2025 ADVANCED MANUFACTURING OUTLOOK REPORT

Industry 4.0 is here: Are Canadian manufacturers ready?

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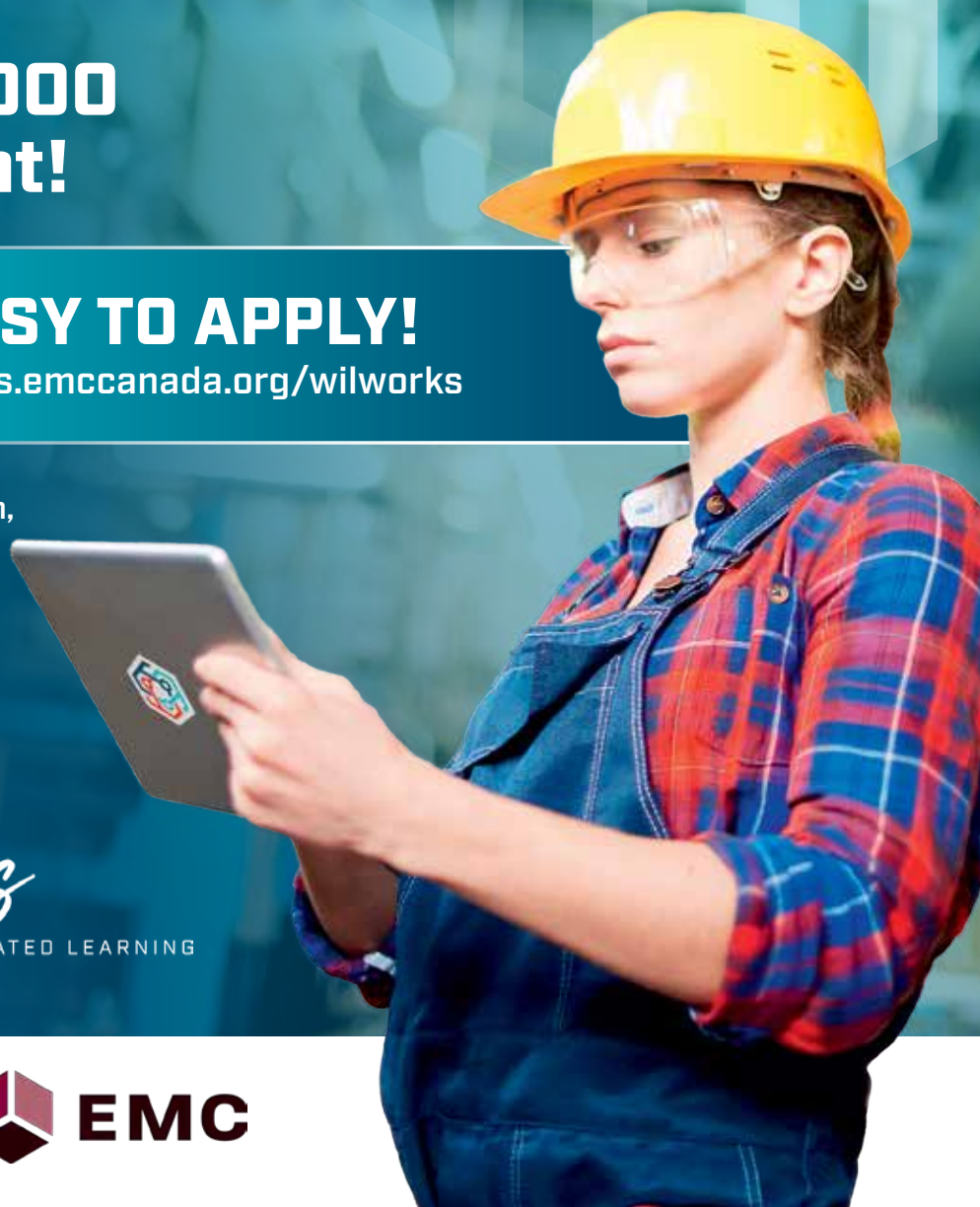

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CHALLENGES OR OPPORTUNITIES? THE CHOICE IS YOURS.

By Hussam Malek, P.Eng, M.Eng, MBA

Today's Canadian manufacturing businesses are at a crossroads.

Amid economic uncertainties, workplace shortages, and the fast pace of technological changes, manufacturers across the country are facing significant challenges — but also exciting opportunities.

Earlier this year, MNP brought together manufacturing business leaders from across southern Ontario to participate in roundtable discussions for our 2024 whitepaper, Innovation in the Business of Manufacturing. Their insights shine a light on the real issues impacting manufacturers today and the strategies they're using to tackle them.

Addressing labour shortages and workforce strategies

One of the most urgent challenges highlighted by manufacturers is the persistent struggle to find and retain workers. It's not only about securing highly skilled employees — businesses are increasingly prioritizing hiring individuals with the right mindset and work ethic. Many manufacturing companies are focusing on non-monetary benefits, like flexible working arrangements and skills development opportunities, to appeal to a broader and more diverse workforce, including the next generation of workers.

Furthermore, manufacturers are looking to diversify their talent pools by attracting underrepresented groups, like women and newcomers to Canada. This strategy not only helps to fill critical gaps, it strengthens organizational culture, fostering a more inclusive and dynamic workplace.

Leveraging technology for smarter manufacturing

Technology is driving big change across the sector, from artificial intelligence (AI) and machine learning to advanced enterprise resource planning (ERP) systems. More and more, manufacturers are leveraging these tools to optimize operations, cut costs, make informed decisions, and improve customer service.

However, many are still grappling with selecting the right tools and technologies that meet their needs without disrupting their operations.

Smart technologies like computer vision and predictive analytics tools are being implemented to reduce reliance on manual labour — not to replace workers but to allow them to focus on higher-value tasks. This transition empowers teams and enhances productivity, which leads to greater innovation on the shop floor.

Data-driven decision-making has become essential. It's used to optimize supply chains, manage production, and make proactive business decisions. But the quality of data is key — without clean, reliable data, even the most advanced systems can fail to deliver quality outcomes.

More and more, manufacturers are recognizing the importance of data integrity, which allows them to make better, more strategic decisions that positively impact their bottom line.

Productivity and performance: A growing concern

Canada's declining productivity remains an issue (we're ranked 29th out of 38 countries for labour productivity as per the Organization for Economic Co-operation and Development) and was a hot topic among manufacturing leaders. Many businesses are focusing on technology, operational efficiency, and continuous learning as key drivers for increased productivity and performance. The challenge lies in making sure employees remain motivated and engaged in their roles, especially as new technologies and processes are introduced.

Manufacturers are emphasizing the need for clear communication and frequent feedback. By maintaining a continuous dialog with their teams, they are better positioned to address performance issues, celebrate successes, and drive operational improvements.

This shift from annual reviews to more frequent feedback has proven effective in maintaining high levels of employee engagement and performance.

Looking to the future

Today's manufacturers are at a critical juncture. The good news is there's a roadmap for the future, one that highlights the need to invest in their workforce, embrace new technologies, and build cultures that prioritize continuous improvement.

The challenges are undeniable, but so are the opportunities. The question is: which path will you choose?

Hussam Malek, P.Eng, M.Eng, MBA
Partner, Consulting | 416.515.3866 | hussam.malek@mnp.ca

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ADVANCING MANUFACTURING IN CANADA: A COMPREHENSIVE APPROACH

By Scott McNeil-Smith

Manufacturing is a cornerstone of Canada's economy, significantly contributing to GDP and employing over 1.8 million individuals. To stay globally competitive and achieve sustainable growth, the sector must continuously evolve. Excellence in Manufacturing Consortium (EMC), Canada's largest manufacturing consortium, has been a steadfast partner to manufacturers for over 27 years. EMC's strategic approach to Advancing Manufacturing in Canada revolves around People, Plant, and Process.

People: Developing a Skilled Workforce

A skilled workforce is vital to the future of manufacturing in Canada. As technologies evolve rapidly, manufacturers must equip workers to efficiently operate advanced machinery, analyze data, and adapt to changing environments. EMC focuses on workforce development through education, apprenticeships, and lifelong learning, while promoting diversity and inclusion to foster innovation and address skills shortages. Engaging with youth and creating opportunities for underrepresented groups in the sector brings fresh perspectives and strengthens the industry.

Plant: Implementing Advanced Manufacturing, Clean Technologies, and IIoT

The integration of advanced technologies, such as the Industrial Internet of Things (IIoT), artificial intelligence, and automation, is revolutionizing manufacturing. These innovations empower manufacturers with real-time data for predictive maintenance, improving operational efficiency while minimizing disruptions. Green technologies and sustainable manufacturing processes are also enabling manufacturers to reduce their carbon footprint and increase resource efficiency. EMC supports manufacturers in adopting these technologies to enhance production quality and flexibility, driving sustainable growth.

Process: Achieving Productive and Sustainable Manufacturing

Process efficiency is central to manufacturing competitiveness. Many small and medium-sized enterprises (SMEs) have yet to fully embrace advanced technologies, relying on traditional methods to drive innovation. EMC helps manufacturers streamline operations through continuous improvement practices, waste reduction, and optimized resource utilization. By prioritizing sustainability through green manufacturing, companies can achieve shorter lead times, better product quality, and lower production costs, ensuring long-term competitiveness.

A Synergistic Approach: People, Plant, and Process

The future of advanced manufacturing depends on the seamless integration of People, Plant, and Process. This holistic approach ensures that Canadian manufacturers are equipped to address current challenges while positioning themselves for future success. EMC continues to provide tailored guidance, industry-validated benchmarking, coaching, and access to an extensive network of experts. Through programs and initiatives like EMC's student work placement programs, upskilling and training solutions and GreenMFG Network, EMC empowers manufacturers to adopt advanced technologies and develop a skilled workforce, helping them thrive in an increasingly competitive global landscape.

As Canada's manufacturing sector faces challenges such as labor shortages, rising costs, and the need for technological adoption, EMC remains dedicated to supporting manufacturers through this transformative journey. By leveraging its resources, programs, and partnerships, EMC is driving forward the mission of Advancing Manufacturing in Canada, helping manufacturers grow, innovate, and succeed.

Scott McNeil-Smith
Vice-President, Manufacturing Sector Performance
Excellence in Manufacturing Consortium (EMC)

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EXECUTIVE SUMMARY

In 2024 Canadian manufacturers were beset with inflationary pressures, increasing market uncertainty due to geopolitical risks, a resilient labour shortage and evolving cybersecurity threats as they continued to use Industry 4.0 technologies to stay competitive and successful through a volatile economy.

Inflationary pressures came as a result of a fluctuating interest rate and global trade disruptions due to a variety of international conflicts. These effects on the supply chain have seen manufacturers consider reshoring their operations, but have also given them pause on making considerable financial decisions in an uncertain economic market. Evolving cybersecurity threats and a resilient labour shortage are affecting manufacturers by having them change their investments and the financial amounts they intend to invest as they modify their Industry 4.0 plans.

Our 2025 Advanced Manufacturing Outlook survey found that the majority of manufacturers are still very interested in using advanced technologies to become more efficient, explore production improvements, eliminate downtime and improve security measures against increasing threats. The survey measured Advanced Manufacturing (IIoT and Industry 4.0 technology) engagement among 203 manufacturing business owners, senior executives, and leaders.

For the first time this year, the research was led by Bramm Research Inc. in Toronto, and conducted through the months of May, June, and July for *Canadian Manufacturing* and *PLANT* magazines, in partnership with our sponsors: MNP, FedEx, EMC, and Alps Welding Ltd.

In our survey, Advanced Manufacturing is defined as manufacturers focused on machine learning, interconnectivity, automation, and the analysis of real-time data involving the Industrial Internet of Things (IIoT), advanced computing, artificial intelligence, and the cloud.

The 2025 survey took a closer look at how mass adoption across the industry has affected business outcomes, and where advanced technologies have been integrated within a manufacturer's operations. Certain trends continue to hold steady, growing in certain areas and remaining steady in others. Unencumbered growth was slowed by an uncertain economic market, and an industry dealing with inflation and global trade uncertainties. Even through this, manufacturers continue to apply Industry 4.0 technologies to stay competitive and afloat. The rising cost of goods and supply chain challenges have been influenced by a variety of political issues, with some manufacturers even faster to take on Industry 4.0 solutions to stay impervious to challenges, and in some cases also delaying their investments in other areas of business and taking on a wait-and-see approach. 32% of respondents now say there's been no change in the amount of intended spend, compared to just 25% a year ago, implying that more manufacturers are holding steady with spending. The key challenges seem to be funding and financing issues, a lack of skilled talent across the sector, the rising costs of goods, and a market averse to spending. Other hurdles include troubles integrating legacy technologies and the dearth of options available to manufacturers, cybersecurity concerns as threats evolve, and resistance to change. Manufacturers are handling a variety of priorities when it comes to their Industry 4.0 investments, displaying a thrifty attitude with their finances amid other priorities.

The rising cost of goods and supply chain challenges have been influenced by a variety of political issues, with some manufacturers even faster to take on Industry 4.0 solutions to stay impervious to challenges, and in some cases also delaying their investments in other areas of business and taking on a wait-and-see approach.

This year, 37% cited costs as a reason for not investing in technology, implying that an Industry 4.0 investment is jostling with other priorities for manufacturing leaders. More manufacturers are seeing IIoT as a business growth opportunity this year, with 90% recognizing its potential compared to 82% of respondents last year. The c-suite executives raised their support for advanced technology tools to 77% from 72% the year prior.

Despite these impediments, manufacturers continue to onboard new solutions and are cognizant of the necessary role advanced manufacturing technologies can play in a business' operational success. 66% of manufacturers still believe that investing in new technologies raises the company's cyber security risk, with no growth compared to the year prior. 69% of companies have a plan and roadmap for Industry 4.0 adoption, a sizeable jump from only 47% who had a plan last year.

Only 3% of respondents report that their operations have "no automation systems in place", a change from last year's 8% which reported having no automation in place.

The leading uses of IIoT have changed somewhat as a result of economic headwinds and a volatile trade market. The top spot still belongs to improving efficiency and productivity (46%), but manufacturers are now more interested in tracking materials and shop floor assets (34%), the visibility of data from across all manufacturing operations (34%), providing visibility into production processes (33%), analytics functionalities (29%), and improving maintenance functions (24%). Of those currently applying Industry 4.0 technologies, 82% are using it to improve efficiency and productivity, suggesting a trend towards continued business operations in the current economy. Respondents overall reported a greater use of IIoT across a broad range of applications, and there was a notable decline (-14%) in respondents who said that they are not currently applying IIoT.

Many businesses have been affected by global trade volatility and they have changed their planned spend on Industry 4.0 technologies, with 58% saying their planned spend has increased compared to 65% last year, and 9% saying there's been a decrease. In the next three years, manufacturers plan to spend on robotics/automation (66%), artificial intelligence (51% and a +17% jump), data capturing at machine/shopfloor (41%), ERP (41%), advanced analytics (39%), cybersecurity (38%) and cloud computing (36%). The intended amount to spend on these technologies over the next three years has risen to $2.11M, which is an increase and may speak to Industry 4.0's importance for companies.

The most significant benefits seen by manufacturers have changed from years prior. The top cited benefits manufacturers have seen are an increased quality of product (47%), increased throughput (43%), reduced downtime (38%), lower cost of operation (37%), and reduced staff requirements (29%). In previous years, a lower cost of operation and reduced downtime factored much higher.

The number of manufacturers not convinced of the business benefits of a technology investment still remains at 17%, with manufacturers citing cost concerns as the biggest impediment now (37%) for reasons for not investing. Last year, the leading reason for not implementing new technologies was that there were difficulties in integrating advanced technologies in existing systems (37%), which still remains a persistent concern.

With regards to how manufacturers were collecting and using the data in their operations and influencing their decisions; 72% are using spreadsheets such as Excel, 58% are using integrated ERPs, 50% are using an accounting package, 35% continue to use manual paperwork for the second year running, 38% are using an MRP, and 18% are using sensors to capture big data.

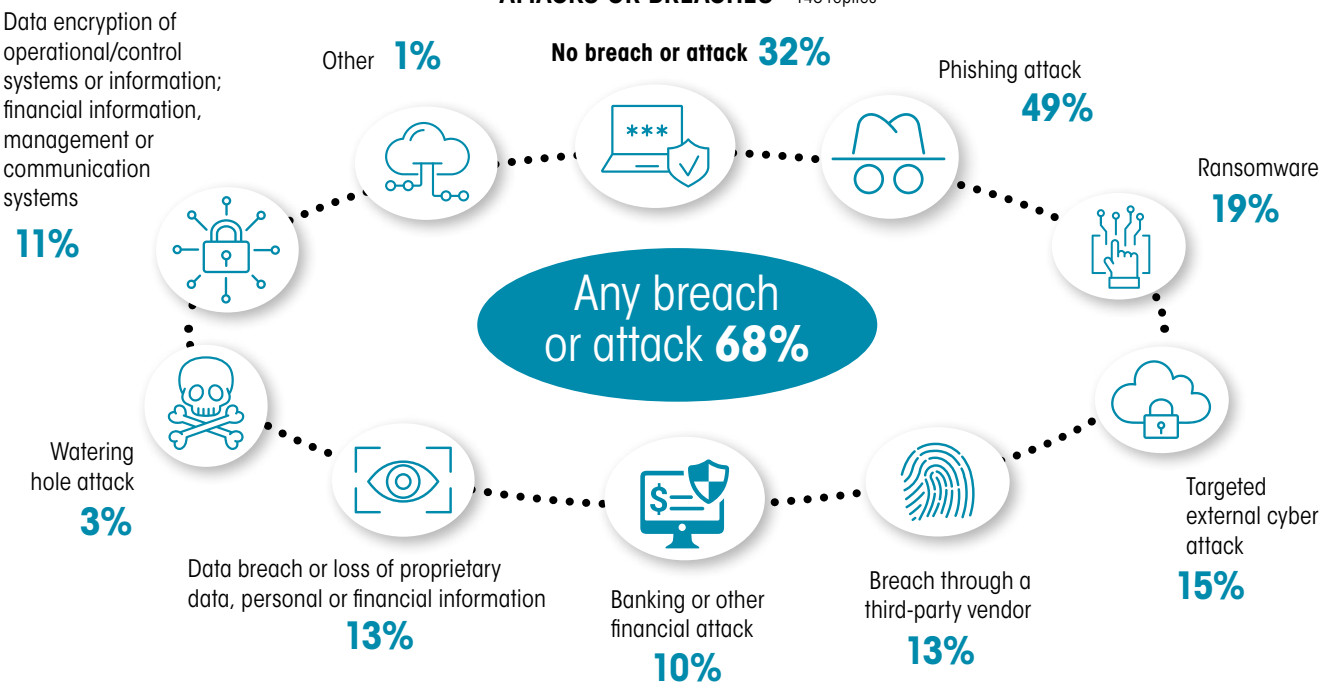
On the topic of cybersecurity, manufacturers continue to express growing levels of concern in relation to their businesses, with a 79% rating themselves as highly concerned, versus 21% not concerned. Importantly, most manufacturers have experienced a cyber-attack at their company (68%), which is a slight decline from last year (74%). The leading types of attacks have evolved, with phishing attacks leading (49%), followed by ransomware (19%), external cyber attacks (15%), a breach through a third-party vendor (13%) and a data breach or loss of personal or financial information (13%). When it comes to strengthening security, 95% of manufacturers have taken some measures to protect themselves from cyber-attacks, including a cybersecurity strategy (62%), security infrastructure (61%), data privacy controls (54%), and a cybersecurity risk assessment/review (51%). Only 24% of manufacturers feel they have taken all possible precautions to protect themselves from cyber-attacks, with 76% recognizing that they need to do more.

Overall, 72% of manufacturers in the survey have a data governance policy in place and 77% of manufacturers are concerned for the future of businesses that do not invest in advanced manufacturing technologies, a jump from 63% the year prior.

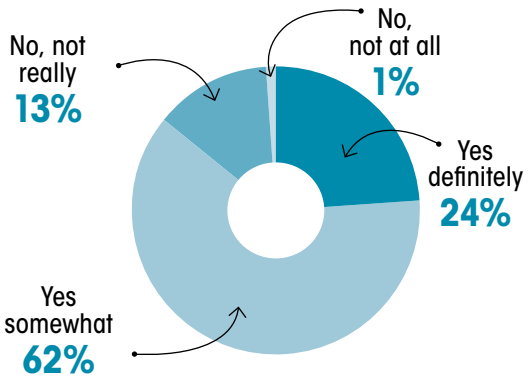
Manufacturers listed missing out on new business opportunities (55%), pricing pressures as a result of automation (53%), low margins (47%) and customer losses (32%), as their main concerns if they do not invest in Industry 4.0 technologies.

Sadi Muktadir, Editor, Advanced Manufacturing Outlook Report

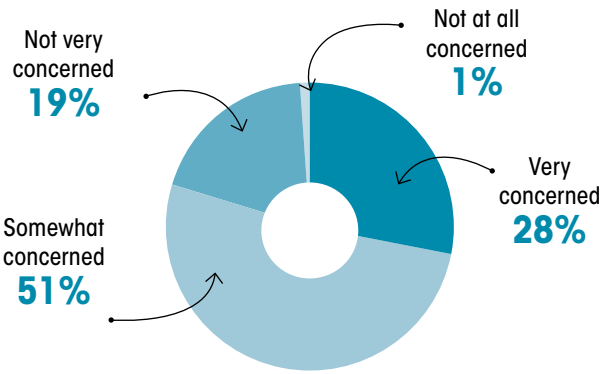
ATTACKS OR BREACHES – 140 replies



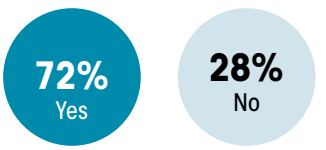
HAVE YOU DONE ENOUGH TO PROTECT YOUR BUSINESS? – 140 replies



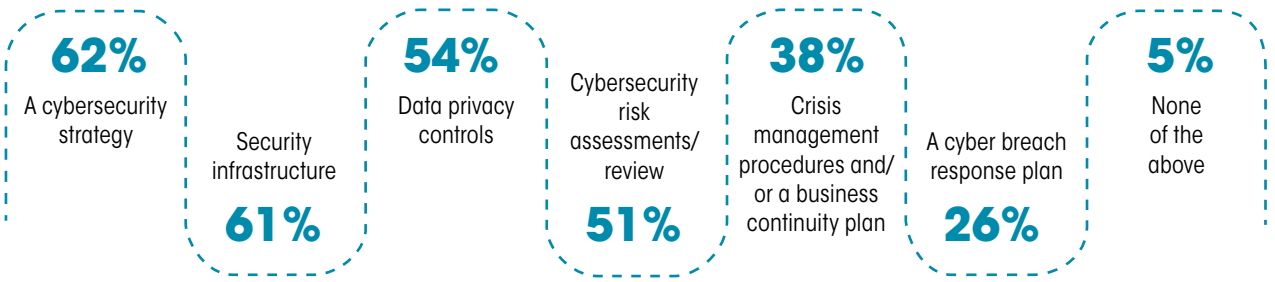
LEVEL OF CONCERN REGARDING CYBERSECURITY – 140 replies



GOVERNANCE POLICY IN PLACE – 134 replies



SECURITY MEASURES TAKEN – 140 replies



ENOUGH IS NEVER ENOUGH:

CYBERSECURITY THREATS EVOLVE

By Sadi Muktadir

After the pandemic increased the level of digitalization across all industries and sectors, many businesses were left with new levels of automation, data-collection capabilities, and other advanced solutions, but this also increased their cybersecurity risk profile.

Back in 2021, our 2022 Manufacturing Outlook Survey found that 83% of manufacturers had experienced some type of cyberbreach or attack. Today, that number has dropped to 68%. This drop suggests that manufacturers have taken action to guard against cybersecurity threats, but the picture may not be quite that straightforward.

"I don't think there's been a big change in how concerned business owners are with regards to cybersecurity. As a whole, it remains a business risk in any sector, including as we see here in manufacturing," said Seyed Hejazi, Partner and National Offensive Security Leader at MNP.

Hejazi was referring to the 79% of manufacturers still concerned with cybersecurity risks compared to 76% last year.

Speaking to the pervasive 21% of manufacturers who are not concerned with cybersecurity risks and their evolving nature, Hejazi was clear.

"Regardless of the sector, there is a minority that believes cybersecurity is not a concern at all, and I think that goes back to the level of awareness within executive teams believing they are too small to be targeted. The reality is that just because they're not connected to some critical infrastructure, it doesn't mean they won't be a target."

The data backs this up. 75% of the manufacturers in the Advanced Manufacturing Outlook survey had less than 250 personnel, and 42% of them had less than 50. 68% of all those surveyed experienced a cyber-attack or breach.

The attacks being deployed have decreased slightly year-over-year, but trends persist in the types of attacks they are. 49% have experienced a phishing attack, 19% were faced with a ransomware threat, 15% with a targeted external cyber-attack, 13% faced a breach through a third-party vendor, 13% faced a data breach or loss of proprietary data,

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and 11% faced a breach through the data encryption of operational systems or financial systems.

Mike Mohseni, Founder of AutoMetrics Manufacturing Technologies, spoke to the kinds of manufacturers that were most at threat for facing an attack.

"The number of manufacturers still using paperwork to record data also seems to be similar to the number of manufacturers who aren't concerned with a cybersecurity threat," he said.

Syed Hejazi responded with his thoughts on why that group is critical to educate.

"Unfortunately, they may not have a correct evaluation of the situation. Even if you don't have Industry 4.0 technologies, you still have operations, you still have bank accounts and you're still paying employees. I've had clients who unfortunately fell victim to cyber-attacks through their business emails. Their bank account was emptied out and they couldn't even pay their employees. If you're still even somewhat reliant on technology, you're somewhat at risk."

Hejazi, a cybersecurity professional, spoke at length about the kinds of threats facing manufacturers and divided them into two.

"Categorizing the risks that the manufacturing industry faces can be qualified into either breach of data threats, or operational activity threats. This second kind is specific to the manufacturing industry."

The cyber-attacks affecting operational and control systems on manufacturing floors were surveyed at 11%, a notably large jump from 3% the year prior. Hejazi's comments seem to suggest that these second kinds of attacks should be more of a concern for manufacturers.

Jason Lee, a Partner at MNP Digital, backed this up.

"A lot of times when we're brought in for an incident response, and when we find out where the breach happened and where the data was located, we'll find that the manufacturer hasn't put the right security in places for things they don't really think about, like the dashboards. The operational dashboards are an exposure point that's overlooked oftentimes in favour of the databases."

Syed further added onto this, saying that "the risks related to operational technologies come from the fact that these systems were built with almost no security in mind. You may see some factory floor systems that don't even have some sort of authentication method. But with the advancements that we've been talking about, it's almost impossible to completely air gap or isolate these systems."

> ***Organizations need to look and prioritize and build a culture of cyber resiliency, you need to have this culture that involves every level of the organization, not just your head of security.***
>
> ***– Jason Lee***

> ***Categorizing the risks that the manufacturing industry faces can be qualified into either breach of data threats, or operational activity threats. This second kind is specific to the manufacturing industry.***

Manufacturers seem to be less aware of the persistent threat to their operations, feeling like they have done quite a bit to protect themselves and the work is done. After having implemented a cybersecurity strategy or some form of defense, executives seem to be taking a wait-and-see approach with further security investments.

62% of manufacturers have implemented a cybersecurity strategy this year, identical to last year, but 51% have implemented a risk assessment, 61% have put security infrastructure in place, 54% have data privacy controls in place, and only 22% have a cyber breach response plan. These numbers are all a drop from the year prior, with the number of manufacturers that have a cyber breach response plan experiencing the biggest drop at -18%.

Seyed Hejazi agreed.

"What's surprising to me is the drop in the number of executives with a breach response plan. It's a key component of any cybersecurity strategy, and I'm hoping that a lot of organizations would see an incident response plan as part of their overall disaster recovery business strategy. Any disaster or crisis management program for a manufacturing organization should include cyber-attack incidents as part of its program."

There were some encouraging numbers with regard to the future.

18% of manufacturers now have a plan to invest in a technology deployment in the next 12 months, up +8% from the year prior, perhaps recognizing that air gapping legacy operation systems are not enough.

The participants seemed to agree that cybersecurity continues to be an evolving threat that needs regular reviews and assessments.

"Organizations need to look and prioritize and build a culture of cyber resiliency," said Jason Lee. "You need to have this culture that involves every level of the organization, not just your head of security."

Manufacturers continue to balance and prioritize their business needs cybersecurity threats and their looming presence over operational activities. They recognize the need to invest in a talent attraction strategy and

Manufacturing leaders head into 2025 with these concerns top of mind as they continue with their Industry 4.0 deployments and try and keep their organizations one step ahead of any possible attacks.

PENNY-PINCHING:

How manufacturers are spending less, but making their tech do more

Industry 4.0 tech branching out

By Sadi Muktadir

Photo: PhotoJamaiPhoto / iStock / Getty Images Plus/Getty Images

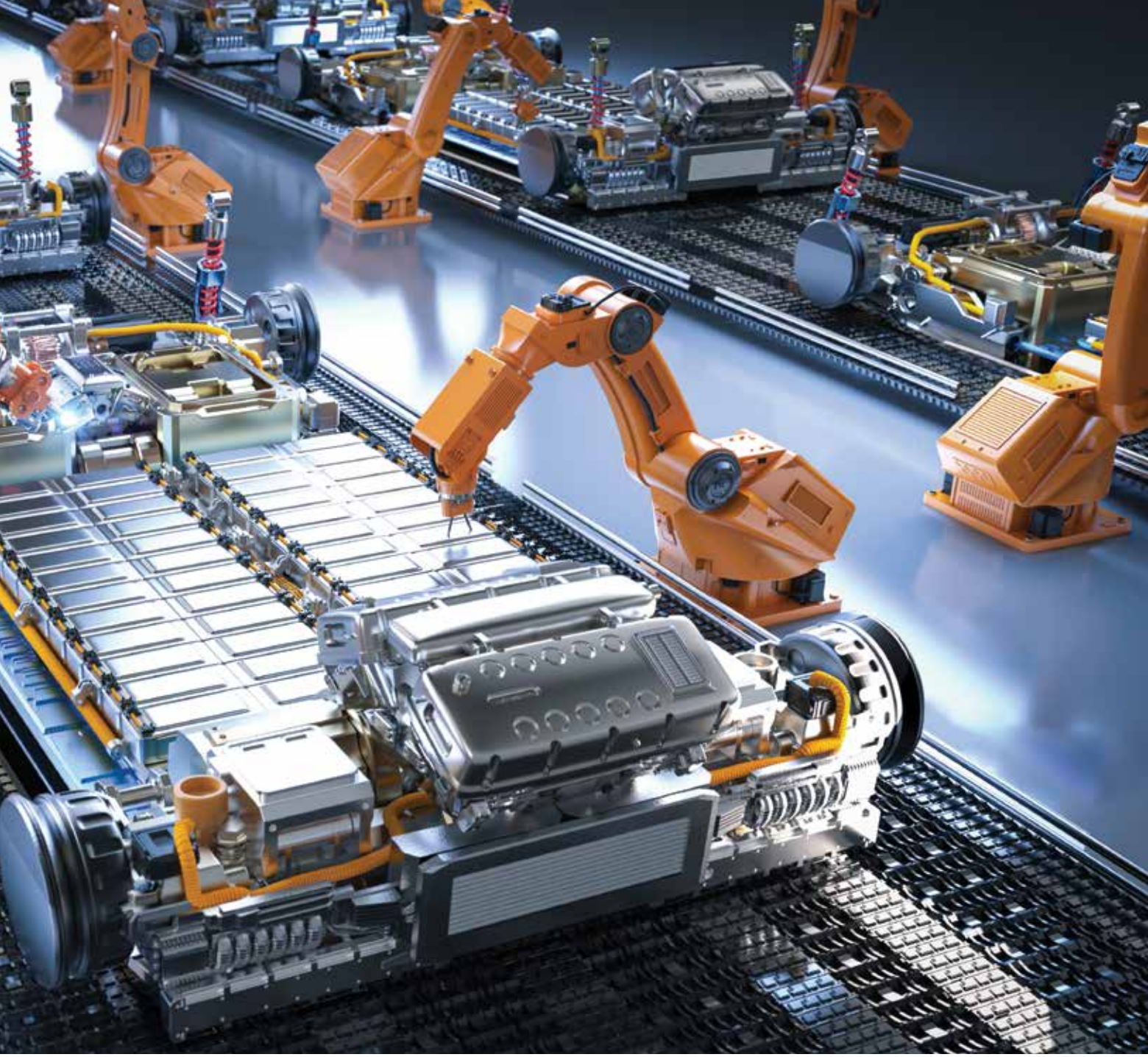
The Canadian manufacturing industry is applying Industry 4.0 technologies in a variety of ways to battle economic headwinds. Volatile interest rates and inflation have led to a rising cost of raw goods and materials, longer lead times on parts, an evolving cybersecurity threat and geopolitical issues causing trade risks have all led to manufacturers balancing a number of concerns while they compete through 2024.

Manufacturers have applied Industry 4.0 technologies across industries at an unprecedented rate over the last few years, and the rate of adoption has finally stabilized somewhat. Manufacturers have begun exploring ways to diversify their supply chains and source materials from closer to home, make their production lines do more with less, and come up with new ways to compete through their advanced technologies. These capital investments have led many manufacturers to a 'holding pattern' regarding further investments into new technologies, though there are others who recognize the crucial role these technologies may play in helping their businesses.

The future remains hazy with regard to what is on the horizon for manufacturers. Geopolitical risks causing trade issues, a fluctuating interest rate, and cybersecurity risks have all led manufacturers to take a long, hard look at spending this year. That said, the pressure to alleviate the labour shortage and replace an aging workforce grows day-to-day, even as manufacturers invest in automation and technologies that will require a specialized skillset. The Canadian government continues to laud the manufacturing industry, especially as it relates to establishing the electric vehicle manufacturing supply chain, but manufacturers are more concerned with addressing today's problems, such as doing more with fewer personnel, and remaining profitable and efficient in a thrifty economy.

These nearer-term challenges are resulting in manufacturers using Industry 4.0 technologies in increasingly creative ways to address their concerns. The technological tools include more automation, a much stronger adoption rate of AI, data visualization and analysis, cybersecurity tools, and robotics to help businesses remain competitive heading into 2025.

The 2025 Advanced Manufacturing Outlook survey investigated where



and how the application of Industry 4.0 technologies led to increased benefits, and where manufacturers were focused in the future with regards to these technologies.

We at *Canadian Manufacturing* and *PLANT* magazines released a survey over the spring and summer of 2024 to determine the deeper effects of Industry 4.0 adoption. This was our sixth instance of the survey, and we took a closer look at how advanced technologies were being applied and what the industry's biggest challenges were. The results revealed patterns, some that were eye-opening and others that were less so. Most importantly, the survey results revealed that manufacturers are not exactly where they want to be and continue to try and fill certain gaps with creative solutions.

We asked 203 manufacturing executives, leaders and business owners about their usage of AI, automation, digitalization and other technology tools. We also asked respondents about what technologies they were investing in, what technologies they were not investing in and how much they were planning to invest in the future. They were also queried on how they are capturing and using data, and what the significant challenges were for them as they considered new technologies.

For the first time, Bramm Research Inc. conducted the survey, in partnership with premier sponsors MNP and FedEx, our supporting sponsor, Excellence in Manufacturing Consortium (EMC), and our supplementary sponsor Alps Welding Ltd.

WHO TOOK OUR SURVEY?

Our survey participants were comprised of executives from all across Canada, but the majority are based in Ontario (55%), while Western Canada made up (23%). Quebec was polled at (11%) and Atlantic Canada comprised of (12%). Most of the companies surveyed were small businesses, with 42% employing less than 50 people. Of the remaining 58% that employ over 50 people, 32% employ 50 to 249 people, 12% have 250-499 people, 5% have 500-999 people, and 7% have 1,000 to 4,999 employees. 2% of those polled had more than 5,000 employees at their organization. Most of the manufacturers surveyed (60%) had over $10 million in domestic revenue, but of the 40% making less than $10 million, 30% is making less than $5 million.

Survey participants possessed an overwhelmingly positive perspective on advanced technologies and IIoT in manufacturing, with 90% continuing to see IIoT as a business growth opportunity, 83% believing that emerging technologies allow small companies to compete globally and 81% saying systems are designed with input from those who use them. Only 60% of manufacturers are saying that machinery replacement is a massive investment and will cause downtime they can't afford, which is similar to last year at 54%. This

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> ***Survey participants possessed an overwhelmingly positive perspective on advanced technologies and IIoT in manufacturing, with 90% continuing to see IIoT as a business growth opportunity.***

suggests a sustained understanding around the importance of machinery replacements. However, the positive perspective has been tempered somewhat by new challenges. 82% are still saying that Industry 4.0 is a great concept, but challenging to implement, and 46% still say they know where to find government programs to help with Industry 4.0 implementations, a stark drop from 74% two years prior. Additionally, only 77% of respondents said that upper management at their companies support Industry 4.0, revealing the lack of a buy-in at the top levels in some places.

These sentiments are bolstered by some persistent beliefs. For the second year in a row, 66% still believe that investing in new technologies raises a company's cyber security risk. Significantly, the 'wait-and-see' approach manufacturers are taking is supported by the 69% of respondents saying their company has a plan or roadmap for an Industry 4.0 implementation, a huge jump from last year's 47%.

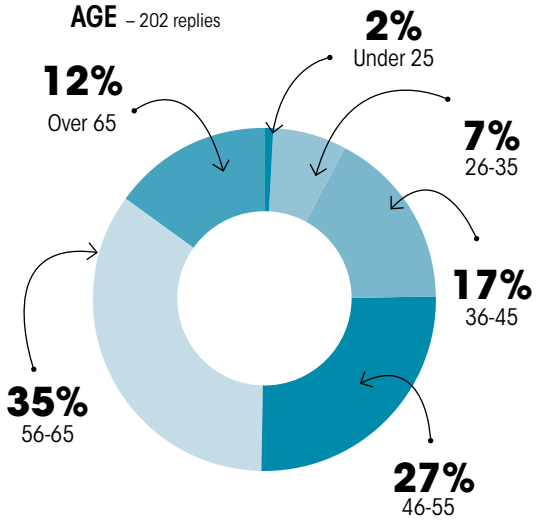
Manufacturers are still applying advanced technologies in a myriad of ways, measuring their utility and finding new ways to do more with less and compete. 58% of manufacturers say their planned technology investment has increased over the last 3-5 years, and a whopping 99% are saying that they will make technology investments over the next three years. The average intended investment has risen to $2.11 million, from $1.8 million last year, revealing that manufacturers have some serious plans for the future. When asked which technologies manufacturers were planning to invest in, 66% said they would be investing in robotics or automation, 51% said they would be investing in AI (a +17% jump from last year), and 41% would be investing in an ERP and some form of data capturing on the shopfloor. With regards to a solution for economic inflation and market volatility, manufacturers were reporting lower spending on IIoT solutions (robotics, automation, advanced analytics), but of those who were already applying technologies, they were spending notably more than the average ($91.1K vs. $40.5K). Most manufacturers are not planning a decrease in spending at all, with only 9% reporting a planned negative change in a planned investment for the second year running.

For the second year in a row, exactly 25% of our respondents identified with currently applying advanced IIoT capabilities, defined in our survey as interconnected sensors, instruments and other devices networked together through a computer's industrial applications, including, but not limited to manufacturing and energy management. This year, 18% are planning to invest in these technologies over the next 12 months, and a further 27% are in the process of evaluating its relevance to operations. 20% are also now responding that IIoT is not applicable for their business needs, which is the same number as last year.

RESPONDENT PROFILE

Those who participated in the survey were mostly male (74%), senior manufacturing executives and managers (average age 52.8 years) who for the most part have a senior level role in their companies (26%). Owners comprise 17% of the sample, 14% have a minority ownership stake and 10% are in an equal partnership. Most companies (60%) have revenues greater than $10 million. Forty two per cent have fewer than 50 employees, but the average number of employees overall is 464.

AGE – 202 replies



NUMBER OF EMPLOYEES

198 replies

Less than 50	42%
50 – 249	32%
250 – 499	12%
500 – 999	5%
1,000 – 4,999	7%
5,000 or more	2%

LOCATION

200 replies


Ontario
55%


Quebec
11%


British Columbia
11%


Alberta
8%


Nova Scotia
7%


Manitoba
3%


New Brunswick
3%


Saskatchewan
2%


Newfoundland & Labrador
2%


PEI
1%


Yukon / NWT / Nunavut
0%

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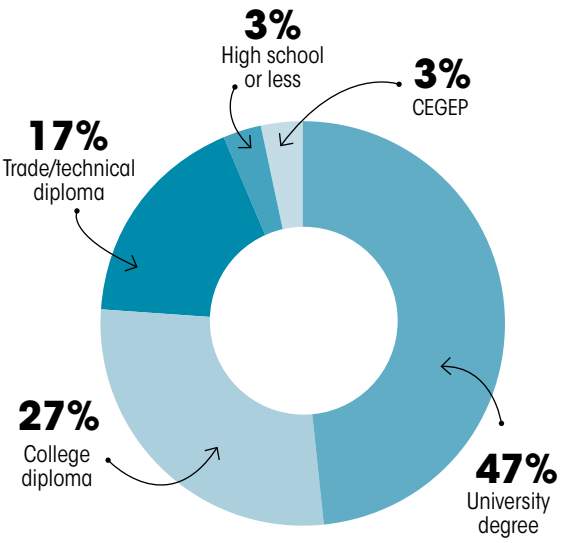
INDUSTRY SECTORS – 209 replies

Industry	%
Miscellaneous manufacturing	26%
Fabricated metal product	18%
Machinery	15%
Electrical equipment, appliance and component	13%
Plastics and rubber products	12%
Food manufacturing	10%
Aerospace product and parts	9%
Wood product	9%
Computer and electronic product component	9%
Motor vehicle parts	7%
Chemical	6%
Life Sciences	5%
Primary metal	5%
Furniture and related products	4%
Petroleum and coal product	4%
Clothing manufacturing	4%
Printing and related support activities	4%
Environmental	4%
Motor vehicle	3%
Paper manufacturing	3%
Beverage and tobacco product	3%
Transportation equipment	2%
Textile and product mills	2%
Ship and boat building	2%
Non-durable goods industries	1%
Non-metallic mineral product	1%

COMPANY REVENUE – 198 replies

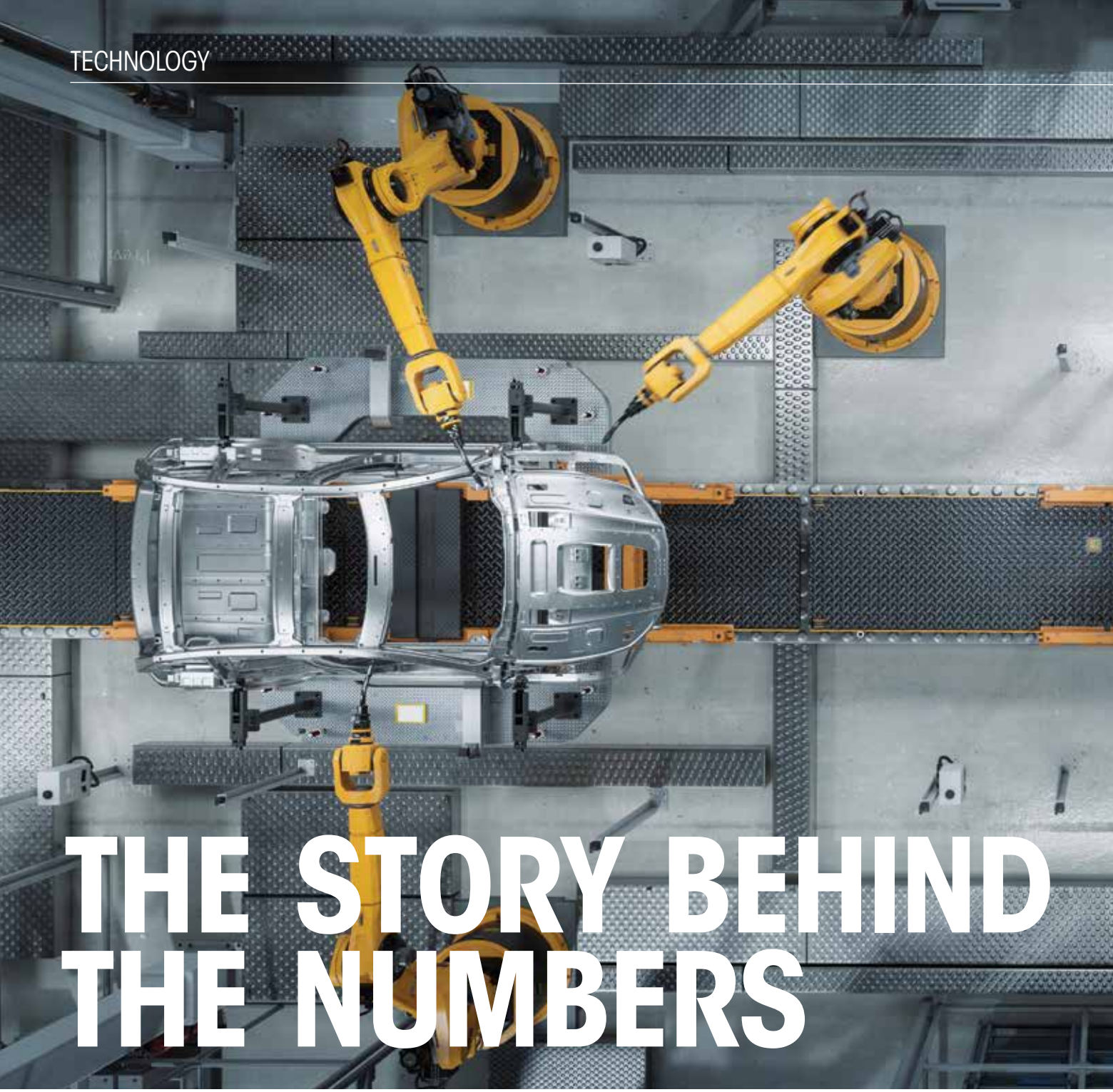
$1M to <$5M	30%
$5M to <$10M	10%
$10M to <$30M	23%
$30M to <$50M	12%
$50M to <$100M	8%
$100M to <$250M	7%
$250M to <$500M	3%
$500M to <$1B	3%
$1B plus	4%

EDUCATION – 223 replies



TITLE – 201 replies

Owner/Partner	17%
CEO/President	10%
Director	9%
Production/Operations Manager	8%
Plant Engineering	6%
Administrative Management	5%
Plant Manager	5%
Design Engineering	4%
Vice-president	4%
Technician/Technologist	4%
Purchasing/Supply Manager	4%
Maintenance Manager	3%
Materials Manager	3%
Quality Assurance Manager	2%
Safety Manager	1%



THE STORY BEHIND THE NUMBERS

In order to dive into the results of our 2025 Advanced Manufacturing Outlook survey, we invited six industry leaders, executives and business owners to a virtual roundtable held on Aug. 29. They were able to analyze the implementations of Industry 4.0 across the industry, and theorize on where Canadian manufacturers were in its journey, and some of the key challenges in seeing further benefits from it. The panel also discussed what some of the critical next steps could be for the industry as it attempts to move forward through trade market uncertainties, a resilient labour shortage and a fluctuating interest rate.

Scott McNeil-Smith, VP of Manufacturing Sector Performance at EMC (Excellence in Manufacturing Consortium), an organization that contributes knowledge, expertise and resources to over 13,000-member manufacturers across Canada, was eager to leap in and provide some commentary on why he felt there was a holding pattern on the number of companies currently applying advanced IIoT capabilities.

"I understand why engagement's kind of held steady. Smaller companies don't have the same budget for investing in technology, but they are also realizing that they can't wait any longer. There's a transition

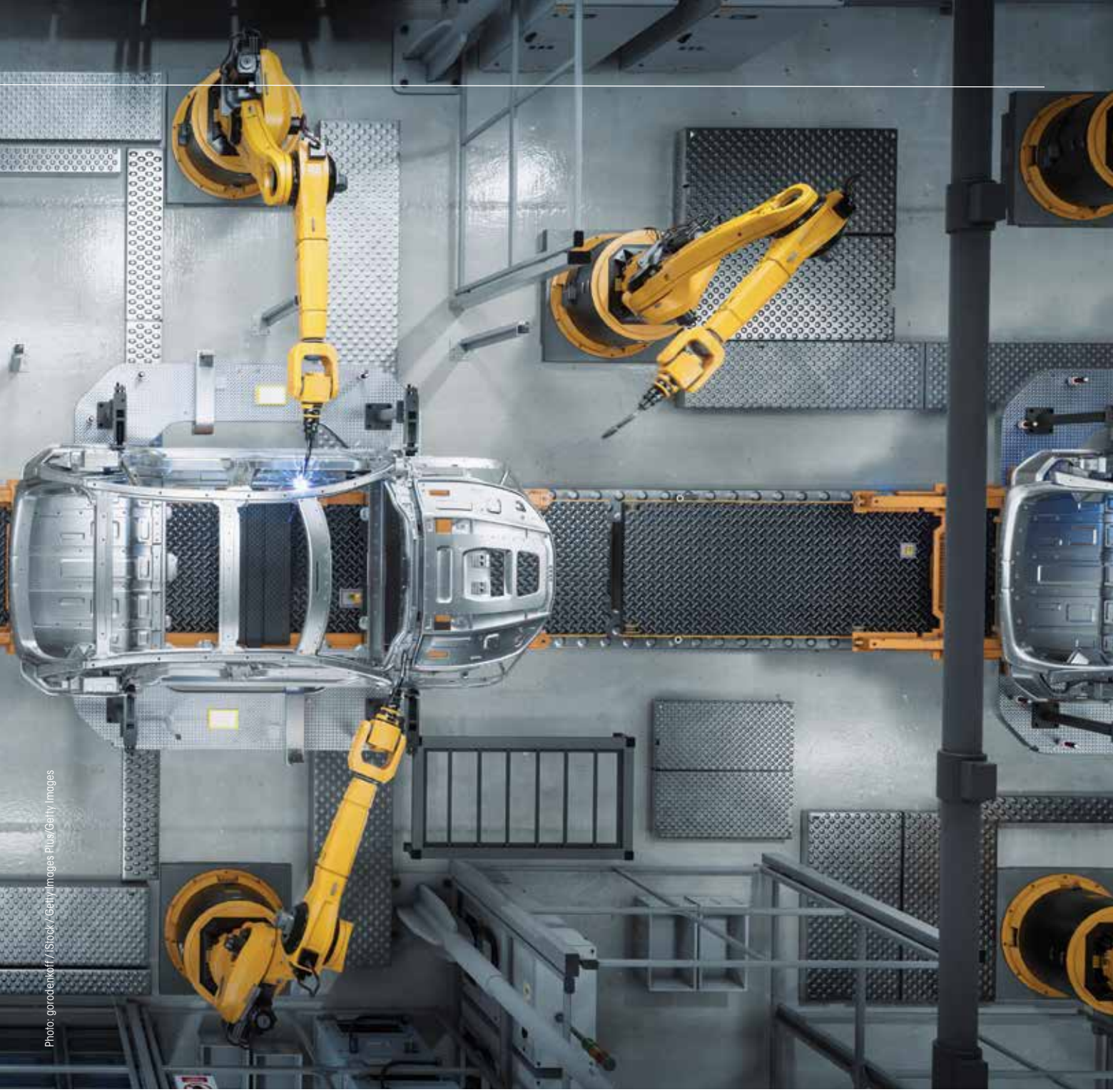


Photo: gorodenkoff / iStock / GettyImages Plus/Getty Images

happening. More companies are further along, but the smaller companies are still dealing with developing their internal capabilities. There's a barrier for them in being able to do it themselves and they're starting to address that barrier."

Smaller businesses comprised of the majority of the survey's respondents (75% of those surveyed had less than 250 employees), and may feel like they were not participating in Industry 4.0 because they did not have the budget for a large investment.

Mike Mohseni, Founder of AutoMetrics Manufacturing Technologies jumped in to address the statistics as well.

"From one set perspective, it might look like adoption of IIoT technologies is really low compared to other countries. I looked at a publication published by the Ministry of Technology in South Korea, and their number for businesses using IIoT is at 52% and 28% for AR technologies. But I think this lines up with the percentage of companies that are not familiar with IIoT technologies."

Mike Mohseni stressed the importance of education and bringing awareness to business leaders.

"Educating manufacturing leaders on the concept of IIoT, its values and implementations is one area that hasn't received a lot of support from governmental bodies. There's some funding available for implementations, but not education on what it can mean for them. I think that lack of education is a big hurdle for smaller companies."

Natalia Stephen, President and Owner of Compound Metal Coatings, Inc. offered her thoughts on the numbers as well.

"What's been said about the education aspect is true. When I was appointed Vice-Chair of the Canadian Moldmakers Association, one of our main goals became educating people on the benefits of using AI, advanced technologies and some of the funding programs available to smaller businesses. Smaller companies tend to have trouble with the cash flow to invest in an implementation, especially in the past year and a half, where the economy has been bad for manufacturing."

Jason J. Lee, a Partner with MNP Digital Services, an organization that helps businesses implement technology solutions so they create value and sustain infrastructure, commented on the number of smaller businesses that were still operating with legacy equipment, and may not be familiar with IIoT capabilities even now.

"Unless they've retrofitted a lot of this equipment with sensors and IIoT-enabled devices, they wouldn't even know what's possible there in your first question."

Jason went on to speak about how Generative AI helping manufacturers explore this retrofit.

"It may not seem readily related how Gen AI and Chat GPT can help manufacturers but we're speaking to C-Suite executives in manufacturing and when they ask us about Gen AI, we start to have a discussion on how they're using AI and ML to improve their operations. So a conversation might start about Gen AI, but it quickly becomes a larger one about IIoT."

The MNP Partner also went on to speak about where and how IIoT was being applied across manufacturing operations.

"The numbers correlate really well with some of the observations I've seen. Companies are asking 'How do I do things quicker, faster cheaper? How do you replace a workforce with automation so I can enable my workers to do something more valuable?' We've seen manufacturers using computer vision or cameras to ensure quality control as opposed to having someone sit on a manufacturing line and stare at jars and packages. Things like that have immediate ROI."

Jason also mentioned another trend he was seeing.

"We're seeing companies address where their value is most significant versus focusing on little science fair projects. They want to make sure that use-cases are identified and not just stuck on a proof-of-concept phase. They're clearing a path to scale up operations."

The panel theorized that many manufacturers were making or planning to make smaller investments, and were continuing to educate themselves on the benefits of an IIoT implementation, and have been affected by the economic market. Manufacturers are analyzing the possible benefits and how implementations could help push them into savvy business decisions.

The rise of AI

As the panel discussed the level of engagement with IIoT-enabled tools, the role of AI and its rising importance in the industry became apparent throughout the survey responses.

"At EMC, we've seen a stark increase in the number of inquiries on how to better utilize AI in a production environment," said Scott McNeil-Smith, VP of Manufacturing Sector Performance at EMC. "Manufacturers are asking what sorts of policies and procedures need to be adopted to measure how their employees are using AI on the job. Information that could be proprietary and confidential could be shared through ChatGPT as employees use tools that help them."

Scott emphasized that the increasing role of AI in the manufacturing industry could be split into companies leveraging it as a part of their business, but also employees electing to use it in their day-to-day work.

Jason J. Lee added onto this.

"Those are the same discussions we're having with organizations. One is about how we can enable and educate their teams and organization on how to use things like Gen AI and ChatGPT. A lot of our conversations are around the governance of this. When you're using AI tools, how are you securing your data? A lot of times they will say 'Okay let's use the same policies for our Gen AI and ChatGPT', and while a lot of the same policies apply, you still need to take the perspective of 'Where do we want to restrict this use?'"

Jason recommended the usage of something like a private, large language model that secures data within an ecosystem, and cites a solution like this is something manufacturers need to think about.

When asked about which processes AI was improving within manufacturing organizations, Jason referenced efficiency and productivity.

"A lot of the improvements gained from AI go under the umbrella of improving manufacturing efficiency. Reducing downtime, improving quality, optimizing maintenance schedules, things like that are about doing more with less and using data to drive your decisions."

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Jason went on to connect the link between AI and the data derived from it.

"You've got an aging workforce in manufacturing. You've got the next generation of a technology-enabled workforce and they're going to be making decisions through data collection and AI. They don't have thirty years of experience to know what to do in certain situations. They're going to be leveraging computer vision, predictive modelling, that kind of stuff."

Dennis Dussin, President of Alps Welding Ltd. a Woodbridge, Ont.-based metal fabricator and pressure vessel manufacturer added onto this, saying "This is all so new and it's moving quickly. What I've noticed is that even this part of the survey and some of these questions weren't being asked as recently as two years ago. We have a set of problems and we're looking for tools to solve these kinds of problems, but the tools are evolving so quickly that if we ask this question again twelve months from now, they'll be used to address a whole new set of problems."

Dennis asserted that AI will continue to transform the way we do things, and but right now AI tools may be addressing the "lowest hanging fruit" in manufacturing operations.

Manufacturers are asking what sorts of policies and procedures need to be adopted to measure how their employees are using AI on the job. Information that could be proprietary and confidential could be shared through ChatGPT as employees use tools that help them.

Given how much data is coming from accounting packages and spreadsheets, you can predict so many variables and forecast, monitor and spend accordingly.

More data: Under the hood of what's driving decisions

When trying to determine how IIoT-enabled operations have been used thus far, the panel moved on to the role of data, and where manufacturers were using it to boost their success.

Dennis Dussin started things off by commenting on the persisting level of paperwork still being used across manufacturing organizations.

"It did jump out at me that manual paperwork persists at the level that it has. Technology is not just about the tools itself, but also about the people and processes. It looks like maybe companies haven't changed their processes. If the culture hasn't changed then maybe the behaviour still continues. I think you can try and throw a lot of technology at that problem, but if you're not fundamentally changing your culture, the manual paperwork will persist."

Natalia Stephen added onto this idea.

"We've seen this as well, when we receive an order, we always receive an electronic copy and a paper copy as well. I don't know what that persists," she said. "But I can still see the need for paper sometimes to accompany a product just in case something gets lost in the way."

Jason J. Lee commented on the opportunities coming from data collection.

"Given how much data is coming from accounting packages and spreadsheets, you can predict so many variables and forecast, monitor and spend accordingly. There's an opportunity for organizations to look at and refine their warehousing and inventory management."

One of the other opportunities provided by data collection and visualization included new revenue streams and increased profitability, a point that Jason also mentioned.

"Data has also sometimes developed the capability for some sort of ESG compliance that isn't available from an out-of-the-box solution and companies might be looking to white-label that and sell it, which is a huge opportunity. I'm curious to see where other organizations are in terms of their analytic capabilities and how they're selling and packaging what they're finding through data."

Mike Mohseni also spoke about this idea.

"What we've seen from large manufacturers is that incorporating more analytics and transparency has essentially helped them sell better to OEMs and increase their margins. I believe this comes under the umbrella of developing analytics capabilities to help with sales."

The roundtable's discussion pointed towards data being used to develop a strategy that would help manufacturers do more with less, and find new sales avenues to explore.

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Standing on business: Productivity and efficiency remain paramount

The panel began discussing some of the ways manufacturers were applying Industry 4.0 tools in their businesses, and how many of the focus areas for the tools have remained the same, with slight adjustments.

The top uses of IIoT were in improving efficiency/productivity (46%), tracking materials and shop floor assets (34%), visibility of data from manufacturing floor to management (34%), providing more visibility into production processes (33%), analytics functionality (29%), improving maintenance functions (24%), and developing smart products (16%) and new revenue streams (11%).

Dennis Dussin commented on the pressure to improve productivity.

"A lot of manufacturers are experiencing a pressure to improve productivity over the last couple of years. The productivity numbers in Canada are somewhat lower than our peers and because of international cost pressures, manufacturers are looking at productivity gains and that's why improving efficiency and productivity is at the top of where IIoT is used. I'd argue that all of the current uses of IIoT are addressing productivity in a way. If you're not using technology, then you're not improving productivity, and if you're not improving productivity, you're not surviving these days."

With regards to the key benefits manufacturers were seeing, Jason was clear to emphasize the importance of doing more with less.

"One observation for me on this was that after the pandemic, there were a lot of challenges with regard to labour. Employee shortages, turnover rates and other things that made it a big challenge for manufacturers to operate. Automation has become a way to address some of those issues."

Mike Mohseni posited an idea about IIoT and how the benefits seen have grown over time.

"For those who have adopted IIoT and seen its productivity improvements, it's reasonable to imagine that it takes them a year to realize its value so it makes sense that the percentage seeing an increased quality of product is really high."

For those who have adopted IIoT and seen its productivity improvements, it's reasonable to imagine that it takes them a year to realize its value so it makes sense that the percentage seeing an increased quality of product is really high.

Roadblocks to seeing benefits

The discussion moved on to the kinds of benefits manufacturers were seeing from IIoT deployments, what were some of the challenges to investing in order to see those benefits.

The key benefits being seen by manufacturers according to the survey include an increased quality of product (47%), increased throughput (43%), reduced downtime (38%), a lower cost of operation (37%), reduced staff requirements (29%) and product innovation (23%).

There was a strong discussion around what the key challenges were for manufacturers with regard to seeing some of these benefits.

90% of respondents listed a reason for not investing in technology. The top cited reasons for not investing in technology include that it is too costly (37%), difficulties in integrating advanced technologies into existing systems (35%), lack of skills to support investment (34%), lack of financing and support (33%), uncertainty, risk and disruption (26%), an investment not necessary for continuing operations (19%) and not convinced of the economic benefit (17%).

"I think it's interesting that too costly is the number one impediment. It ties back to the fact that businesses aren't seeing a reduced cost in operating their production lines, and they're realizing that this promise of investing in technology and saving money eventually, also costs a lot of money to implement right. Skill levels of the people in your organization have to go up to deal with some of the technologies you're implementing and there are costs associated with that," said Scott McNeil Smith.

Scott also added that for SMEs, this cost means a lot, and ties into the increased number of respondents feeling like there was a lack of financing available to them and a lack of skills to support an implementation.

Natalia Stephen pointed towards the economy and political climate as a possible roadblock to an investment.

"For the past year, or year and a half, manufacturers haven't really been buying, perhaps because it's an election year, or the political climate. If we conduct this survey again next year, we might see the numbers change. Right now, businesses are extraordinarily careful with investments. Interest rates are high, and that ties into the lack of financing."

Jason J. Lee emphasized an Industry 4.0 solution as a long-term solution and understanding the cost associated with it.

"With things like AI, ML, manufacturers need to understand the cost of adoption. There's a significant investment in getting it up and running, and then maintaining it. We try and tell manufacturers to think about implementation as an operating expenditure over a few years because it is that significant sometimes."

Mike Mohseni spoke about the market challenges with regard to investing to see these benefits as well.

"When the ROI is not clear, it's difficult to invest. A lack of skills to support an investment may point towards not knowing what it is exactly they're taking on when they're considering an implementation."

Jason J. Lee added on to another roadblock in the form of finding top-end talent to bolster the lack of skills that could support an investment.

Photo: Patamaporn Umnahanant / E+ / Getty Images

"When the ROI is not clear, it's difficult to invest. A lack of skills to support an investment may point towards not knowing what it is exactly they're taking on when they're considering an implementation."

"You're definitely competing against every other technology company for top talent. The pace of technology is evolving at a mach speed, and upskilling your team is a challenge as well. Even for us, it's a challenge to keep ahead."

Scott McNeil-Smith added onto this idea of upskilling.

"Manufacturers are often thinking about product or process related skills, and consider technology as an enabler, but every manufacturing business is increasingly becoming a technology business and we need to change the lens that we look through and understand that we've got to be investing in new technology and skills. Whatever people knew two years ago is less relevant today. Investing in our employees needs to be a priority and I don't think all manufacturers look at it that way."

APPLYING IIoT – 203 replies	Total	Currently applying	Have a plan	Evaluating	Not familiar
Improving efficiency/productivity	46%	82%	64%	46%	5%
Visibility of data from mfg. floor to ceiling	34%	62%	56%	26%	8%
Tracking materials, shop floor assets	34%	60%	50%	30%	8%
Providing more visibility into production	33%	68%	39%	30%	5%
Analytics functionality	29%	56%	39%	26%	5%
Improving maintenance functions	21%	28%	34%	28%	3%
Developing smart products	16%	30%	22%	15%	5%
Developing new services/revenue streams	11%	20%	14%	9%	3%
Consolidating control rooms	9%	18%	11%	7%	3%
Not currently applying IIoT	33%	2%	0%	14%	80%

REASONS FOR NOT INVESTING IN INDUSTRY 4.0 – 202 replies

37%	Too costly
35%	Difficulties integrating advanced technologies in existing systems
34%	Lack of skills to support investment
33%	Lack of financing and support
26%	Uncertainty, risk and disruption
19%	Investment not necessary for continuing operations
17%	Not convinced of economic benefit
15%	Lack of support or services from government
13%	Lack of adequate information about advanced technologies
13%	Not sure where to start
11%	Concerned about exposure to cyber security threats
11%	Weak customer demand

IIoT ENGAGEMENT – 202 replies

25%	Currently applying IIoT capabilities
27%	In the process of evaluating its relevance to operations
20%	Not familiar with IIoT capabilities
18%	Have plan, investing in technology for deployment in next 12 months
11%	Not applicable

USING MACHINE LEARNING – 140 replies

RATE THE FOLLOWING – 139 replies

90%	I see IIoT as a business growth opportunity
83%	Emerging technologies allow small companies to compete globally
82%	Industry 4 0 is a great concept, but challenging to implement
81%	Systems are designed with input from those who use them
77%	Upper management at our company supports industry 4.0
69%	Our company has a plan/roadmap for I4.0
66%	Investing in new technology raises the company's cyber security risk
60%	Machinery replacement is a massive investment and will cause downtime we can't afford
46%	I know where to find government programs to help with new technology investments

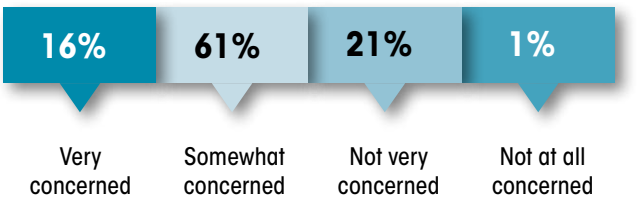
LEVEL OF AUTOMATION 140 REPLIES

Machines, processes require significant human involvement	39%
Machine-driven, some human intervention	31%
Minor automation, processes mostly require human involvement	29%
Primarily machine-driven systems, minimal human intervention	4%
No automation systems in place	3%

BENEFITS FROM TECHNOLOGY UPGRADES 202 replies	%
Experienced a Benefit	89%
Increased quality of product	47%
Increased throughput	43%
Reduced downtime	38%
Lower cost of operation	37%
Reduced staff requirements	29%
Product innovation	23%
Increased energy efficiency/reduced GHG emissions	22%
Reduced time to market	21%
Increased cybersecurity	16%
New revenue streams	14%
Other	2%
None of these	11%

FUTURE CONCERNS

CONCERNS ABOUT BUSINESSES NOT INVESTING IN INDUSTRY 4.0 – 140 replies



PERCEIVED RISKS TO INVESTING IN INDUSTRY 4.0

203 REPLIES

- **60%** Integrating technology with current operations
- **56%** Financial concerns
- **44%** Resistance to change
- **42%** Cybersecurity threats
- **2%** Other
- **8%** None of these

NOTHING VENTURED NOTHING GAINED:

HOW MUCH MANUFACTURERS ARE SPENDING

The discussion transitioned toward the investments manufacturers were making, and how much it has changed over the last 12 months, and how much manufacturers will adjust the amount heading into the future.

From those familiar with IIoT, the key technologies being spent on are cloud computing (71%), ERP (67%), data capturing machine (66%), IIoT/M2M (58%), advanced analytics (57%), 3D printing/additive manufacturing (52%), robotics/automation (56%) and AI (41%).

Natalia Stephen started off by mentioning the importance of automation and its continued spending on it.

"I think that everybody's going to continue to move whatever they can to automation. It's a no-brainer in manufacturing. With the help of technology, you can stay ahead because the cost of labour has risen so much. You can't hire anybody to wash dishes for less than $22 an hour now. The industry recognizes that and this is the way to go.

Scott McNeil-Smith agreed and elucidated further.

"I think manufacturers are looking for a direct relationship between investment and return. If they can automate these processes then that's a straight translation into savings and a productivity improvement. That's why an ERP investment remains so high. Manufacturers don't just have manufacturing processes, they've got purchasing processes and project management and quality processes. If they can automate these things then they'll do that."

When looking at where manufacturers were looking to invest in the next 3-5 years, Jason J. Lee drew a conclusion from the survey responses.

"For me, AI, data capturing and advanced analytics are all part of the same thing. You're trying to achieve near real-time data decision making."

Mike Mohseni also added onto this point.

"We are also seeing that companies are defining data capturing machine and advanced analytics as AR. They're very different of course, but they do get grouped together under an umbrella."

When survey respondents were asked to reveal the amount they intended to spend on these technologies has changed in the last 3-5 years, 58% said the amount has increased, while 9% said there was a decrease, identical to the year prior. 32% revealed there had been no change.

Scott McNeil Smith provided his insight there.

"I think this speaks to just how much more expensive this has become.

Photo: yoh4nn / iStock / Getty Images Plus/Getty Images

The technology has gotten better and more sophisticated and a lot of manufacturers are looking at projects and realizing that when they get through it, it costs more. Maybe it's being undersold by vendors, but people think some of it is free because they use ChatGPT but once they use these tools at an industrial scale they're going to find a lot of costs."

Jason J. Lee seemed to agree.

"With AI projects, the processing costs start to become apparent. When you start processing AI models that consumption cost starts to add up. As soon as you scale AI out to an organization you go from hundreds of dollars a month to thousands of dollars a month."

Mike Mohseni came at it from a different angle.

"I think a lot of supply chain challenges that happened in the past year, with the market being really up and down has played a role in people's motivation to invest in technology. It's been a tough couple of years from a supply chain perspective. Every manufacturer has had an issue hiring for specific jobs."

"With AI projects, the processing costs start to become apparent. When you start processing AI models that consumption cost starts to add up. As soon as you scale AI out to an organization you go from hundreds of dollars a month to thousands of dollars a month."

STILL ROOM FOR MORE AUTOMATION

When it came to automation, survey respondents said that their company's level of automation was machine driven with some human intervention (31%), machines with significant human involvement (39%), minor automation processes (23%), primarily machine-driven with minimal human involvement (4%) and no automation in place (3%).

"I think this response kind of depends and is application specific but generally this makes sense. Manufacturers are trying to do more with less. I'm not surprised seeing human involvement go down at all," said Natalia Stephen.

"Grabbing data from IIoT equipment isn't dependant on human beings so whatever platform or solution will ingest that data for us is great. It doesn't need a human for that."

Dessin Dussin spoke to the growing trend of automation, and its related ML and AI applications increasing in usage.

"I think it's going to continue. The way we use these tools is limited right now by our imaginations and as time goes we'll see these tools being used in ways we're not anticipating right now."

Jason J. Lee spoke to the importance of having a plan and roadmap when automating or using AI.

"Once you've done a use case for one sensor or one piece of equipment, the ability to repeat that should accelerate. Organizations that have a strategy and roadmap already in place will see their automation accelerate even further because now that they've ingested the data and cleaned it and know what needs to happen next they can scale it across other machines."

Photo: urfinguss / iStock / Getty Images Plus/Getty Images

198 replies

INVESTING PRIORITY OVER THE PAST 12 MONTHS	%	AVERAGE SPEND
Cloud	71%	**$42,900**
ERP	67%	**$63,100**
Data capturing/shopfloor	66%	**$46,400**
IIoT/M2M	58%	**$40,500**
Advanced analytics	57%	**$35,500**
Robotics, automation	56%	**$77,600**
3D printing, additive manufacturing	52%	**$32,700**
Artificial intelligence	41%	**$22,800**
Digital twinning	28%	**$18,100**
Virtual reality	24%	**$13,200**

140 replies

TECHNOLOGY PRIORITIES OVER THE NEXT 3-5 YEARS	2025
Robotics, automation	66%
Data capturing machine/shopfloor	41%
ERP	41%
Advanced analytics	39%
Cyber security	38%
Cloud	36%
Energy Management Systems	35%
Artificial intelligence	34%
3D printing, additive manufacturing	34%
Virtual reality	16%
Digital Twinning	12%

AVERAGE SPEND OVER NEXT THREE YEARS

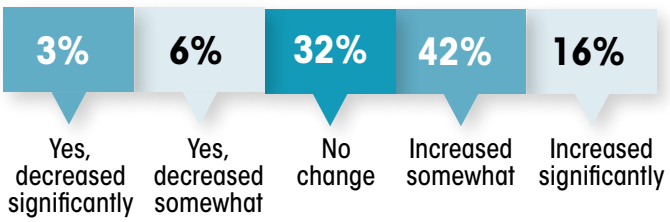
$2.11 MILLION

($1.8 MILLION IN 2024)

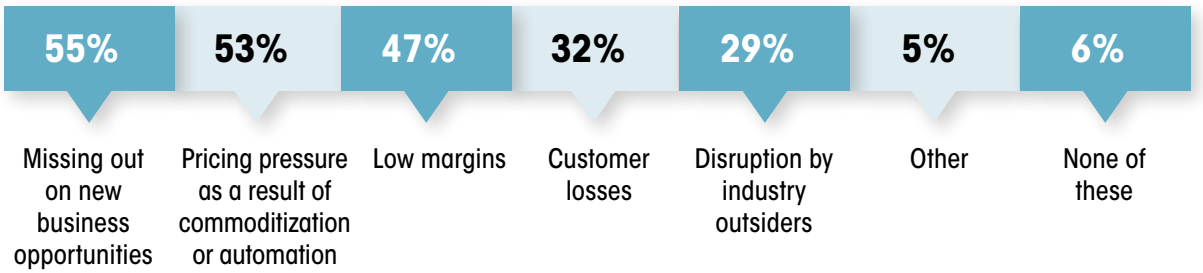
203 replies

HOW IS YOUR COMPANY APPLYING IIOT	%
Improving efficiency/productivity	46%
Tracking materials, shop floor assets	34%
Providing more visibility into production	33%
Tying in business data from top to bottom	34%
Improving maintenance functions	24%
Developing smart products	16%
Analytics functionality	29%
Developing new services	11%
Developing smart products	16%
Consolidating control rooms	9%

HAS THE AMOUNT YOU INTEND TO SPEND ON IIOT CHANGED IN THE LAST 3-5 YEARS? 197 replies



GREATEST THREAT IF NOT INVESTING IN TECHNOLOGY 139 replies



RE-EXAMINING CYBERSECURITY PLANS

The discussion evolved to how cybersecurity has changed over the last year, and some of the new threats and challenges manufacturers are facing from that perspective. When speaking about some of the measures manufacturers have taken to protect themselves, Seyed Hejazi, Partner, National Offensive Security Leader at MNP, spoke about the gaps in the measures businesses have taken.

"It makes sense that companies have a cybersecurity strategy, security infrastructure and data privacy controls in place. I would like to see manufacturers expand data privacy control to data protection controls as a whole, because there are so many other kinds of data that need to be protected. But what is surprising to me is the drop in attention to having a breach response plan. It's a key component to any cybersecurity strategy."

Seyed further suggested that perhaps there was a drop in having a breach response plan because companies had already implemented one in years prior, and didn't see it as an ongoing activity.

Jason added onto these ideas.

"Organizations need to build a culture of cyber resiliency. As you know the number of cyber-attacks have gone up, right? Insurance companies are locking down on compliance and rejecting claims because you need to have this culture of security that involves every level of the organization."

Organizations need to build a culture of cyber resiliency. As you know the number of cyber-attacks have gone up, right? Insurance companies are locking down on compliance and rejecting claims because you need to have this culture of security that involves every level of the organization.

Dennis also brought up an interesting finding regarding the number of respondents who weren't worried about any cybersecurity risk.

"There's always a portion of respondents who are sort of complacent and think they're okay or they're not too worried, and they're going to be surprised. It's a constant thing you have to be aware of and push for because it affects everybody. Suppliers, customers, we can all be hurt by their complacency too."

Photo: matejmo / iStock / Getty Images Plus/Getty Images

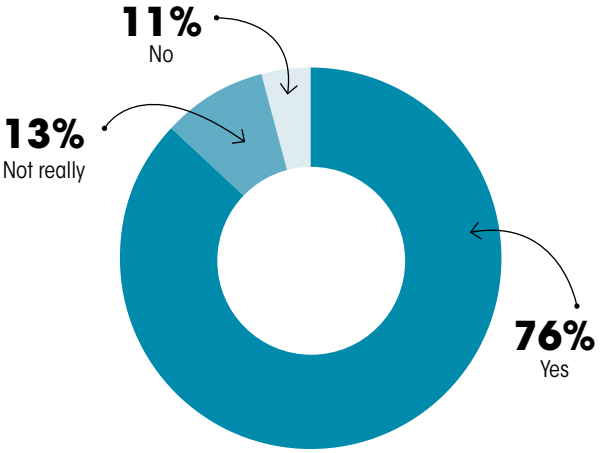
HOW DATA IS MONETIZED – 140 replies

- Improving operational efficiencies **65%**
- **37%** Adding new services to existing offerings
- Leveraging supply chain/ customers **32%**
- **32%** Developing new business models
- Adding new services to existing offerings **29%**
- **23%** Developing analytics capabilities for external sale
- Partnering with similar companies **15%**
- **12%** None of the above
- Other **1%**

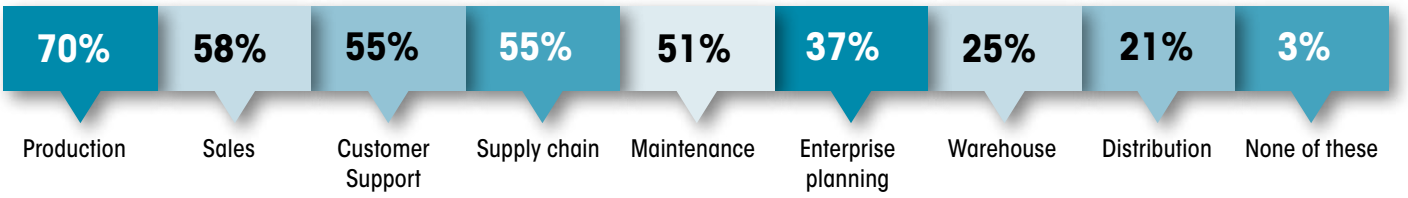
COLLECTING AND USING DATA – 140 replies

72%	Spreadsheets, such as Excel
58%	Integrated ERP for supply chain
50%	Accounting package
38%	MRP
35%	Manual paperwork
18%	Sensors-big data

USING CLOUD SYSTEMS – 140 replies



AREAS TO IMPROVE DATA – 139 replies



FINAL THOUGHTS

By Sadi Muktadir

To end our roundtable conference, panel participants were asked to give their final thoughts on the survey data and where the manufacturing industry was headed next.

Dennis Dussin said, "The technologies are changing so fast that their definitions are constantly changing. We're at an inflection point where technology is embedded in everything we do as manufacturers. We can take a deeper dive into how manufacturers would define technology and as it evolves year over year. It remains an interesting time."

Jason J. Lee said, "When that shiny new object comes out, it's really important to try and understand, plan, the people-process-technology part of it. Make sure you know what you're trying to tackle is realistic. There are valid use cases for IIoT that will make you save money, make money, and do things faster, quicker and better. It's just making sure you identify what that use case is, not biting off more than you can chew, and not trying to boil the ocean."

Seyed Hejazi said, "Throughout this, we saw the importance of cybersecurity and we also that strategy matters when it comes to running a manufacturing business. As technology grows, this cybersecurity element becomes bolder and bolder, there are more avenues to potentially attack and there are also more ways to secure ourselves."

Natalia Stephen said, "Most people are recognizing the need for using technologies. But the change is happening very fast, and a lot of people are scared and a lot of people are excited. I think that if we do this again next year, if the interest rates are lower, people will be more encouraged to invest. We're heading in that direction anyway and there's no turning back. I think the only reason people are reluctant right now has to do with financing."

Mike Mohseni said, "I'd love to see how the Canadian appetite is changing in relation to risk culture, because new technology adoption is very much tied to the culture of taking risk. Education is also really important, manufacturers are going to take some time to survey all of the available technologies and I think we need a high level support that allows manufacturers to get exposed to these new technologies in a less risky way."

Scott McNeil-Smith said, "It's not enough to do an equipment swap. It's clear that when we say 'people, plan and process' that's something that's key. You've got to upskill your workforce, you've got to put in that change plan and you've got to follow up continuously with it. If you're lacking in any of those areas, you're going to be challenged."

Manufacturers look forward to 2025, weathering inflation and volatile interest rates, geopolitical uncertainties and supply chain troubles to find ways to keep their businesses competitive and successful. They're expanding the use of their Industry 4.0 implementations to do more with less, and explore ways to respond to a quickly evolving marketplace. The Canadian manufacturing industry continues to change, landing on innovative solutions to funding and personnel issues, and explore solutions to bring new benefits and products onto the marketplace. While the future may remain uncertain, manufacturers continue to display a commendable level of persistence, ingenuity and appetite for growth, thanks in large part to their Industry 4.0 commitment.

Photo: amgun / iStock / Getty Images Plus/Getty Images

2025 Advanced Manufacturing Outlook Roundtable Panelists

SPONSORS

Dennis Dussin
President
Alps Welding Ltd.

Jason J Lee
Partner, Applied Data
National Lead
MNP Digital

Seyed Hejazi
Partner, National
Offensive Security
leader
MNP Digital

Scott McNeil-Smith
Vice-President –
Manufacturing Sector
Performance
Excellence in
Manufacturing Consortium

PANELISTS

Mike Mohseni
Founder
AutoMetrics
Manufacturing
Technologies Inc.

Natalia Stephen
President and Owner
Compound
Metal Coatings

RESEARCH

Gerald Bramm
President
Bramm Research Inc.

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Hussam Malek, P.Eng, M.Eng, MBA, Partner | 416.515.3866 | hussam.malek@mnp.ca

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