5 years.



3. ECONOMIC IMPACT OF ENTREPRENEURS

In comparison to provincial and national GEM surveys there are some interesting contrasts. None of the university respondents aspires to self-employment in the longer term. As well, a striking 29% of respondents have aspirations to exceed 20 employees. These high levels are reported across the university, with one third of respondents in Social sciences and Humanities, and roughly one-quarter of respondents from both Science and Engineering and Health Sciences reporting greater than 20 jobs.

3.3 Innovation, export orientation, and technology

Beyond job creation, impacts of productive entrepreneurship can include: new products in new markets, export orientation, and use of advanced technology.

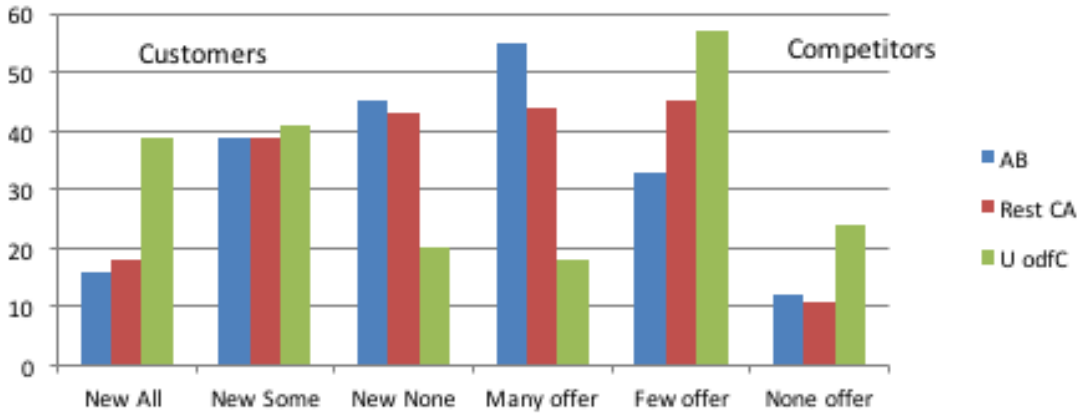
The introduction of new products to new markets is a very direct indicator of product and market innovation. Two question address the novelty and uniqueness of products (or services) of the early-stage entrepreneurs. The first asks whether the product will be **new** to customers; *all, some, or none*. New to none is the most common response in the provincial and national surveys, but 38% of respondents at the U of C report new to *all*, in sharp contrast to the 2015 data for Alberta and the rest of Canada.

The second of these questions asks whether parallel products (services) are offered by other firms; *many, few, or none*. The most common response in other surveys is that *many* other firms offer the product (or service), but the U of C respondents make this the least common answer and 24% report *none*, i.e. no competitors. The GEM Alberta report shows only 12%, *none* (no competition), which is slightly higher than for the rest of Canada.

The overall results are shown in Figure 3. 3. There are significant differences among discipline areas in the University with the very high rate of novel products. The Health Sciences area reports just above 50% as products *new to all*. This falls to 44% for Science and

Engineering, and to just over 25% for Social Sciences and Humanities. Faculty members report somewhat more novelty and uniqueness than students.

Figure 3.3: Novelty of product to customers and existence of competing firms offering comparable products.

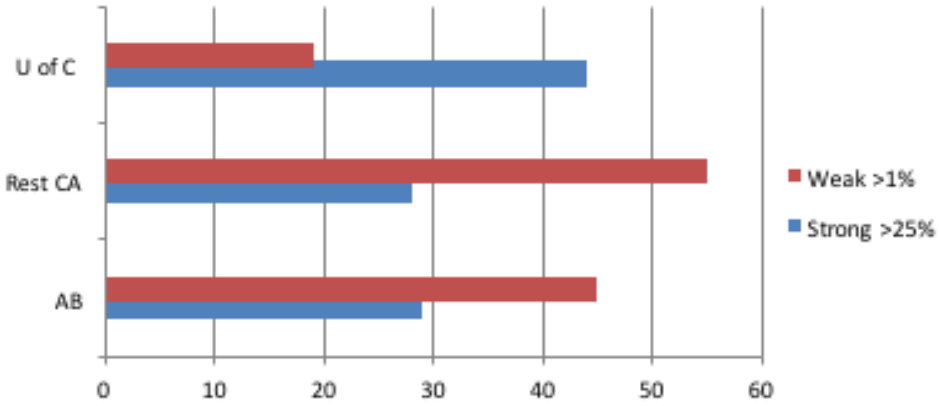


The comparison with general population reports for both Alberta and the rest of Canada emphasize claims to a much higher degree of novelty and innovation in the University initiatives.

Export orientation of firms signals participation in an economy larger than the immediate community. It may suggest participation in global value chains, although such participation may be indirect where the early-stage firms are suppliers to larger firms involved in global networks, leaving this share of exports unrecorded. As well, export orientation may relate to more innovative practices.

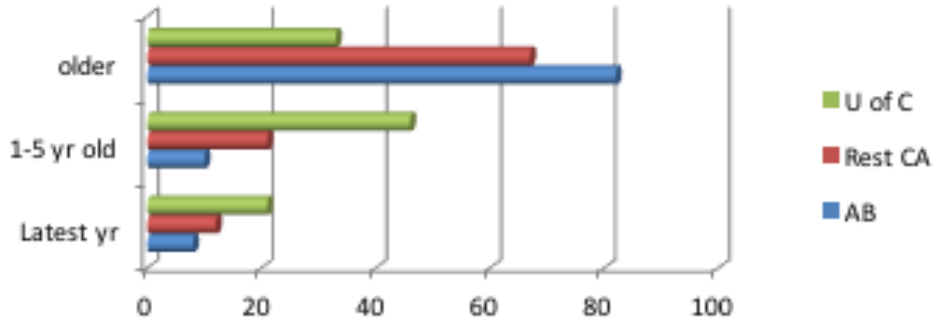
The sample of entrepreneurs is large enough to reliably assign them to three classes: those that anticipate more than 25% of revenue from outside Canada (strong orientation); those with some export orientation that is >1% but less than 25% (weak orientation); and the remainder not expecting export revenue. The data in Figure 3.4 show that 44% of U of C entrepreneurs have a strong export orientation and 19% % have some expectation of export revenue, leaving 37% non-exporters. It is noteworthy that among those export oriented, there appears to be a majority representation by those focused on exports (> 75% of revenue).

Figure 3.4: Percent of firms expecting strong or weak contributions of export to firm revenue



The degree to which firms use up-to-date technology is considered an indicator of productivity growth that is correlated with innovation. Figure 3.5 shows percentage of firms reporting use of: (1) the latest technology introduced in the last year; (2) technologies from one to five years old; and (3) older technologies. In the provincial and national data, older technology dominates. This is decidedly not the case for U of C start-ups, with 67% using technologies introduced less than five years ago.

Figure 3. 5: Percentage of firms reporting use of technology introduced in the latest year, one to 5 years ago, or over five years ago



Another technology question addresses the technology level of the new initiative. Using the OECD definitions, it asks whether the firm will be in a medium or a high technology industry. Seventeen percent of respondents report high technology and twelve percent report medium technology as their sector classification.

The reports from University of Calgary entrepreneurs clearly draw a picture of more innovative and productive initiatives than those reported in provincial or national reports. The strength is reported for all of the three major discipline areas and characterizes both student and faculty activity. It seems safe to conclude that University of Calgary entrepreneurship make a serious contribution to economic development.

3. ENTREPRENEURS IN THE ECONOMY

4. GENDER

In introducing the TEA (total early stage entrepreneurship), data by gender were reported. It was noted that rates of entrepreneurship by women lagged significantly behind that of men. The difference merits some analysis. As a limited first step, GEM offers responses about gender variation in attitudes in the total respondent population. Answers with respect to the questions about attitudes toward entrepreneurship appear in Table 4.1, which reports responses of University of Calgary women in relation to the full University population.

Table 4.1 Attitudes

Attitudes	Knowent	Opport	SuSkil	FearFail	FutSu
Women	51	?	33	56	22
U of C	55	?	41	48	27

The data show that there is a gap between women's and men's profile of attitudes. Women expressed less confidence in their skills and knowledge (SuSkil) to start a business and an increase of inhibition arising from fear of failure (FearFail). These differences have been observed in other GEM surveys.

A second area differentiates responses of some entrepreneurs (TEA ctive) of the two genders. This is the question of the motives. Since opportunity is the predominant motive (vs. necessity) in this population, motives for taking up the opportunity are relevant. As noted above, it is really only very general motives that are easily probed. Table 4.2 compares responses on motives of: increased income; independence; and mixed motives (which may include necessity components).

Table 4.2 Motivations

	increased Income	independence	mixed
Women	20	11	59
Men	54	20	22

4. GENDER

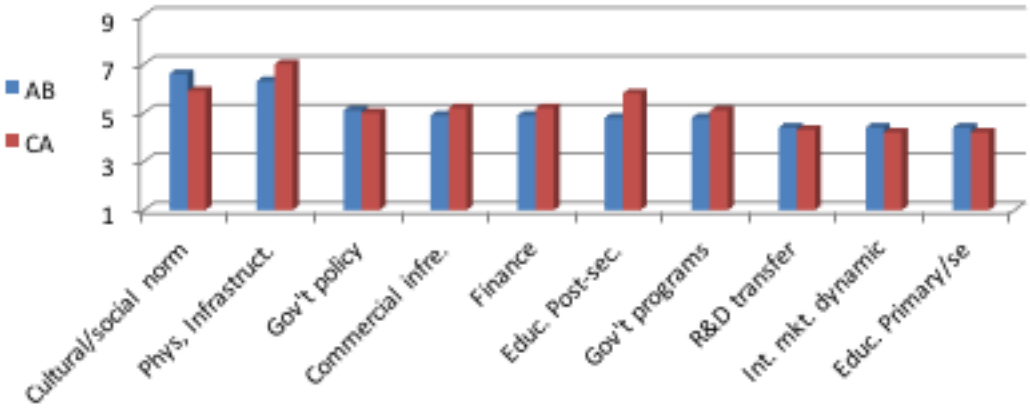
This simple probe of entrepreneurs' motives highlights a significant difference of expressed motivation. Income increase is cited by a majority of the men where only twenty percent of women report it. A complexity of decisions for the women is probably behind the fact that mixed motives account for a majority of responses. It was noted above that student women had a much higher TEA rate than faculty women. This could possibly be translated into an age factor, but there is no significant difference in TEA and motive parameters if the sample is restricted to age below 35 (almost all students).

Sectors of women's initiatives are qualitatively similar to men's, but lean even more strongly to business oriented services. The responses include 6% transformative, 64% business oriented services, and 29% consumer oriented services. The distribution for University women is in contrast to the national situation where the majority of women report activity in consumer services.

5. EXPERT EVALUATION OF THE CONDITIONS ENCOUNTERED IN ALBERTA

The experts come from different professional perspectives related to entrepreneurship where they gain considerable knowledge of entrepreneurial activities. Nine areas of expertise are specified by GEM. The survey instrument presents a series of statements reflecting the GEM perspective on conditions that would be supportive of entrepreneurship. The experts are asked to estimate the degree to which each is true for Alberta. The final section solicits open ended responses, which are coded to twelve categories. The nine major areas that create the framework in which entrepreneurs operate are each explored by a set of questions. These areas are: *(1) Financing; (2) Governmental policies; (3) Governmental programs; (4) Education and training; (5) Research and development; (6) Commercial infrastructure; (7) Internal market openness; (8) Physical infrastructure and; (9) Cultural and social norms*. Four experts per framework condition are identified who bring the perspective of one of these nine areas and each panel member rates the validity of statements of conditions phrased to be favourable to entrepreneurship on a 9 point scale from completely false = 1 to completely true = 9. The neither true nor false is scored as 5. The entire panel rates four or five statements about each area. The data in Figure 5.1 indicate the aggregate scores for each area presented in order of the most favourable rating of conditions in Alberta to the least favourable.

Figure 5.1 Overall evaluations of framework conditions



5. EXPERT EVALUATION OF THE CONDITIONS ENCOUNTERED IN ALBERTA

The highest ratings are for the social and cultural norms in Alberta. Albertans are evaluated as independent minded and favourable to the idea of self-sufficiency, which are deemed to be important to an entrepreneur considering individual risk. The next most positive ratings go to physical infrastructure in terms of availability and affordability of communication infrastructure and utilities. There is no direct mention of roads, nor is air transport considered. Air transport may be a positive factor, but it isn't clear how the roads would be evaluated. Government policy and programs are rated neutrally, but the experts do call for one central office for access and simplification of rules and procedures. Overall, the experts appear to be mildly positive about Finance but not entirely satisfied with the funding environment. The neutral view of government's role suggests an invitation to policy creativity. Commercial infrastructure, such as sub-contractors and banks, is rated available but not always affordable. The contribution of post-secondary institutions to entrepreneurship education is seen as improving but not yet satisfactory.

The transfer of research knowledge from public institutions and large firms to small and growing firms is rated poor with the exception of availability of incubators and research parks. The role of primary and secondary education in teaching about basic business economics and (at the secondary level) knowledge needed for operation of a business is unsatisfactory. A more satisfactory aspect is primary education's role in encouraging creativity and independence. With respect to internal market dynamics, there are concerns about ease and affordability of entry and the capacity of large firms to block entry.

6. CONCLUSIONS

The level of early stage entrepreneurship in the University community is comparable to the high levels observed in Alberta and Canada. It can only be deemed satisfactory, but the overall level does not reveal the lower level of women's activity. This suggests a need for special attention to providing information about entrepreneurship and mentoring for women. The low scores for knowledge of skills and higher scores for fear of failure endorse the University's initiatives to broaden access to entrepreneurship education. Indeed, this applies to all forms: business formation; intrapreneurship; and social entrepreneurship. Attention to entrepreneurial thinking is an appropriate goal across the university.

The performance of university student and faculty respondents in the EEA category is quite encouraging and the metric may provide one valuable way to identify levels of community engagement.

The University entrepreneur's performance and aspirations on job creation, market innovation, export orientation and technology exploitation are all at leadership levels as compared to the environments of other GEM surveys.

Aspects of the responses that differentiate the U of C GEM study from results of other Canadian GEM surveys notably include:

1. The high rate of business oriented services, especially compared to consumer oriented services, and the indications from EEA data of engagement with outside organizations in innovation.
2. The engagement with up to date technology and activity in high technology sectors.
3. The high rate of reports of market innovativeness, export orientation, and five-year job aspirations, all indications of productive and innovative entrepreneurship.
4. The reduced (more realistic?) estimation of opportunity and skills.

The recommendations presented above reflect the overall perspective on University entrepreneurship that the respondents have provided.

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The Centre for Innovation Studies (THECIS)
#125, Alastair Ross Technology Centre
3553 31 Street NW
Calgary, Alberta, Canada T2L 2K7

More information

For more information on the GEM Canada 2015 report, please contact ***Peter Josty***, p.josty@thecis.ca

For more information on the GEM global reports and on GEM, please contact the GEM Executive Director, ***Mike Herrington***, at MHerrington@gemconsortium.org

The 2015 GEM Canada report is available at www.gemcanada.org

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Although GEM data were used in the preparation of this report, their interpretation and use are the sole responsibility of the authors and the GEM Canada team.

In addition to the 2015 GEM Canada report, there will be provincial reports published for Alberta, Ontario, Quebec and Atlantic Canada. These will be available at www.gemcanada.org in due course.

SPONSOR RECOGNITION

The authors would like to gratefully acknowledge the financial support from the University of Calgary (through the office of the Vice-President, Research and the Hunter Centre for Entrepreneurship and Innovation) to prepare this report. They would also like to acknowledge the excellent support and assistance provided by Jenny McLean to administer the surveys.

The GEM Canada project, on which the GEM Report to the University of Calgary Community is based, would not be possible without the support and encouragement of many supporters and funders. We would like to recognize the contribution of the organizations listed below.

REPORT AUTHORS

Cooper H. Langford, Ph.D., FRS(Can.)

Dr. Langford is Faculty Professor in Chemistry and in Communication and Culture (Science and Technology Studies) at the University of Calgary. He is a Fellow and member of the board THECIS. He is a former Vice-President (Research) at U of C and a former Director of Physical and Mathematical Sciences at NSERC. He has published on university/industry/ government relations, strategic research funding, evaluation of the outcomes of university research, Canadian participation in megascience, regional clusters in innovation and knowledge flows. His current research includes study of the social dynamics of innovation in the city as an innovation system.

Peter Josty, Ph.D., MBA

Peter Josty has been Executive Director of THECIS since 2001. THECIS is a not for profit research company that specializes in innovation research. THECIS carries out three main activities: research projects for clients relating to innovation; it organizes events such as breakfast meetings, workshops and conferences, to promote networking in the innovation community; and it educates graduate students in science, engineering in medicine about the fundamentals of innovation and the basics of starting a business. Before this he had a diversified career in the chemical industry in Canada.

Chad Saunders, PhD, MBA

Chad Saunders is an Assistant Professor at the Haskayne School of Business in the area of Entrepreneurship & Innovation, and holds adjunct appointments with the Departments of Community Health Sciences and Medicine at the Cumming School of Medicine, where he is the eHealth Services and Strategy Lead with the Ward of the 21st Century (W21C.org). Chad's research focuses on the supports that entrepreneurs draw upon, with a particular interest in the role of academia in entrepreneurial ventures. Prior to entering academia Chad worked with a business incubator for rapid growth enterprises.

Global Entrepreneurship Monitor

Global Entrepreneurship Research Association
London Business School
Regents Park, London NW1 4SA, UK.

+44 796 690 81 71
info@gemconsortium.org

www.gemconsortium.org

The Centre for Innovation Studies (THECIS)
#125, Alastair Ross Technology Centre
3553 31 Street NW
Calgary, Alberta, Canada T2L 2K7

www.thecis.ca