

Next Generation Manufacturing Canada

Presentation to BSAC Deans 2021 Conference

Stewart Cramer, Chief Manufacturing Officer

Next Generation Manufacturing Canada (NGen)

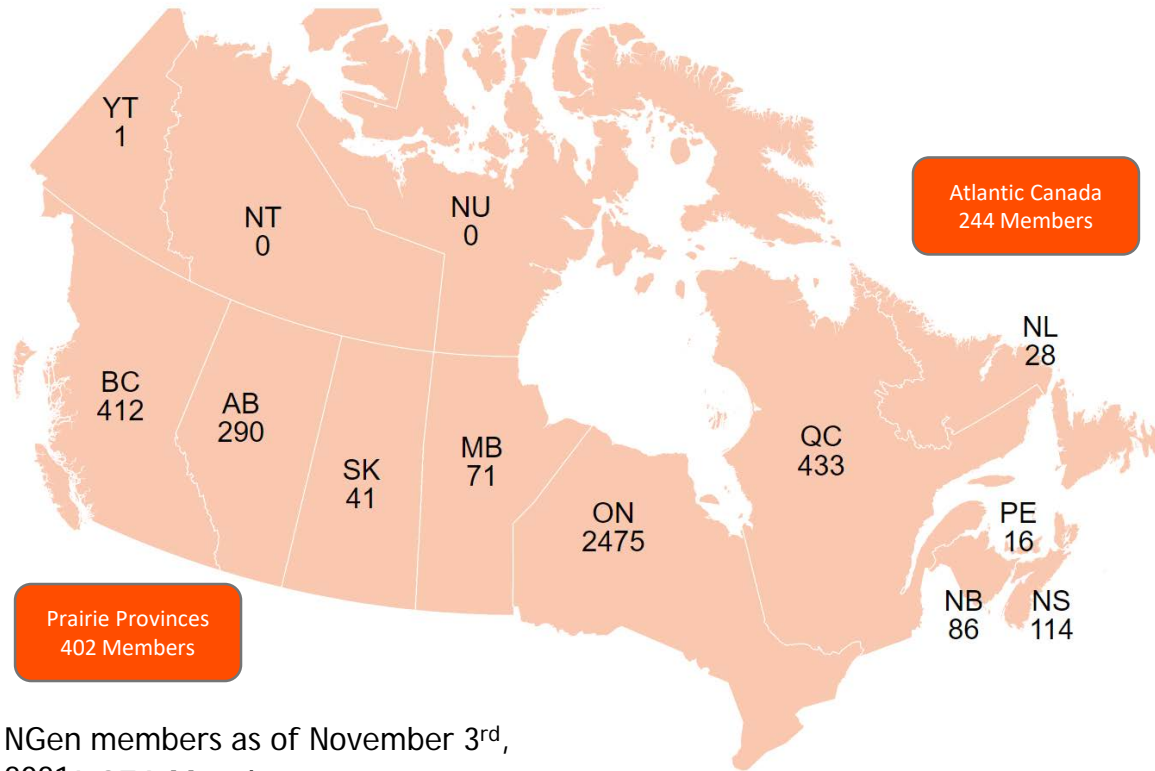
- Canada's Advanced Manufacturing Supercluster, established in 2018.
- Funded by the Government of Canada, with additional contributions from private industry.
- Mission is to “Build world-leading advanced manufacturing capabilities in Canada”.

What is Advanced Manufacturing ?

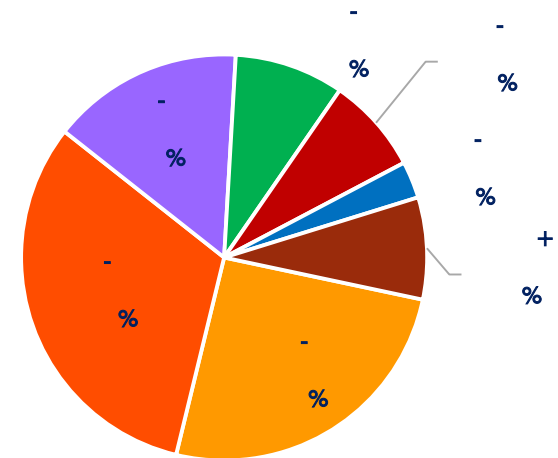
Advanced manufacturing refers to the application of digital and other advanced technologies within optimized and managed processes and workflows to achieve the following objectives:

- Drive customer success.
- Sustain long-term competitiveness and support business growth.
- Enhance productivity and profitability.
- Support continuous learning, improvement, and innovation.

NGen Members are Located Across Canada



92% of NGen Members are SMEs



NGen members as of November 3rd, 2021, 3,376 Members

- 3,969 Canadian Members
- 38% from outside Ontario
- 407 international members

Key Objectives of NGen

- Accelerate development, scale-up, and successful adoption of new technologies that will improve manufacturing competitiveness in Canada.
- Build connections and strengthen collaboration among key manufacturing stakeholders.
- Strengthen capabilities of Canadian manufacturing SME's.
- Build a vibrant manufacturing “ecosystem” that optimizes the contributions of key stakeholders.
- Help build world-class Advanced Manufacturing businesses

NGen's Strategic Approach


- Provide leadership to identify important trends, challenges, and opportunities that will impact future of manufacturing.
- Establish connections between manufacturers and other key stakeholders to serve mutual interests.
- Encourage collaborations that will lead to future success for Canadian manufacturing.
- Provide funding for transformative initiatives, with a focus on the successful application of advanced technologies to generate business results.
- Facilitate access to services, tools, and training that support implementation of new technologies, especially

Impacts ... to Date

 \$1.632 billion in sales




200 new IP assets created

 \$40.5 million actually invested by NGen in completed projects



44 IP assets available for commercialization

 40.3X Return on NGen Investment



5 patents licensed

 6X Return in Federal Tax Revenue



15 new companies created

 \$305.3 million in new R&D investments by industry



131 new manufacturing processes

 992 new jobs created



76 processes to manufacture new products

 20,207 new jobs projected over the next ten years



39 products to fight COVID-19

Economic Importance of Manufacturing in Canada

Manufacturing is a critically important component of the Canadian economy:

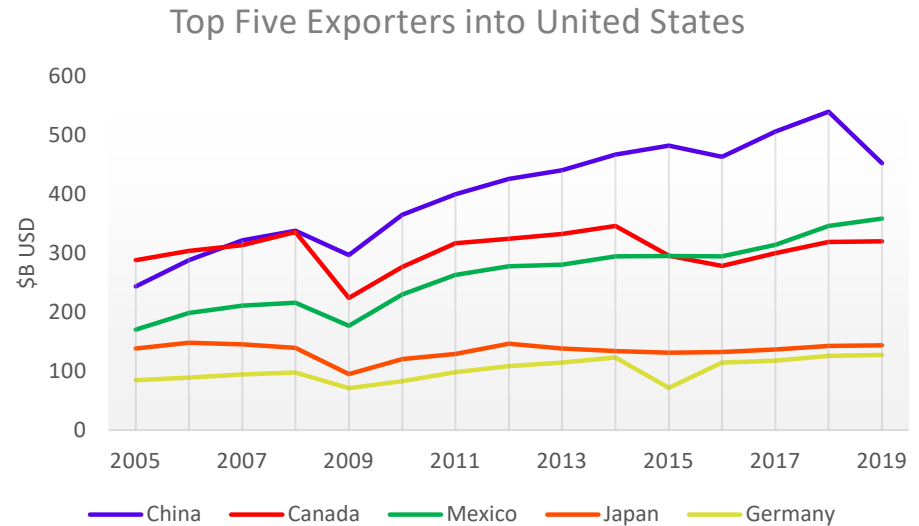
- 12% of GDP (equivalent to \$270 Billion in 2019)
- Directly employs 1.7 million Canadians.
- Generates over 60% of Canadian merchandise earnings.
- Each \$1 invested in manufacturing generates \$3.20 in subsequent economic activity.
- Manufacturing is the ultimate integrator of new technology.

Key Challenges Facing Canadian Manufacturing

- Political and market risks.
- Changing customer requirements and expectations.
- Cost and productivity pressures.
- Global competition from other manufacturing nations.
- Disruption of business models and supply chains.
- Difficulties in attracting and retaining human capital.
- Gaps in research, education, and training infrastructure.
- Need to effectively implement new technologies and develop improved business processes.

How Does Canada Compare Internationally ?

- In real terms, value of goods produced by Canadian manufacturers has not increased significantly in the last 20 years.
- In 2000, United Nations ranked Canada 4th globally in terms of manufacturing competitiveness. Canada has since fallen to 15th globally.
- Productivity gaps vis-à-vis other major manufacturing nations are widening.



ref: <https://www.thebalance.com/u-s-imports-by-year-and-by-country-3306259>

- In most recent ten years, R&D spending has decreased 10% and investments in technology acquisition have declined by 24%.
- Challenges are particularly significant for smaller Canadian manufacturers due to resource constraints.

Competitive Advantages of Canadian Manufacturing

- Diversity, encompassing a presence in a wide variety of industry sectors.
- Access to leading-edge technology providers.
- Highly educated, stable, and skilled workforce.
- Well-developed education and training infrastructure.
- World-class research in numerous fields relevant to the needs of manufacturing.
- Wide variety of clusters, networks, and business services that can support growth of manufacturing.
- Preferential access to large international markets through trade agreements with various regions of the world.

The Imperative for Action



%

,
(%
).



%



%



%

%



%

, %



%

Pre-COVID, 30% of Canadian manufacturers were at risk of going out of business because of their failure to adopt advanced technologies.

NGen's Interest in Business Schools

- Business schools are a large and vitally important part of Canada's post-secondary educational system.
- Manufacturing needs leadership and management skills to complement technical expertise - business schools are the best source of these skills.
- Key challenge for manufacturing companies will be to attract high potential new talent - business schools can supply this talent.
- Academic expertise in business schools can be mobilized to help address key challenges facing the manufacturing sector.

Business schools have the potential to become an invaluable component of the larger manufacturing

What Can Business Schools Contribute ?

- Well educated, highly motivated younger talent.
- World-class academic expertise to address key management challenges.
- Support lifelong learning for Canadians now working in manufacturing.
- Custom-designed curricula to meet needs of manufacturing sector.
- Global networks to help Canadian manufacturers access international markets.

Canadian Manufacturers Represent an Opportunity for Business Schools

- Enhanced learning opportunities for students.
- Attractive career opportunities for graduates.
- Additional support for key areas of research.
- More extensive linkages and stronger relationships with industry.
- Higher profile and enhanced brand image, both locally and nationally.
- Revenue generation through programs designed for manufacturers.

Potential Opportunities for Collaboration

- Encourage more business students to pursue careers in manufacturing.
- Undertake collaborative research to identify innovative solutions to key management problems.
- Provide training and professional development to the industry.
- Mobilize alumni and stakeholder networks to support Canadian manufacturing.

Some Immediate Opportunities

- Expose students to advanced manufacturing through Work Integrated Learning opportunities, both within Next Generation Manufacturing itself and in member companies.
- Provide class projects focusing on issues and challenges that are important to the advanced manufacturing sector.
- Identify research units whose work is potentially relevant to the needs of advanced manufacturing; explore opportunities for research collaboration.
- Partner with business schools to provide professional development opportunities to the advanced manufacturing sector.
- Encourage business school alumni to consider new career options in advanced manufacturing.

Issues for Discussion

- What areas of teaching and/or research could be most relevant to needs of manufacturing sector ?
- What relationships does your school presently have with manufacturing companies, regionally, nationally, and internationally ?
- How could more of your students be encouraged to explore careers in manufacturing ?
- What would you seek to achieve through collaboration with NGen ? What resources could your school potentially devote to a collaborative relationship ?
- Questions ? Concluding Thoughts ?

Thank You

- Join NGen today for free today at www.ngen.ca
- For more information, please contact:
- Mike Kennedy mkennedy@idirect.com (416) 385 - 3942

