

The Perfect Remedy

Could drug incubation allow Canada to better compete in the global pharmaceutical industry?

By David Stewart and Sabriya Karim

In spite of society's reliance on their products, pharmaceutical companies are often portrayed as greedy, profit-seeking machines. The discovery and distribution of tuberculosis and polio vaccines in the 1940s and 50s, for instance, as well as the emptying of mental health wards in the 1970s due to a breakthrough in neurological drug treatments, demonstrate the benefits of a strong pharmaceutical industry. These kinds of successes are driven by innovations that stem from high-risk investments and a convoluted value chain.

The pharmaceutical industry provides jobs, tax revenue, foreign investment, and the accumulation of intellectual capital. A thriving local pharmaceutical industry not only improves societal health and allows for lower cost drugs, but also improves the host country's economic and scientific output. Unfortunately, Canada is struggling to compete internationally, leaving many of these benefits unrealized.

Lost Opportunities

The global pharmaceutical market is experiencing double-digit growth, but the Canadian market is growing at a rate of only 6.4%. Employment in the industry has dropped by more than 28% over the past five years and year-over-year growth, after a peak in 2001, hit a low of 4.5% in 2009. Imports have increased from \$7 billion to \$13 billion over the past 10 years.

According to Calvin Stiller, an Officer of the Order of Canada, "Canada has become almost completely dependent on multinationals coming in and selling to its economy." These trends have caused an 18% decrease in newly patented medicines launched annually in Canada over the past decade, thus creating a drug trade deficit of over \$7 billion in 2010. Why is Canada failing to bring its own drugs to market?

The Value Chain

The process of bringing a drug to market begins with Research and Development (R&D), where the potential benefits of the drug are brought to light. The drug then undergoes rigorous testing and if successful, it is commercialized and sold. A funding cycle allows profits earned from a commercialized drug to fund the high investments in testing and R&D. Any disconnect in this loop stops R&D funding, and thus reduces the likelihood of future drug commercialization.

Industry Challenges

Relative to other countries, Canada offers comparable research quality but at a higher cost, and is consequently struggling to attract foreign investment. The pharmaceutical industry is facing one of the largest waves of patent expiration ever, and as a result multinationals are restricting investments to the final stages of testing in a desperate attempt to fill their production pipelines. The lack of demand for early-stage drugs has forced Canadian startups to license their products too early and at painful prices.

A thriving local pharmaceutical industry not only improves societal health, but also improves the host country's economic and scientific output. Unfortunately, Canada is struggling to compete internationally, leaving many of these benefits unrealized.

As a result, Canada is capturing less than 1% of the \$100 billion invested in pharmaceuticals annually despite its 3% stake of the global market, which is growing at 7% annually. As IMS Health reported, the global market for pharmaceuticals is expected to grow nearly \$300 billion over the next five years, reaching \$1.1 trillion in 2014. If Canada cannot find the funds to scale up its comparatively small pharmaceutical companies, foreign multinationals will purchase many of Canada's innovative products at too early a stage in the value chain. As a result, Canadian companies capture much less value than they would otherwise.

Success Story

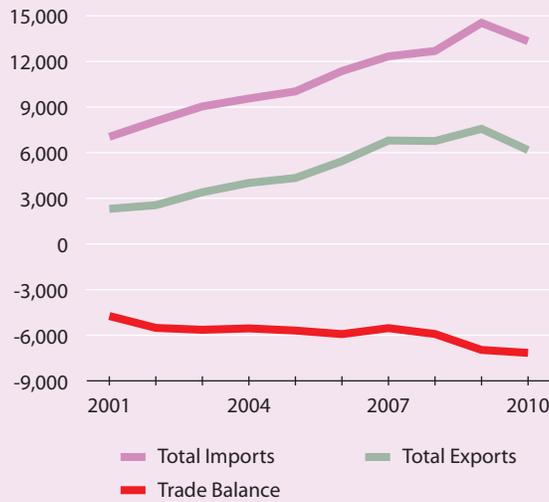
The Republic of Ireland illustrates the economic growth that a strong pharmaceutical industry can provide. In the early 1970s, the Irish pharmaceutical sector was stagnant, with few employees and exports relative to its international peers. At 50% of exports, Ireland is now the second largest net exporter of pharmaceuticals in the world. The government's initial investment paid off, as the pharmaceutical industry is now also the largest contributor to corporate tax revenues.

Like Canada's emphasis on only the research component of the pharmaceutical industry, Ireland initially focused only on a single part of the value chain. Instead of bringing new drugs to market domestically and then reinvesting the profits into R&D, the industry largely produced raw, active ingredients for export to other countries. As a result, they never saw revenues generated from finished products. Stemming from a belief in free trade, low corporate tax rates, and investment in education, Ireland managed to turn this situation around. The government adopted policies that facilitated foreign investment in both the R&D and production stages, and took advantage of the country's resources and intellectual capital.

It is clear that the Canadian pharmaceutical industry is in need of a similar change. In order to emulate Ireland's dominant presence in the global pharmaceutical market, drug research, testing, commercialization, and production must be domestic. This can only be achieved if the capital and facilities required to push drugs through the testing phases are made available in Canada. The importance of fusing the gap between research and commercialization can be seen in Finance Canada's estimate that

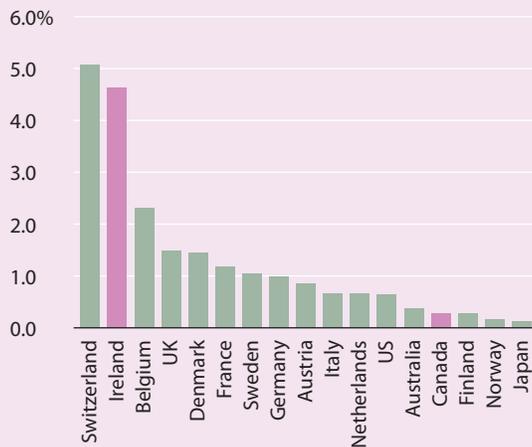
Canadian Pharma Industry

Pharma Trade Deficit (\$ millions)



Source: Industry Canada

Export Market Share (2008)



Source: Conference Board of Canada

The Republic of Ireland illustrates the economic growth that a strong pharmaceutical industry can provide.

for every \$1.00 invested in Scientific Research & Experimental Development, the final yield is \$1.38. Every dollar invested in R&D that is not commercialized forgoes this yield. Canada is in dire need of a system that leaves less money on the table.

High Risk, High Reward

With over 10 years of research and odds of success of about 10,000 to 1, it costs around \$1 billion on average to bring a drug to market. This risk is too great for smaller, individual Canadian firms to bear, leading to high-risk drugs being sold too early in their development. A system to lower the commercialization risks faced by smaller drug companies through pooling would significantly improve their ability to push drugs forward in the value chain.

Enter: Incubation

Business incubation is a dynamic industry that helps startups transition into self-sustaining companies. Incubation services include anything from marketing assistance to intellectual property management. Business incubation has a proven track record: 87% of incubated startups stay in business, compared to 44% of unaided companies.

Canadian incubators are admittedly still in their infancy, but some are established enough to push Canadian pharmaceutical R&D in the right direction. A prime example is MaRS Discovery District whose mission is to commercialize publicly-funded medical research with public-private partnerships. The MaRS Incubator offers state of the art facilities for entrepreneurs to conduct their own research and testing. This incubator model allows small startup pharmaceutical companies to utilize laboratory resources and helps them develop early-stage drugs. Firms like MaRS use their industry expertise and consultancy to provide concrete

benefits to the underachieving Canadian pharmaceutical industry, but fall short at actually commercializing the research. To achieve this more difficult goal, a model that covers more of the value chain is needed. That idea was once attempted, but unfortunately faced a number of roadblocks that stopped it in its tracks.

“The Incubator” was proposed by a group of industry leaders twenty years ago. This concept differs from MaRS in that it would actually perform required testing and assume the risks of doing

Pharmaceutical Development Process

The role of the incubator in the value chain

Current Canadian Industry Value Chain



Incubator-Enabled Value Chain



so, allowing smaller Canadian pharmaceutical companies to lower the risk profile of their investments to levels acceptable for long-term sustainability. An effective drug incubator's goals are aligned with its partner companies, who have an interest in seeing drugs through the entire value chain.

This Drug Incubator would raise capital through industry partners, venture capitalists, government grants and multinational pharmaceutical companies. These stakeholders seek returns earned from drugs in the market and have a vested interest in the pharmaceutical industry's overall wellbeing. With a pool of financing available for R&D, the Drug Incubator would offer research staff capable of performing the phases of testing necessary for commercialization.

Startup companies who not only lack the resources for high-cost testing, but also the know-how, would be able to turn their product over to the facility for development. Once testing is complete and the drug has been proven commercially viable, the startup company would have the opportunity to buy the drug back with a royalty premium. Unfortunately, The Incubator model never made it to fruition, due to the unwillingness of all stakeholders to invest in an opportunity where the risk may not have been matched by return.

The Drug Incubator would actually perform the required testing and assume the risks of doing so, allowing smaller Canadian pharmaceutical companies to lower the risk profile of their investments to levels acceptable for long-term sustainability.

However, due to recent trends in the domestic pharmaceutical industry, Canada cannot afford to let an innovative solution like this just sit on the shelf. Now is the time to bring The Incubator to life; the status quo's opportunity cost outweighs the risk of implementation. The Incubator will spark domestic commercialization and subsequently create high-paying jobs, boost drug sales, and most importantly, improve Canada's attractiveness for foreign investment.

Canada has been resilient through the most recent recession and has taken a leadership role in global economic policy. Calvin Stiller, founder of MaRS Discovery District and a member of the original group who proposed The Incubator, asserts that "in today's economic climate, Canada is truly an island of order and security in this ocean of chaos."

Canada has the finances, human capital, and drive to become a global pharmaceutical leader. The industry is now well positioned to bridge the gap between research and commercialization, and take advantage of the economic and societal benefits that will come along with it. If the pharmaceutical industry's infancy can be incubated, there is no telling what it may grow up to be.