SCC's Innovation Initiative

Propelling Canada to lead the Innovation Race

Standards Council of Canada

Open a world of possibilities.

Canada

Aussi offert en français sous le titre *L'initiative d'innovation du CCN : Propulser le canada en tête de la course à l'innovation*.

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Table of contents

Message from the CEO

Innovation holds the key to ensuring Canada's prosperity; it drives productivity, creates jobs, and makes companies more competitive. In recent years, the Canadian government has created tailored initiatives, such as the Innovation and Skills Plan, to fuel innovation.

But Canada isn't the only country to recognize the importance of investing in innovation. We are competing against other nations that focus on standardization to support innovation and the growth of their societies. Five years ago, the Standards Council of Canada (SCC) launched the Innovation Initiative to provide innovators with the support and tools they need to get ahead in today's increasingly competitive global economy. We knew time was of the essence. Canada was falling behind in the innovation race. We were losing ground to other innovation leaders such as Switzerland, Finland, Sweden, Japan, and the United States. Canada ranked 8th in the world on the Global Innovation Index in 2011 but had dropped to 18th by 2018. Although our nation is starting to turn things around – moving to 16th spot in 2021 – there is more work to be done.

Who wins and loses that race is impacted by support from governments to help start-ups and small and medium-sized enterprises get their products developed and to market. Countries with a seat at the international standardization table can protect their intellectual property and are better positioned to compete internationally.

I invite you to read this account of SCC's Innovation Initiative which clearly demonstrates the value of standardization in helping Canadian companies succeed. The results and testimonials speak for themselves – SCC is proud to have played a small, yet significant role in boosting Canada's economic performance and the resilience of our businesses.

Chantal Guay, ing. P.Eng. FCAE, ICD.D
CEO, Standards Council of Canada

The Standardization Pathway

Preparation

IDENTIFY
ANALYZE
PLAN

Identify high-potential innovations

Analyze the opportunities and challenges

Develop strategy and implementation plan

OUTCOME

A planned path forward.

Proposal

PROPOSE
PROMOTE
APPROVE

Create a standardization proposal

Reach out, collaborate, and promote to generate stakeholder engagement and support

Achieve consensus for the proposal's approval

OUTCOME

Ready to begin the standard or conformity assessment solution.

Development

LEAD
ADVANCE
PUBLISH

Secure Canadian leadership on committees and working groups

Draft standard, embed Canadian needs and approaches, and develop the solution

Approve the solution and advance to publication

OUTCOME

A standardization solution for your innovation.

Adoption

AWARENESS
ASSESSMENT
INCORPORATION

Raise awareness and encourage adoption in key markets and supply chains

Develop conformity assessment programmes for the new solution

Promote incorporation of standards and certifications in regulations, guidelines, and procurement policies

OUTCOME

Standardization success!

SCC's Innovation Initiative

The connection between standardization, international commerce and economic prosperity has long been understood. By establishing common rules and languages, standardization helps innovators enter and compete in markets around the world. Standardization also provides confidence in the products we use, the air we breathe and the health, safety and well-being of Canadians.

68%

of companies reported job creation, increased exports or revenue as a result of working with SCC

Over the past five years, SCC's Innovation Initiative has demonstrated a clear link between innovation and standardization. In particular, we have shown how standards can assist innovative small and medium-sized enterprises (SMEs) to break into new markets. Since eight out of 10 new Canadian exporters are SMEs, supporting these businesses is critical to Canada's future growth.[1]

We launched the program in 2017 to bring the full benefits of the standardization system directly to Canada's entrepreneurs. These benefits can be immense, from enabling commercialization and scale up to reducing costs, increasing revenue, and improving productivity. Standardization also helps entrepreneurs influence marketplace rules and protect and leverage their intellectual property. We understood that most organizations were not aware of the role that standardization plays in Canada's innovation ecosystem and the difference it can make. We collaborated with more than 250 Canadian innovators to help them successfully navigate the standardization system here and at the international level. We also directly supported more than 130 Canadian companies by providing invaluable customized standardization advice.

The impact is clear. In a recent survey of companies involved in the Innovation Initiative, 62 percent of responding companies said they were actively using the standardization strategy or solution we helped develop. Ninety percent said they were satisfied with the support we provided and would recommend SCC's services to other innovators. In addition, companies that were involved with SCC for at least two years – and whose standardization solutions are complete – were more likely to report a positive economic impact. In fact, despite the challenging economic conditions during the COVID-19 pandemic, 68 percent of the companies reported that working with SCC created jobs and increased exports or revenues.

1 https://www.international.gc.ca/gac-amc/assets/pdfs/publications/State-of-Trade-2019_eng.pdf

Delivering tailored standardization solutions

Standardization experts in key sectors – experts who understand the market and the technology – worked directly with Canadian innovators to identify obstacles to their growth and developed strategies to overcome them. SCC then supported the delivery of tailor-made standardization solutions to support these innovators, such as:

- Developing a new national or international standard.
- Amending, revising, or adding a new part to an existing standard.
- Developing a technical specification or other normative document.
- Ensuring compliance with existing standards and conformity assessment programs and/or schemes.
- Developing or expanding a new conformity assessment program and/or scheme.
- Creating a consortium, committee or working group to advance standardization activity.

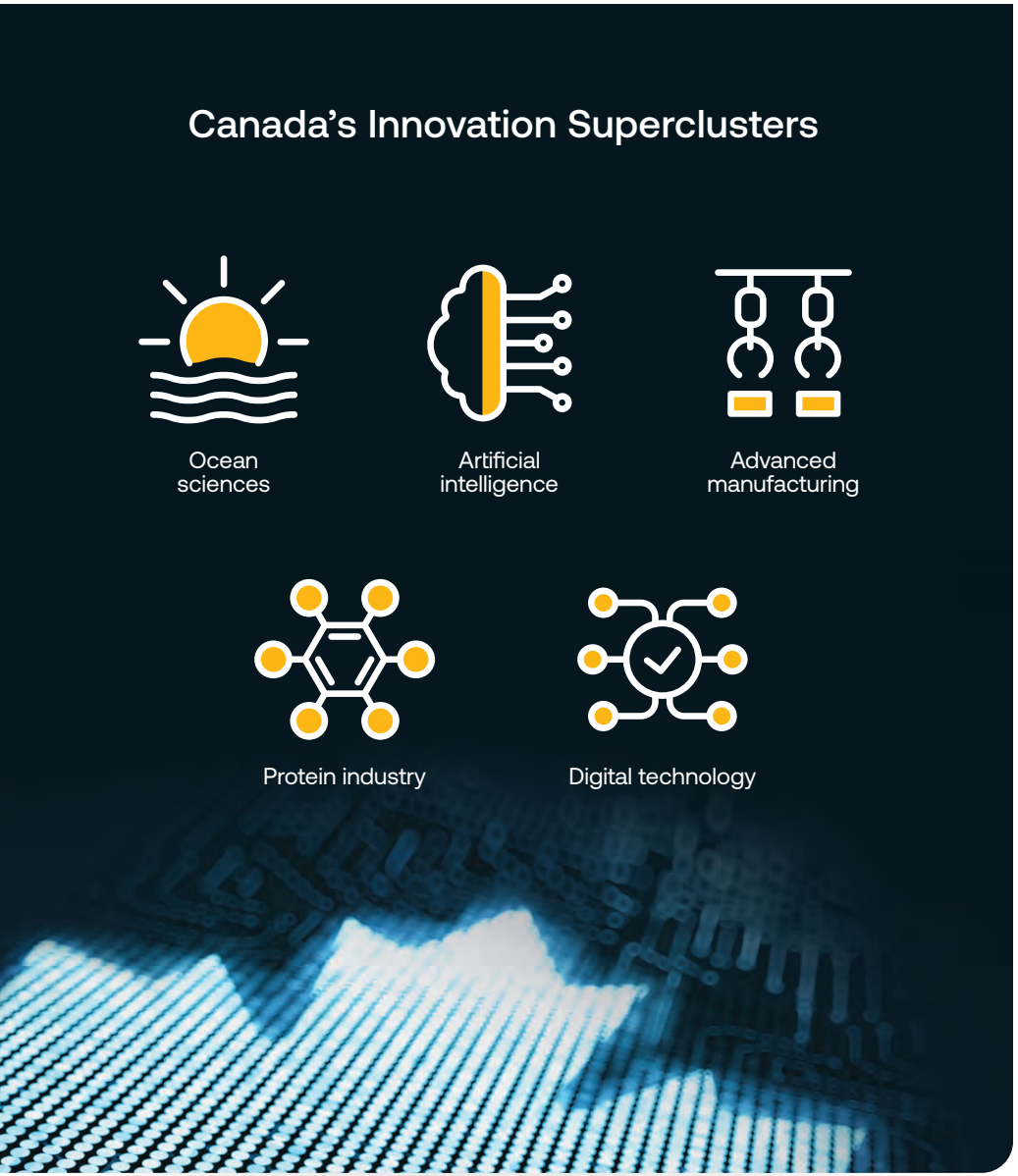
We guided Canadian innovators through every step of the standardization process – from helping them identify how standardization could address their specific challenges, to facilitating the development of a standard to help them succeed and grow. Our involvement helped address some of the most critical business challenges facing Canadian businesses. These include things such as ensuring compatibility, removing trade barriers, and enhancing consumer confidence. Our support also enabled Canadian innovators to break into new markets so they can compete nationally and globally – and even become world leaders in their field.

Leveraging the innovation ecosystem

Often, what Canadian innovators needed most was to be connected to other partners in the standardization network – such as regulators, standards development organizations, and certification bodies. We worked within the innovation ecosystem to facilitate those connections and at all levels to reach out to the companies that could most benefit from SCC's services. In fact, in the last program survey, 87 percent of the companies involved in the initiative reported that working with SCC led to strategic partnerships that have helped them grow.

To educate innovators about the need to embed standardization early in their development process, we liaised with universities like McMaster, Waterloo and Memorial as well as organizations such as the Council of Canadian Academies to connect with researchers and designers. We visited organizations like Sustainable Development Technology Canada, MaRS Discovery District, Ontario Centres of Excellence, Research Innovation Commercialization Centre, Innovation Guelph, Spark Centre, Council of Canadian Innovators, and many others, to get their assistance in ensuring we could better reach key industries and make them aware of what our program offered. We also collaborated with provincial, territorial, and municipal organizations and governments to get our message out that standardization can support innovation.

To align our services, we collaborated with countless innovation support providers and funders such as the National Research Council Industrial Research Assistance Program, the Accelerated Growth Service, the Business Development Bank of Canada, Canadian Intellectual Property Office, Export Development Canada, regional development agencies like Atlantic Canada Opportunities Agency, and the Clean Growth Hub.



Supporting Canada's "Innovation Superclusters"

One of the ways SCC has worked to embed standardization into our nation's innovation ecosystem is by supporting Canada's Innovation Superclusters. In 2017, the Government of Canada announced a plan to establish five superclusters where collaboration on large-scale innovation projects had the greatest potential to fuel our nation's economic growth. The five sectors identified were:

- Ocean sciences.
- Artificial intelligence.
- Advanced manufacturing.
- Protein industry.
- Digital technology.

Through the Initiative, we worked directly with innovators within these superclusters to ensure that they understand what standardization can do for them. We also provided them with standardization strategies to accelerate commercialization of their innovations and remove barriers that prevent new technologies from being adopted. Not only has this advanced research and innovation within these superclusters, but it has strengthened the innovation ecosystems of these sectors and helped to ensure Canada will be a global leader in the years ahead.

The Standards Council of Canada (SCC) has partnered with Canada's Digital Technology Supercluster and its industry members to develop a National Data Governance Standardization roadmap to help implement Canada's Digital Charter. In addition, we are working with SCC to help define the Supercluster Standardization Strategy that will enable our technologies to advance with fewer market barriers and bring value to our members. We recognize the importance of industrial standardization to our emerging and globally competitive industries and appreciate the support that SCC brings to the Supercluster."

Evgueni Loukipoudis,
Chief Technology Officer
Canada's Digital Technology Supercluster

"The Standards Council of Canada has established a strong relationship with the Ocean Supercluster as an active support organization. SCC has not only offered service and provided knowledge of standardization to our members but has worked collaboratively with us to develop a standardization strategy as well as project selection criteria aimed at removing barriers to commercialization. SCC continues to look for opportunities to advance Canadian ocean technology and the broader ocean innovation ecosystem through standardization."

Kendra MacDonald, CEO
Ocean Supercluster

"The Standards Council of Canada has offered ongoing support to Protein Industries Canada. They have outlined strategic areas of standardization to benefit the agriculture industry and is working with members to implement solutions to address broad-based sectoral issues like traceability. SCC continues to offer engagement opportunities for PIC and our members to benefit from standardization."

Bill Greuel, CEO
Protein Industries Canada Supercluster

Encouraging Canadian leadership in standardization

Thousands of new standards are published every year to support new innovative products, services, or ideas. Being first to develop international standards for these innovations is an opportunity to not only protect Canadians and promote our economic interests, it can also be key to a company's success. That is why we have encouraged Canadian innovators to take a leading role in standards development – and provided them with the support to do this.

Through our Innovation Initiative, we brought together key players in many emerging sectors to work together to develop the relevant standards. This has enabled Canadian innovators to influence the standards that will help protect their interests and better leverage their intellectual property so that they can be competitive in the global marketplace. In fact, through the program we have already facilitated the participation of 404 Canadian experts on national and international technical committees, including International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), including 28 chairs, conveners and project leads in key growth areas such as artificial intelligence, data governance and clean technology.

The results: Fostering innovation to help Canadian companies, sectors and citizens

SCC's Innovation Initiative started out as a way to work one-on-one with innovators to better meet their needs, address the barriers facing them, and determine how standards could propel them down the path to success. Over time, we shifted our focus to explore how we could help entire high-growth sectors to have an even larger impact.

The following sections provide a snapshot of our results. They not only highlight the program's direction and accomplishments, but also what Canadian innovators could achieve in the future, with the right support and investment. (For more detailed case studies, see www.scc.ca/innovation.)

Enabling and securing the use of data

In our modern world, data touches almost every sector and industry – everything from manufacturing to the delivery of products and services. Through our Innovation Initiative, we have worked to ensure the safe collection and use of data, as well as its reliability and accuracy. By focusing on everything from data security and privacy to data indicators, SCC's support has clearly demonstrated the key role standardization should play in determining how we structure, secure, and govern data, now and in the future.

ENSURING THE COLLECTION OF QUALITY DATA

When we first launched the initiative in 2017, we were approached by innovators who wanted standards that ensured the quality of data. British Columbia-based innovator AML Oceanographic knew their marine sensors could outperform the competition, but no international standard existed to provide a consistent approach for performance tests or a universal method for reporting on them. We helped the company navigate the international standardization system to develop an ISO standard that will allow customers to accurately compare technologies when purchasing marine sensors.

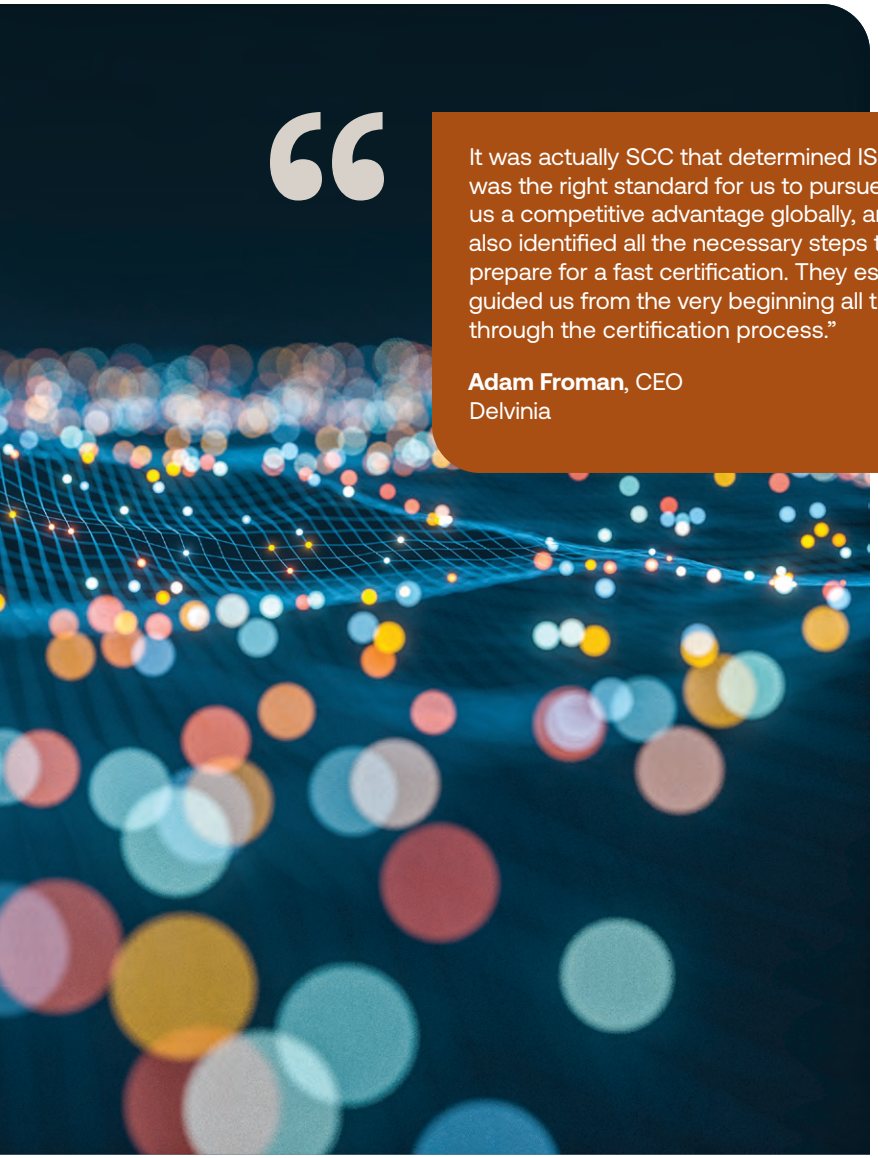
We also partnered with researchers at the National Research Council's (NRC's) Nanotechnology Research Centre to address a gap that existed for ensuring the images and measurements produced by electron tomography in a transmission electron microscope (TEM) are reproducible and accurate. With SCC's support and guidance, they led the development of a technical specification that provides a consistent method for measuring the shape and size of nano-objects at nearly atomic resolution in 3-D.

Waterloo-based MappedIn had developed an innovative indoor geographical information system (GIS) that is able to maintain accurate maps of indoor spaces, but the company faced a lack of consistency and compatibility when marketing tools such as theirs. SCC provided the company with the support it needed to lead an international industry consortium of major mall facility owners and digital device providers that developed an international standard for the indoor mapping industry to address this issue.

PROTECTING AND SAFEGUARDING DATA

Data is created by everything from our cell photos to our smart appliances. It is constantly being collected and analyzed, and applied, but it is also at risk of being misused. ISARA Corporation is a Canadian security solutions company that makes use of algorithms that are resistant to hacker attacks, from both traditional computers and quantum computers. But to detect data tampering, there needed to be appropriate quantum-safe cryptographic schemes to guarantee the integrity and authenticity of transmitted information. In 2017, we began working with ISARA to develop new global standards for quantum-safe cryptography solutions that can be embedded into commercial products to secure and protect data.

We also provided strategic support to Delvinia, a Canadian data collection company, to enable it to make use of standards as a way to demonstrate their commitment to data privacy and protection and country-or state-specific compliance requirements. SCC's strategic advice enabled Delvinia to obtain ISO 27001 certification (an international standard used to manage the security of information) so that the company was able to compete globally by demonstrating that it follows best practices in data security.



> It was actually SCC that determined ISO 27001 was the right standard for us to pursue to give us a competitive advantage globally, and they also identified all the necessary steps to take to prepare for a fast certification. They essentially guided us from the very beginning all the way through the certification process."
>
> **Adam Froman**, CEO
> Delvinia

SUPPORTING DATA GOVERNANCE

The role of data governance is to ensure that data is used properly, both to avoid introducing data errors into systems and to prevent the misuse of personal data. Data governance is also important for Canadian companies that need to comply with regulatory compliance initiatives, such as the European Union's General Data Protection Regulation (see section below).

In 2019, SCC established the Canadian Data Governance Standardization Collaborative to accelerate the development of industry-wide data governance standardization strategies. Made up of 220 Canadians from across government, industry, civil society, Indigenous organizations, academia, and standards development organizations, the collaborative published the Canadian Data Governance Standardization Roadmap to tackle the challenging standardization and data governance questions facing our country. The solutions identified in the roadmap will help build a safer and more secure digital infrastructure founded on quality, trust and ethics.

Not only will this work help to protect data in the future, but it will also provide social and economic value by securing Canada's place as a leader in data innovation. It will also enhance Canadians' security by supporting increased interoperability, reduced uncertainty, and updated ethical use and protection of data. Standards can help play a role in in building that trust so that Canadians can participate in the digital economy knowing that their information is being protected.

In 2018, the European Union (EU) implemented the General Data Protection Regulation (GDPR) as a way to safeguard data across Europe. This regulation has implications for any company offering goods or services to people living within the EU. As part of the Innovation Initiative, SCC established the Canadian Advisory Committee on GDPR to help Canadian organizations better understand the GDPR.

USING DATA TO ENHANCE CANADIANS' QUALITY OF LIFE

Data can provide insights to improve services and boost the quality of life for citizens. But to do this, data must be reliable and standardized. In the past, there were no established definitions and methodologies for a set of indicators to steer and measure the performance of city services. Through the program, SCC began working with the World Council on City Data to provide the guidance it needed to develop standards to ensure globally comparable and independently verified city data.

Issues such as climate change, extreme weather events, demographic changes and population migration are also creating challenges, as well as opportunities, for many rural communities. However, there has been no way to measure the impact these were having on rural communities. To accomplish this, we partnered with CSA Group for the development of a standard to define and establish methodologies for a set of indicators to identify and measure the wellbeing, prosperity, and sustainability of rural communities.

Genomic sequencing data can be used by researchers and clinicians to provide important insight into human health and disease. In the past, there was no common method of providing a uniform, machine-readable, phenotypic description to enable data exchange between clinical systems. In 2020, SCC began working with the Global Alliance for Genomics and Health (GA4GH) to advance a standard for Phenopackets, a common file format that the group had created to share this type of information. We helped GA4GH navigate the standardization network to get the Phenopackets standard recognized by ISO so that genomic data is more accessible around the world.

> We are proud to have represented Canada in leading the development of standards and certification for sustainable cities. With SCC's support, we have been able to help cities worldwide to save money, offer better services, and make their cities more resilient."
>
> **Dr. Patricia McCarney**,
> President & CEO, WCCD

> "I'm delighted to work with ISO and with SCC. It's really worth it for a start-up like us because you can have an international impact – a way bigger impact than you could imagine – by working with them. This ISO standard is benefiting to Moov AI and Snitch AI any other start-up."
>
> **Olivier Blais**,
> Moov AI

> "By having more Canadian representation in these international communities, it can help with making sure Canadian needs are represented in these standards development communities. It could help put Canada at the forefront of some of these initiatives as well. I think those are the main two things, making sure we're represented and making sure that we are part of that innovation community."
>
> **Lindsay Smith**,
> Global Alliance for Genomics and Health

Propelling Canada forward in AI

Artificial Intelligence (AI), like data, is playing an increasingly important role in many products and services. Because there are no regulatory frameworks guiding the use of AI technologies, Canada has the opportunity to cement its position in this growing field by spearheading the development of AI standards.

To this end, SCC has created a multi-stakeholder collaborative to advance the development and adoption of AI standards. This will help commercialize Canadian AI technologies and support the development of flexible, anticipatory regulatory systems. To ensure Canada has a cohesive strategy around the development of AI standards, SCC collaborated with the CIO Strategy Council to develop a cloud computing compendium, artificial intelligence standardization strategy, and has engaged with Superclusters to facilitate their involvement.

SCC worked with other National Standards Bodies to propose an Artificial Intelligent Management System Standard (AIMS) for the International Organization for Standardization (ISO). This standard will help to increase interoperability, harmonize requirements, and build trust in AI systems. It will also help to ensure the product quality and safety of AI applications across companies and industries.

HELPING AI INNOVATORS SUCCEED

Although Canada is a leader in AI research, we have fallen behind other countries in the application and use of the technology. One issue is that companies lack confidence in AI systems. Quebec start-up Moov AI has tried to address this by developing a tool (Snitch AI) which allows organizations to validate the usefulness of their AI systems. SCC supported the company to successfully develop an ISO technical specification that provides concrete guidelines that align with the tool to compete in the global marketplace.

The Vector Institute is a not-for-profit corporation that is dedicated to AI and machine and deep learning research. But their work was hampered because there was no standardized approach for validating and comparing this sort of research. SCC partnered with the institute's experts to provide them with the guidance needed to lead the development of an ISO standard that standardizes aspects of machine learning and provides a common approach for how academics or companies describe the machine's capability.

SCC has been the guiding hand in helping HARvEST Systems navigate the standards development process. They have provided invaluable support through evaluating potential standard development paths, presentation coaching, and effective project planning, which has all been supported by the patient staff that truly understand the lengthy standards development process."

Jeffrey Girard,
HARvEST Systems Inc.

"Standards are paramount for the entry of new and innovative products like MAGS into the market. SCC has helped pave the way with this standard for our clean, efficient energy appliance."

Peter Tsantrizos,
CEO and Founder, Terragon

Commercializing Canada-made clean technologies

Clean technology – or clean tech – is a rapidly growing sector focused on improving environmental sustainability. As the world searches for ways to cut greenhouse gas emissions, the demand for clean innovation is rapidly growing. Therefore, supporting Canada's clean tech sector is not only important for meeting our climate and environmental goals, but also for boosting our economy.

HELPING INNOVATORS TURN WASTE INTO POWER

Throughout the program, SCC has helped Canadian clean tech companies overcome hurdles preventing their innovative products from being accepted in various markets. For example, Montreal-based Terragon Environmental Technologies' Micro Auto Gasification System generates thermal energy from wastes such as wood or plastics. But because the system was new and unique, the company could not demonstrate its safety to regulators. We worked with Terragon to show them how developing a document to be used for certification could enable them to do this and help them to break into new markets.

HARvEST Systems Inc.'s POWER system captures heat and converts it to electricity that can be used to power lights, heat hot water and other uses. However, waste heat recovery is not uniformly defined across Canada, preventing the company from marketing their innovative system. With our support, HARvEST was able to develop a standard to market their waste heat recovery system more effectively to restaurants across North America.

> SCC serves as a tremendous resource from three perspectives: technical knowledge, advocacy, and mentorship or financial support. We find that our relationship with SCC has evolved and continually delivers value. The support we have received thus far, and the friends we have made along the way, have left an invaluable mark on iGEN and our commercialization of the i2."
>
> **Michael Chatzigrigoriou**, CEO
> iGEN Technologies

FUELING INNOVATION IN THE ENERGY SECTOR

Hydrogen is increasingly being used as a fuel, particularly in the mining sector, as it produces electricity without generating greenhouse gas emissions. To support its uptake as an alternative fuel, SCC partnered with the Bureau de normalisation du Québec (BNQ) to facilitate the development of a Canadian code that updates the safety guidelines for hydrogen technology. BNQ also worked to harmonize the Code with the relevant American standards, as much as possible, paving the way for a seamless Canada-US market for this technology.

The application of hydrogen fuel in ships is a relatively new field that has lacked Canadian-specific standards. SCC has helped the Canadian Network for Innovative Shipbuilding, Marine Research and Training (CISMaRT) to engage in DNV GL's Maritime Hydrogen Safety joint development project to publish safety guidelines hydrogen fueled ships. This will enable CISMaRT to advance innovative technologies for marine vessels using hydrogen in Canadian waters, where international marine companies operate.

SUPPORTING INNOVATION IN THE COMBINED HEAT AND POWER SECTOR

Combined heat and power is a promising technology of particular interest to large industrial organizations needing significant thermal energy. To address a lack of standards for these types of systems, SCC partnered with CSA Group to support the development of a bi-national (Canada-US) cogeneration technology standard. The standard establishes a consistent method that specifies the safety requirements and test methods for combined heat and power appliances and systems.

Ontario-based iGEN Technologies Inc. developed the first self-powered heating system in North America. But to compete against traditional heating systems the company needed to be able to demonstrate the reliability of their system. In 2019, SCC began working with iGEN to build on an already existing European standard that has enabled them to demonstrate to users that their system, and others like it, are safe and reliable.

Creating a more sustainable future through standardization

Extreme weather events like droughts, wildfires, floods, and windstorms are a common occurrence in Canada and around the world and are becoming more frequent and intense. If we want to mitigate the effects of climate change, we need to find innovative ways to adapt and live more sustainably. SCC's new Initiative has helped support and promote standardization solutions for Canadian-made innovations that can propel us on a more sustainable path going forward.

ADDRESSING STANDARDIZATION GAPS IN THE BIOMASS SECTOR

The extraction and use of bio-mass products is a rapidly growing sector, but it is still relatively new. This has made it difficult for bio-projects to obtain financing because there has been no standardized way to evaluate risk. SCC worked with Ontario-based Ecostrat to support the development of a National Standard of Canada on Biomass Supply Chain Risk and create a validated method to price feedstock risk and accelerate bio-project financing.

There has also been a standardization gap when it comes to technologies that extract bio-mass. extractX Inc. is a Canadian biotech company that has developed an innovative automated mobile biomass extraction lab that provides manufacturing capabilities normally only found in large bricks and mortar facilities. SCC helped extractX integrate standardization into the front end of their product development process so that the company was able to roll out units that meet or exceed the highest standards within the pharmaceutical industry.

> Working with SCC presents an opportunity to certify your innovation with a seal of approval that is globally recognized. It challenges you to improve upon your existing product through expert feedback, and fosters your best work by providing a network of support and resources. Utilizing SCC is something any innovator should seriously consider."
>
> **Jordan Solomon**, President & CEO
> Ecostrat Inc.

> "Without SCC, we probably wouldn't have started as early as we did. Instead of trying to figure it out on our own, we were able to go out and find third-party experts to get us to the next level. So SCC's support really allowed us to do a lot of the initial work early and that, in turn, gave us a big competitive advantage in the marketplace because we were already there."
>
> **Albert Iannantuono**,
> extractX Inc.

SUPPORTING INNOVATIVE TECHNOLOGIES THAT CAPTURE CARBON

Nova Scotia-based CarbonCure's innovative technology injects carbon dioxide into concrete as it is mixed, creating stronger concrete while at the same time reducing greenhouse gas emissions. The company was unable to expand into the European market because their technology wasn't an accepted method of producing concrete. With SCC's support, they were able to get the current standard for concrete updated to cover their innovative technology.

Calgary-based Questor Technology Inc. is a clean tech company that provides high efficiency waste gas combustion systems primarily to the oil and gas sector. The company's solar-powered waste gas incinerators produce CO_2 and water that can then be used to generate power or treat water. But there was no standard for incinerators such as theirs. SCC worked with Questor to achieve Environmental Technology Verification so they could compete with companies offering other combustion technology alternatives.

ENABLING CUTTING-EDGE TECHNOLOGIES TO SUCCEED

Ontario-based WindTrans Inc. had developed an innovative energy efficient and portable high-volume, low-speed (HVLS) pump that could transfer fluids quickly with, or without an engine or motor. The pump is ideal for situations when there is no power, such as during power outages after a natural disaster. But when the company went to market, they couldn't certify their revolutionary pump since no relevant standard existed. SCC provided WindTrans with the guidance and support they needed to amend an existing standard, enabling them to access new markets and stay competitive.

Nature Fibres was the first company in North America to manufacture bio-based hemp-based insulation material for use in the construction industry. However, the lack of a North American standard for bio-based construction materials was holding back its commercialization. SCC helped the company create a technical guide that would enable the company to obtain certification from the Canadian Construction Materials Centre, allowing them to commercialize their innovative product.

> SCC gave us a better understanding of updating existing standards to address technology barriers. Their help has opened doors and allowed us to finally enter the market!"
>
> **Andrew Masse**,
> General Manager, WindTrans Inc.

Capitalizing on opportunities in emerging industries

Being the first to develop international standards for emerging sectors is not only an opportunity to protect Canadians and promote our economic interests; it can also be key to a company's success. Over the past five years, SCC has focused on several innovative sectors where growth is happening but where standardization is lacking. We have worked together with Canadian innovators in these areas to show them how standardization can help achieve their goals and the importance of considering standardization during the development process, rather than as an afterthought.

PROVIDING CANADA WITH A LEG UP IN THE LIGNIN SECTOR

Lignin is a highly versatile and renewable bioproduct, created from wood waste products, that can be used to replace fossil-based raw materials. However, commercializing lignin-based products has been hampered by a lack of reliable and market-accepted methods for characterizing their chemical composition, structure, and properties.

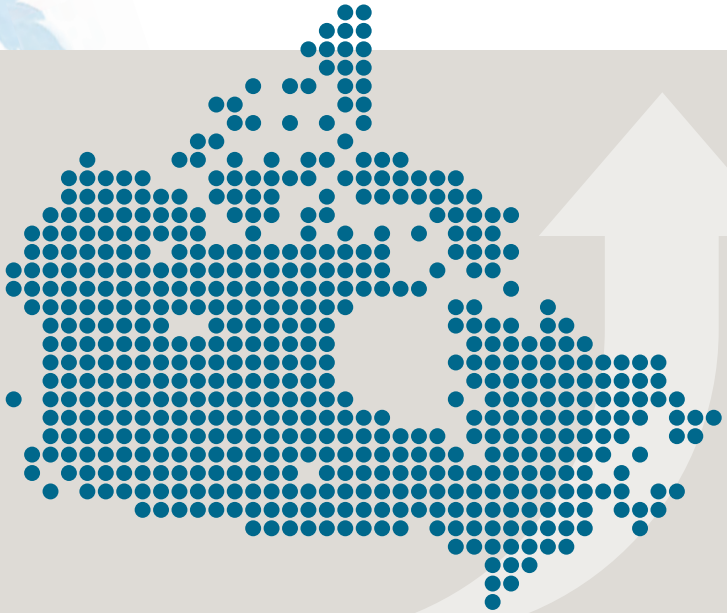
As part of Innovation Initiative, SCC guided Quebec-based FPInnovations through the standards development process to develop standardized methods for measuring lignin content and carbohydrate composition in lignin products. The resulting standards will help promote commercialization of Canadian lignin and lignin production processes.

SCC also worked with CSA Group to develop a roadmap for the development of national and international lignin standards. The CSA facilitated the coordination of a task force that serves as a standards advisory group to help Canada to position itself as the leader in this emerging industry. With SCC support, CSA Group developed a new National Standard of Canada for functional groups in lignin using the nuclear magnetic resonance method.

SCC facilitated the participation of

404 Canadian experts

on international technical committees



8 out of 10 new Canadian exporters are SMEs. Supporting these businesses is critical to Canada's future growth.

TAKING A LEADING ROLE IN THE CANNABIS INDUSTRY

As the first OECD country to legalize recreational cannabis, Canada has been able to get ahead of the game by leading the development of international cannabis standards. This has enabled us to not only protect consumers at home and around the world, but to promote Canada's economic interests.

SCC worked directly with the NRC to coordinate Canadian input through the National Cannabis Standardization Advisory Committee. As well, Health Canada identified how standards can support Canada's regulatory framework for cannabis. Canadian stakeholders requested SCC's support to convene and coordinate a Canadian advisory committee to ASTM D37 to ensure that participation is balanced among interest groups, and that Canadian perspectives and requirements are represented.

Additionally, we helped innovative companies like Edmonton-based Aurora Cannabis Inc. to address gaps in the industry regarding product safety. When SCC began working with Aurora, there was a lack of industry best practices. But we helped the company to develop a framework that resulted in 13 standards that will ensure that cannabis and cannabis products are safe for use.

SUPPORTING BREAKTHROUGH TECHNOLOGIES

Early in the program, SCC began working with Saskatchewan-based TESCO Automation to address gaps they had identified in the operation of power stations. TESCO recognized that standardizing the software and images used to run Human Machine Interface software applications (HMIs) which control power stations would save significant time and money and reduce risk. SCC was instrumental in facilitating TESCO's participation in the International Electrotechnical Commission (IEC) committee responsible for developing an international standard to fill this industry gap.

Virtually Reality (VR) technology is increasingly used across sectors for various applications. Edmonton-based Serious Labs approached SCC because there was no international oversight over cyber motion, the sickness associated with MTP latency (the lag that occurs between the user's head and VR headset). SCC facilitated their participation at the Institute of Electrical and Electronics Engineers (IEEE) to contribute to the development of a standard to create a benchmark for MTP latency. This will allow innovative companies, like Serious Labs, to develop and deploy VR headsets that are safe for users.

When the world moved from fourth generation (4G) to fifth generation (5G) wireless technology, Canadian telecommunication companies got left behind. To ensure they don't miss out on future opportunities in this area, SCC partnered with Innovation, Science and Economic Development Canada and the NRC's Industrial Research Assistance Program to develop a roadmap to enable Canadian companies to remain competitive as we move beyond 5G. We also held a workshop for Canadian companies to explore how SMEs can overcome any challenges they face entering and competing in the global wireless technologies market – and how standards can assist with this.

"Digital twins" are digital, computer-based replicas of a product or machine, and its related processes, systems, and information. They enable cyber-physical interfaces, notably useful for virtual industrial production environments. Digital twins have a cross-sectoral impact and their wide-reaching use is still developing. SCC held a workshop to identify potential market opportunities and challenges where using standardization could help advance development and use of this emerging technology.

Flexible standards-based solutions

NSC

National Standard of Canada

A standard developed by an SCC-accredited standards development organization resulting in a full consensus document.

TS

Technical Specification

A fast-track standards document under the direction of a qualified subject matter developer with appropriate experience in standards development.

ORD

Other Recognized Document

A temporary standards document developed by an SCC-accredited certification body, used to certify products in regulated areas.

PAS

Publicly Available Specification

A sponsored standards document developed under the oversight of a steering group of experts to satisfy an urgent market or policy need.

WA

Workshop Agreement

A standards document of best practices produced through workshops with affected stakeholders, using a structured process.

CSG

Community-Sourced Guidance

Guidance developed using existing information collected and housed within a single online platform, allowing for continuous renewal of content and ease of access.

Ensuring the health, safety and well-being of Canadians

Standardization plays a key role in safeguarding and promoting Canadians' health and well-being. SCC has supported innovative standardization solutions that will help to better protect Canadians – from standards that ensure the safety of the food to those that ensure the reliability of live-saving medical devices or can help respond to natural disasters.

Standards and conformity assessments also play a key role in guiding industry so that they can respond rapidly to health crises such as the COVID-19 pandemic. Through our Innovation Initiative, we pivoted to quickly deliver standardization solutions that support both Canadian companies and citizens, today, and in the years ahead.

RESPONDING TO THE CHALLENGES OF THE COVID-19 PANDEMIC

The beginning of the COVID-19 pandemic brought a severe shortage of personal protective equipment (PPE) and there was no Canadian standard in place at that time to ensure its certification in this country. To provide a reliable and quality supply of PPE for Canada in the future, SCC worked with CSA Group and Health Canada to facilitate the development of a National Standard of Canada for Medical Grade Personal Protective Equipment (PPE), including the establishment of a certification program so that Canadian manufacturers had access to the necessary product testing in Canada.

Many Canadians quickly shifted to working at home when the pandemic hit. Finding ways to enable people to safely move back to the workplace has been not only critical to Canadians' health and well-being, but also to our economy. To support employers as they reopened workplaces, the SCC collaborated with CSA Group to hold a webinar and workshop to identify what guidance was needed so that workplaces can safely operate during a pandemic in the future. These discussions also helped to identify the standardization needs and solutions required to respond to the current pandemic and resulted in a published report that will help prepare for others.

SCC's role has been really almost like project management, which maybe is what it's designed to be. In addition, they basically educated me on the process, and coordinated with ISO to get the information we needed to move this thing forward. They also connected me with another expert in the field ... So that's another thing that they can do, because they work with multiple working groups, they know other experts that have the experience that can help."

Alex Sheftel,
Genomadix (Formerly Spartan Bioscience)

"Navigating the world of standards is not easy for most businesses. With SCC's help, we have learned how to bring amazing value to both our industry and our company through participating in standards development."

Amol Karnick, President & CEO
KA Imaging

CREATING AN AGRI-FOOD INDEX TO INCREASE COMPETITIVENESS

Although Canada is one of the safest, most sustainable, and reliable food producers in the world, there has been no concrete way to demonstrate this to the rest of the world. SCC partnered with Protein Industries Canada, Pulse Canada, the Global Institute for Food Security at the University of Saskatchewan, and more than 75 organizations spanning the food system to create a National Index on Agri-Food Performance. This index provides an integrated picture of Canada's agri-food sector's sustainability and will help increase Canada's competitiveness in the global market by shining a spotlight on sustainable practices in the industry.

SUPPORTING INNOVATIVE TECHNOLOGIES IN THE HEALTH SECTOR

KA Imaging's innovative X-ray technology allows users to differentiate between soft tissue and bone in patient, while maintaining low exposure to harmful radiation. But because their patented technology had no relevant standard the company faced barriers entering new markets. SCC helped the company navigate the complexities of the standard creation process so they could develop a new standard that would be part of an existing International Electrotechnical Commission (IEC) standard series.

To test water for Legionella, or Legionnaires' disease, Spartan Bioscience, now known as Genomadix, developed a way to conduct polymerase chain reaction (PCR) DNA testing on-site, using a small portable kit. One of the problems the company faced was that their technology was so innovative it was not recognized in existing standards. SCC worked with them to use the technical specifications of an existing ISO standard for traditional laboratory testing to draft a new one to conform to.

The COVID-19 pandemic highlighted serious health and safety issues in the long-term care (LTC) system. Nova Scotia-based Tenera Care developed a discreet wearable device for LTC workers that can help to address some of these issues. The technology allows care providers to safely and accurately monitor the movement and interaction of residents, staff and visitors within their facilities to prevent and manage many health and safety events, such as COVID-19 outbreaks. Although there was an existing standard for LTC facilities, it did not cover the use of a wearable automated nursing call system. SCC provided Tenera Care with the support they needed to amend the existing standard to reflect their innovative device.

Partnering with SDOs to fill key standardization gaps

During the program, SCC put the call out to our Standards Development Organization (SDO) partners to determine where they thought standardization was needed to support Canadian innovation. We received proposals in a range of areas that could benefit from standardization to enhance market access and positioning, improve supply chain opportunities, and capitalize on and protect Intellectual Property (IP). Most notably, the SDOs pointed to the need for standards that addressed gaps when it comes to the environment and infrastructure.

SUPPORTING CANADA'S ZERO PLASTIC WASTE PLAN

In 2019, federal, provincial, and territorial governments launched the Canada-wide Action Plan on Zero Plastic Waste to prevent and reduce plastic waste and pollution. The plan also called for the development of new standards for recycled plastics, bioplastics, and the use of plastics in general. As part of SCC's callout to SDOs, BNQ proposed a new standard on recycled plastic content products as well as certification that would allow companies to demonstrate compliance to this standard.

SCC has collaborated with more than

250 Canadian innovators

and supported more than

130 Canadian companies

90%

of companies we've worked with are satisfied and would recommend SCC

PROVIDING NEW STANDARDS FOR THE OIL AND GAS SECTOR

Oil and gas operators currently use various tools, instruments, and equipment to support the operation of flares, incinerators and enclosed combustors that safely combust natural gas streams. A gap was identified that no standard addressed best practices for new equipment in the marketplace. CSA Group developed a new standard to set out the minimum requirements, guidance, and best practices when designing and operating these sorts of technologies. This will make it easier for new technologies and innovative solutions in the industry to meet regulations.

As well, the oil and gas sector uses tools to meter, estimate, test and report the amount of gas released through the venting of equipment. Standards existed for vent gas metering, but not for measuring vent gas quantities. We supported CSA Group to develop a new standard to provide minimum requirements, guidance, and best practices for the quantification of vent gas emissions, standardized metering, testing, estimating, and reporting requirements.

ADDRESSING STANDARDIZATION GAPS IN THE USE OF eDNA

Environmental DNA (eDNA) methods detect DNA that is shed into the aquatic environment which can be effective for early detection of aquatic invasive species. However, there was no standard for how to present eDNA assessment reports, or eDNA data, and the quality and detail of information can vary. As part of our callout to SDOs, SCC worked with CSA Group to address this significant standardization gap, enabling labs and consultants to use this tool more confidently in environmental assessments.

USING STANDARDS TO SUPPORT THE CONSTRUCTION OF MODULAR BUILDINGS

Modular high-rise construction is a method where freestanding volumetric units, or modules, are manufactured offsite and then transported to the building site for assembly. This process improves productivity by up to 40 percent, but Canadian companies have been reluctant to use this construction method, in part, due to a lack standards in this area. To address critical safety aspects of modular design and construction and reduce operational risks for companies entering this field, SCC worked with CSA to facilitate the development of a new National Standard of Canada that sets out guidelines for planning, designing, making, and assembling these structures.

The path forward: Continuing to fuel Canadian Innovation

Our Innovation Initiative has fundamentally changed how SCC provides support to Canadian innovators as well as the support they expect from us. It has also demonstrated the unique role that SCC can play in assisting Canadian companies and fuelling innovation. This initiative has enabled us to work hand-in-hand with Canadian companies to help them bring their ideas and products to the world.

Proactively and strategically engaging in international standards development has provided Canada with an influential voice at the standardization table and enabled us to emerge as a leader in many new industries such as artificial intelligence and data governance. Investing time in standardization does not necessarily result in immediate returns. Rather, like an investment in equipment and machinery, and in people, it pays back in the longer run. The same can be said of investing in standardization.

After five years of dedicated support to Canadian innovators, one thing is clear – there is a strong need for advisory and faciliatory services like the Innovation Initiative. Small companies like Windtrans Inc. need a place to go to understand how the standardization system works and how it can help them commercialize. Broad-based sectors, like those relying on artificial intelligence and data governance, need a forum to launch their ideas and address their concerns and to help develop roadmaps to set the path for future policy and standardization. Canadian companies need help navigating the system, education and awareness on how to leverage it., and assistance in participating at the international tables where the rules are created.

We will not immediately see the returns of the investments we have made in Canada's innovation ecosystem. The rewards and benefits may take years and even decades to become clear. But we know that the future holds great opportunities for nations investing in scientific and technological advancements and supporting policy frameworks that open markets for innovations. Standardization plays a key role to each of these.

Given the sunsetting of the Innovation Initiative, SCC's services to innovators are now being wrapped up. But the foundation has successfully been laid for SCC to continue this important work, if circumstances allow. Because Canada cannot afford to lose the hard-won gains that we've made over the last five years.

For more Innovation Initiative case studies, visit www.scc.ca/innovation

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