Industry Canada Industrie Canada

Canada Pharmaceutical Greenfield Investments

Canada

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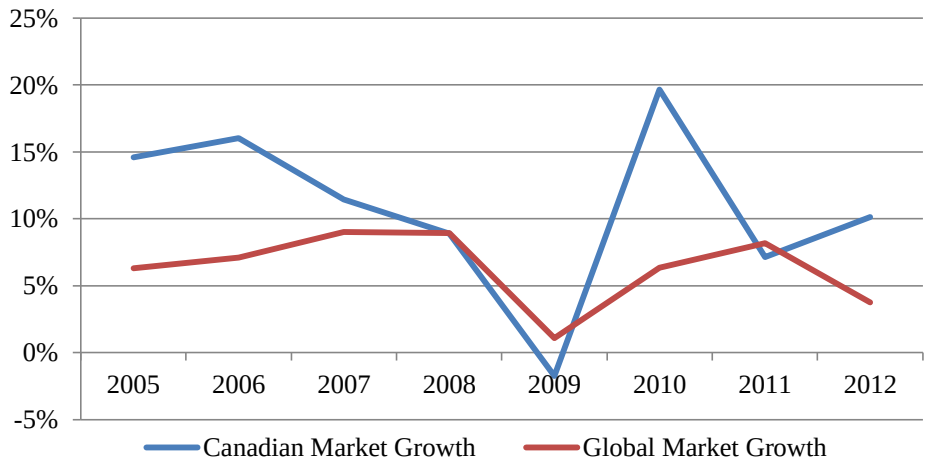
Overview of the Biopharmaceutical Market

The global pharmaceutical and life sciences industry continues to evolve from the original models that have driven growth and sustained the market for years. Fewer blockbuster drugs, which historically drove industry growth, are being developed by multi-national pharmaceutical companies. Instead, those companies are turning their attention to developing biologic products and other medications which are more focused, and many of which require even more extensive research & development. Additionally, the patents of popular and profitable medications, whose sales represent nearly $60 billion for their manufacturers, are beginning to expire.[1] This allows generic manufacturers and other companies to create equivalent drugs to capture brand named companies' market share and force companies such as Pfizer, Merck, and Novartis to focus their resources on creating strategies that defend market share instead of growing market share. The performance of the Canadian pharmaceutical market has shown stronger growth than the global market since the recession, but is that translating into investments in pharmaceutical industry in Canada? [2]

Figure 1: Growth in Pharmaceutical Sales 2005-2012



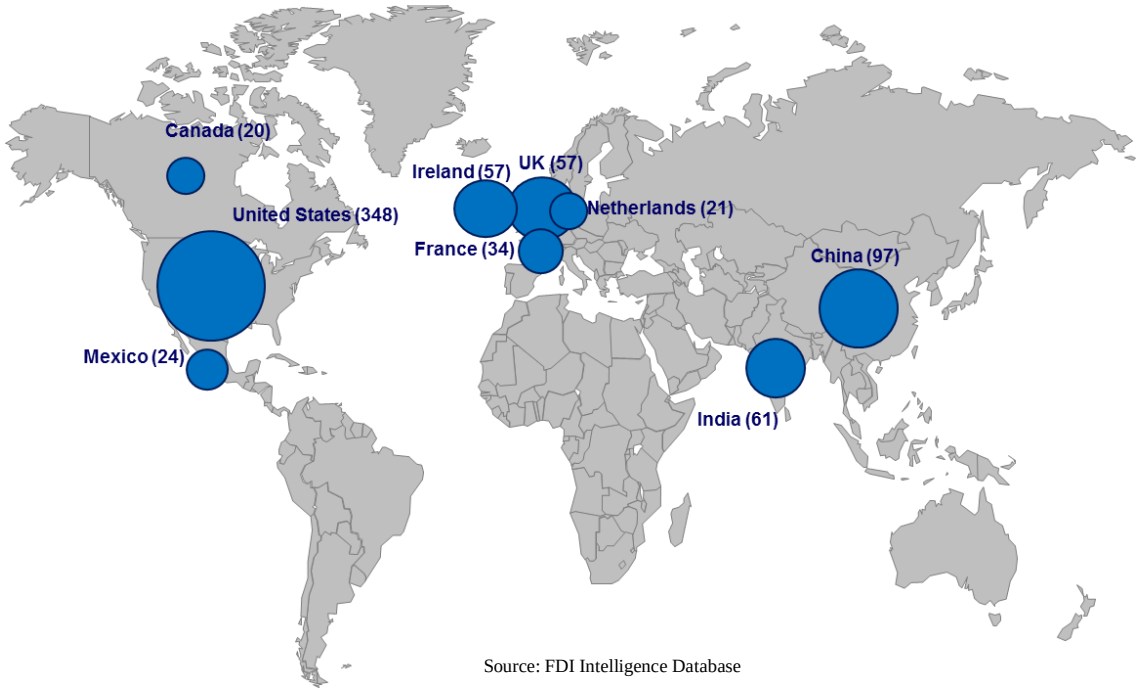
Source: 2012 Economist Intelligence Unit Industry Briefing

Where Are Companies Investing

In the current global environment the processes for developing new products are changing and the traditional established countries that drove industry revenue are expected to have a diminished role in growth of the global life science market.

[1] IBIS World 2012 Global Pharmaceutical and Medicine Report
[2] 2012 Economist Intelligence Unit Industry Briefing

Figure 2: Location and Number of Life Science Industry Investments 2008-2012



Source: FDI Intelligence Database

Companies are seeking opportunities for revenue growth in rapidly developing markets such as China, India, Brazil, Russia, as well as Mexico and South Africa. It is expected that the large brand name companies will focus more resources on capturing growth for branded and off branded products in these markets.[3]

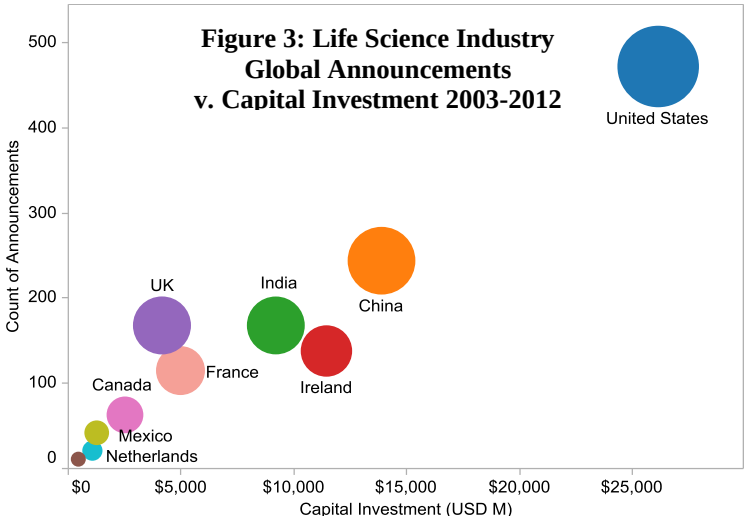
An important outcome of changing market dynamics will be the continued consolidation of market participants. Consolidation is expected given the globalized nature of the major industry players and their need to shore up weakening development pipelines and to diversify away from branded products. The weak product development pipelines currently characterizing the industry are an important driver for various acquisitions. Other acquisitions will be motivated by the need to acquire scale in a particular sector (such as generics), a particular product, or a specific type of technology. For example, pharmaceutical manufacturers may continue to look to biotech firms as a means of broadening their R&D capacities, particularly as the lines between traditional branded drug companies and biotechs become increasingly blurred.[4] While M&A activity is expected to continue, this is not a new trend for the industry. From 1999-2009, over 1,300 mergers and acquisitions occurred, totaling over $690 billion. The highest grossing year was 2009 when over $147 billion in M&A activity took place.[5]

[3] IBIS World 2012 Global Pharmaceutical and Medicine Report
[4] IBIS World 2012 Global Pharmaceutical and Medicine Report
[5] Irving Levin and Associates

While it would be expected that this activity would lead to larger entities with bigger market shares and potentially decreased competition, no company has ever had more than 7% of the global market. Most large drug mergers since 1970 have failed to increase market share in the longer term as the potential for larger product offerings and product development pipelines or the benefits of a genuine long term gain in productivity failed to materialize. As an example, GlaxoSmithKline currently has a smaller combined market share (4.3%) than its three previous components (Glaxo, Wellcome and SmithKline Beecham) did one decade earlier.[6]

There is no doubt that despite significant changes in the industry, the global pharmaceutical and healthcare industry will continue to see growth going forward and be an important factor in the global economy. The Financial Times, a leading global daily business and economic publication, tracks worldwide announcements for investments by companies across all industries and activities through its FDI Intelligence (FDI) database. FDI data for a selected group of countries indicates that from January 2003-September 2012, nearly 2,570 investments have been announced in the life science industry totaling approximately USD 130 billion around the world and creating over 320,600 jobs.[7] As shown in Figure 3, investments and announcements have been primarily concentrated in a number of the emerging economies and established markets. Combined, the US, China, India, the UK/Ireland, and France have received over half of all global project investment dollars over the last ten years for life sciences projects. Despite an overall slowing of revenue generation in the historically established markets, the United States continues to receive more new project announcements than any other country, and has done so every year since 2007. Over the last three years project announcements for the US have doubled the announcements in China and in India.

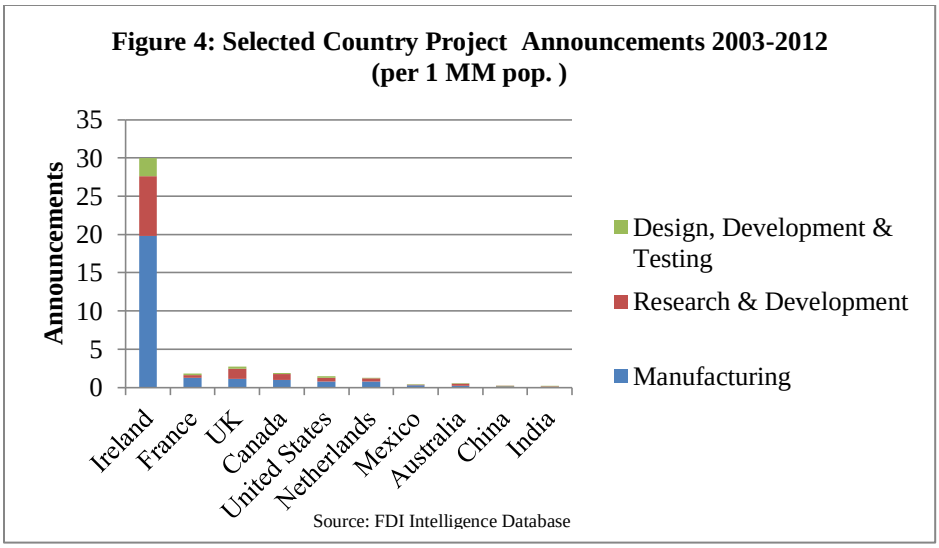
Figure 3: Life Science Industry Global Announcements v. Capital Investment 2003-2012



Source: FDI Intelligence Database

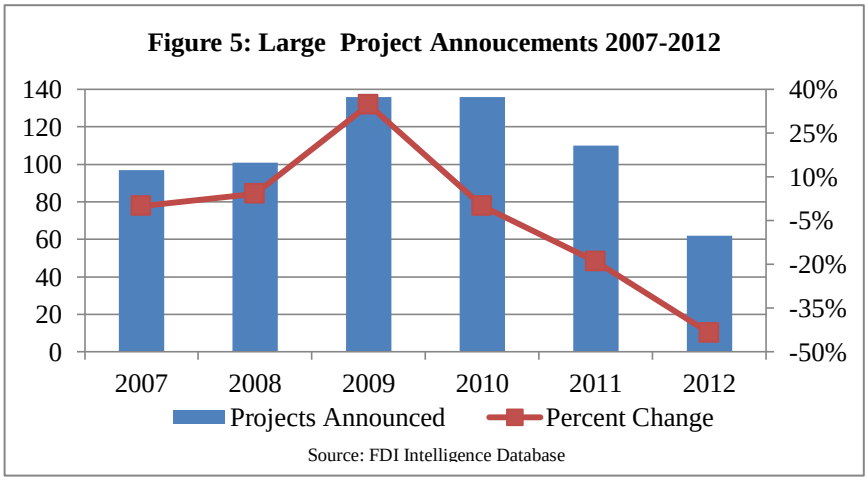
While it appears that the United States has recently dominated investments, when examining the number of project announcements on a per capita basis, Canada aligns more closely with the U.S. However a small country such as Ireland that has received a number of projects in recent years appears to be the most dominant of selected countries compared as demonstrated in Figure 4.

[6] IBIS World 2012 Global Pharmaceutical and Medicine Report
[7] Selected countries chosen for comparison throughout report based on emerging market or established competitors for Canadian investment



Despite an estimated 3.5% annual growth for the global pharmaceutical industry through 2017, it appears that companies are making fewer investments in new facilities and operations.[8] The number of projects, investment dollars, and job creation has declined every year since all three categories peaked in 2009. Since then, the number of projects announced has decreased by nearly 20% with capital investment and job creation both decreasing by over 30% through the end of 2011. Through September 2012, 161 projects have been announced in FDI. If that pace continues through the fourth quarter, it is estimated that approximately 215 projects will be announced for the year or a decrease of 22.4% from 2011 and 37.7% since 2009.[9] These indicators validate general market trends that operations are becoming more efficient, requiring less investment for greater productivity.

Globally, fewer large life sciences investments are being made that create 100 or more new jobs. 2011 saw a 19% decrease in the number of larger projects compared to 2010. Through the first three quarters of 2012, 62 large projects have been announced, a number that could lead to a year with less than 100 big project announcements for the first time since 2007.[10]



Two trends are likely causing the decrease in investments. Annual revenue growth has been

[8] IBIS World 2012 Global Pharmaceutical and Medicine Report
[9] FDI Intelligence, Financial Times January 2003-September 2012
[10] FDI Intelligence, Financial Times January 2003-September 2012

low or negative over the last two to three years for a select group of companies.[11] The reduction in revenue, may be leading to fewer resources to invest within new facilities and existing operations.

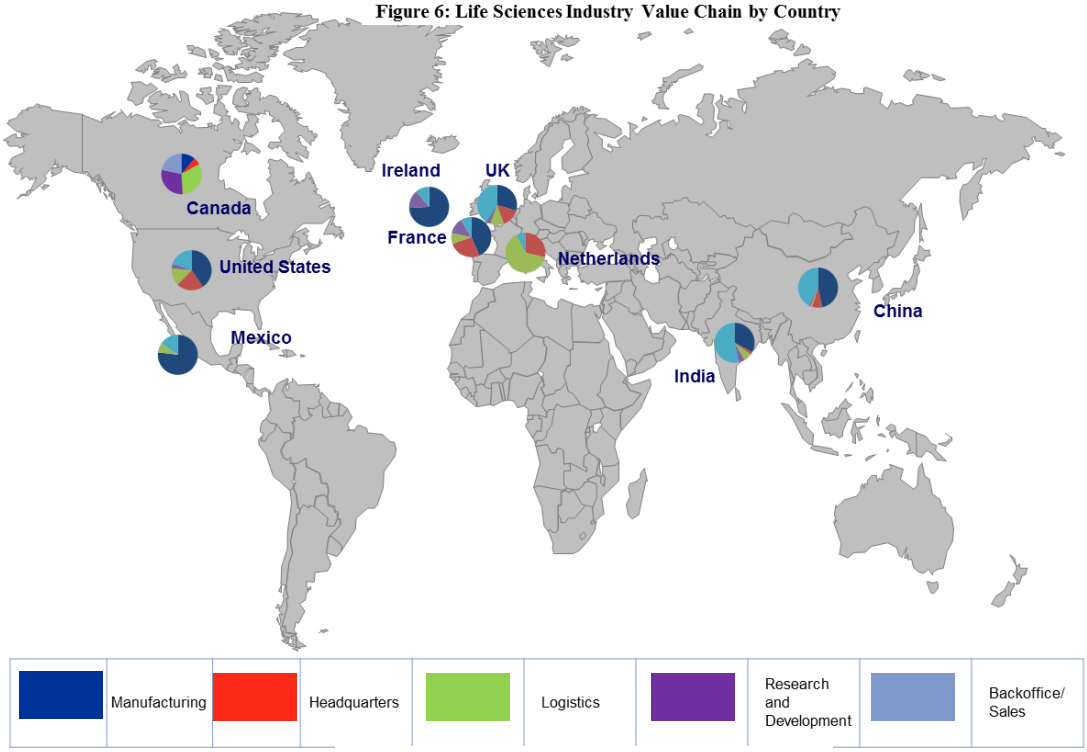
Alternatively, this reduction of investment could be an indication that companies are seeking to improve overall efficiencies and utilize existing resources to fuel future growth. It also aligns with general responses around the reasons companies select certain locations for investment. Location decisions are being driven by a number of monetary and opportunity related costs, specifically having access to skilled labor and strong growth markets as well as the ability to operate in a low cost environment.[12] This emphasizes that emerging markets will continue to take on a more significant role in life sciences industry growth with lower cost environments and increasingly skilled labor force.

How Are Companies Investing?

Global life sciences investment trends can be generally segmented by four sectors: pharmaceuticals, medical devices, biotechnology, and healthcare, with investments heavily weighted towards pharmaceutical and medical devices. Combined these two sectors have accounted for 82% of the total industry projects and 83% of planned capital expenditures since 2003. The industry has focused more investments on pharmaceutical related projects, as that sector has accounted for over 55% of projects and approximately 66% of planned capital investment over that ten year period. While pharmaceutical sector projects have received more investment, medical device projects are more labor intensive and create 16.5% more jobs per project than the pharmaceutical sector.[13]

[11] IBIS World 2012 Global Pharmaceutical and Medicine Report
[12] FDI Intelligence, Financial Times January 2003-September 2012
[13] FDI Intelligence, Financial Times January 2003-September 2012

Figure 6: Life Sciences Industry Value Chain by Country



Source: FDI Intelligence Database

Similar to its segmentation of industry sectors, the majority of projects in the pharmaceutical industry are divided into one of three activities: manufacturing, research and development (R&D), and design, development, & testing. These activities represent the stages of development for new products in the life sciences industry. The R&D announcements include those projects that will focus on the development of new science, technology, and products. Manufacturing announcements represent projects when products are actually made, while design, development, and testing investments are those related to refining and testing finished goods before they are sold in the market.

Of these activities, manufacturing has comparatively received the largest number of private industry investments, and has received more than two times the number of projects of R&D activities and nearly six times the number of design, development, & testing projects. That same trend holds true for the number of jobs created and capital investment estimated for manufacturing projects compared to the announcements for the other two activities.[14]

To better understand the types of global investments that are being deployed, it is helpful to examine activities vs. sectors vs. project types (i.e. new investments, expansion of existing facilities, or co-locating multiple facilities at one location). When examining them all together as

[14] FDI Intelligence, Financial Times January 2003-September 2012

in the chart below, new pharmaceutical manufacturing facilities stand out as the most prevalent type of investment by companies across the globe since 2010.

Figure 7: 2010-2012 Global Life Sciences Announcements

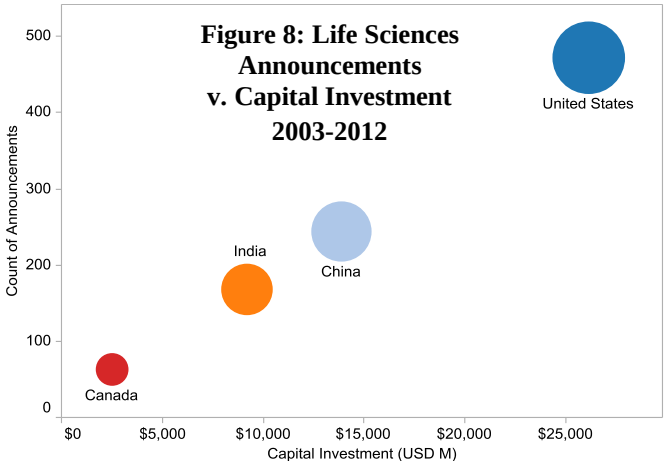
Source: FDI Intelligence Database

While new operations tend to dominate investments for design and R&D, manufacturing appears to be evenly split among new investments and expansions.

Canada Market Overview

Despite a focus on emerging markets, the US has continued to play a significant role in the global pharmaceutical industry because of its market size and the headquarters' presence of some of the largest industry players. Canada on the other hand could be classified as a country that contributes to the broader industry rather than as a leader, as seen in Figure 8. From January 2003 to September 2012 there has been approximately 2,570 life sciences industry business investments announced. The majority of these projects have been focused on the US and emerging economies such as China and India. These three countries saw 472 (18.3%), 244 (9.5%), and 168 (6.5%) project announcements, respectively. Over this same nearly ten year period, Canada received 63 projects, or approximately 2% of the total global market. These announcements equaled approximately USD 2.5 Billion of estimated investments and 5,340 new jobs. As a point of comparison, in 2011 alone the United States had 91 new projects announced with investments totaling USD 3.5 Billion and 9,150 new jobs.[15] When considering this data on a more comparable basis the total investment dollars per million people of population would equal USD 7.4 per investment for Canada for the entire ten year period and USD 11 per investment in

Figure 8: Life Sciences Announcements v. Capital Investment 2003-2012



Source: FDI Intelligence Database

[15] FDI Intelligence, Financial Times January 2003-September 2012

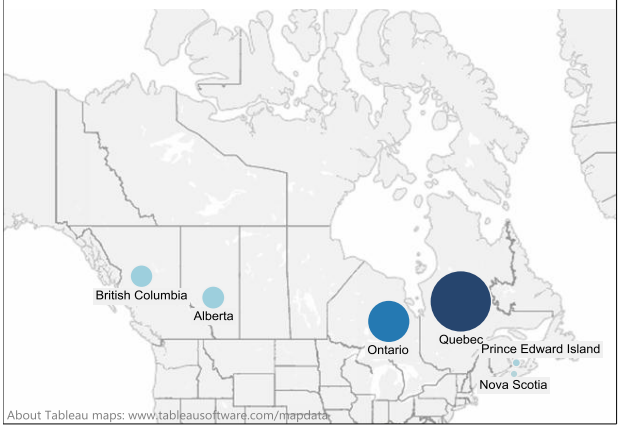
the U.S in 2011. In terms of job creation per 100,000 in population, Canada's job creation estimates are nearly 1.6 jobs per 100,000 people, while the US is nearly 3 jobs per 100,000 people over these same time periods.

During the past ten years, the Canadian life sciences industry has benefitted from its proximity to the United States, especially in the first half of this time period. Since 2003, 17 American companies made 22 project announcements in Canada. However, only five of those announcements have come since 2008. Canada's strongest year for project announcements came in 2007 when 12 of its 63 projects were announced. These 12 projects included the largest to be announced in Canada, a USD 600 million investment by Charles River Laboratories for a new research and development facility in Sherbrooke, Quebec that was set to create 1,000 new jobs. This one project represents 24% of the total projected investment into Canada and ~19% of job creation since 2003. The most recent investments by US companies into Canada though have been made by global pharma brands Merck (including Schering-Plough) and Pfizer who both planned to expand existing manufacturing facilities in Quebec.[16]

Even though large multi-national companies have not made recent investments into Canada, the country has seen past investments from some of the world's largest biopharmaceutical companies. According to FDI, Novartis, Merck, and Sanofi have all made multiple investments into the country over the last ten years with Novartis announcing five projects and Merck/Schering-Plough investing an estimated USD 180 Million.

Merck and Pfizer announced plans to expand existing manufacturing facilities in Quebec. Along with Ontario, these two provinces have received an overwhelming proportion of project announcements compared to other provinces. With a large number of existing operations and prestigious research institutions located in these provinces, it could be expected that both would be a popular choice for investments. Represented in Figure 9, no other province has received more than three life sciences investments since 2003.[17]

Figure 9: Number of Life Sciences Announcements by Province 2003-2012



Source: FDI Intelligence Database

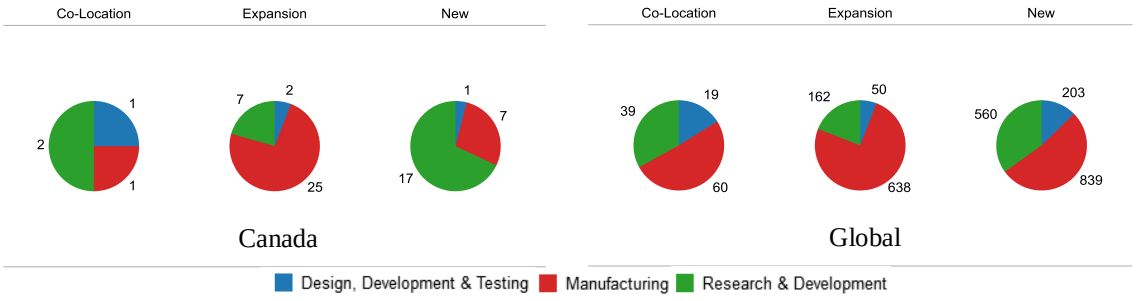
The recent investments of Merck and Pfizer that were highlighted above represent three distinct themes for the Canadian pharmaceutical industry.

- Expansions of existing life sciences manufacturing facilities have been the most frequent investment, followed by new R&D investments. As shown in Figure 10, life

[16] FDI Intelligence, Financial Times January 2003-September 2012
[17] FDI Intelligence, Financial Times January 2003-September 2012

sciences manufacturing expansions have received the most activity nationwide since 2003, which differs from the global industry that has seen more new life sciences manufacturing investments over that same time period.

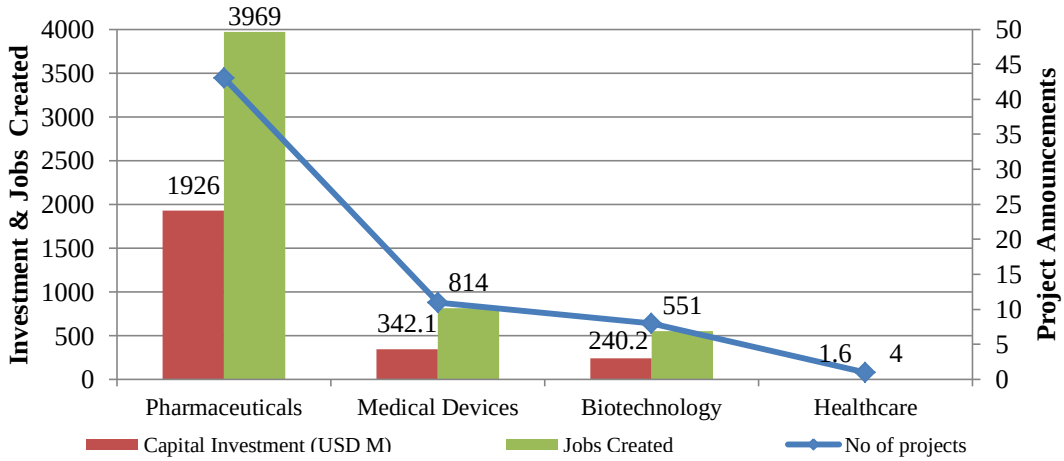
Figure 10: Canadian and Global Life Sciences Investment by Project Type & Activity 2003-2012



Source: FDI Intelligence Database

- The pharmaceutical sector has received a disproportionate amount of project announcements, job creation and planned capital investment when compared to the medical device, biotechnology, and healthcare sectors, shown in Figure 11. This is a concerning trend as the industry more recently focused research and development efforts on biotechnology and medical device related products.

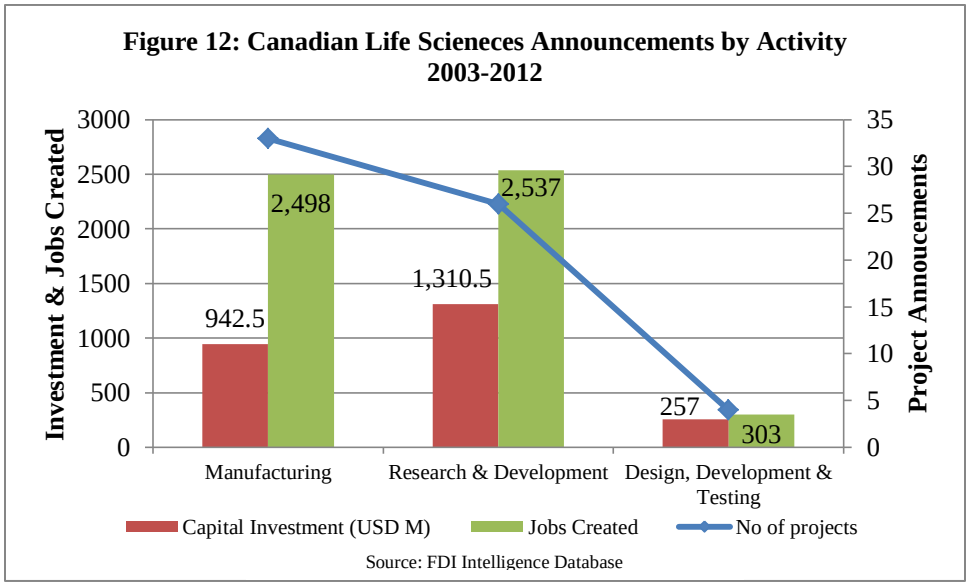
Figure 11: Canadian Life Sciences Investment Annoucements by Sector 2003-2012



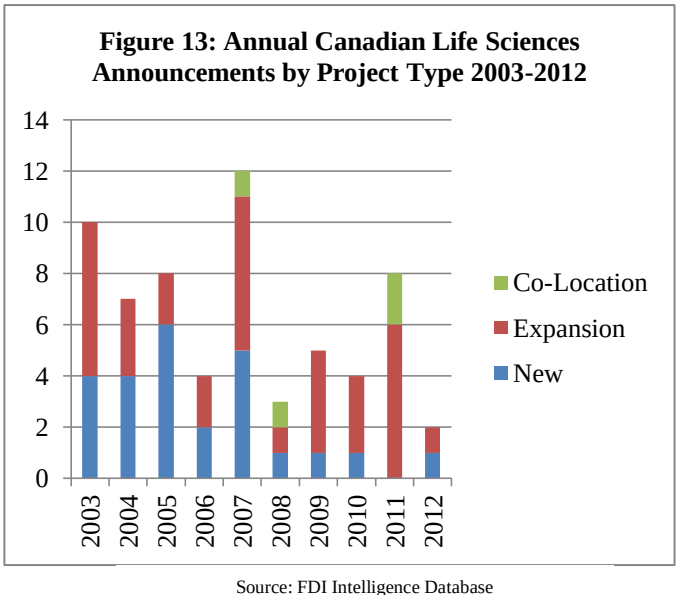
Source: FDI Intelligence Database

- Figure 12 illustrates investment by life sciences industry activity. Manufacturing investments represent the highest number of FDI activity announcements since 2003. While the number of manufacturing investments has been inconsistent year to year, they total 33 projects over the last ten years, with surges of announcements in 2003, 2007, and 2011. The number of research and development project announcements has been comparable to the number of manufacturing announcements at 26. However, there have only been five R&D projects announced since 2009. The R&D projects

though have been more labor and capital intensive than those related to manufacturing.



Unlike global trends, where new investments comprised the majority of project announcements, Canada has had more success with companies expanding existing facilities as compared to attracting greenfield investments.[18] While these expansions demonstrate that companies are comfortable with the business climate and general operating conditions in the country, Canada needs to find ways to attract more greenfield investment. Since 2008, only 4 new life sciences projects have been announced nationwide as shown in Figure 13. According to industry participants, it is expected that new companies that enter the market are likely to be smaller entities with limited product offerings.[19]

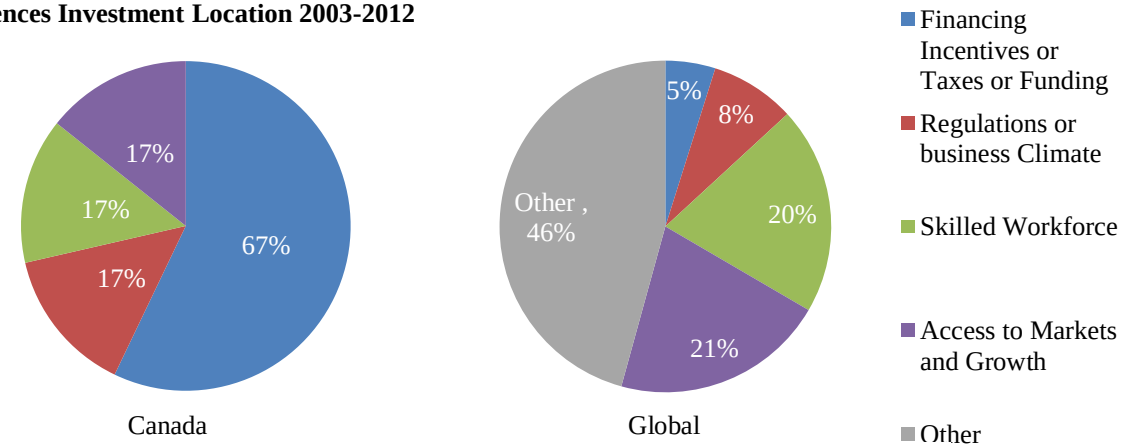


In order to attract more large scale investments, Canada has to improve its ability to market its advantages versus competitors. FDI provides additional insights into investment decisions and collects information from survey participants around decision making criteria used for selecting a location for investment. At a global level, these reasons focused on costs of operations, labor availability, and the ease of

[18] FDI Intelligence, Financial Times Ltd. , November 2012
[19] Deloitte Market Interview, December 2012

doing business within a country. Despite the prestigious research universities, highly skilled labor pool, and stable economic climate, the largest percentage of respondents indicated that governmental support and ease of doing business was a deciding factor in selecting Canada for its projects. A number of respondents indicated that "Financial Incentives or Taxes, or Funding" were a determining factor in choosing Canada indicating that investments decisions were influenced by Canada's R&D tax credit benefits. This is concerning for Canada since Financing and Incentives is a low priority issue for global investment. Skilled workforce was also a highly cited reason as to why Canada was chosen by companies, which is more in line with global trends.

Figure 14: Criteria for Selecting a Life Sciences Investment Location 2003-2012



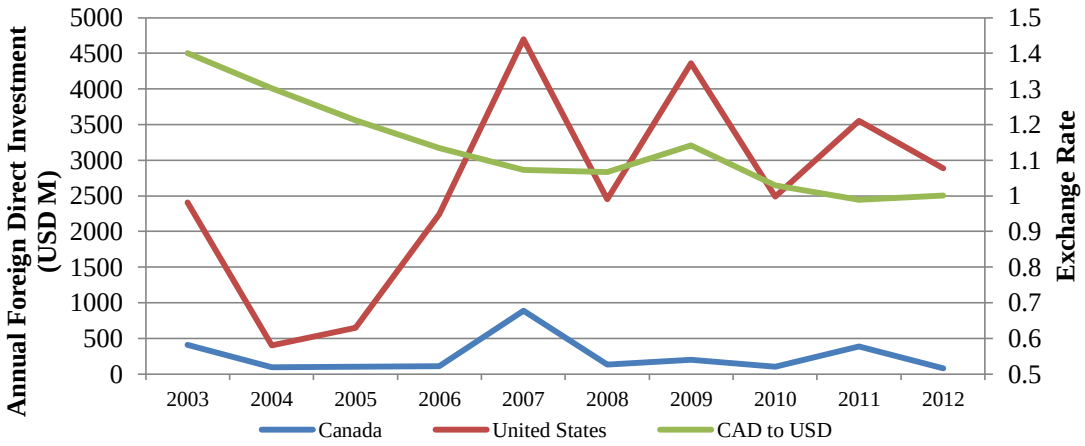
Note: Other includes Lower Costs, Industry Cluster/Critical Mass, IPA or Gov't Support, Infrastructure and Logistics, and University or Researchers

Source: FDI Intelligence Database

Companies will generally consider Canada for high value operations with its high levels of education and stable, low risk business operating environment. Historically, Canada had also benefitted from currency exchange with the U.S. dollar, which allowed for highly skilled operations at a discount over U.S. costs. In recent years though, the exchange rate between the Canadian and U.S. currencies have been nearly on par, thus mitigating any exchange benefits as shown in Figure 15.[20]

[20] United States Federal Reserve Historical Exchange Rate Data

Figure 15: Life Sciences Investment into Canada & U.S. vs. CAD-USD Exchange Rate 2003-2012



Sources: Investment Data from FDI Intelligence Database; Historical Exchange Rates from U.S. Federal Reserve

Comparative Indicators

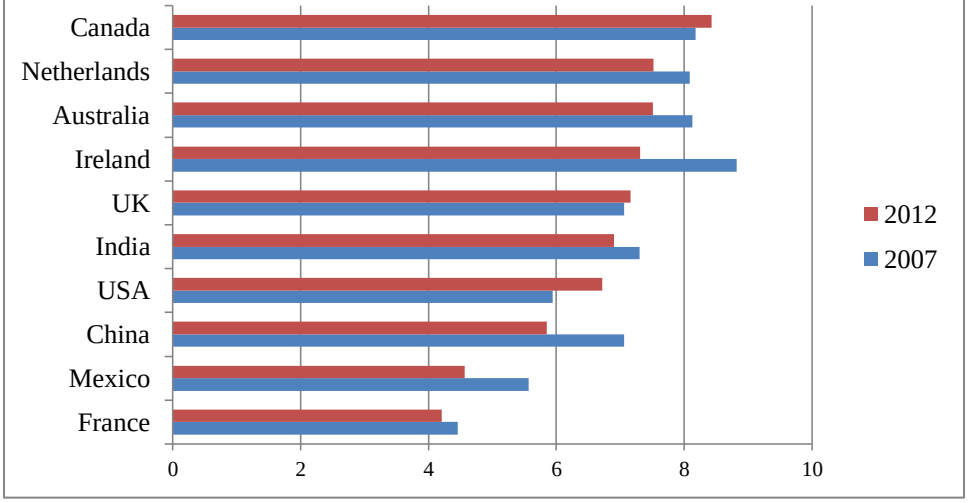
To better understand the investment decisions of global life sciences companies, and why they would or would not select Canada as a destination, further analysis into Canada's qualities and infrastructure needs to be performed as well as a comparison between Canada and other benchmark countries that might be considered as competitors for investment deployment. Nine countries were selected based on population size, the expected size of the pharmaceutical market, and FDI's information for the number and amount of investment in recent years. Examining Canada independently and in comparison to other countries will help demonstrate overall benefits Canada offers industry investors, but also understand qualities that are lacking. A range of indicators are analyzed throughout this paper in order to assess business operating environments (infrastructure, talent, markets) and costs (labor, taxes, incentives). The relative importance of selected categories can vary significantly by company and operation type, but the selected categories provide insight into relevant indicators used by companies when making location decisions.

The International Institute for Management Development (IMD) has developed a series of surveys and a database that collects information about countries' image and qualities in terms of business climate and business development.[21] Comparative scoring and rankings are based on hard data (i.e. number of graduates in a given field) or qualitatively based on global executive survey responses. Four categories were selected from IMD's database to assess the quality and image of labor within each nation: Skilled Labor, Labor Relations, Attracting and Retaining Talent, and Brain Drain. Based on the characteristics identified above, the selected countries were: Australia, China, France, India, Ireland, Mexico, the Netherlands, the United Kingdom,

[21] IMD is a well-respected Swiss business school with strong ties to global businesses. These businesses often send their corporate leaders to this institution for advanced education according to the description from the Economist. They annually collect survey and other data to help provide prospective on global and local business environments.

and the United States. Among these selected benchmark nations, Canada ranks first for its image abroad as a country that encourages business development. In fact Canada's score exceeds second place Netherland's by 12%.

Figure 16: Image Abroad



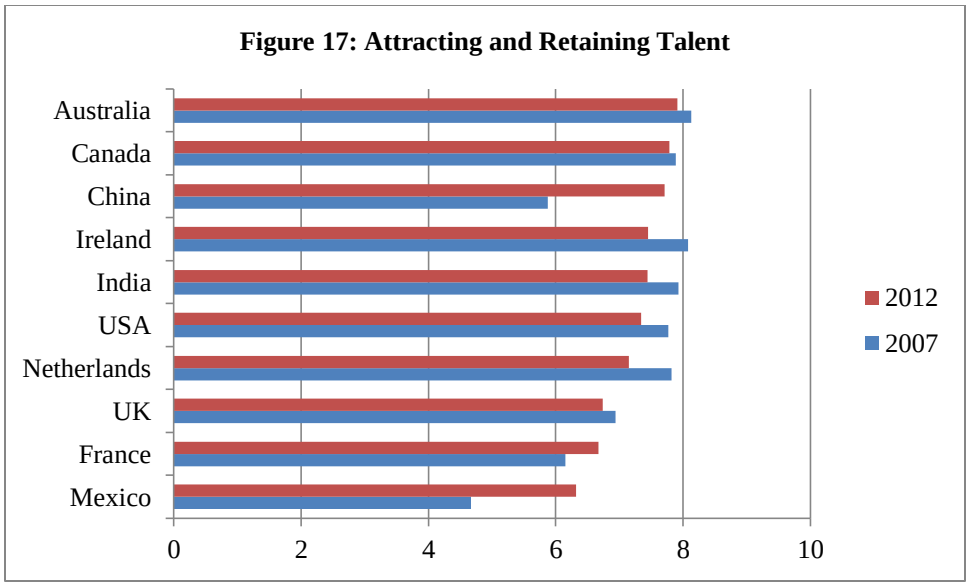
Source: IMD's 2012 Global Competitiveness Rankings,

An important factor in this image is the quality and size of the skilled labor pool that Canada possesses. While the labor pool has traditionally been seen as a strength for Canada, further rankings by IMD indicate that among the select countries, Canada falls more towards the middle of the rankings.

Canada's ranking for the availability of skilled labor was near the middle of the selected countries, trailing just behind the United States, and with Ireland leading all of the nations. This is a telling statistic considering Canada has a population approximately seven times larger than Ireland's, which has the strongest growth in the availability of skilled labor over the last five years followed by Mexico.[22] [23] Emerging economies such as Mexico are starting to see an increase in the perception of the availability of a skilled labor force as evidenced by investment in these locations.[24]

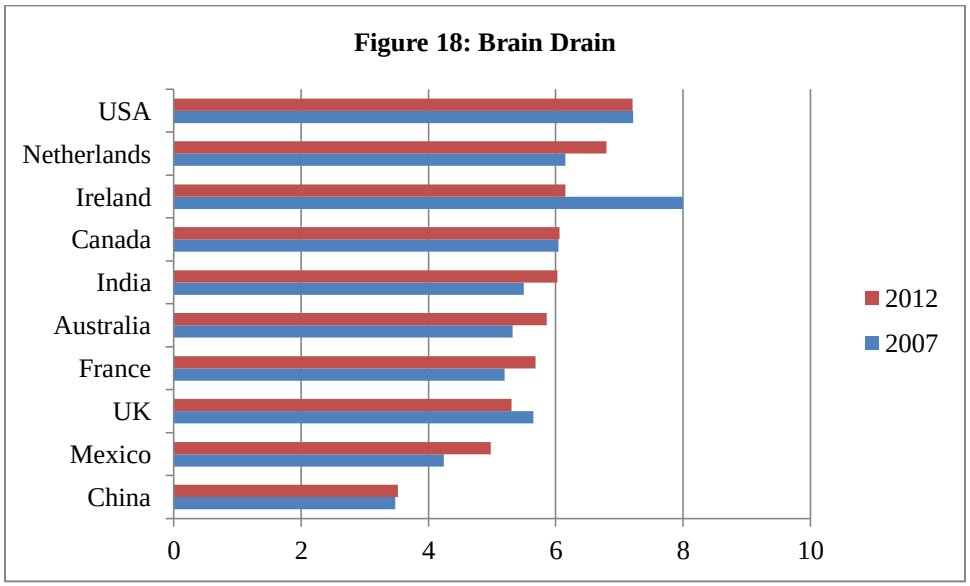
This is not to say that retaining a strong pool of skilled labor is not a focus for Canada. In fact Canada ranked second only to Australia in terms of maintaining a focus on attracting and retaining talented people in organizations, ahead of other industrialized nations such as the United States and the United Kingdom.

[22] 2011-2012 World Economic Forum Global Competitiveness Report
[23] IMD's 2012 Global Competitiveness Rankings
[24] FDI Intelligence, Financial Times January 2003-September 2012



Source: IMD's 2012 Global Competitiveness Rankings, scored 0 (weak) to 10 (good)

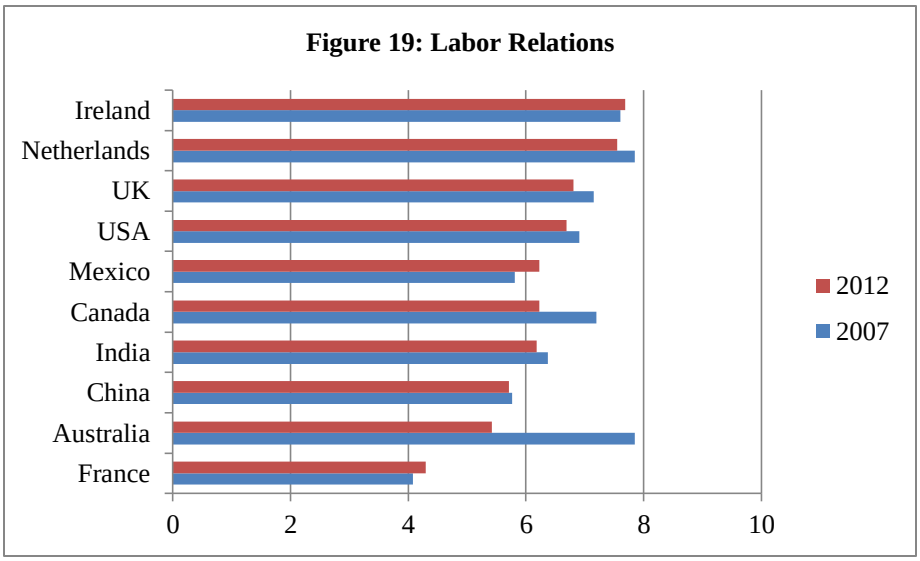
While this continues to be a focus, IMD's rankings indicate that there should be some concern around the economy's ability to compete should highly educated and skilled workers choose to leave the Canadian workforce. Canada again ranked near the middle of the selected countries in terms of how the loss of the highly educated and skilled population, aka Brain Drain, would affect competitiveness. Of the top ten countries, brain drain is expected to least affect the United States, with China expected to be the most impacted by the loss of top tier talent.



Source: IMD's 2012 Global Competitiveness Rankings, scored 0 (weak) to 10 (good)

Manufacturing facilities have historically been labor intensive operations where relationships between labor and management are hugely impactful to a facility's performance. Canada has been perceived to be a nation with few labor relations issues. According to national data, the average annual hours lost per worker for labor disputes has been approximately one hour or less since 2006 and has fallen dramatically since 1976 when it peaked at nearly ten hours per worker.[25]

Figure 19: Labor Relations



Source: IMD's 2012 Global Competitiveness Rankings, scored 0 (weak) to 10 (good)

However, IMD's rankings over the last five years indicate that labor relations in the country are not as strong as they have been previously. Since 2007, the rankings for Canada have fallen nearly a full point, on a scale from zero (weak) to ten (good), or approximately 13%, which is consistent with some other industrialized nations.[26] The economies in more emerging locations like Mexico and Ireland have seen an improvement in labor relations over that time, though. In fact in 2012, Canada and Mexico were tied in terms of productive labor relations.

While these rankings are not specific to the life sciences industry, they provide a general picture of how the country is perceived versus other locations. Other factors will be considered when making decisions regarding manufacturing investments, but labor markets will generally be the most heavily weighted in any decision making process.

Comparative Costs

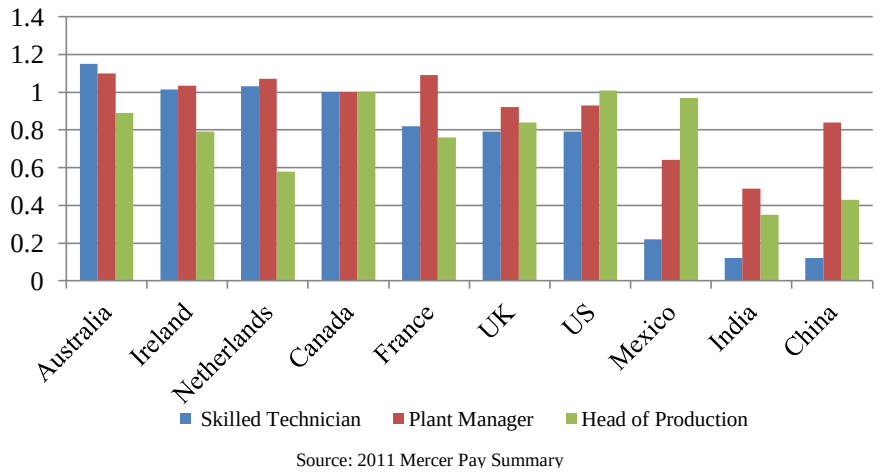
Lower cost environments are always going to be relevant factor for companies, who in some cases have seen a reduction in financial resources as global markets change and product patents expire. Mercer's 2011 Global Pay Summary and Faithful Gould's 2012 construction index were referenced to identify how costs in Canada compare to the benchmark nations.

Mercer, a globally accepted leader in human resources research and consulting, provides salary information for 50 positions in a variety of functional areas across 67 countries. An index was

[25] Human Resources and Skills Development Canada
[26] IMD's 2012 Global Competitiveness Rankings

created to compare total compensation by position for a select set of manufacturing related positions across the ten countries. As shown in the table below, average total compensation tends to be higher in Canada then in the emerging economies, but also higher than the other industrialized nations. Canadian employers offer the highest annual base salary for 23 of 50 positions and the highest total cash for 22 of 50 positions. This table further illustrates that Canada not only pays more compared to countries in the Americas, but also compared to other large nations around the world[27] [28].

Figure 20: International Labor Salary Index

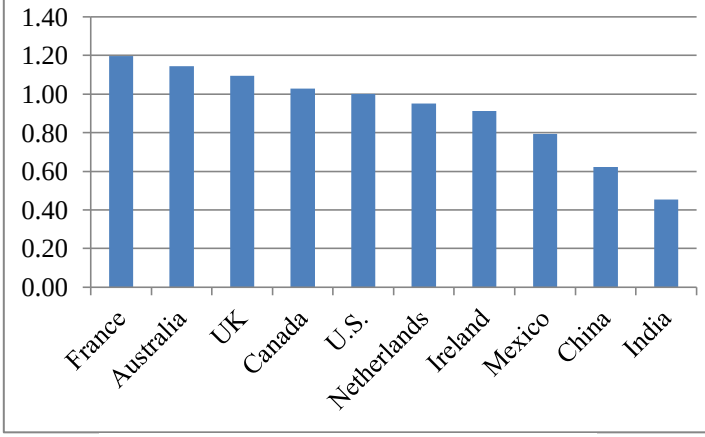


Source: 2011 Mercer Pay Summary

Cost of construction is another financial metric that companies must consider when making an investment for a new facility or expanding existing operations. These costs are usually a onetime expense, but they can drastically impact the financial implications for an investment because of the scale of the expenses that will be incurred.

Faithful Gould, an internationally recognized construction management and consultancy that is a division of global engineering firm Atkins, presents an annual index comparing construction costs across global markets/countries. The selected markets in the survey are populous cities that generally represent one of, if not the, financial center for their country and measured against

Figure 21: Construction Cost Index



Source: 2012 Faithful Gould Construction Cost Index

[27] 2011 Mercer Pay Summary
[28] Salary information for Ireland based on Deloitte experience

the U.S. market with Chicago set as the benchmark location. As seen above in Figure 21, locations in Western Europe tend to be more expensive for construction costs, and as could be expected, China and India are the lowest.[29] Canada's costs are more comparable to Western Europe than to its North American counterparts, the U.S. and Mexico.

These two indices further emphasize that the cost of operating in Canada can present challenges for companies considering Canada as a greenfield investment option.

Tax environment can also heavily influence life science investment decisions, particularly for manufacturing and fill/finish/distribution operations. The Canadian government has actively reduced Federal corporate tax rates to a currently aggressive 15%. However, when combined with provincial tax rates net effective tax rates can range from 25% to over 30%. While these tax rates are competitive and in most cases better than many developed countries, high margin companies seeking low tax environments will first consider low tax markets such as Ireland, Switzerland, Singapore, Costa Rica, or Puerto Rico.

Comparative Tax and Business Assistance Environment

	Tax Rate	R&D Tax Credit	Cash Grant	Corporate Income Tax Abatements	Property Tax Abatements	Provision of Training Programs	Provision: Real Estate or Infrastructure
Australia	30%	✓					
Canada	25-30%	✓					
China	25%	✓	✓		✓ (in SEZ)		
Costa Rica*	30%	✓		✓	✓		
India	32%	✓		✓ (in SEZ)	✓ (in SEZ)		
Ireland	12.5%	✓				✓	✓
France	33.3%	✓	✓ (based on location)		✓		
Mexico	30%	✓			✓		
Netherlands	25%	✓		✓			
Singapore*	17%	✓	✓	✓	✓	✓	✓
UK	24%	✓	✓ (based on location)				
USA	35%- 40%	✓	✓ (state level)	✓ (state level)	✓ (state level)	✓ (state level)	✓ (state level)

Source: 2013 Deloitte Tax Guides, Deloitte Experience
* Additional countries shown as "top performers" for business incentives

[29] 2012 Faithful Gould Construction Cost Index

Canada does offer a well-recognized Research and Development tax incentive, which is likely the reason many companies cited "Financing Incentives…" as a reason for investing in Canada. However, this tax incentive program is still not competitive with low tax locations listed above and there are virtually no impactful incentives for manufacturing or distribution operations. Of greater concern are the proposed changes to the Canadian Scientific Research and Experimental Development (SR&ED) program. With a proposed change in the Investment Tax Credit (ITC) rate from 20% to 15%, for non-Canadian controlled companies, Canada's primary investment incentive will be less attractive. As well the removal of capital expenditures from ITC recognition will further hinder capital investment. Therefore, while R&D operations may have had some incentive to locate in Canada, the changes to the program will further hinder Canada's global competitiveness and the remainder of the value chain will generally be disincentivized by Canada's existing cost structure.

Operating Environment

The ease of operating and conducting business in a selected country can have as dramatic of an impact on the deployment of a facility as the availability of labor or the financial expense. Countries that lack the basic physical, legal, and government infrastructure will likely not be as attractive to investing companies who can identify nations where goods are easily transported, business is easily and fairly conducted, and transparency in laws and regulations can be easily understood. This holds particularly true for high value operations that want to minimize risk such as biotechnology and biologics.

Despite an evolving regulatory environment for the pharmaceutical industry in Canada, the overall perception is Canada is a good place to do business. The World Economic Forum's (WEF) 2011-2012 Global Competitiveness Report assesses multiple categories around bureaucracy, legal protections, and business ethics.[30] Across these categories Canada only falls out of the 50th percentile once, and when considered in aggregate, ranks in the top 15% of the over 140 countries that are surveyed. In comparison, countries like the U.S. and China are ranked in the top 33rd percentile and top 38th percentile, respectively.

Overall infrastructure is an important consideration for companies as well. With growth expected to be concentrated in emerging markets, necessary infrastructure such as power availability and stability, access to transportation nodes, and the physical connection between locations may not be as readily available and usable compared to established and industrialized nations. WEF ranks countries' overall infrastructure as well as individual infrastructure categories. Compared to the selected countries, Canada's score is only behind France and is tied with the Netherlands for top overall infrastructure. The next closest of the selected countries, is the United States whose overall infrastructure score is approximately five percent below Canada's. When assessed by the

[30] The World Economic Forum is an international non-profit organization that brings together global leaders across politics, business, and academia with a focus on "improving the state of the world." This report is a collection of data and survey information they create.

quality of specific transportation infrastructure, i.e. roads, rail, air, and port access, and quality of electricity supply, France, Netherlands, and Canada consistently stand out amongst competing nations.[31]

Other less tangible components of a country's infrastructure will play a vital role in the attractiveness of a nation for life sciences investors. Intellectual Property (IP) laws as well as other legal and regulatory controls can impact the financial and opportunity cost considerations a company must make when weighing deployment options.

The U.S., Canada, Netherlands, and Ireland all offer legal and regulatory environments that encourage scientific R&D and innovation, while also protecting firms' intangible assets. According to IMD's rankings, all of these countries rank at the top for having regulations that support the development and application of technology, support business development and innovation. Additionally, Canada and the U.S. have laws in place that encourage scientific research and innovation. It likely is not surprising that the countries that rank near the top are more industrialized nations. However, the large emerging economies in the selected group, China, India, and Mexico, still lag in their development and implementation of legal infrastructure that encourages, supports, and protects scientific production.

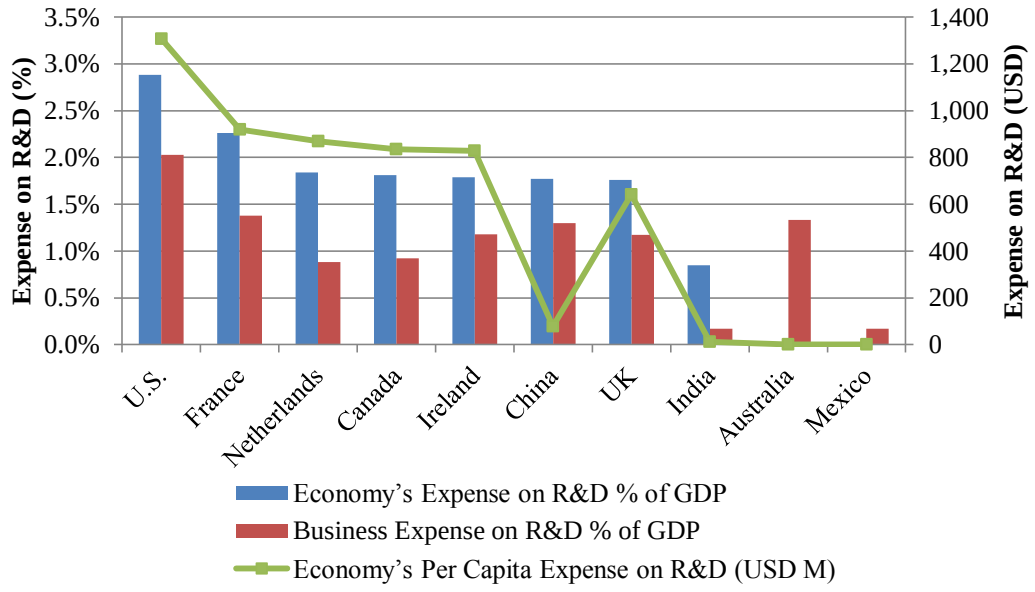
Research and Development

Research and Development operations often seek out more than strong legal environments. In an executive survey conducted by FDI, respondents indicated that they want to be part of a critical mass that includes qualified labor, ongoing research and innovation, and growth potential. Canada is a location that offers many of these qualities.

Financial resources funneling into new projects and research will attract the attention of life sciences companies. In 2009 and 2010 Canada falls to the middle of the rankings of the competing countries in terms of total R&D spend. The economies of the United States and France spend between two and three percent of total Gross Domestic Product (GDP) on these types of expenditures, leading this category. Canada's expenditures amount to just less than two percent of GDP, which is closely aligned with the other competing nations. When considering what businesses spend on R&D, Canada's ranking decreases because less than 1% of total GDP comes from businesses' R&D expenditures. Canada ranks in a similar position in terms of its economy's total R&D spend on a per capita basis.[32] Expenses on a percentage of GDP and on a per capita basis are summarized below in Figure 22:

[31] 2011-2012 World Economic Forum Global Competitiveness Report
[32] IMD's 2012 Global Competitiveness Rankings

Figure 22: Expenditure on R&D 2009-2010



Source: IMD's 2012 Global Competitiveness Rankings

A secondary financial metric that can be considered as a strong indicator of life sciences and R&D related investment is the availability of venture capital (VC) funding. The availability for all countries has generally decreased since 2008 as the global economy suffered through the recession, and less venture capital was made available to invest. As of 2012, the United States stands out as the location with the most available VC funding, followed by the Netherlands and Canada.[33] This type of funding is important to small life science companies who seek out capital to fund product development, support growth, or in preparation for acquisition. In many of the compared markets this type of financial resource is not as readily available.

Investment Snapshot:
August 2007 - Charles River Laboratories into Canada

Charles River Laboratories (Wilmington (MA), United States) invested in the city of Sherbrooke, Canada in the Pharmaceuticals sector in a Research & Development project.

Charles River Laboratories announced that it intends to build a new facility in Sherbrooke, Quebec, to support the company's expanding Preclinical Services business. This facility would provide essential drug discovery and development services to the international pharmaceutical and biopharmaceutical industries. The announcement planned for approximately 300,000 square feet. The Sherbrooke facility is ultimately expected to employ 1,000 people.

"Our goal was to identify a location similar to Montreal, equally convenient for our customers, where we could situate this new facility. Sherbrooke is ideal for many reasons, including its proximity to world-class educational institutions offering well-educated laboratory and life sciences graduates, as well as opportunities for collaborations and access to cutting-edge technology," said Christopher Perkin, Corporate Vice President and President, Canadian Preclinical Services. "We greatly appreciate the assistance of the government of Quebec, which is supporting this project, as we support our customers' efforts to bring drugs to market faster and more cost effectively."

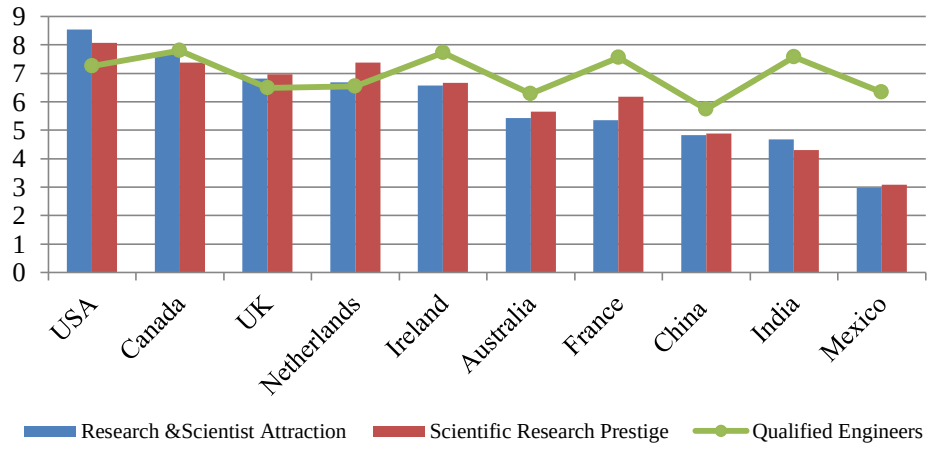
Jobs Created: 1000 Investment: USD 601.30 million

FDI project type: New

[33] IMD's 2012 Global Competitiveness Rankings

While funding and financial issues may influence location decisions, labor and research infrastructure are generally more significant. The base for knowledgeable scientists who conduct respected research that is shared between academia and businesses helps distinguish Canada, as well as the U.S., from many other competing countries. These two countries stand out for attractiveness to scientists and researchers and developing respected international research. Their scores are at least 13% higher for attractiveness to scientists and 6% higher for quality of academic research compared to the other eight compared countries. Canada distinguishes itself even further by being rated highest for the availability of qualified engineers in the labor force as seen in Figure 23.

Figure 23: Scientific Infrastructure



Source: 2012 IMD Global Competitiveness Report

Within the life sciences industry, public and private sector cooperation play a more important role as a source of innovation and new developments than for other industries. Again Canada and the United States stand out as locations where these types of cooperative relationships are supporting technological development and successfully transferring knowledge between companies and universities.[34]

While Canada has been well positioned for R&D investments, there are looming pressures on global organizations to increase their innovative output, changing the traditional R&D investment model. R&D investment decisions are primarily concerned with quality of innovations, novelty, and practical applications for R&D. Therefore R&D investments are generally driven by talent and more recently by access to innovative ideas. An example is the current growth in "reverse innovation". Companies have historically focused R&D investment and activities in developed countries such as the US, Canada, and Western Europe where the greatest depth of talent was found. Products developed in the West were then marketed globally including into traditionally developing countries. Today, traditionally developing countries such

[34] 2012 IMD Global Competitiveness Report

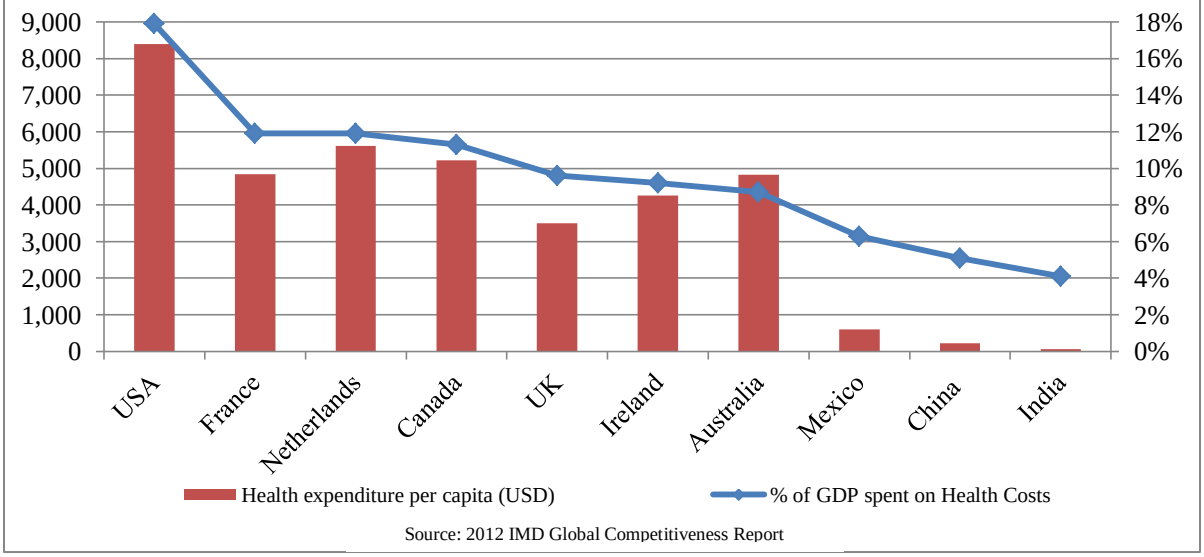
as India, China, and Brazil have well developed education and research infrastructure and more importantly provide unique perspectives into research and development. For example, in India, traditional Ayurvedic medicine is being researched to identify innovative therapeutic applications that could be marketed globally. This evolving R&D model will put added pressure on research in countries like the US and Canada where new drug development has slowed in recent years.

Fill/Finish/Distribution

Decisions for fill/finish/distribution locations can be impacted by the local market size and average healthcare expenditures in the domestic market. Canada's expenditure on healthcare lagged countries like the U.S. and France, but has continued to see growth over the last five years on a per capita basis.

Certain economies, such as the United States, spend a significant percentage of their total economy on health related costs, nearly 18% and $8,400 per capita. Canada, the Netherlands, and France comprise the next tier of countries based on their comparable spending on these expenses. All three countries spent between 11-12% of GDP and approximately $5,000-$6,000 per citizen in 2010 on healthcare costs. The emerging economies of Mexico, China, and India spend significantly less on healthcare expenditures as can be seen in Figure 24[35]:

Figure 24: Healthcare Expenditure 2007-2010



Source: 2012 IMD Global Competitiveness Report

When examining growth on spending per citizen from 2007 to 2010, China and India have seen the most increase in spending per capita over that time period, growing at 92% and 40%,

[35] 2012 IMD Global Competitiveness Report

respectively. Canada's growth in spending grew 21% over this time, tied with growth in the Netherlands, and behind Australia's expense growth of 27%.[36] Canada's continued growth in country level spending shows that it is a good candidate to be considered by companies where healthcare related costs are seeing significant increases.

Investment Snapshot:
July 2012 - Pfizer into Canada

Pfizer (NYC (NY), United States) is investing in the city of Saint-Laurent, Canada in the Pharmaceuticals sector in a Manufacturing project.

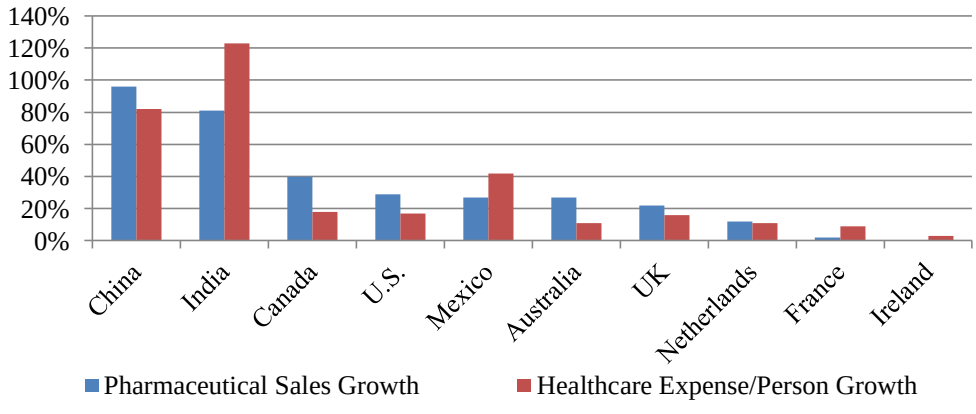
US-based pharmaceutical company Pfizer has invested C$32m in the expansion of its manufacturing facility in Saint-Laurent, Canada. Capacity at the plant has increased to capacity of 4.4 billion multivitamin tablets annually, and includes new bottling packaging lines and coating machines. The company received C$2.7m funding from Investissement Quebec.

Jobs Created: 65 (est) Investment: USD 31.52 million

FDI project type: Expansion

The Economist Intelligence Unit (EIU), a data source created by the global publication the Economist, tracks this same information that closely aligns with IMD's estimates, and also provides projections for expected healthcare expenditures as a percentage of GDP and per capita. As a percentage of GDP, EIU projects fairly stable spending on healthcare costs across all of the selected countries. Most countries are expected to see 0% to 0.2% increases annually.

Figure 25: Projected Growth in National Healthcare Costs 2012-2016

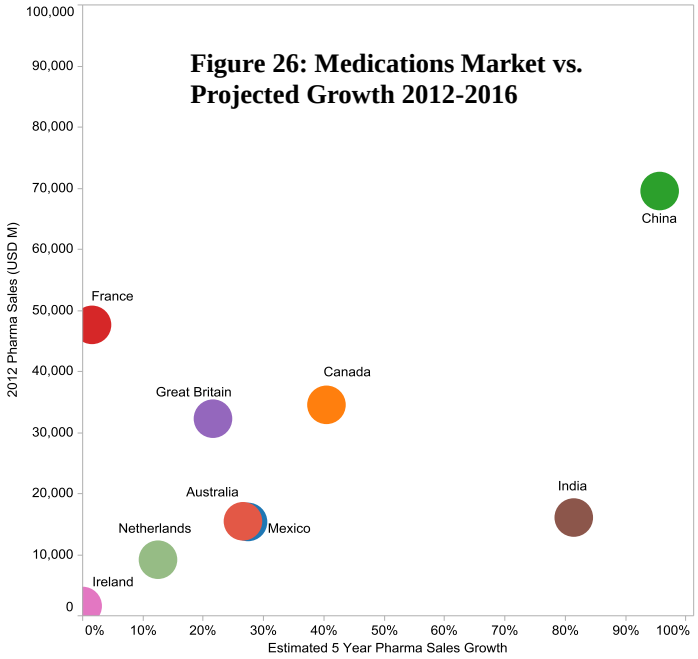


Source: 2012 Economist Intelligence Unit Industry Briefing

On a per capita basis, this increase can appear more dramatic as countries like India, Mexico, China are projected to see above average growth in GDP at over 7%. It should be noted that EIU projects healthcare spending per person in Canada to increase by 18% through 2016, which is more than any other of the industrialized countries.[37]

[36] 2012 IMD Global Competitiveness Report

[37] Economist Intelligence Unit Industry Briefing, This source is utilized due to its depth of information across multiple industries and other economic factors, as well as for its historic data and forward looking projections from a globally recognized and trusted publication.



Source: 2012 Economist Intelligence Unit Industry Briefing

A portion of that expected growth in healthcare expenditure will likely be spent on pharmaceutical products, specifically prescription and over the counter medications paid for by the public insurance programs, private insurance, or consumers themselves. As shown in Figure 26, every country but France and Ireland is expected to see double digit pharmaceutical sales growth over the next five years, in addition to double digit growth in total healthcare spend per person.

What makes these projections for growth in pharmaceutical sales potentially more attractive for Canada is that they do not include other industry related products, such as medical devices.[38] With information from EIU that indicates the population of people over the age of 65 in Canada will increase by nearly 15% over the next five years, it is likely that a pharmaceutical and medical device sales growth projection could exceed the current 40% estimate.

While there is optimism for substantial growth in the market, there also should be trepidations around regulatory factors that could provide limitations to the actual growth. On-going trends and changes at the province level are impacting reimbursements. There are ongoing provincial level reimbursement changes that raise concerns for major market participants. While reimbursement will undoubtedly continue to face cost pressures, Canadian Federal and local government representatives should recognize potential downstream effects on in-market investment.

Currently, each province has control over its own drug formulary and can limit which medications will be approved. Provinces appear to be reducing reimbursements for new drugs, and may only provide reimbursement if comparable products have not worked for a patient already. This limits the choices of prescribing physicians to prescribe more generic or inexpensive medications to patients rather than brand name drugs or even drugs that are new to the market.

Furthermore, generic prescription medications are also receiving price pressures and manufacturers are being prohibited from providing trade allowances to pharmacists. Historically, generic prescriptions came to market at approximately 80% of a brand name drug's

[38] Pharmaceutical Sales market data from EIU only includes the price of prescription and over the counter medications for consumers

price and manufacturers provided trade allowances to ensure that pharmacies would only offer their product to consumers. Provinces such as Ontario and Quebec are taking legislative action to reduce generic products to launch at 25% of brand name price and outlawing the previously accepted trade allowances. In addition, some brand name medications from large pharmaceutical companies are unable to gain approval for their products to be on provinces' drug formularies because of the prices they charge which are needed to recover R&D investment expenses. While there is expected to be significant growth in pharmaceutical sales, price pressures from public institutions may limit the scale of that growth and make Canada appear less attractive to new investors.[39] Pricing pressures are prevalent throughout global markets, and are expected to be significant in the US over the coming years as well. However, the proposed changes to Canadian reimbursement should be recognized as significant since they are being closely monitored by global life science companies.

[39] Deloitte Market Interview, December 2012

Strengths Weaknesses Opportunities and Threats (SWOT)

Figure 27: SWOT Analysis

Canada has a number of strengths that are recognized through independent third party rankings and ratings. Canada is highly regarded for its overall infrastructure, both from a physical perspective as well as an institutional/legal perspective. Strong physical infrastructure allows companies to rely on their utilities and access environment and ultimately transport finished goods to consumers. Having a trusted legal and regulatory infrastructure mitigates risk by providing assurance that government and institutions support a fair and competitive business environment where life sciences companies can succeed scientifically and financially. The opportunity for research and development tax credits creates additional financial incentive for companies to consider Canada for location deployment.

In addition to a legal structure that promotes competition, Canada's symbiotic relationships between university researchers and private companies helps each set of stakeholders maintain their primary focus. Knowing that there is shared interest in transferring knowledge between parties helps ensure that scientists can continue focusing on technology development and corporations can concentrate on marketing and selling those technologies and medications to consumers.

The amount of skilled labor that either stays in or is attracted to Canada is a significant attribute for the local life sciences industry. By having a concentration of scientists, engineers, and other members of a skilled work force, it develops its own case for the need to develop research

centers, laws and regulations, and financial incentives that in conjunction will stimulate the growth and prosperity for the local industry.

Even though Canada demonstrates significant strengths, the lack of significant new investments indicates that there are pressing issues as well. These strengths, however, do not generally separate Canada from the US and Western European countries which also boast strong infrastructure, deep talent pools, and stable operating environments.

A contributing factor to the slowdown of investment could be blamed on the competition with the US. Many of the strengths that Canada possesses are also strengths of the US. The US also has a very developed infrastructure environment and talent pool at a generally similar and often lower cost structure The US also has a disproportionate market size advantage and, depending on the state, generally aggressive business attraction incentives. Given the operating similarities of the US and additional market and incentive advantages, companies will often choose to locate investments south of the border. Additionally, labor costs and construction costs in Canada are higher than Mexico, and many parts of the US, making it more difficult to justify creating or expanding operations in Canada.

Summary of Critical Factors Comparison by Country

	Tax Environment	Talent Availability	Market Size	Costs	Infrastructure	Political / Economic Stability
Australia	−	+	−	−	+	+
Canada		+	−	−	+	+
China	−	+	+	+	+	+
India	−	+	+	+		
Ireland	+	+			+	+
France	−	+		−	+	+
Mexico	−			+		
Netherlands		+		−	+	+
UK		+		−	+	+
USA	−	+	+	−	+	+

+ Advantage
− Disadvantage
Neutral

Despite the number and size of investments being less robust than other comparative countries, there are sources for optimism in the Canadian life sciences industry. Three factors in particular provide sources for expected financial gain and market attractiveness. 1) Over the next five years, the population is expected to continue aging adding significantly more people over the age of 65; 2) more money is expected to be spent on healthcare; and 3) pharmaceutical sales of medications is expected to experience high growth. While these three factors are intertwined, they each can independently justify reasons why the life science industry can improve in Canada.

The strengths of the Canadian life sciences industry will continue to present opportunities going forward as well. Canada will continue to be a strong location for research at educational institutions, and continue to be an attractive location for development of science and technology. Companies that recognize this can continue to benefit from the tax credits offered by the federal government.

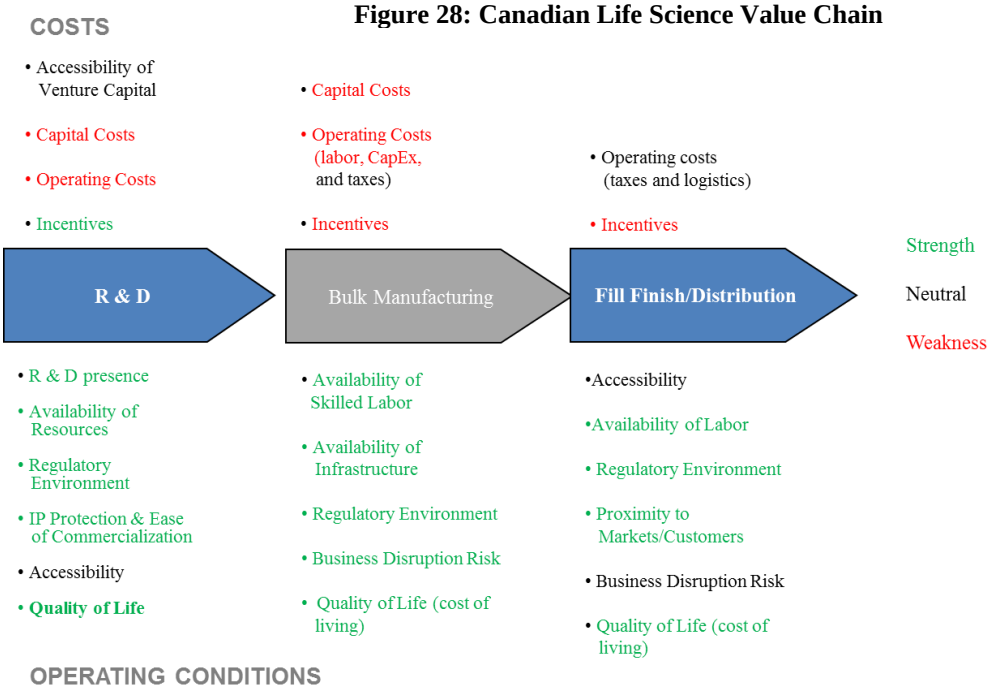
The scientific and skilled labor pool in Canada is a shining light, but also creates its own negatives. The cost of labor in Canada is expensive. It will become increasingly difficult to compete with the U.S. and other emerging economies. Additionally, labor relations have worsened in recent year. While strikes are rare, having an expensive labor pool with perceived labor relations issues could cause problems in the future.

With the Canadian Dollar strengthening as compared to the US Dollar, a historically strong reason to invest in Canada has been mitigated. Emerging and lower cost economies will play a more important role in the industry and be a larger source of growth. Additionally, these countries along with others seeking to grow foreign direct investment, will offer more business friendly tax structures that could entice firms to invest in countries other than Canada.

Finally, the government at the federal and provincial level is continuing to take regulatory actions that will have an impact on competition and limit the ability for brand name drugs to compete in the market. With continued price pressure more branded medicines and products could see diminishing returns by operating and trying to sell in the Canadian market. More should be done to work cohesively with all market participants and not limit the opportunities for improved product to be offered to Canadian citizens.

Canada's Opportunities in Relation to the Life Science Value Chain

Figure 28: Canadian Life Science Value Chain



Along the life science industry value chain, Canada performs well across a majority of operating conditions. The labor and regulatory environment in Canada is a significant strength and a positive attribute across the value chain.

However, Canada does not fare well on costs, with high labor and construction costs and incentive programs which favor Research and Development. Costs tend to most significantly influence manufacturing decisions, with companies willing to pay a premium for Research and Development and market access. Given the current operating environment, Canada appears best positioned to pursue opportunities in R&D and Fill Finish/Distribution. While the overall corporate tax rate in Canada has been dropping, Canada is not seen as a low tax location such as Ireland, Costa Rica, Singapore or others. So while the tax rate is beneficial when competing against the US, those companies that are margin heavy and sensitive to tax costs will often focus directly on low tax environments.