The Price Institute

Helping Manitoba Bridge Gaps in its Manufacturing Sector

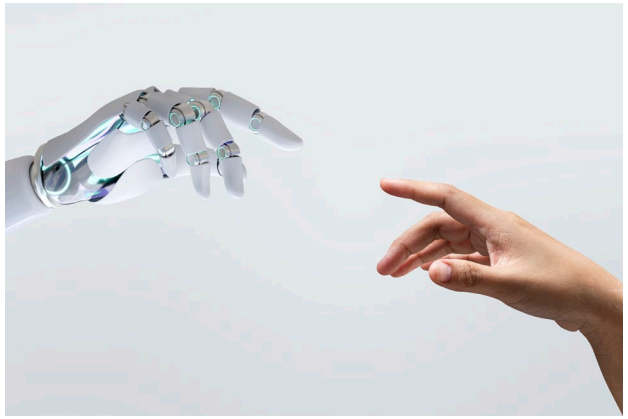
Manufacturing Landscape in Manitoba

- Manufacturers employ roughly 10 per cent of Manitoba's workforce (68,100)
- Ship approximately $24 billion (2022) worth of goods annually
- Total GDP: $6 billion
- Total business establishments: 1,359
- Invested in research and development: $100 million+

Problem Statement

Our efforts to put an economic value on labour shortages and constraints gave CME the chance to reveal the nearly $13 billion in lost economic activity to government and the public alike. With our members' input, CME's efforts played a direct role in the Immigration Levels Plan by the Immigration, Refugees and Citizenship Canada Minister Sean Fraser, which will bring in 465,000 immigrants annually.

- Canadian Manufacturers and Exporters 2022 Annual Report



- Our province and our country have fallen behind in adoption of the digital technologies — such as automation, advanced manufacturing, AI and robotics — driving Industry 4.0
- To stay competitive on the global stage, Manitoba must bridge these gaps!

BRIDGING THE GAP IN MANUFACTURING

LABOUR MARKET NEEDS

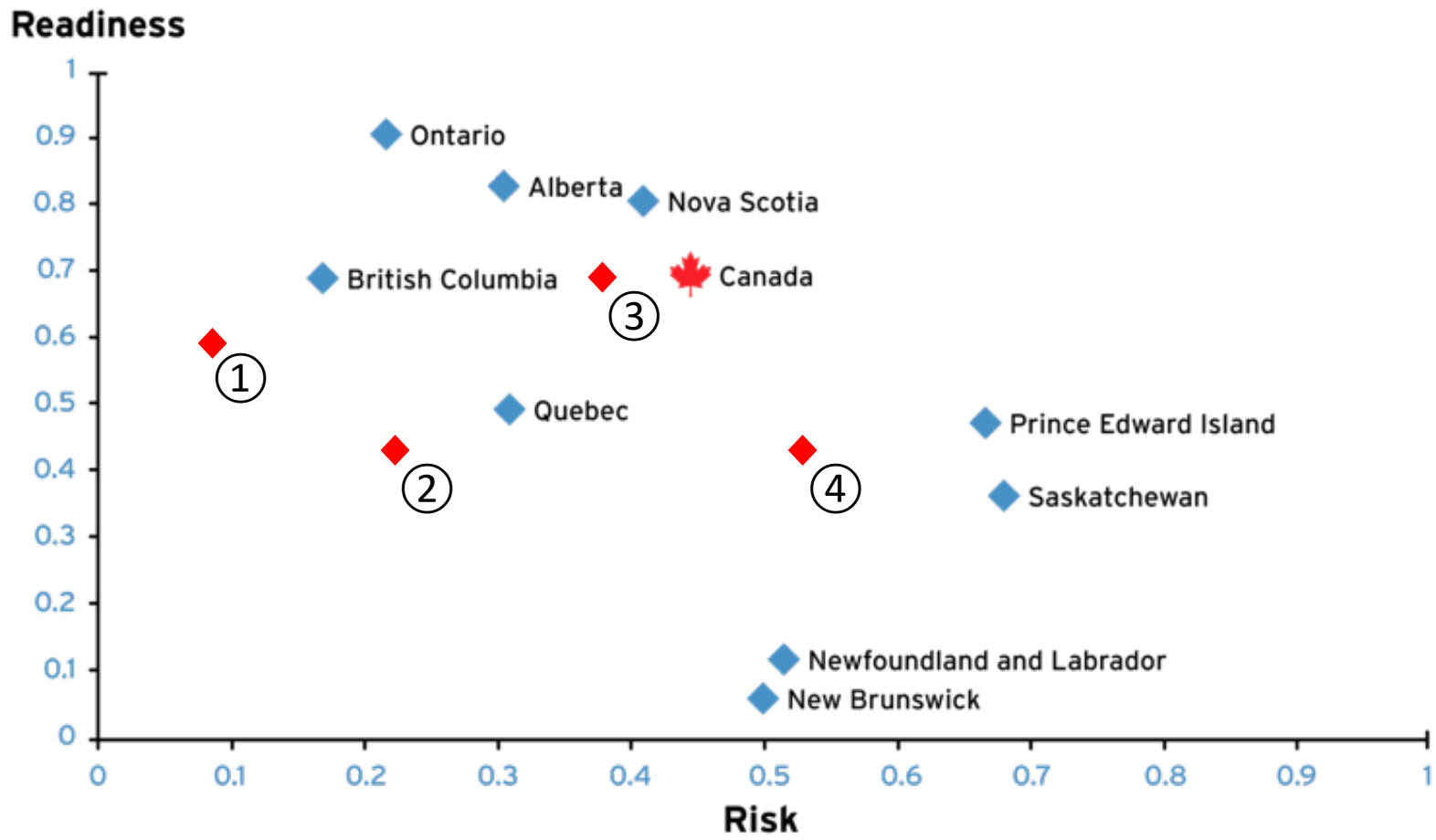
of Canadian manufacturers are currently facing labour and skills shortages

of Canadian manufacturers cite attracting and retaining a quality workforce is the greatest challenge they're facing right now

of Canadian manufacturers are facing an advanced manufacturing skills gap

Source: CME Business Outlook and Labour Skills Survey, Nov. 2021

Risk of Automation and Readiness to Adapt



The Solution

The Solution

New Academic and Collaborative Programming

Centre for Automation and Manufacturing Technology Transfer

Manitoba's First Chair in Advanced Manufacturing

Opportunities

Industry Collaboration

Develop an Industry Advisory Board to foster regular communication and collaboration. Create joint projects and internships.

Technological Advancements

Invest in state-of-the-art facilities, ensuring faculty and students have access to the latest tools. Foster a culture of continuous learning and adaptation.

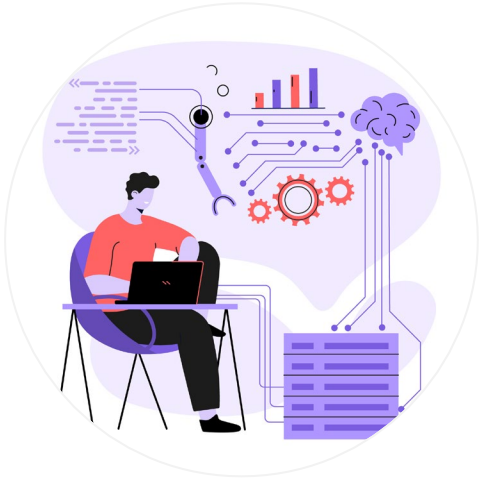
Workforce Development

Collaborate with educational institutions to design programs that provide hands-on experience. Establish pathways for graduates to seamlessly transition into industry roles.

Applied Research Initiatives

Create research centers within the institute. Facilitate partnerships with industry for collaborative projects. Emphasize the practical application of research outcomes.

Challenges

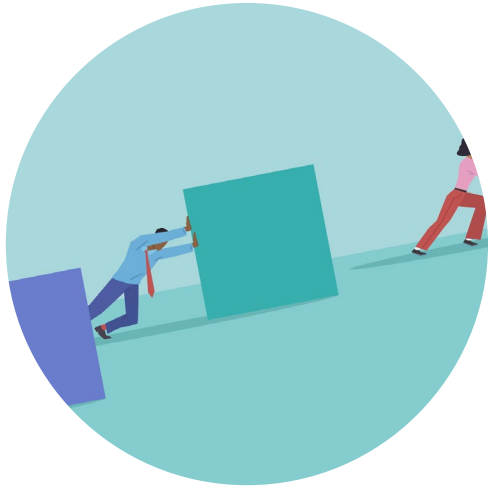


Rapid Technological Changes

Implement continuous professional development for faculty and staff. Foster collaborations with tech companies to gain insights into emerging technologies.

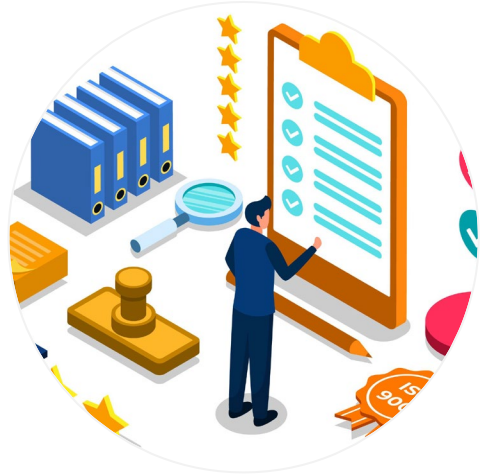
Resource Constraints

Diversify funding sources through grants, private partnerships, and philanthropy. Optimize resource allocation through transparent financial management practices.



Industry Competitiveness

Regularly assess and update training programs to align with industry needs. Encourage faculty and students to engage in applied research to solve real-world challenges.



Changing Regulatory Landscape

Establish a regulatory intelligence system to stay informed about changes. Develop partnerships with regulatory bodies to ensure compliance.

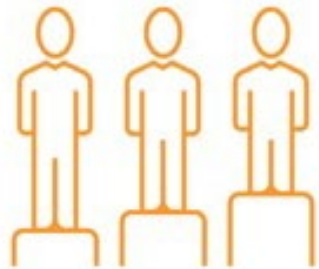
Focus Areas

- **Strategic Partnerships**
- **Technological Advancements**
- **Resource Optimization**
- **Agile Adaptation**
- **Stakeholder Engagement**
- **Continuous Improvement**

ANNUAL OUTPUTS

We expect the Institute of Advanced Manufacturing and Mechatronics to realize the following outcomes each year

150%
increase in new skilled graduates



25%
equity seating for students from under-represented groups*

1,000
employees upskilling or reskilling

New Academic and Collaborative Programming

Tailored to the needs of MB Manufacturers

POST-GRADUATE DIPLOMA IN MECHATRONICS

Builds on existing
Instrumentation and Control
Engineering Technology Diploma

Taught using
Systems Approach

Flexible, affordable delivery

GRADUATE PROFILE

Consultant level

Determine equipment needs
Blueprint solution
Source components and build

Apply project management
methods and tools

Understand and oversee
complete mechatronic
system life cycle

Design and implement system
optimization in existing
mechatronic systems

CAREER OPTIONS

- Automation engineering
- Electronics design engineering
- Instrumentation engineering
- Mechanical design engineering
- Robotics enginnering
- Software engineering
- Troubleshooting engineering
- Big data analyst
- Control system design
- Data scientist

POST-GRADUATE DIPLOMA IN ADVANCED MANUFACTURING

Affordable with flexible delivery (direct entry or part-time while you work)

Graduates develop, deliver Industry 4.0 concepts to shop floor

Includes work-integrated learning

GRADUATE PROFILE

Management-level decision making including supply chain, ops, and Lean

Ability and skills to manage projects, budgets, costs, and energy

Facilitate team building in interdisciplinary environment including negotiation and problem-solving skills

Evaluate cost-effectiveness of products, processes, and operations

Strategy development to minimize business risks, maximize opportunities

CAREER OPTIONS

Advanced manufacturing

Lean manufacturing

Enterprise resource planning

Resource planning

Sustainable manufacturing

Operations management

Supply chain and resource planning

Manufacturing processes and control

Energy management

Advanced programmable controls

Plant layout

Quality assurance

Leadership

Project management

Siemens Plant simulation, SAP, Solid Work, Plant Work, Retscreen, Minitab 16, Microsoft Project, PLC

ISO 9000, 14000 and 50000

INDUSTRY SPECIFIC MICRO-CREDENTIALS

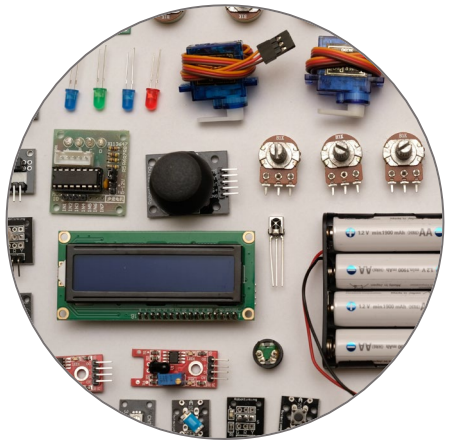
Nearly half of MB's current manufacturing workforce needs to upskill/reskill

MCs provide affordable, short-duration, targeted training

RRC Polytech rapidly deploys MCs to meet business opportunities or emergent needs

SIEMENS LEVELS I AND II

For front line maintenance workers in a factory – new or veteran – who don't need a diploma or advanced diploma but who need added layer of knowledge when repairing/ installing advanced, automated systems



SIEMENS LEVELS I AND II

Level I graduates become
Mechatronics Systems Assistants

Level II graduates become
Mechatronics System Associate Technicians

INDUSTRY-IDENTIFIED MICRO-CREDENTIALS

Mechatronics Control Systems

Program Logic Controllers

Lean Manufacturing & Quality Control Systems

Critical Thinking

Additive Manufacturing

Adaptive Design

CAD for 3D Printing

3D Printing

Functional Testing

Project Trace and Analysis

Post-Processing

UI/UX

Cybersecurity

PILLAR ONE

BENEFITS TO STAKEHOLDERS

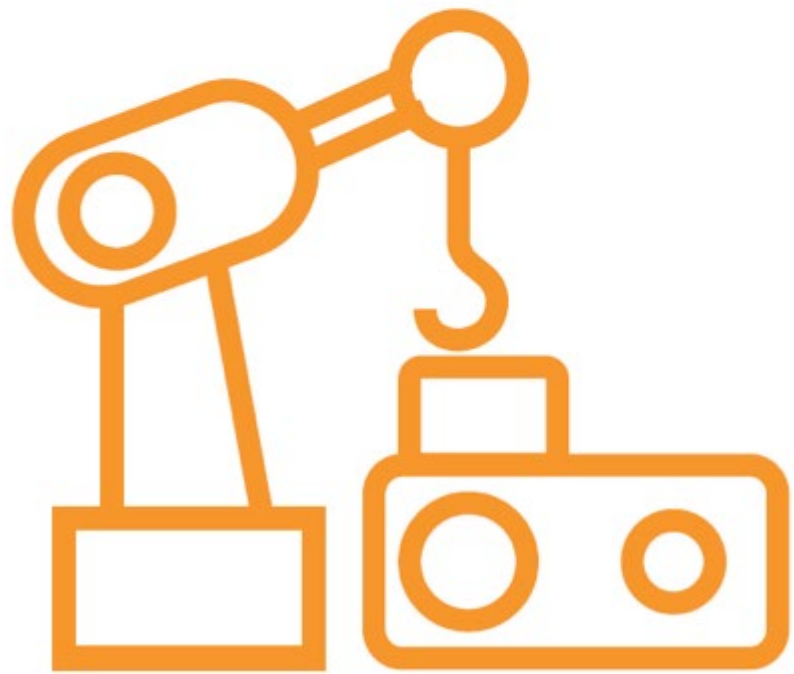
Access to talent pipeline
Graduates have broad technical and human skills, as well as work-integrated learning experience, and are ready to lead and grow in the workplace

Affordable, flexible, and tailored micro-credentials
Supports the lifelong learning requirements of current manufacturing employees

PILLAR TWO

CENTRE FOR AUTOMATION AND MANUFACTURING TECHNOLOGY TRANSFER (CAMTT)

Bridge to applied research for SMEs in MB manufacturing



CENTRE FOR AUTOMATION AND MANUFACTURING TECHNOLOGY TRANSFER (CAMTT)

- CAMTT is NOT:

❖ A single space or building

❖ Focused ONLY on contract or deliverables-based applied research & tech transfer

❖ Focused ONLY on student-led projects and training

CENTRE FOR AUTOMATION AND MANUFACTURING TECHNOLOGY TRANSFER (CAMTT)

- CAMTT is:

❖ **1. A bridge to applied research, innovation, tech transfer, and talent for SMEs and partners in Manufacturing in Manitoba and beyond**

❖ **2. A distributed network of spaces, facilities, and expertise through which industry and partners can access and leverage our collective assets and talent**

❖ **3. Anchored by a net-new student Project Space**

❖ **4. Amplified by the multi-center, multi-facility TACAM, ACE Project Space, and adjacent facilities**

❖ **5. Committed EDI and TRC**

Amplified by the multi-center, multi-facility Technology Access Center for Aerospace and Manufacturing, the ACE Project Space, and adjacent facilities ….

CAMTT has an **applied research arm** through its access to a distributed network of existing facilities, equipment and expertise through RPI's leading Centers such as TACAM

Research Center spaces accessible and flexible for CAMTT activities with levels of access provided to ensure safety and adequate training

CENTRE FOR AUTOMATION AND MANUFACTURING TECHNOLOGY TRANSFER (CAMTT)

Leverages $35M+ of investment in specialized facilities and equipment, such as:
Motive Lab
Smart Factory

Engages students and faculty in Applied Computer Education programs focused on:
Business information technology
Information security
Data science
Machine learning

Opens up possibility to leverage greater capital ecosystem through existing partnership with NRC

PILLAR THREE

RESEARCH CHAIR IN ADVANCED MANUFACTURING

Only chair of its kind in Manitoba

PILLAR THREE

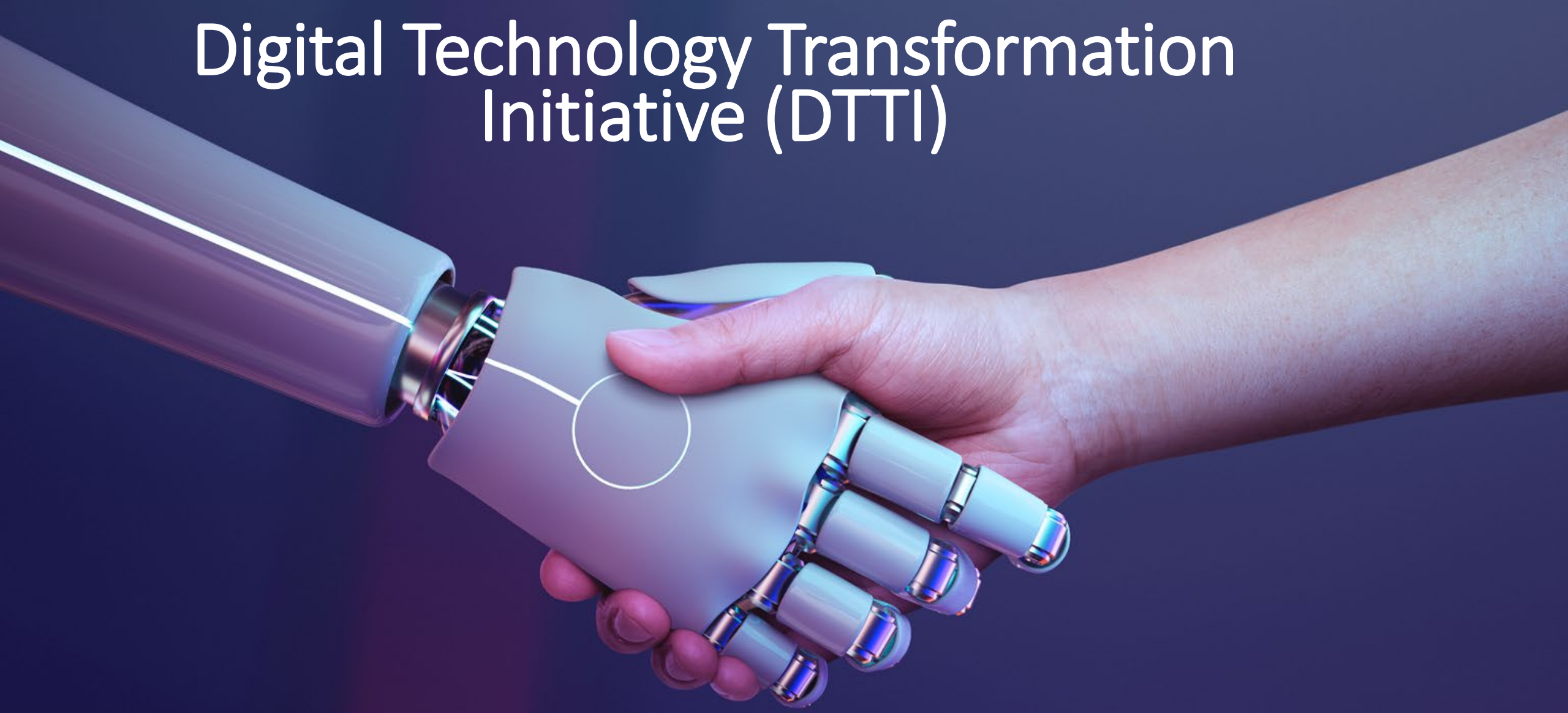
BENEFITS TO STAKEHOLDERS

Single-window contact
Research Chair works directly with industry partners on project development, and forecasting future AR needs.

Deepened connections to RRC Polytech learning ecosystem
Research Chair will inform industry partners of relevant AR activies happening at RRC Polytech that may be relevant.

Government funding expertise
Research Chair to help secure support for industry partner AR from various levels and sources

Digital Technology Transformation Initiative (DTTI)

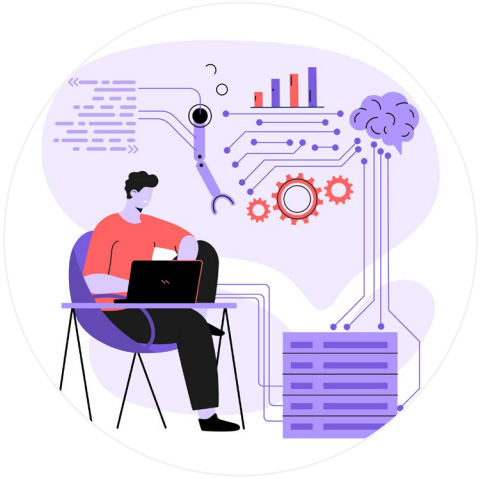


A cross-institutional applied research initiative led by Research, Partnerships & Innovation at RRC Polytechnic

Digital Technology Transformation Initiative (DTTI)

- NSERC Mobilize grant (~$3.5 million)
- Targeting Manitoba's SMEs in advanced manufacturing and clean technology.
- Support applied research projects in the digital technology innovation space for Manitoba organizations on the path to net-zero.
- Flexible funding for research, student salaries, and instructor course release.

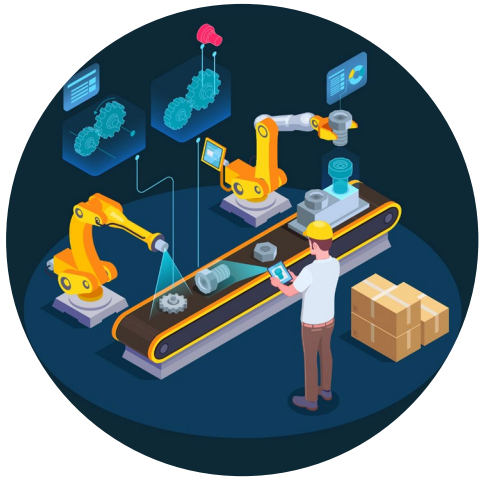
RRC POLYTECH
20 YEARS Research Partnerships & Innovation



44 DTTI Transform applied research projects with industry

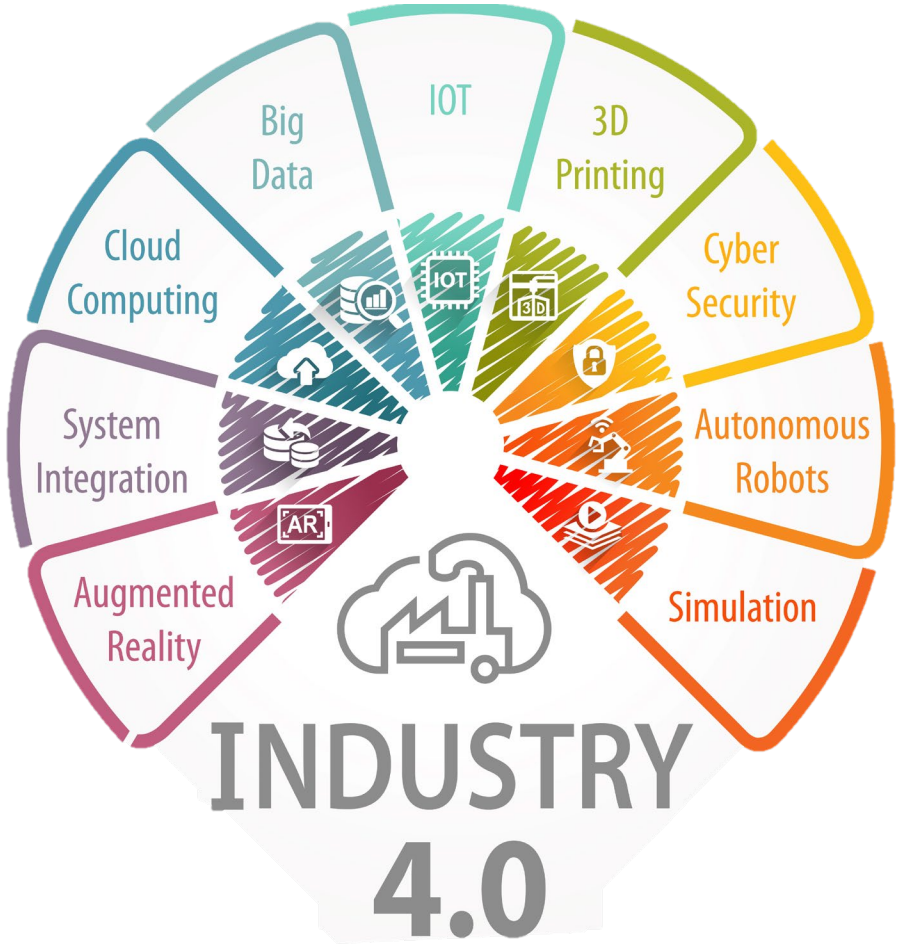
32 DTTI Innovate student applied research projects with industry

100 students engaged in applied research



5000 total course release hours for faculty

Applied Research Focus Areas



Advanced manufacturing:

- Digital twinning & simulation of manufacturing processes
- Real-time data acquisition, analysis, & decision-making including large data
- Advanced collaborative robotics
- Advanced manufacturing IoT, process integration & coordination
- Enterprise resource management optimization & data visualization

Climate/Cleantech:

MHZEV**:**

- Intelligent charging systems
- Advanced battery management systems
- Smart grid system development
- EV performance optimization/predictive maintenance systems

Building Efficiency:

- Digital twinning and virtual simulation of building design
- Building automation & energy management systems
- Real-time optimization of energy consumption image & drone data analysis

Climate Resilience:

- Physical asset optimization & predictive maintenance
- Digital twinning/simulation of environmental scenarios

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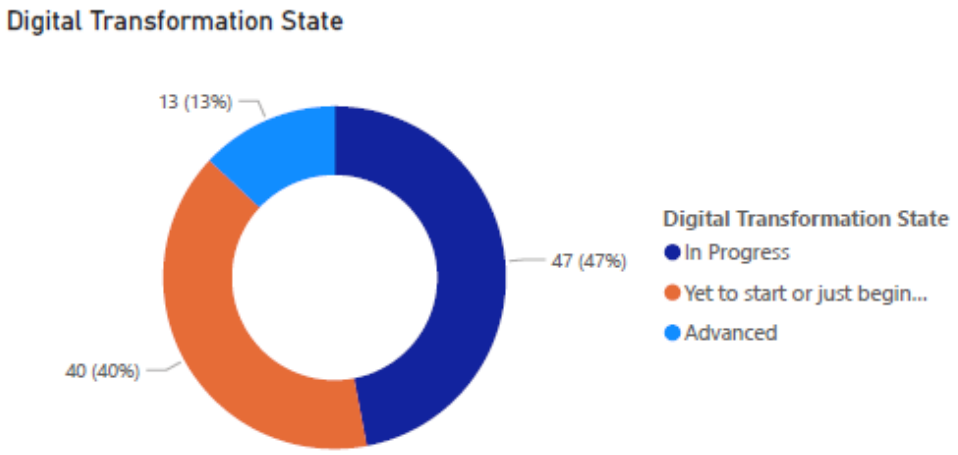
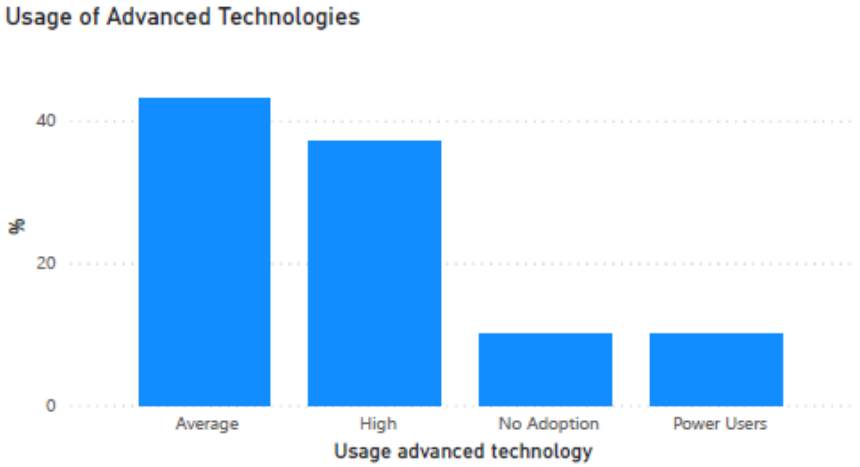
20 YEARS Research Partnerships & Innovation

Digital Technology Adoption in Canada lags behind

2023 CME Survey Report





- **40% of businesses have yet to start or are just beginning their digital transformation process.**

- **24% are currently not using digital transformation software solutions available on the market, like ERP systems, QMS, SCM etc.**
- **10% of companies surveyed have yet to adopt advanced manufacturing technologies, like cybersecurity, automation and cloud computing.**

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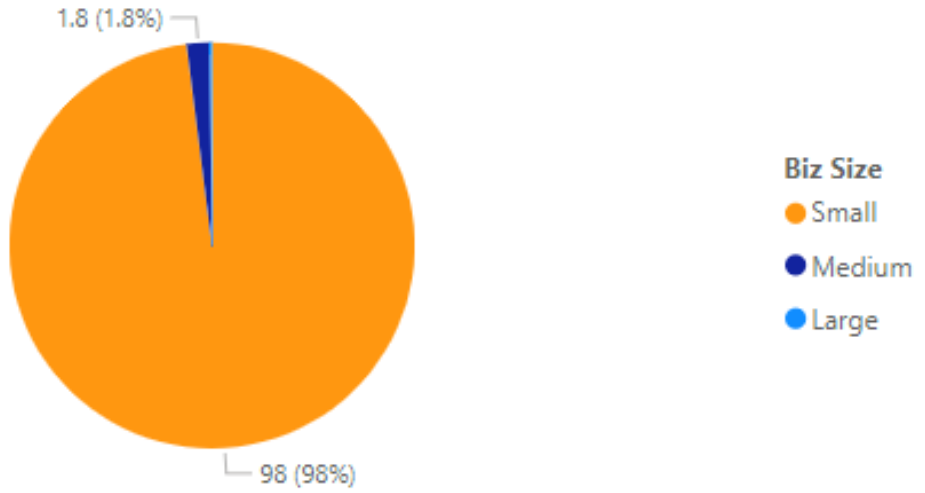
Manitoba SME's & Digital Tech Adoption

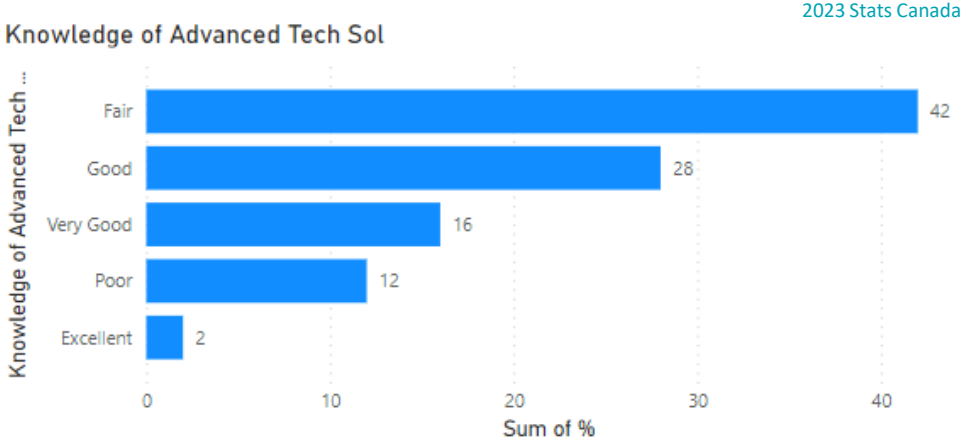
Nearly 98% of businesses in Manitoba are small businesses, predominantly in retail, construction, and healthcare.

Small size businesses show lack of knowledge of advanced technologies, greater difficulty in obtaining financing for digital transformation projects, and lower rates of technology adoption.

The province faces challenges in digital technology adoption and innovation.



2023 Stats Canada



2023 CME Survey Report

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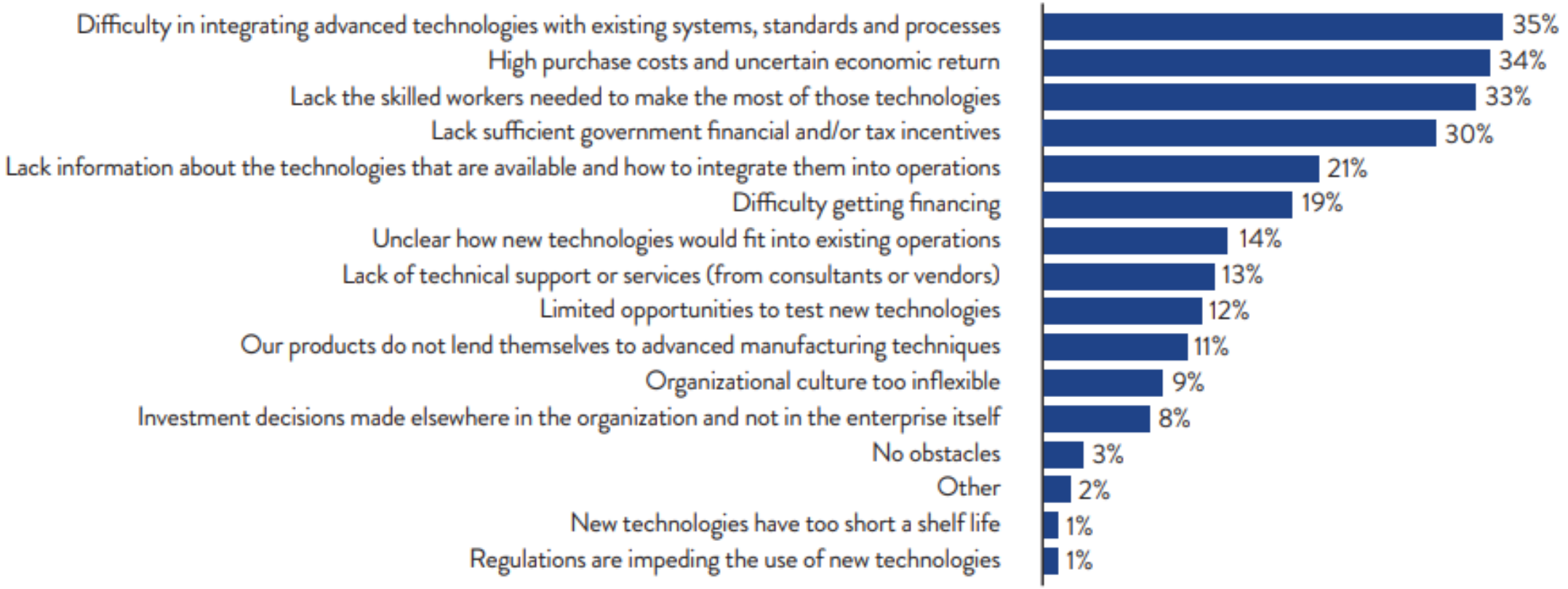
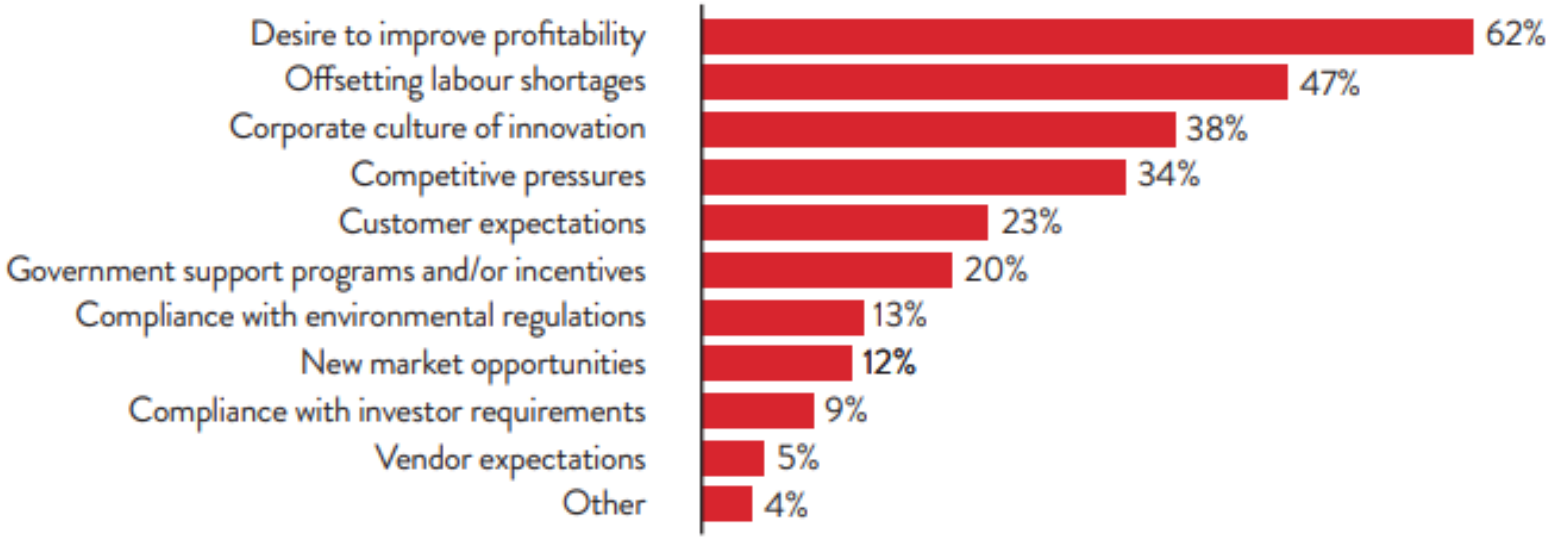
Barriers to investment in advanced technologies

2023 CME Survey Report



ECH

20 YEARS Research Partnerships & Innovation



Critical factors driving technology adoption

2023 CME Survey Report

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DTTI Industry and Ecosystem Partners

Ecosystem Partners

Industry partners

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DTTI projects

Industry 4.0 adoption to accelerate digitalization

Applied research and digital technology adoption support net-zero aims

Contributes to supplying the workforce to support innovation & adoption

Includes multi-disciplinary teams and cross-cutting applications

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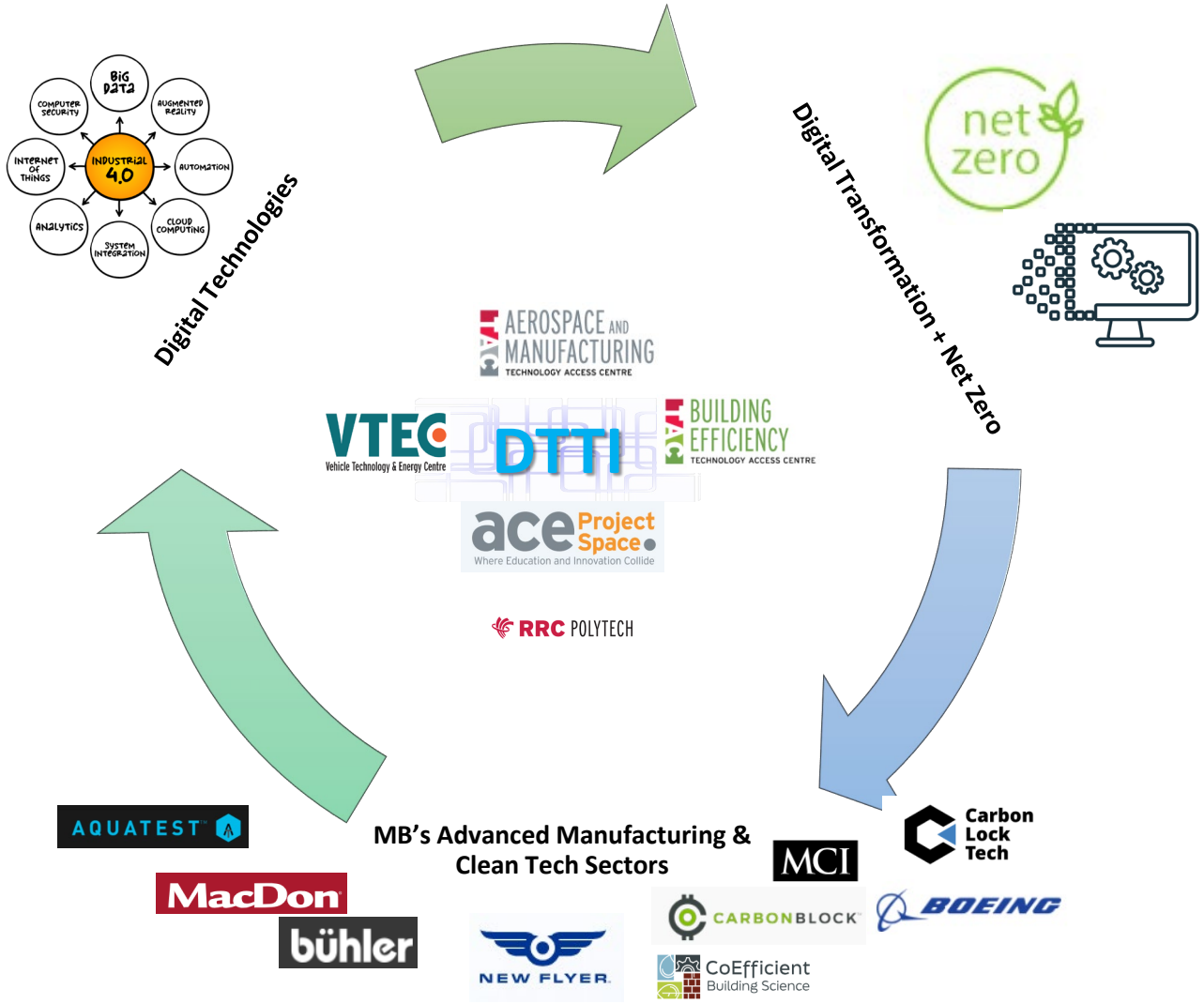
The role of RRC Polytech's role in Manitoba's digital transformation

RRC Polytech Digital Technology Transformation Initiative (DTTI)



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Thank you!