



Fostering Innovation, Commercialization and New Product Development in Canadian Manufacturing



Canadian
Manufacturers &
Exporters

Manufacturiers et
Exportateurs du
Canada



About Industrie 2030

Industrie 2030 is a national strategy developed by Canadian Manufacturers & Exporters (CME) and our strategic partners to leverage the opportunities presented by the Fourth Industrial Revolution and usher in a new era of manufacturing growth in Canada.

Manufacturing is the largest and most important business sector in Canada, directly and indirectly accounting for 28 per cent of all economic activity and 27 per cent of all employment. However, the sector has been struggling in recent years and along with it, so too has the Canadian economy. Output and employment have stagnated, investment and innovation have declined, and trade deficits have ballooned.

Industrie 2030 began with a simple question: What would it take to double Canadian manufacturing output and value-added exports by the year 2030? This question was the beginning of a months-long research and consultation process that formed the heart of the exercise. We heard about the issues, challenges and opportunities manufacturers see every day while running their businesses, and what would help them grow their operations, output and sales. CME and our strategic partners held 55 community consultations across Canada that were attended by more than 750 business leaders. In addition, we received over 550 responses to our bi-annual *Management Issues Survey* to add qualitative depth to our analysis.

From these consultations emerged five major themes – areas where specific and direct action are needed if we are to achieve our goal of doubling manufacturing output and exports by 2030 and to reverse recent trends in manufacturing and in the Canadian economy as a whole. These are:

- *Building a Strong and Skilled Workforce for Growth;*
- *Accelerating Adoption of Advanced Manufacturing Technologies;*
- *Fostering Innovation, Commercialization and New Product Development in Canadian Manufacturing*
- *Manufacturing a Competitive Business Environment in Canada;* and
- *Increasing Sales in Domestic and Foreign Markets.*

The Industrie 2030 summary report, *Manufacturing Growth, Innovation and Prosperity for Canada* provides an overview of the issues, challenges and opportunities in each of these five priority areas and offers specific recommendations for action in each. In addition to this strategic report, additional research reports published in 2016 included *Roadmap to 2030: A path towards doubling manufacturing output and exports* (April); *Management Issues Survey 2016* (October); *Industrie 2030: A National Strategy for Canadian Manufacturing in the Digital Age* (October) and *Manufacturing and Exporting in Canada* (October).

This document, *Fostering Innovation, Commercialization and New Product Development in Canadian Manufacturing*, is one of five reports that provide detailed analysis and recommendations in each of the priority action areas. It is itself a stand-alone strategic blueprint: it identifies the specific challenges manufacturers face; it examines the factors contributing to these challenges; it highlights the impacts that these challenges pose to manufacturing in Canada; and it proposes detailed solutions.

These reports and recommendations reflect the realities of Canadian manufacturing as heard during our research and consultation process throughout the summer of 2016. We understand that these priorities can change as economic and political realities shift. However, this is not an excuse for inaction. Given the importance of manufacturing to the Canadian economy, we can and must act immediately to address the challenges and opportunities the sector faces today. The core recommendations in this report are the beginning of that process. We will adjust our priorities and actions as the changing business context requires, keeping long-term growth in manufacturing as our overarching focus.

The Industrie 2030 objective is to double manufacturing output and exports by 2030. Working together with our strategic partners, members, and all levels of government across Canada, CME is firmly committed to reaching this goal. All recommendations, reports, background information and analysis from the Industrie 2030 initiative are available at: **www.industrie2030.ca**.

Partner Summary



Michael Gillespie
Partner, National Manufacturing Leader
BDO

BDO is pleased to collaborate with CME on Industrie 2030, an important initiative aimed at helping Canadian manufacturers discover ways to embrace innovation and become more competitive on a global scale.

With the industry entering a critical turning point, industry consultations were focused on determining the requirements for Canadian manufacturers to leverage available opportunities, doubling output and value-added exports by 2030. We see many reasons for optimism; however, manufacturers across the country are still working to overcome the challenges that have come with today's international business environment.

Skilled labour shortages, outdated technology, lack of innovation, increasing competition and limited access to global markets remain top challenges for manufacturers of all sizes, and more and more executives are growing discouraged by their inability to access the government assistance that will help them compete. Many of our manufacturing clients have expressed a desire to see Scientific Research and Experimental Development ("SR&ED") programs overhauled and modernized to allow for a greater focus on innovation and commercialization.

As we continue pushing for progress and change in the industry, BDO is helping to ensure that our manufacturing clients are taking full advantage of the opportunities available to them now. Whether you wish to reinvest in new plants, upgrade existing ones, invest in new product innovation, or implement new technologies in order to boost output and control costs, BDO can help. We have extensive experience working closely with more than 3,000 manufacturing clients as their auditors, taxation advisors and corporate finance consultants. This has given us a thorough understanding of the inner workings of companies big and small and the knowledge and capability to help them capitalize on opportunities and sustain healthy growth. Our combination of industry expertise, tax and accounting knowledge, and process methodologies enable our clients' access not only to SR&ED investment tax credits, but also direct funding for business expansions, capital acquisitions, adoption of new technologies, hiring, training, and export market development.

BDO's SR&ED professional services team consists of over 70 engineers, software developers, scientists, technicians, tax and accounting specialists. We draw upon our diverse experience to identify funding opportunities and develop an implementation blueprint to support financial planning of future growth initiatives.

On behalf of BDO, I would like to thank all those who took place in the coast-to-coast consultations. Your input is vital to helping us identify the issues that matter to you, which in turn, helps us identify ways to overcome them. As we usher in a new era of manufacturing, we wish you continued success in the future and look forward to joining you on the journey to making Canada a major force in the manufacturing world.

Executive Summary



Mathew Wilson
Senior Vice President
Canadian Manufacturers & Exporters

Innovation is turning an idea into a product or service. Successful innovation is creating commercial and social benefits out of those products and services.

Consumers are growing ever more demanding as rapid advances in technology reshape their expectations. To meet these expectations, manufacturers must be continuously innovating – investing in research and development that leads to new product commercialization. Demonstrated ability to commercialize new products is essential to attracting production mandates which, in turn, generates investment, jobs and economic growth.

Canada – our people, society and businesses – is full of ideas. However, we often struggle to turn those ideas into new products or services. Our post-secondary institutions have more peer-reviewed articles per capita than anywhere else in the world. Similarly our government research labs regularly turn out a range of intellectual property (IP) and patents each year. However, despite all of this primary research; tens of billions of dollars in annual federal government funding; and billions more from provincial governments, neither of these groups leverage their ideas into commercial success on a regular basis. While they have a role to play in commercialization, it is not their primary focus, nor is it their job to do so. They should instead look to the private sector for partnerships to support this goal.

Manufacturers in Canada are also struggling with product and process innovation and commercialization. While Canadian manufacturers are known for creation of innovative, customized, niche solutions, we are falling behind our international competitors and our overall economic performance is being undermined as a result. Industrial research and development spending in manufacturing is declining and businesses are introducing fewer new innovations. From 2007 to 2009, 48.6 per cent of manufacturers produced at least one product innovation. By the 2012 to 2014 time period – just five years – that share had fallen to 43.9 per cent. Meanwhile, over the same five-year period, the share of companies reporting no innovations of any kind doubled from 18.8 per cent to 3.8 per cent.

Why does this matter? Manufacturers are directly responsible for more than 42 per cent of all private sector research and development in Canada. Their development of new products, technologies and processes drives the growth of their business and the wealth creation of the broader Canadian society. If Canada is going to be a more innovative society, Canadian manufacturers must play a central role.

According to the 2016 *Management Issues Survey*, the biggest obstacle that manufacturers face in developing and commercializing new products is the cost and difficulty in building prototypes. New advanced manufacturing technologies like 3-D printers can dramatically lower these costs, but many Canadian businesses are slow adopters of these technologies – something we must clearly overcome.

While technology may offer some advantages to industry for prototyping, it is only a small part of the manufacturing innovation and commercialization story. Repeatedly throughout the Industrie 2030 consultations, companies spoke about Canada's overall support environment for innovation – from the initial stages of product development through commercialization. While there were some positive stories told, most companies were frustrated at the level of government support offered. The source of this frustration ranged from the current state of Canada's Scientific Research and Experimental Development (SR&ED) program, to the existing poor linkages and support from post-secondary institutions, to the lack of government risk-sharing support in most sectors.

To bridge the gap in supporting manufacturing innovation, commercialization and product development, Industrie 2030 participants had a wide range of recommendations, including to:

1. Conduct a complete review and modernization of the SR&ED program.

- a. Strengthen and modernize the SR&ED program to enhance innovation and commercialization by:
 - Updating the definitions of innovation, manufacturing, and commercialization to reflect modern realities;
 - Unlocking the \$10 billion in unused credits by making a portion of the credit refundable;
 - Fast-tracking and simplifying the claim and audit processes; and
 - Increasing the threshold for cash refund of the for SMEs to \$1 million.

2. Implement a Patent Box system to reward commercialization and production of goods in Canada.

- a. The Federal and all provincial governments should introduce a Patent Box system to support new product development in manufacturing. The program would provide corporate income tax relief for manufacturers on income generated from patents and other qualifying intellectual property.

3. Create a manufacturing commercialization investment fund that would provide risk-sharing financial support for strategic research, development and demonstration projects along with capital investments.

4. Expand funding for industry-driven programs aimed at post-secondary partnerships in R&D and commercialization.

- a. Existing R&D voucher systems should be expanded to support industry-driven research at post-secondary institutions.
- b. Post-secondary institutions should be required to make all intellectual property that was developed with public funds freely available for the exclusive use of Canadian businesses.

5. Leverage government procurement to foster R&D and new product development through a 1% set aside fund to support private-sector led research into specific areas of strategic benefit to Canada.

Much of the focus in these recommendations is naturally on the government and related public-sector institutions to foster innovation and commercialization. However, in our Industrie 2030 consultations, there was also tremendous emphasis on how smaller companies can and should leverage global assets and the supply chains of larger multi-national enterprises to facilitate commercialization of new technologies, services and products. How this could be more broadly implemented will also need to be explored further.

How innovation, commercialization and new product development tie into the Industrie 2030 Strategic Goals:

- Developing and commercializing new products is a necessity if manufacturers are to satisfy changing customer demands, adapt to technological change and expand market share.
- Offering differentiated products and services attracts new customers and yields higher revenues and profits. It helps small companies grow into larger companies.
- Expanding the customer base and attracting production mandates fuels investment in new facilities.
- Commercializing more new products and technologies fosters a culture of innovation in Canada.
- Access to those technologies will improve the productivity and competitiveness of the entire manufacturing sector.
- Private-sector-led research and development is a critical step in developing and commercializing new products and new business lines.

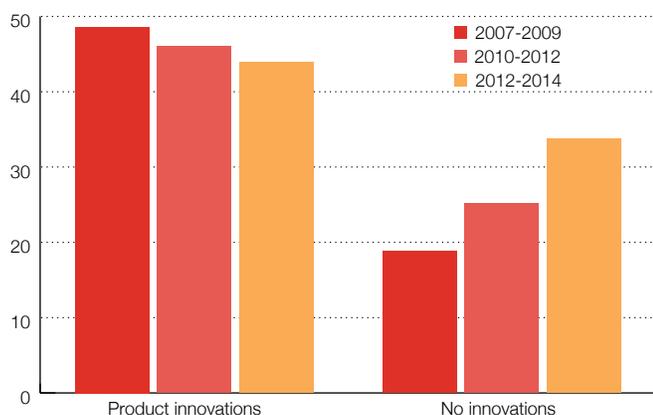
The problem: Canada's lagging performance in innovation and new product commercialization

There are too few examples of Canadian companies that are world leaders in innovation and new product development. Over the years, Canada has developed a handful of such companies, but changing consumer preferences and competing innovations in other countries have supplanted many of those businesses.

To be sure, there are examples everywhere of innovative activity in Canadian manufacturing. However, on the whole, other countries have done a better job of fostering manufacturing innovation and leveraging public- and private-sector research and development (R&D) to create and, more importantly, successfully commercialize new products and technologies.

INNOVATION IN MANUFACTURING IS FALLING

(% of companies reporting innovations)



Indeed, data on innovations show that the Canadian manufacturing sector is moving in the wrong direction. In 2007-2009, 48.6 per cent of manufacturers surveyed by Statistics Canada reported at least one product innovation over that two-year period. That share fell to 46 per cent in the 2010 – 2012 survey and 43.9 per cent from 2012 – 2014.

More troubling still, the number of manufacturers reporting no innovations of any kind (product, process, organizational or marketing innovations) is rising. From the 2007 – 2009 Statistics Canada Survey, 18.8 per cent of manufacturers reported making no innovations. By 2012 – 2014, that figure had risen to 33.8 per cent.

Product innovation and commercialization is of critical importance for the long-term health of manufacturing in Canada. Customer expectations and available technologies are changing at a feverish pace. Today's mobile phones, for example, bear little resemblance to those from 20 years ago. Similar changes are sweeping through other manufacturing industries. Canada must either be at the forefront of this change, or the goods and services we produce risk being rendered obsolete.

To improve on their record in innovation, Canadian manufacturers need to engage in more industrial R&D and, more importantly, convert the intellectual property they create (or have accessed from other sources), into new products, they will be left behind. Commercializing new or improved goods is the key to developing new business lines, attracting new production mandates and expanding the range of goods produced in Canada.

Innovation and commercialization, in turn, lead to new manufacturing investment, increased output and economic activity across the country. Securing new production mandates feeds domestic investment in new plants, machinery and equipment. It also attracts more foreign investment to Canada. Access to technology and R&D infrastructure is an important consideration for global businesses when deciding where in the world to invest. Putting Canada at the forefront of innovation is, therefore, a critical step to bringing that investment – and the jobs, growth and opportunities it creates – here.

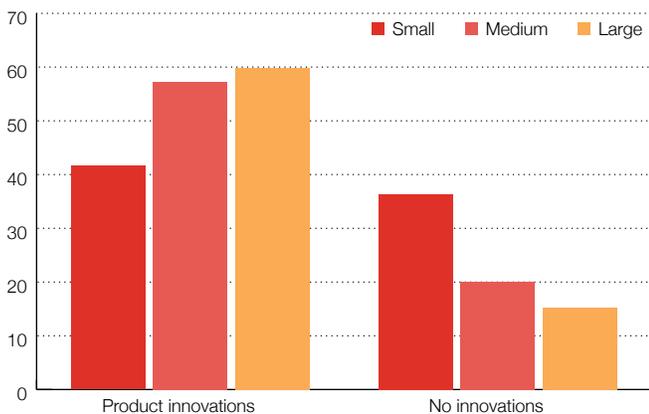
New product commercialization also enhances the long-term competitiveness of existing manufacturing industries. Many new products and technologies are also tools and inputs that can be leveraged to benefit other industries. Creating a faster, more versatile, more energy-efficient robot, for example, not only adds to the range of products made in Canada, but it has applications all across the Canadian economy. This cross-fertilization of technology development, innovation, commercialization and adoption creates a virtuous circle that enhances productivity and competitiveness across the manufacturing sector. Without that cross-fertilization, Canada is ceding a head start to its global competitors who recognize its importance.

The good news is that the Fourth Industrial Revolution – the fusion of the physical and digital worlds – offers an extraordinary opportunity for Canada to improve on this record. Advanced manufacturing technologies are themselves a catalyst for new product development, dramatically lowering production costs and making possible what was once thought to be impossible. The key is to leverage these opportunities into meaningful progress on innovation and commercialization.

Contributing Factors

As detailed in the Industrie 2030 report *Accelerating Adoption of Advanced Manufacturing Technologies*, the structure of Canada's manufacturing sector is very different from that of many of our international competitors; the vast majority of Canadian manufacturing businesses tend to be small operations. In fact, nearly 84 per cent have fewer than 20 employees and only 0.3 per cent of manufacturers have more than 500. This industrial structure plays an important role in Canada's relatively poor record on innovation and product commercialization; data show that large companies tend to be more innovative than smaller ones.

SMALL COMPANIES TEND TO DEVELOP FEWER INNOVATIONS (% of companies reporting innovations, 2012-2014)



According to the 2014 Statistics Canada Survey of Advanced Technology, 41.6 per cent of small manufacturers reported making at least one product innovation in the 2012-2014 period, compared to just under 60 per cent of large enterprises. Meanwhile, only 15.3 per cent of large manufacturers reported making no innovations of any kind over that two-year period, compared to 36.3 per cent of small enterprises.

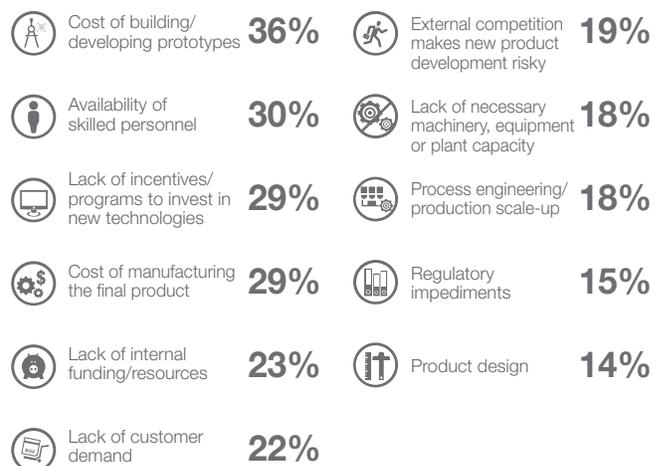
That small manufacturers tend to be less innovative is not surprising. While many new small businesses are founded on the creation of a new product or a new idea, established small businesses often lack the internal R&D capabilities or the financial or human resources needed to focus on new product development. Large companies, on the other hand, have considerably more capacity to engage in these activities.

More concerning, however, is that fact that Canada's small manufacturers are growing less innovative over time. The share reporting at least one product innovation has fallen steadily since 2007-2009, and the share reporting no innovations at all has risen from 20 per cent in 2007-2009 to 36.3 in 2012-2014.

According to the 2016 *Management Issues Survey*, the biggest obstacle manufacturers themselves see impeding new product development is the cost of building prototypes. This finding speaks to the vital importance of leveraging new advanced manufacturing technologies. Technologies like 3-D printers have the capacity to dramatically lower these costs. Unfortunately, if Canadian manufacturers are slow adopters of new technologies, their efforts to develop and commercialize new products suffer as well.

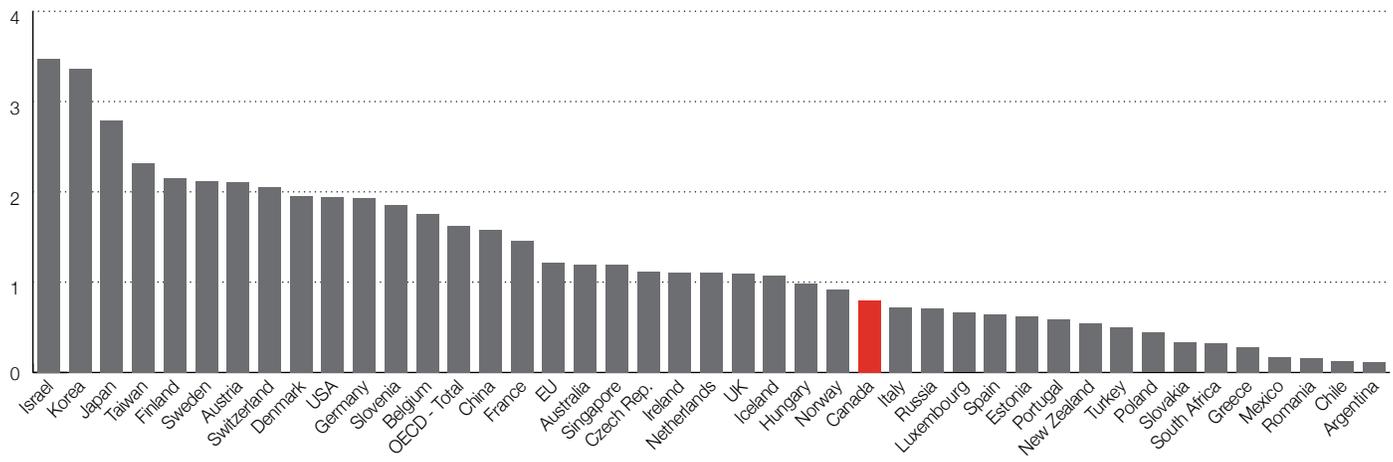
Industrial research and development is an important driver of innovation and new product commercialization. However, R&D investment by Canadian manufacturers is low by international standards and falling. For the business sector as a whole, business enterprise research and development (BERD) spending in Canada is half the OECD average (as a percentage of GDP) and BERD spending in the United States is 143 per cent higher than in Canada. This gap is getting worse, not better; BERD investment in Canadian manufacturing has dropped by nearly 25 per cent in the past 15 years.

WHAT ARE THE MOST SIGNIFICANT CHALLENGES YOUR COMPANY FACES WHEN BRINGING NEW PRODUCTS OR SERVICES TO MARKET?



CANADIAN BUSINESSES UNDERINVEST IN R&D

(BERD expenditures, as a % of GDP)



Canada's poor record on BERD spending is itself an issue worth exploring. One underlying factor is, once again, Canada's industrial structure. Sectors like pharmaceuticals, aerospace and information and communications technologies tend to perform significantly more R&D than other manufacturers. And while Canada has significant activities in these sectors, Canada's manufacturing base is more heavily skewed to industries that are not traditionally R&D intensive. Further, with a few notable exceptions, there is a relatively high degree of foreign ownership in many of these R&D intensive industries. Companies that operate branch plants in Canada may invest heavily in new product commercialization, but perform those activities in other countries. This may be a significant opportunity for Canada to attract both the R&D and the production mandates in these sectors.

Another factor is that Canada has underdeveloped linkages between business R&D, post-secondary institutions and government. In countries like the United States, the military is a significant funder of R&D. That funding is a tremendous resource for the private sector, which has a well-established track record for producing innovative new consumer products and services derived from military research. The same is true in Israel which leads the world in BERD expenditures and has a global reputation for innovation.

Finally, there is the issue of measurement. A growing number of Canadian manufacturers outsource the physical production of goods to other countries and conduct their marketing, design, legal, research and other corporate functions in their domestic offices. Statistical agencies assign BERD spending according to the primary business function that takes place in Canada. As such, R&D that is clearly for manufacturing may be attributed to industries like wholesale trade or professional, scientific and technical services.

However, these factors do not explain the entire R&D gap between Canada and its international competitors. Even Canada's high-technology industries tend to invest less in BERD compared to those same industries in other countries. According to the Science, Technology and Innovation Council, Canadian manufacturers performed at only 38 percent of the R&D intensity of their US counterparts and 35 percent of the intensity of a range of OECD and non-OECD countries.

Even so, at the end of the day, industrial R&D and intellectual property development is just a means to an end. Commercializing new products is the end goal of these activities. Performing more industrial R&D in Canada, and developing more Canadian IP, offers minimal long-term benefit to our economy if it just sits on a shelf or, worse still, if it is developed into commercial products by global competitors.

Solutions:

Industrie 2030 participants recognize the importance of new product development, commercialization and fostering a culture of innovation in Canada. Through their participation in cross-country roundtable discussions and the *Management Issues Survey*, manufacturers offered a number of specific ideas for how to reverse Canada's innovation decline and help move the country to the forefront of R&D and new product commercialization.

1. Strengthen, improve and modernize the SR&ED program.

Canada's Scientific Research and Experimental Development program was one of the most hotly discussed topics at Industrie 2030 roundtable sessions. SR&ED is a tax incentive program designed to encourage businesses to conduct R&D activities in Canada. Through SR&ED, the federal government invests more than \$3 billion every year to support private sector R&D.

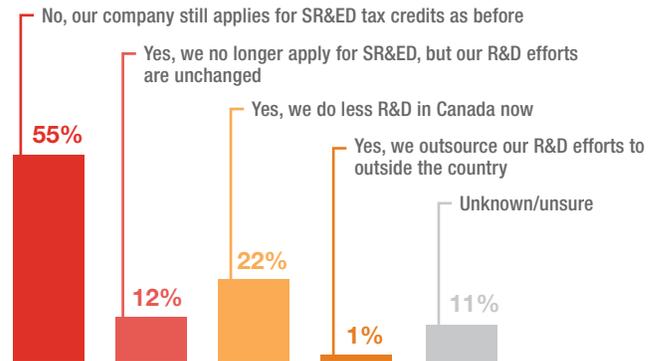
DOES YOUR COMPANY USE CANADA'S SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT (SR&ED) TAX CREDIT PROGRAM?



According to the results of the 2016 *Management Issues Survey*, about 56 per cent of manufacturers use the SR&ED program. At the same time, however, companies expressed strong concerns about the increasingly onerous restrictions that the Canada Revenue Agency has imposed on the program in recent years. Industrie 2030 participants noted that SR&ED tax credits have become harder to get, the administrative burden of compliance is rising, and the list of R&D-related activities that qualify for the credit is shrinking.

Cuts to SR&ED imposed in 2012 and 2015 have dramatically affected both program usefulness and the amount of industrial R&D that takes place in Canada. According to the 2016 MIS results, nearly 22 per cent of businesses say they now do less R&D in Canada as a result of SR&ED cuts. About 12 per cent still conduct R&D but no longer find it worth their while to even apply for SR&ED tax credits.

HAVE THE RECENT CUTS TO SR&ED AFFECTED YOUR USE OF THE PROGRAM?



Government supports are a critical enabler of business sector R&D and new product commercialization. Industrie 2030 participants were clear: the SR&ED program needs to be reformed, broadened, simplified and modernized.

Recommendation 1a: The Government of Canada should undertake a legislative review of SR&ED that aims to refocus the program to support its original purpose: economic growth through innovation and commercialization of products and processes. This refocusing effort would include:

- Updating the definitions of innovation, manufacturing and commercialization for today's realities, not the original 1960s concepts;
- Unlocking the \$10 billion in unused SR&ED credits among Canada's large corporations by making a portion of it refundable;
- Fast-tracking and simplifying the SR&ED claim and audit processes; and
- Increasing the threshold for cash refund of the SR&ED tax credit for SMEs to \$1 million.

2. Implement a Patent Box system to reward commercialization and production of goods in Canada.

Canada has a great track record of inventing new technologies, but a poorer record in commercializing those technologies. One of the obstacles that businesses face in this regard is the lack of government support programs designed to bridge the gap between the two. Nearly 30 per cent of 2016 *Management Issues Survey* respondents identified this as a major obstacle in product development.

One approach to addressing this gap is to introduce a “Patent Box” tax incentive program. This program would provide relief from corporate tax on income generated from certain types of qualifying intellectual property, notably patents.

Patent box regimes kick in at a later stage of the innovation lifecycle, in the years when income is generated from exploiting intellectual property. They generally target the commercial or manufacturing activities that follow development rather than the R&D activities themselves. Support can take the form of either a reduced tax rate, or a deduction for a portion of the patent box income. A patent box tax incentive would support companies at a critical point in their product development and financing cycle while encouraging them to commercialize new products in Canada.

Notably, Israel has developed and used a Patent Box system as a core part of its innovation agenda to great success over the past several years. It has witnessed an increase both in research and innovation, as well as in manufacturing investment and output. A version of this program has very recently been introduced in Quebec, but it is still too early to understand its impacts. Saskatchewan has also committed to putting in place a similar program. However, aside from these two examples, there has been no broad-based attempt at implementation of this program in Canada.

Recommendation 2a: The Federal and all provincial governments should introduce a Patent Box system to support new product development in manufacturing. The program would provide corporate income tax relief for manufacturers on income generated from patents and other qualifying intellectual property.

3. Create a manufacturing commercialization investment fund that would be repayable based on commercial success of the product.

One of the biggest hurdles that manufacturers face in the development of new products is the risk that the product will be commercially unsuccessful. The costs of developing and commercializing a new product can be significant and the economic return far from guaranteed. As noted above, in the 2016 *Management Issues Survey*, participants cited the cost of building and developing prototypes as the single biggest obstacle they face in new product development. The cost of manufacturing the final product was also a major concern, as was a lack of internal resources for product development. These issues all speak to risk and uncertainty. Industrie 2030 participants told us that if governments were able to mitigate some of these risks, it would make a tremendous difference in their capacity to innovate and commercialize new products.

The creation of a new federal risk-sharing investment fund would help address this concern and support private sector innovation. Simply stated, the fund would provide financial support for strategic research, development and demonstration projects that produce economic, social and environmental benefits for Canadians. Funds would be distributed to businesses through conditionally-repayable loans for the long-term commercialization of R&D projects, market development and business expansion. Such a program would fill an important gap in Canada’s support for the commercialization of research and would be in line with the federal government’s stated intent of providing more direct support for private sector R&D and innovation.

This program could be directed across a wide spectrum of technological development, including environmental technologies, life sciences, information and communications technologies, and advanced manufacturing. Conditionally-repayable loans would be available for companies that have a plan to commercialize a product or a process that requires R&D and that is in its early commercialization phase. Repayment terms would be subject to the successful commercialization of the technology. This could operate similar to existing programs that are aimed at Canada’s aerospace sector.

Recommendation 3: The federal government should create a risk-sharing investment fund that provides financial support for strategic research, development and demonstration projects. Repayment of loans from this fund would come from the sales revenues generated by successful commercialization.

4. Expand funding for industry-driven programs aimed at post-secondary partnerships in R&D and commercialization.

Manufacturers and other private-sector businesses are not the only organizations that conduct R&D that has commercial potential. However, academic researchers often do not have the business acumen needed to turn a good idea into a saleable product. In many cases, an entrepreneurial mind can imagine an application for a new technology that bears no resemblance to the original intent of the research. For example, the technology that created unmanned drones for use in military operations has found its way into the recreational market and is being tested for the delivery of goods purchased online.

A considerable amount of R&D takes place at Canada's numerous high-quality universities and technical schools. This research is an underused resource for new products and technologies. As we heard from manufacturers, however, there exists a wide gap between post-secondary research and commercial product development in Canada. Governments are placing considerable public policy emphasis on enhancing Canada's innovation performance. But ideas themselves have little value if we do not take the next step and transform them into new products. Improving industry-post-secondary R&D linkages could help achieve those results.

There are two specific recommendations in this regard:

Recommendation 4a: Existing R&D voucher systems should be expanded to support industry-driven research at post-secondary institutions. This would not necessarily be new money, rather it could be a portion of the existing \$13 billion that post-secondary institutions already receive annually from the federal government in R&D funding. This would ensure the money remains in the post-secondary system, while directly targeting those funds at commercial innovation.

Recommendation 4b: Post-secondary institutions should be required to make all intellectual property that was developed with public funds freely available for the exclusive use of Canadian businesses. If necessary, a royalty regime based on sales revenues generated from commercially-successful applications could be established to compensate post-secondary institutions or researchers.

5. Leverage government procurement to foster R&D and new product development.

Governments spend billions of dollars every year on public infrastructure, health care, military and other procurement projects. While we believe there are opportunities to leverage these procurement dollars to maximize economic benefits for the manufacturing sector (see the Industrie 2030 companion paper *Increasing Sales in Domestic and Foreign Markets*), there are also opportunities to use these investments to spark innovation well beyond its current levels.

Specifically, Canada would benefit from improvements to its industrial benefit programs and domestic industry set-asides – policies that are common in other countries but underused here at home. Canada does require companies involved in military procurement to allocate certain spending to Canadian companies through industrial regional benefit programs. However, aside from this program, there are limited relationships between government procurement, on the one hand, and economic development and product commercialization on the other. These relationships need to be strengthened.

Certain elements of the Small Business Innovation Research (SBIR) program in the United States are a useful model for Canada. That program requires US federal agencies with extramural R&D budgets in excess of \$100 million to allocate 2.8 per cent of that budget to a competitive awards-based program that funds small-business R&D with the potential for commercialization. The intent is to stimulate high-tech innovation by small businesses, while also addressing specific national R&D needs.

Another similar model from the US could serve as a basis for an equivalent Canadian program: the Defense Advanced Research Projects Agency (DARPA). DARPA's mission is to make pivotal investments in breakthrough technologies for national security. DARPA's goal is not simply incremental improvements, but transformational change. It works to achieve this goal within a broad ecosystem that includes government, industry and post-secondary institutions. While focused on military applications, the end results often have broad-based consumer applications. Notable examples include the Internet, automated voice recognition and language translation, and Global Positioning System (GPS).

A Canadian equivalent of these programs would be useful, but the federal government does not perform enough R&D on its own for such a set-aside to produce meaningful results. Federal R&D in the natural sciences and engineering is valued at about \$2.4 billion and has been flat since 2010.

As an alternative, we propose that the federal government set aside one per cent of all procurement spending into an innovation fund to finance private-sector-led research into specific areas of strategic benefit to the Canadian economy. Examples might include (but are not limited to) research into infrastructure and transportation, remote communications, energy, disease vaccination, health care, or environmental technologies.

Such a program would also help to overcome Canada's small-business hurdle. As noted above, large companies tend to produce more innovations, but Canada's manufacturing sector is skewed towards small enterprises. Creating a program that could support small-business innovation, especially through a direct expansion of the customer base, would inject significant resources into industrial R&D and represent a major step towards developing a culture of innovation in Canada.

Recommendation 5a: The federal government should set aside one per cent of funds from all procurement spending to finance an innovation fund to support private-sector-led research into specific areas of strategic benefit to Canada.

Conclusion – Tracking Progress

Fostering innovation, commercialization and new product development in Canada is critical to meeting customer demands. Innovative companies leverage R&D and new ideas to improve existing products and create more new ones. Companies that report new innovations also commercialize new goods and attract production mandates. That, in turn, leads to new market opportunities and growth. Finally, a robust culture of innovation and commercialization has benefits that extend deeper into the manufacturing sector. A new product created by one manufacturer can be used as a tool or an input for another. A culture of manufacturing innovation thus paves the way for broad-based gains in productivity and competitiveness across the manufacturing sector. This paper provides a blueprint for action on how to create such a culture in Canada.

However, success is not measured by whether or not the recommendations contained in this report are implemented; it is measured by the results that they achieve. For this reason, the Industrie 2030 strategic plan has outlined seven KPIs that we will track over the next 15 years to monitor our progress. Two of these seven relate directly to innovation and new product development:

- **The share of manufacturing businesses in Canada reporting product innovations will rise by four per cent every two years to reach 60 per cent by 2028-2030.** Our goal is to foster a deeper culture of innovation and commercialization in Canadian manufacturing. As such, the clearest KPI to measure progress is the share of domestic manufacturing businesses that report new product innovations. An increase in this share indicates that commercialization and new product development are on the rise.
- **Canada will be among the top two G7 countries for manufacturing productivity growth in every five-year period ending in 2020, 2025 and 2030.** New product commercialization can lead to productivity growth in two ways. First, new products themselves have enhanced value that can attract a price premium. Second, to the extent they can be used by other manufacturers, those new products can achieve cost savings and/or efficiency gains across the sector.

Increasing new product development is critical for the long-term success of manufacturing in Canada. However, the cultural change required to transform Canada into a nation of manufacturing innovators cannot happen overnight. The path forward will not be a straight line. New challenges will arise and new responses will be required. A focus on results ensures that we maintain an unwavering focus on fostering innovation in Canadian manufacturing and, by so doing, pave the way to double manufacturing output and exports by 2030.

Who We Are

Since 1871, Canadian Manufacturers & Exporters has been fighting for the future of Canada's manufacturing and exporting communities and helping them grow.

The association directly represents more than 2,500 leading companies nationwide. More than 85 per cent of CME's members are small and medium-sized enterprises. As Canada's leading business network, CME, through various initiatives including the establishment of the Canadian Manufacturing Coalition, touches more than 100,000 companies from coast to coast, engaged in manufacturing, global business and service-related industries.

CME's membership network accounts for an estimated 82 per cent of total manufacturing production and 90 per cent of Canada's exports.

www.cme-mec.ca | www.industrie2030.ca

Strategic Partners

CME's strategic partners have helped us throughout this process by defining the agenda and supporting the research and consultation exercise. Like CME, they believe that a strong Canada can and must have a strong manufacturing sector at its heart. From business associations to manufacturers to key service providers, these groups have been instrumental in creating this action plan and in supporting the growth of manufacturing in Canada.

A special thanks to:



Royal Bank



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