Patenting
Halifax

The number of patents per calendar year generated by inventors in Halifax increased by nearly a factor of four between 1975 and 1997 from 5 patents per year to 20 patents per year (see Figure 1).

The industrial mix of patents also changed significantly between 1975 and 2007. The combination of pharmaceuticals (18.3%), telecommunications (9.6%), and chemicals (7.0%) accounted for one thirds of patents between 1998 and 2007. This is roughly twice the proportion of the previous two decades.

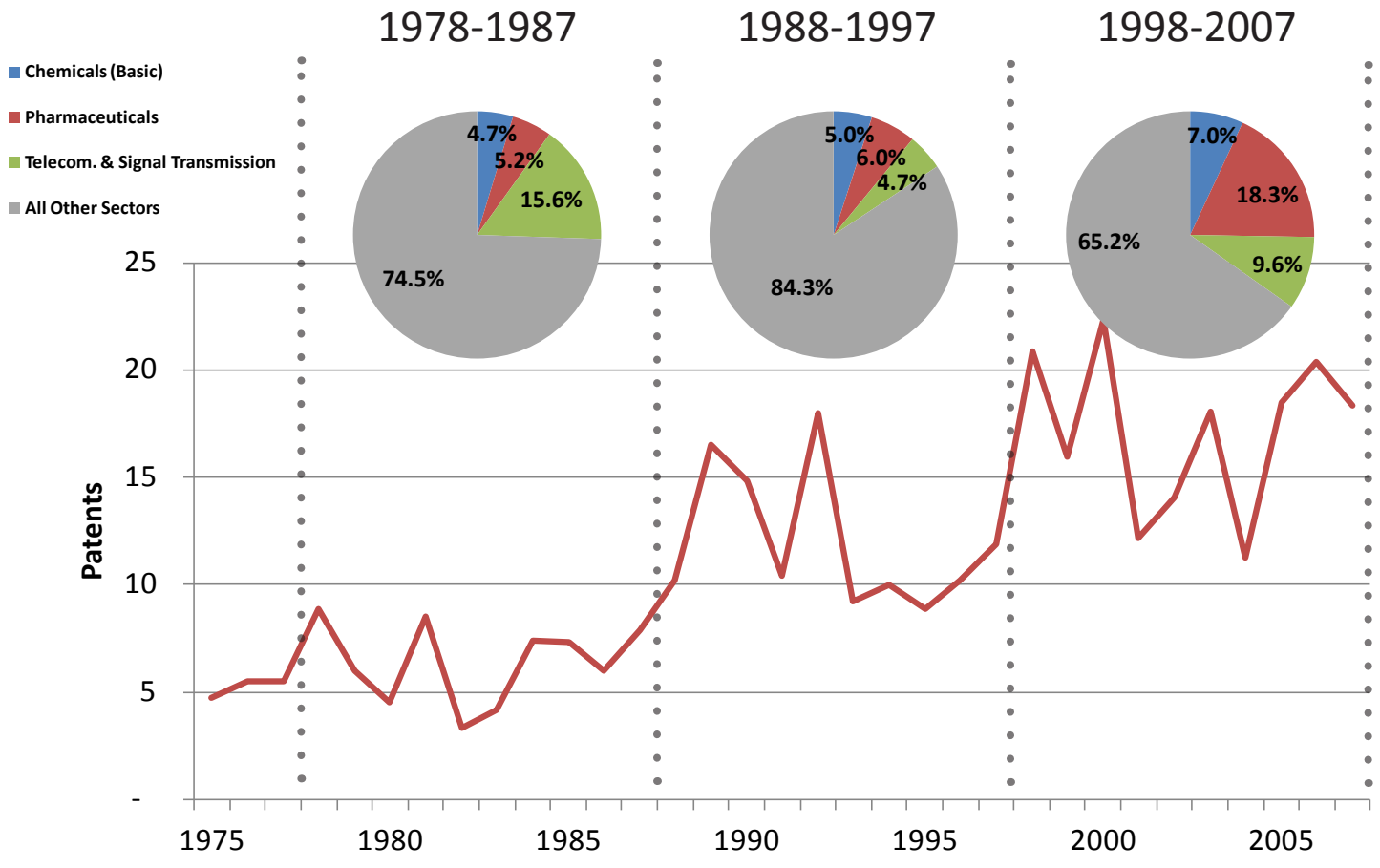
Dalhousie university is the most prolific generator of patents by a with 23 patents between 1998 and 2007 (see Table 1). Various entities within the Federal Government of Canada was second with 12. The public aspect of these organizations suggests that Halifax may have a larger challenge with commercializing the IP being generated.

Table 1 - Top 5 Patenting Enterprises 1998-2007

Enterprise	Patents
Dalhousie University	23
Federal Government of Canada	12
3M Innovative Properties	8
Ocean Nutrition Canada	7
America Online	5

Data notes:
- Source: USPTO
- All data has been cleaned and geocoded by Prof. Dieter Kogler University College Dublin
- Patents counts are proportional to number of inventors

Figure 1 - Number of patents by year and key industries



Inventor Connections

Halifax

An analysis of patents that involved collaboration between inventors based Halifax and inventors elsewhere show that the majority of these relationships exist within individuals in Toronto and Ottawa-Gatineau. Specifically, connections to Toronto (see Figure 2) are the most common with 36 instances of a Toronto-based inventor collaborating with an inventor in Halifax. Connections with Ottawa-Gatineau is a close second with 34 connections.

Most instances of international collaboration occur with US-based inventors. The top US states (see Figure 3) are California (19), Minnesota (12), Pennsylvania (9), Texas (9), Massachusetts (8) Virginia (8) and, New Jersey (8).

Beyond the United States (122) the top countries for inventor collaboration with Halifax are Great Britain (17), Japan (14), China (3), Germany (3), and France (3) (see Figure 4).

Figure 2 - Top ten Canadian city-regions by number of co-inventors, 1975-2007

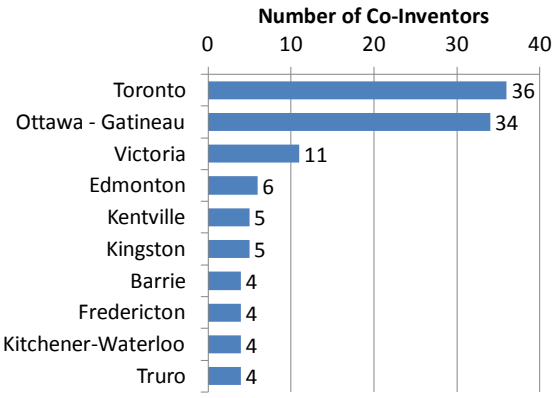


Figure 3 - Top US states by number of co-inventors, 1975-2007

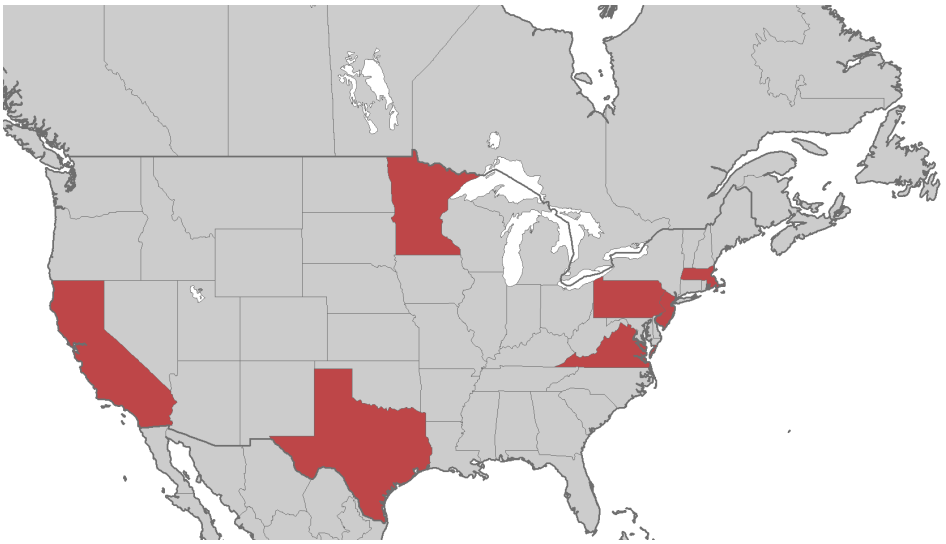
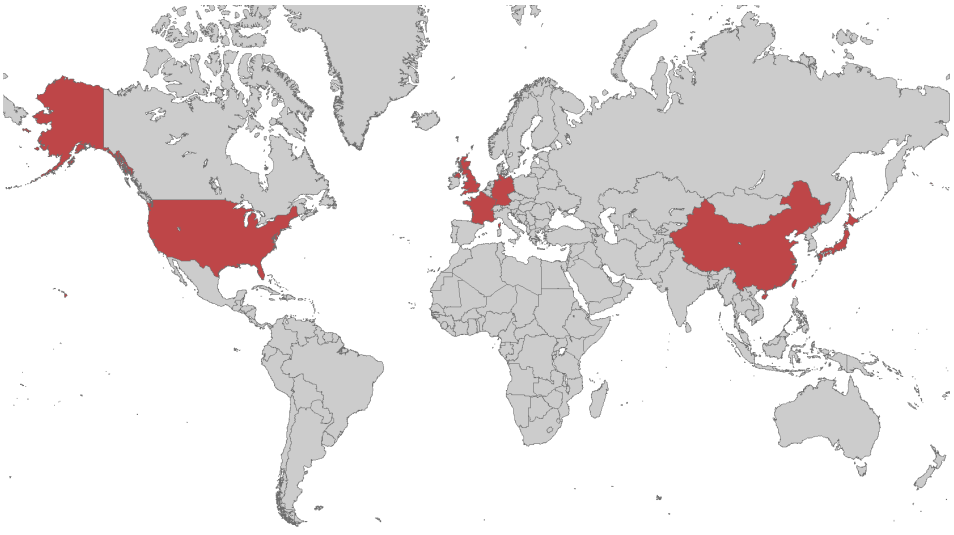


Figure 4 - Top five countries by number of co-inventors, 1975-2007



Data notes:
- Source: USPTO
- All data has been cleaned and geocoded by Prof. Dieter Kogler University College Dublin
- Each co-inventor counts as one and is not dependent on the total number of co-inventors on each patent

Business Expenditure on R&D
Halifax

Business spending on R&D in Halifax averaged around $50 million between 2005 and 2009 (see Figure 5). Expenditures per R&D employee ranged from roughly $60,000 to $70,000 over the same time period.

There were approximately 130 business in Halifax reporting significant R&D activity in 2008 (see Figure 6). This was down by nearly 60 firms over a four year period. R&D spending per firm showed growth from just over $300,000 in 2005 to roughly $400,000 in 2008.

Figure 5 - Business enterprise R&D (BERD) 2005-2009 (constant dollars)

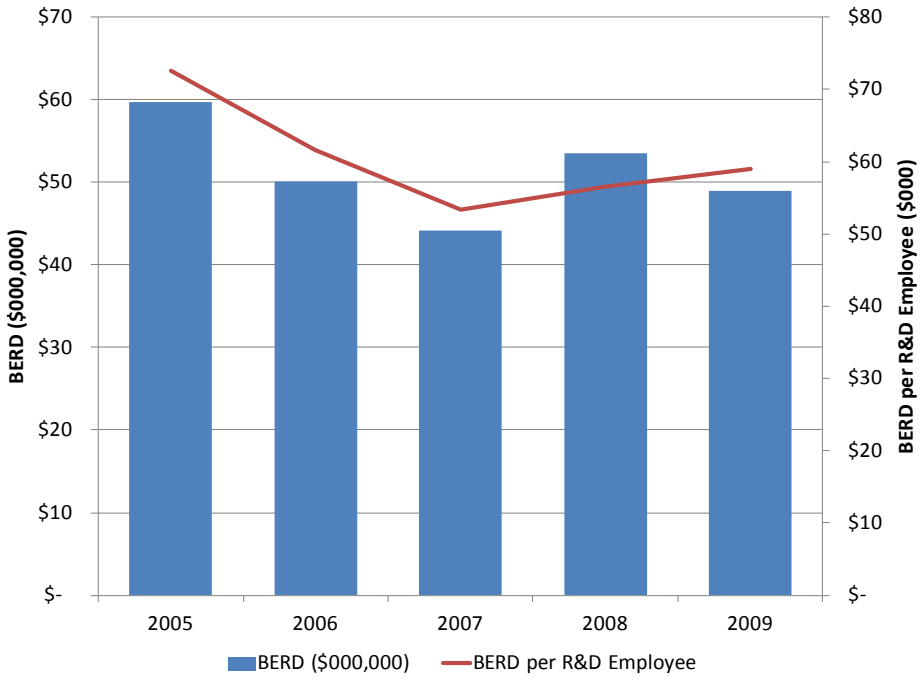
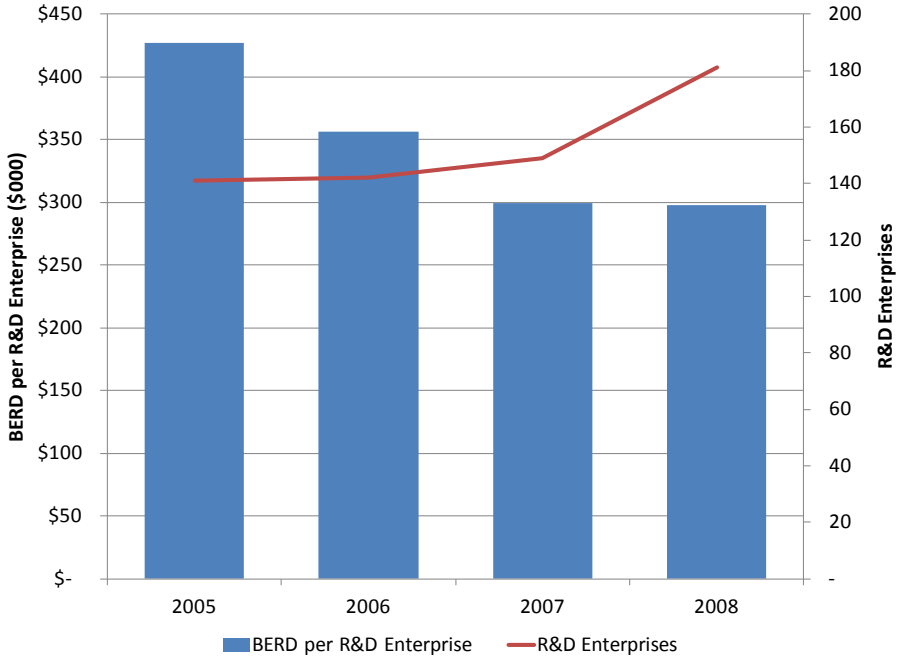


Figure 6 - BERD per R&D enterprise 2005-2008 (constant dollars)



Data notes:
- Source: Statistics Canada via The Impact Group
- Exact figures cannot be disclosed for proprietary reasons
- Dollar amounts have been standardized to constant 2008 or 2009 dollars by Local IDEAs
- The figures represent the most recent data available

Post-Secondary Research Funding
Halifax

Research funding to public institutions such as universities and research hospitals increased steadily from 1999 through 2008 in Halifax from under $100 million to over $150 million per year.

Apart from general government sources from all three levels (23.4%), private individuals and business (21.5%) and not-for-profit organizations (13.5%) were that largest contributors in 2008 (see Figure 8). Medical and health research (12.3%) and The Natural Sciences and Engineering Research Council (12.0%) were the largest specific sources of public research funding.

Figure 7 - Public research funding 1999-2008 (constant dollars)

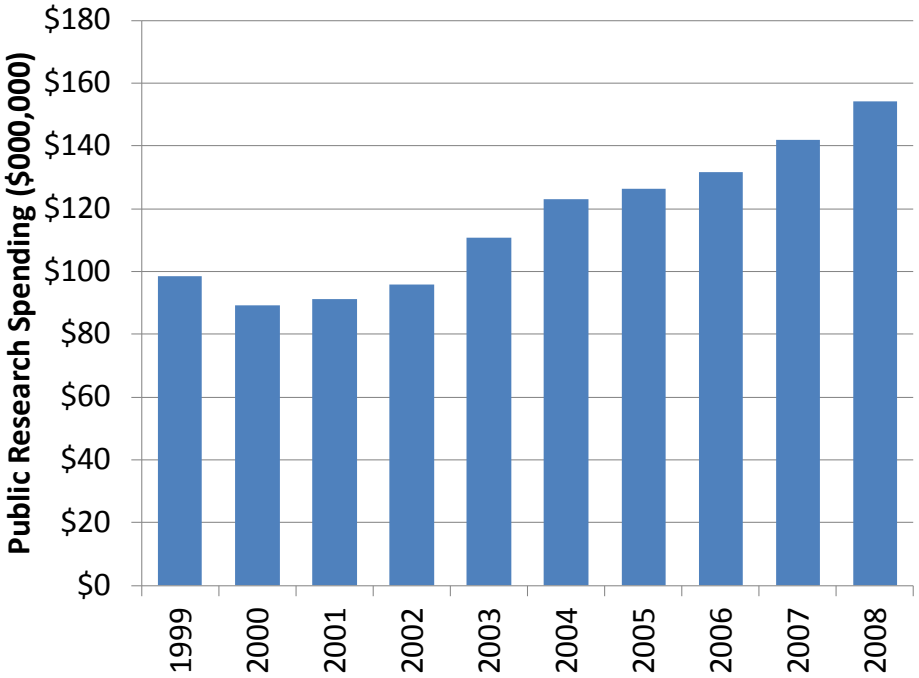
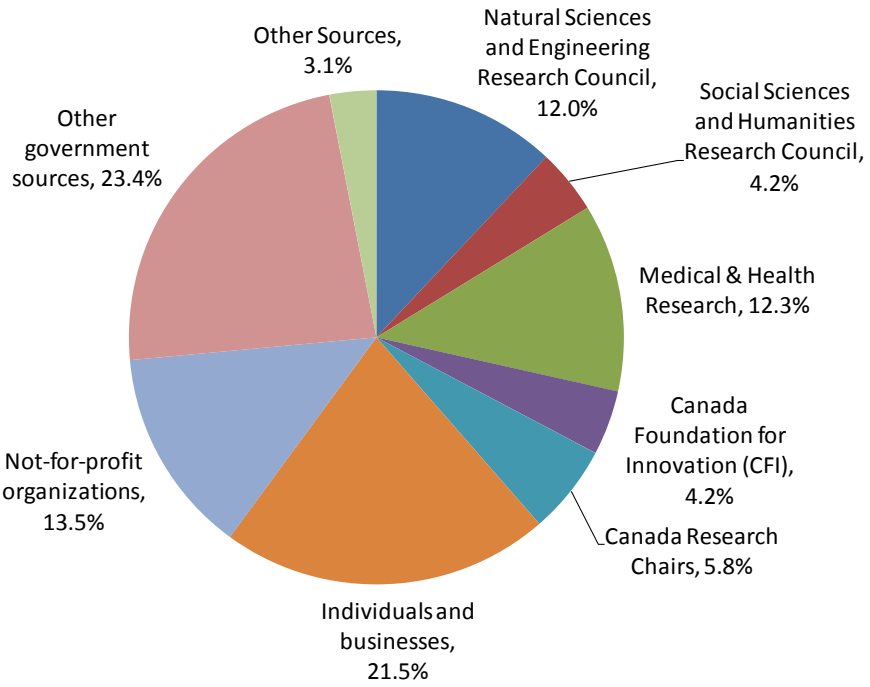


Figure 8 - Share of public research funding by major sources (2008)



Data notes:
- Source: Canadian Association of University Business Officers (CAUBO)
- Dollar amounts have been standardized to constant 2008 dollars by Local IDEAs

Venture Capital
Halifax

Venture capital activity in Halifax had its strongest years between 1997 and 2001 when the dot-com boom was at its peak (see Figure 9). There were at least 10 VC deals reported in each of these years. However, 2011 showed the highest estimated value of deals at over $40 million.

Software and ICT services (37.2%) and bio-pharma (20.4%) have received the most number of VC investments over the period of 1996-2011 (see Figure 10). ICT manufacturing (13.1%) also attracted a significant share of VC activity in Halifax.

Figure 9 - Venture capital deals and estimated total value (constant $)

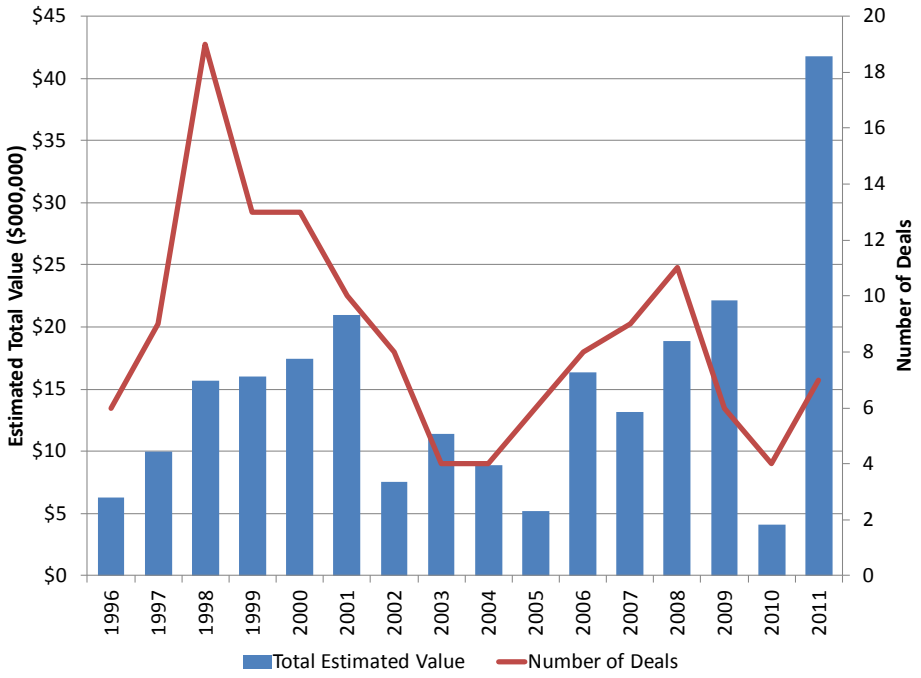
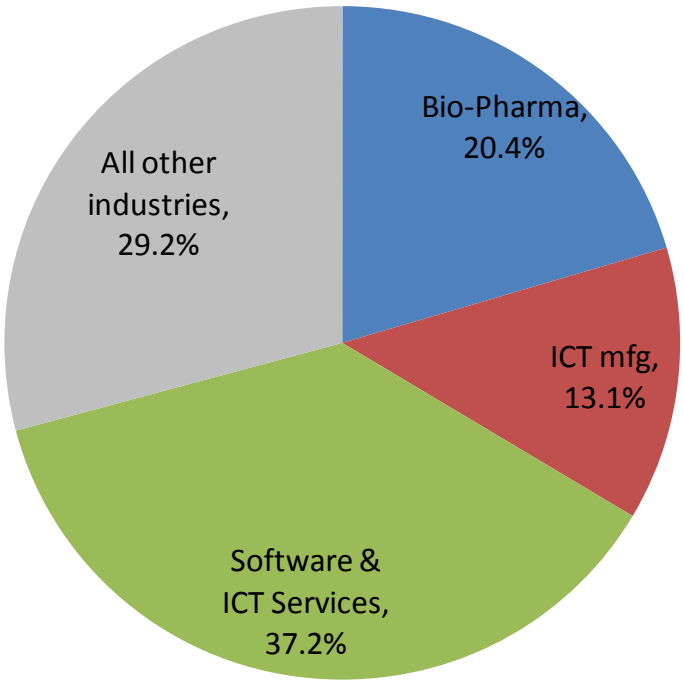


Figure 10 - Share of venture capital deals by industry, 1996-2011



Data notes:
- Source: Thomson-Reuters
- Annual values are estimated due to undisclosed values on certain deals (annual averages are applied)
- Dollar amounts have been standardized to constant 2011 dollars by Local IDEAs

University Spin-Offs
Halifax

Since 1970 there have been 19 companies spun started by either local university professors or based on technology produced at a local university. Of these companies 3 have been high growth firms all of which remained in Halifax (see Figure 11). Roughly two thirds of all spin-offs were in biomedical and pharmaceutical industries.

Figure 11 - University spin-off firms by growth and location

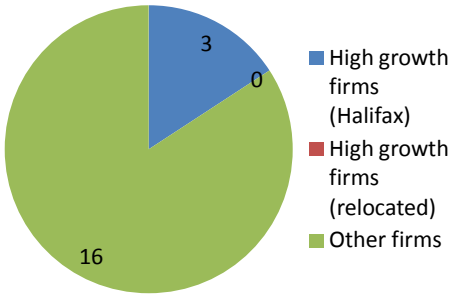
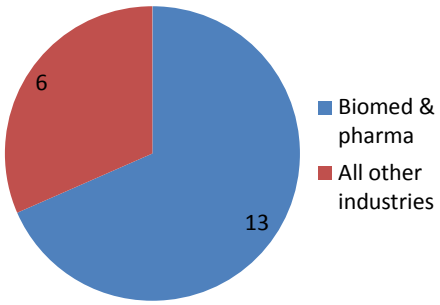


Figure 12 - University spin-off firms by industry



Data notes:
- Source: Denys Cooper USO/USSO database
- Individual firms cannot be disclosed due for reasons of confidentiality
- High growth firms defined as doubling of employees within five years to at least 20 employees or doubling in sales within five years to at least $10 million