2024 ADVANCED MANUFACTURING OUTLOOK REPORT

Industry 4.0 is here: Are Canadian manufacturers ready?

Published by:

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EMBRACING A DATA-DRIVEN FUTURE

By Tony Alderdice

Manufacturing is the heart of the modern economy, and technology is the heart of modern manufacturing. The typical plant today is a high-tech whir of advanced machinery, powered by software and operated by skilled workers. It's a beautiful sight watching raw materials undergo a process to produce the building blocks of day-to-day life, from food to medicine to shelter and beyond.

For manufacturers in Canada, there is much to be excited about. The value added in the market is projected at a steady 2.47% CAGR through 2028, and as this year's Advanced Manufacturing report shows, 96% of manufacturers familiar with IIoT are planning to invest in new tech over the next 3-5 years.

Manufacturers are on an eternal quest to improve efficiency while increasing profits, boosting margins, and expanding sales, all the while delivering excellent customer satisfaction. In our complex digital universe, simplifying and solving daily shop floor problems—with an eye toward business scale and growth—often means deploying advanced technological solutions.

But solutions are only as good as the teams behind them, and all people, too, are products of their environments, organizational and macroeconomic. For Canadian manufacturers, success comes from the clever navigation of current trends—two of which have recently emerged as the industry's driving forces.

Developing a Connected Workforce in a Labour Crunch

To maximize productivity, most manufacturers strive for a connected workforce capable of running three shifts per day, every day. This is a massively complex undertaking, requiring shrewd practices across hiring, training, cross-training, upskilling, and scheduling, especially in IIoT environment.

A truly connected workforce means that the right people are always in the right place to keep the plant humming. Talented workers have the right training to do their work and support other teams, so that when shifts change and scheduling issues arise, operations continue seamlessly, reducing downtime.

The foundation for a connected workforce is cloud ERP that centralizes information across the organization. With properly flowing data, automation and decision-making speed up and improve, and the top challenges of working with data—siloed systems and a lack of internal experts—start to evolve into opportunities.

Capturing Supply Chain Value in the Shift to Nearshoring

Over the past few years, supply chain disruptions affected practically every manufacturer across the country. One solution has been nearshoring, which comes with its own set of complications—as well as opportunities.

Nearshoring may bring more manufacturing jobs to Canada; it will certainly eliminate the headaches of supplies stuck in faraway canals. But nearshoring creates new cost structures, as locally produced parts and materials can affect assembly and production costs. With new vendors and resources requiring new systems and management, nearshoring effectively necessitates an entire supply chain reworking.

The key ingredient in managing this is data. The manufacturers that strategically upgraded their systems and streamlined their data—the ones that turned their creaky supply chain into a dynamic value chain—should have a blueprint for how to align tech and workers in this landscape. Get it right and you can be super productive with higher ROI.

Toward a Tech-Enabled Future

A discussion about technology in manufacturing is not complete without a quick point about artificial intelligence. As AI continues to mature, it will proliferate, promising huge returns to manufacturers that can harness it for highly actionable, data-driven insights.

Along the way, AI may reduce redundancies, eliminate repetitive tasks, and generate eerily predictive analytics in ways yet unimaginable. You may one day use an advanced algorithm to thwart a ransomware attack or automate every area of your energy output, helping you achieve sustainability goals, meet compliance, and save money.

Stage now, get ahead, and don't let a little uncertainty steer you amiss.

Tony Alderdice,
Vice President of Sales,
Epicor Software

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ADVANCING MANUFACTURING IN CANADA

By Scott McNeil-Smith

Manufacturing is a cornerstone of Canada's economy, contributing significantly to GDP and providing employment to over 1.8 million individuals from all walks of life. To remain competitive on a global scale and ensure sustainable growth, Canada's manufacturing sector must continue to evolve.

For Canada's largest manufacturing consortium, EMC's approach to 'Advancing Manufacturing in Canada' is multifaceted, focused on: Developing a skilled workforce, incorporating advanced manufacturing, clean technologies, streamlining sustainable manufacturing processes and harnessing the transformative power of IIoT. For over a quarter of a century, EMC has been a steadfast partner and resource for manufacturing leaders across Canada.

People: Developing a Skilled Workforce

Equipping the manufacturing sector with a skilled workforce is paramount. To thrive in an era of rapidly evolving technologies, Canada's manufacturing industry requires highly trained individuals who can efficiently produce a diverse array of products, operate and maintain advanced machinery, analyze data, and adapt at an unprecedented pace.

Investing in workforce development encompasses education, apprenticeships, and lifelong learning opportunities. Early engagement with youth is vital, and fostering diversity and inclusion in the workforce brings fresh perspectives and innovative ideas, addressing skills shortages and promoting a dynamic industry.

Plant: Implementing Advanced Manufacturing, Clean Technologies and IIoT

Integrated technologies are a game-changer for the manufacturing sector. The connectivity of machines, sensors, and devices empowers manufacturers with data-driven decision-making capabilities. Predictive maintenance preemptively addresses equipment issues, averting costly production disruptions.

Green and sustainable manufacturing production and Clean Technology adoption is enabling manufacturers to do more, with a smaller carbon footprint. Smart factories harmonize automation, data analytics, and artificial intelligence, enhancing quality control, reducing energy consumption, increasing resource efficiency and bolstering production flexibility.

Process: Achieving Productive and Sustainable Manufacturing

Process efficiency is key to manufacturing competitiveness. Many SMEs have yet to embrace advanced technologies and rely on intuitive processes to spur innovation in production. By prioritizing resource efficiency and continuous improvement, streamlined processes, reduced waste, and optimized resource utilization can yield shorter lead times, improved product quality, and lower production costs. Also incorporating sustainability through green manufacturing practices further magnifies efficiencies.

The pursuit of excellence in advanced manufacturing hinges on the synergy of 'People, Plant, and Process.' This holistic approach ensures that Canadian manufacturers are not only well-equipped to tackle the challenges of today but also poised to thrive in an increasingly advanced and competitive global landscape.

Fortunately, an abundance of expertise, skills training, technology support, and resources exists to support manufacturers on this journey. EMC proudly stands with our sector partners, offering leadership, tailored guidance, and support and is again honoured to be part of this year's Advanced Manufacturing study and panel. We remain dedicated to assisting manufacturers on this transformative journey and encourage all manufacturers to take advantage of our industry-validated benchmarking, coaching, mentoring resources, subject-matter content, and extensive network of manufacturing thought-leaders.

Together, we will continue our mission of Advancing Manufacturing in Canada.

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

EXECUTIVE SUMMARY

In 2023 Canadian manufacturers battled supply chain issues, the rising costs of raw materials, and a growing labour shortage as they continue to adopt Industry 4.0 technologies in order to innovate and explore new ways to flourish in a changing economy.

Supply chain troubles were brought on by geopolitical unrest, seeing manufacturers nearshore their supply chains at an unprecedented rate. New security concerns, rising inflation and a growing labour shortage are all influencing manufacturers to change their investments in an attempt to adapt through the changing market.

Our 2024 Advanced Manufacturing Outlook survey found that manufacturers are still investing in and adopting advanced technologies to improve processes, enhance operations and bolster security measures against increase threats. The survey measured Advanced Manufacturing (IIoT and Industry 4.0 technology) engagement among 257 manufacturing business owners, leaders and senior executives.

For the fifth consecutive year, the research was once again led by R.K. Insights in Toronto, and conducted through the months of June and July for Canadian Manufacturing and PLANT magazines, in partnership with our sponsors: Epicor, MNP, Mitsubishi HC Capital, EMC and Alps Welding Ltd. The margin of error was +/- 6%, 19 times out of 20.

As part of our survey, Advanced Manufacturing is defined as manufacturing with a focus on interconnectivity, machine learning, automation and the analysis of real time data that involves the Industrial Internet of Things (IIoT), the cloud, advanced computing and artificial intelligence.

This year's survey took a close look at the results of mass adoption across the industry, and which parts of the business these technologies were being integrated in. The trends continue to be persist, with some stagnation and some growth in certain areas. Unrestrained growth was challenged by a volatile market, and an industry juggling the pressures of inflation. Despite this, companies continue to apply IIoT technologies to explore new ways it can help their businesses. Inflationary pressures and supply chain delays have been affected by the global market, with some companies even quicker to adopt Industry 4.0 solutions to stay ahead, and in some cases slowing them down and investing in other areas of their businesses instead. 25% of respondents now say there's been no change in the amount of intended spend, compared to 32% a scarce two years prior. The core challenges seem to be a lack of skilled talent across the sector and a supply chain affected by global unrest.

This year, 34% cited costs as a reason for not investing in technology, suggesting that an Industry 4.0 investment is jockeying with other priorities for business owners. 82% of respondents see IIoT as a growth opportunity, with the c-suite executives dropping their support for advanced technology tools to 72% from 80% the year prior.

The top applications of IIoT have changed somewhat as a result of inflationary pressures and supply chain issues. The persistent top spot still belongs to improving efficiency and productivity (36%), but now, manufacturers are more interested in the visibility of data from across all manufacturing operations (27%), providing visibility into production processes (25%), and tracking materials and shop floor assets (24%). From those currently applying Industry 4.0 technologies, 50% are using it to improve maintenance functions, suggesting an emphasis on stable operations and business continuity.

The number of manufacturers not convinced of the business benefits in a technology investment is at 17%, with difficulties integrating advanced technologies in existing systems (37%) being listed as the top reason for not implementing new technologies.

Many businesses have been influenced by the post-pandemic economy and have adjusted their planned spend on Industry 4.0 technologies, with 65% saying their planned spend has increased, and 9% saying there's been a decrease. In the next three to five years, manufacturers plan to spend on robotics/automation (55%), data capturing at machine/shopfloor (50%), advanced analytics (50%), ERP (47%), cloud computing (40%) and cybersecurity (40%). The intended amount to spend on these technologies over the next three years has dropped from last year to an average of $1.8 million, which is in line with the years prior to last.

The most significant benefits seen by manufacturers has adjusted from years prior. The top cited benefits manufacturers have seen are a lower cost of operation (37%), reduced downtime (36%), increased throughput (32%), and an increased quality of product (29%). In previous years, an increased throughput and an increased quality of product ranked much higher.

The number of manufacturers not convinced of the business benefits in a technology investment is at 17%, with difficulties integrating advanced technologies in existing systems (37%) being listed as the top reason for not implementing new technologies.

On the topic of cybersecurity, manufacturers continue to express growing levels of concern in relation to their businesses, with 76% rating themselves as highly concerned, versus 24% not concerned. Significantly, most manufacturers have experienced a cyber-attack at their company (74%), a large jump from the previous year (56%). The leading types of attacks are phishing (57%), ransomware (18%), a targeted external cyber-attack (15%) and a breach through a third-party vendor (11%).

Manufacturers listed missing out on new business opportunities (47%), pricing pressures as a result of automation (36%), low margins (32%) as their main concerns if they do not invest in Industry 4.0 technologies.

Sadi Muktadir, Editor, Advanced Manufacturing Outlook Report

WHO TOOK OUR SURVEY?

Our survey participants were made up of business leaders from across Canada, but the majority are based in Ontario (60%), while Western Canada made up 19%. Quebec was polled at 11% and Atlantic Canada comprised of (8%).

Most of the companies surveyed were small businesses, with 45% employing less than 50 people. Of the remaining 55% that employ over 50 people, 31% employ 50 to 249 people, 12% have 250-499 people, 5% have 500-999 people, and 4% have 1,000 to 4,999 employees. Three per cent of those polled had more than 5,000 employees at their organization. Most of the manufacturers surveyed (57%) had over $10 million in domestic revenue, but of the 42% making less than $10 million, while before 27% is making less than $5 million.

Survey participants possessed an overall positive perspective on advanced technologies and IIoT in manufacturing, with 82% continuing to see IIoT as a business growth opportunity, 81% believing that emerging technologies allow small companies to compete globally and 50% saying

Photo: FatCamera/E+/Getty Images

they would be interested in an equipment acquisition strategy that included a finance offering. 54% of manufacturers also now say that machinery replacement is a massive investment and will cause downtime they can't afford, down significantly from 73% the year prior. This suggests an increased appetite and understanding around machinery replacement. However, the positive perspective has been tempered somewhat by new challenges. 82% now say that Industry 4.0 is a great concept, but challenging to implement, and 46% now say they know where to find government programs to help with Industry 4.0 implementations, a stark drop from 74% the year prior. Additionally, only 63% of manufacturers are concerned for the future of businesses that do not invest in Industry 4.0 technologies, revealing more comfort with a slower transition to advanced technologies.

Survey participants possessed an overall positive perspective on advanced technologies and IIoT in manufacturing, with 82% continuing to see IIoT as a business growth opportunity, 81% believing that emerging technologies allow small companies to compete globally and 50% saying they would be interested in an equipment acquisition strategy that included a finance offering.

This sentiment is further supported by the 82% of manufacturers who said that Industry 4.0 is a great concept, but challenging to implement, and 66% still believing that investing in new technologies raises a company's cyber security risk. 72% are also now saying that upper management at their companies support Industry 4.0, down from 80% the year prior. Additionally, only 47% now have a plan or roadmap for an Industry 4.0 transition, a stark drop from the year prior.

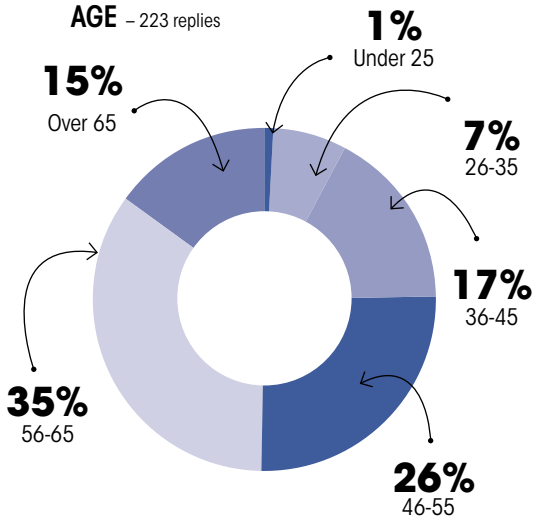
Despite this, manufacturers continue to move forward with advanced technologies, gauging their utility and finding new ways to stay ahead of the competition. 65% of manufacturers say their planned technology investment has increased over the last 3-5 years, and 91% are saying that they will continue to make investments over the next three years. The average intended investment is $1.8 million, a decrease from last year, but in line with years prior to that. When asked which solutions manufacturers were planning to invest in, 50% said they were increasing their investments in a digital transformation, and 36% were increasing their investments in a supply chain solution. Regarding a solution for economic inflation and market volatility, manufacturers were more likely to maintain their investments as opposed to increasing them (74% and 76% respectively). These numbers suggest that manufacturers are looking for ways a technology investment will support their business' supply chain challenges and ambitions. Survey respondents also said that they were unlikely to decrease investments in any one area, with responses for all available categories ranging in the single digit percentages.

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. 10% have a plan to invest in these technologies over the next 12 months, and a further 25% are in the process of evaluating its relevance to operations. 20% are also now responding that IIoT is not applicable for their business needs, an increase from 14% the year prior.

RESPONDENT PROFILE

Those who participated in the survey were overwhelmingly male (83%), senior manufacturing executives and managers (average age 53.7 years) who for the most part have a management only role in their companies (55%). Owners comprise 18% of the sample, 9% have a minority ownership stake and 5% are in an equal partnership. Most companies (57%) have revenues greater than $10 million. Seventy six per cent have fewer than 250 employees, but the average number of employees overall is 413.

AGE – 223 replies



NUMBER OF EMPLOYEES

217 replies

Less than 50	45%
50 – 249	31%
250 – 499	12%
500 – 999	5%
1,000 – 4,999	4%
5,000 or more	3%

LOCATION

218 replies


Ontario
60%


Quebec
11%


British Columbia
8%


Alberta
6%


Manitoba
5%


Nova Scotia
5%


New Brunswick
2%


Saskatchewan
1%


PEI
1%


Newfoundland & Labrador
0%


Yukon / NWT / Nunavut
0%

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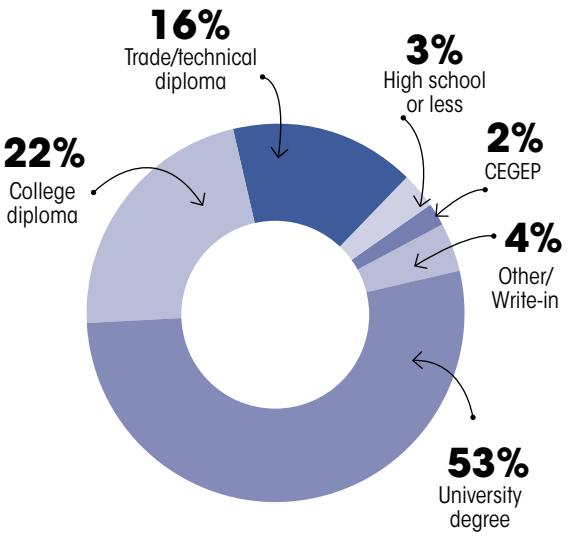
INDUSTRY SECTORS – 209 replies

Industry	%
Miscellaneous manufacturing	30%
Fabricated metal product	17%
Machinery	13%
Plastics and rubber products	9%
Electrical equipment, appliance and component	8%
Food manufacturing	6%
Aerospace product and parts	5%
Motor vehicle parts	5%
Wood product	5%
Chemical	5%
Computer and electronic product	4%
Environmental	3%
Motor vehicle	3%
Paper manufacturing	3%
Printing and related support activities	3%
Transportation equipment	3%
Life Sciences	3%
Furniture and related products	2%
Petroleum and coal product	2%
Primary metal	2%
Textile and product mills	1%
Beverage and tobacco product	1%
Clothing manufacturing	<1%
Non-durable goods industries	0%
Ship and boat building	0%
Non-metallic mineral product	0%

COMPANY REVENUE – 209 replies

$1M to <$5M	27%
$5M to <$10M	15%
$10M to <$30M	20%
$30M to <$50M	11%
$50M to <$100M	9%
$100M to <$250M	7%
$250M to <$500M	2%
$500M to <$1B	3%
$1B plus	6%

EDUCATION – 223 replies



TITLE – 217 replies

Owner/Partner	19%
Design Engineering	15%
Production/Operations Manager	13%
Director	12%
Administrative Management	10%
CEO/President	10%
Plant Manager	10%
Plant Engineering	9%
Technician/Technologist	7%
Vice-president	6%
Maintenance Manager	6%
Purchasing/Supply Manager	5%
Safety Manager	5%
Materials Manager	4%
Logistics Manager	4%
Quality Assurance Manager	4%
IT/Systems Manager	3%

SKILL ISSUE

Talent woes plague manufacturing

By Sadi Muktadir

The end of the pandemic was meant to usher in an era of prosperity due to the appetite for digital transformation and resiliency shown by manufacturers across all industries. However, the nascent problem of missing skilled talent has now grown into a much larger beast. The digital transformation has brought on new technologies, increased automation, data collection and AI usage, but personnel remain ill-equipped to take full advantage of Industry 4.0's changes.

As a result of the digital transformation, the 2024 Manufacturing Outlook Survey found that 10% of manufacturers have a plan to invest in a technology deployment over the next 12 months. This a stark drop from 14% the year prior, and 20% in the survey prior to that.

When the survey investigated reasons for why manufacturers were not investing in a technology deployment, 37% of respondents said there were difficulties integrating advanced technologies in existing systems, and 25% said they lacked the skills to support an investment. Together these were the 1st and 3rd leading reasons for not investing in technology. The roundtable participants were eager to clarify how difficulties integrating advanced technologies were related to the talent shortage.

"The core part of a technology investment is in the integration," said JP Giroux, President at EMC. "This is linked to a lack of awareness on the skilled talent that's available that can help there. A lack of skilled talent is acting as a barrier to take on these new technology deployments. I can definitely see a solution around skills development related to digital adoptions that can build the capacity to take on these projects."

During the roundtable's discussion on how the skills shortage was manifesting itself in the survey results, the participants pointed to an interesting relationship between automation and reduced staff requirements.

Kerry Mann, Partner & National ERP Technology Lead at MNP Digital, said "The opportunity is not in reducing people. I think, as we introduce

Photo: © Drazen / Adobe Stock

technology, the upskilling and reskilling is key to a successful technology deployment."

Dennis Dussin, President of Alps Welding Ltd. agreed with the idea.

"When we implement a technology deployment, people's jobs often change for the better. People are able to engage more with the company, they're able to understand what else is happening within the company. Sure there are efficiency gains and throughput increases, but decisions also get made faster. People are more understanding and teams work together better," he said.

Another interesting finding from the survey was that when executives were asked what challenges they faced in developing and implementing technology strategies, the leading challenge was found to be a lack of skilled talent. 49% of executives listed this as a persistent challenge.

"That's not just on the decision-makers," said Mann. "It's also a skills issue in middle management. Most companies that are taking on technology deployment and implementations are leaning on their internal teams that really have no experience in doing this."

Manufacturers are aware of the challenges the industry faces to market itself as more attractive to top-end talent.

"Our government and our education systems have glorified the tech world to be the future, and relegated manufacturing to be the dinosaurs of the world. I find that students are coming out of school and looking at manufacturing as something that's old. Something that creates a lot of pollution, or not headed in the right direction. We're trying to merge the right ideas to influence students to understand that technology doesn't just mean working for Facebook. It can mean working for manufacturing companies," said Hussam Malek, Partner, Consulting at MNP.

The survey's responses seem to support the idea of a struggle for manufacturers in applying Industry 4.0 technologies due to a lack of knowledge and talent. Manufacturers may be feeling like a lack of knowledge around where to find programs to implement a successful technology deployment is also related to a lack of skilled talent.

"Everyone seems to be consistently struggling with hiring quality candidates, not reducing headcount. So it's more a question of 'how can we attract people? How can we retrain people so that they can be retained?' We need to incentivize people to go into manufacturing. We've made it a dirty word for too long," said Dan McKiernan, Manager at Epicor.

46% of manufacturers said they knew where to find government programs to help with technology investments, a 28% decline from last year's figure.

"I think there's an awareness problem we're trying to solve. Not knowing where government programs are is a problem we're trying to address. The question that's missing though is whether this is a particular priority for them. If it is, then it's a genuine barrier," said Scott McNeil-Smith, VP of Manufacturing Sector Performance at EMC.

"The number one challenge we have in engaging with our manufacturing clients is ensuring they have quality people dedicated to the digital transformation and not overburdened with their other work and responsibilities," said McKiernan.

"When we implemented our ERP system, we hired a full-time employee just to run the implementation. When people ask me what's involved in an ERP implementation, I tell them that for a small business like ours, you basically have to add full-time employee to implement and then run it on an ongoing basis. Part of the cost is in having a skilled person in-house to operate. There's no substitute for having skilled people," said Dussin.

The participants seemed to agree that a decline in technology deployments and capital investment in Industry 4.0 could be tied to the skills shortage and a lack of quality talent that could spur this charge.

Manufacturers continue to balance and prioritize their business needs amidst the pressures of inflation and a supply chain reshoring focus. They recognize the need to invest in a talent attraction strategy and

2023's balancing act will continue into 2024 as manufacturers find new ways to attract talent and secure top-end candidates to help them in their Industry 4.0 applications and grow as a business.

IT WAS THE BEST OF TIMES, IT WAS THE NOT-SO-BEST OF TIMES

Slow going: 2023's Industry 4.0 growth

Canadian manufacturers continue to flourish and adapt despite some of the unique challenges that 2023 has presented them with. Increased interest rates and inflation have led to a rising cost in raw goods and materials, longer lead times on parts, and coupled with an alarming labour shortage and regular cyber-attacks, manufacturers are juggling a number of priorities heading into 2024.

Manufacturers have applied Industry 4.0 technologies across industries at an unprecedented rate over the last few years, hastened by the COVID-19 pandemic. Due to the fractured supply lines throughout the pandemic, the inability to travel and ship freight without issue, manufacturers have begun exploring ways to diversify their supply chains and source materials from closer to home. These capital investments have tied many manufacturers into a 'wait and see' approach about

Photo: © Oleksandr / Adobe Stock

further investments into new technologies, though there are others who recognize the critical role new technologies will play in helping their business.

2024 is not an opaque scenario for manufacturers as they try and stay ahead of the changing global markets. 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 tout the manufacturing industry, especially as it relates to the burgeoning electric vehicle manufacturing supply chain, but manufacturers are more concerned with addressing nearer-term problems, such as a rising cost of goods and finding quality talent for their businesses.

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 an increased level of AI, automation, data visualization and collection, robotics, and security tools to help businesses continues to succeed heading into 2024.

The 2024 Advanced Manufacturing Outlook survey investigated how the application of Industry 4.0 technologies led to increased benefits, and where there were gaps and challenges.

We at Canadian Manufacturing and PLANT released a survey over the summer of 2023 to examine the effects of Industry 4.0 in the industry. This was our fifth instance of the survey, and we took a deeper look into how advanced technologies were being applied and where the industry was facing challenges. The results found a number of patterns, some that were a surprise and some that were a surprise to none. Significantly, there still remains a gap between how manufacturers are operating today, and how they want to operate ideally.

We asked 257 manufacturing business owners, leaders and executives about their usage of automation, digitalization and other advanced technology tools. We queried respondents on what technologies they were investing in, what technologies they were not investing in and why, and how they were using advanced technologies. They were also asked about how they are capturing and using data, and what the significant challenges were for them as they considered new technologies.

RK Insights conducted the survey, in partnership with premier sponsors Epicor and Excellence in Manufacturing Consortium (EMC) our supporting sponsors Mitsubishi HC Capital and MNP and our supplementary sponsor Alps Welding Ltd.

APPLYING IIoT – 255 replies	Total	Currently applying	Have a plan	Evaluating	Not familiar
Improving efficiency/productivity	36%	81%	65%	31%	6%
Visibility of data from manufacturing floor	27%	52%	69%	22%	4%
Providing more visibility into production	25%	55%	58%	17%	4%
Tracking materials, shop floor assets	24%	50%	50%	23%	2%
Analytics functionality	23%	47%	54%	20%	0%
Improving maintenance functions	21%	50%	38%	17%	2%
Developing new services/revenue streams	9%	22%	8%	8%	2%
Developing smart products	6%	16%	8%	2%	2%
Consolidating control rooms	4%	11%	12%	0%	0%
Not currently applying IIoT	47%	2%	15%	39%	90

REASONS FOR NOT INVESTING IN INDUSTRY 4.0 – 254 replies

37%	Difficulties integrating advanced technologies in existing systems
34%	Too costly
25%	Lack of skills to support investment
25%	Lack of financing and support
24%	Uncertainty, risk and disruption
17%	Not convinced of economic benefit
17%	Investment not necessary for continuing operations
16%	Concerned about exposure to cyber security threats
15%	Not sure where to start
14%	Lack of adequate information about advanced technologies
13%	Lack of support or services from government
9%	Weak customer demand
7%	Lack of support or services from external vendors

IIoT ENGAGEMENT – 257 replies

25%	Currently applying IIoT capabilities
25%	In the process of evaluating its relevance to operations
20%	Not familiar with IIoT capabilities
20%	Not applicable
10%	Have plan, investing in technology for deployment in next 12 months

INTEREST IN A TURNKEY EQUIPMENT ACQUISITION STRATEGY – 115 replies

9%	42%	31%	18%
Very interested	Somewhat interested	Not very interested	Not at all interested

RATE THE FOLLOWING – 118 replies

83%	Systems are designed with input from those who use them
82%	I see IIoT as a business growth opportunity
82%	Industry 4.0 is a great concept, but challenging to implement
81%	Emerging technologies allow small companies to compete globally
72%	Upper management at our company supports Industry 4.0
66%	Investing in new technology raises the company's cybersecurity risk
54%	Machinery replacement is a massive investment and will cause downtime we can't afford
47%	Our company has a plan/roadmap for Industry 4.0
46%	I know where to find government programs to help with new technology investments
41%	Our company provides a finance offering for our product

BENEFITS FROM TECHNOLOGY UPGRADES 255 replies	%
Experienced a Benefit	76%
Lower cost of operation	37%
Reduced downtime	36%
Increased throughput	32%
Increased quality of product	29%
Reduced staff requirements	19%
Increased energy efficiency/reduced GHG emissions	18%
Product innovation	18%
Increased cybersecurity	14%
Reduced time to market	14%
New revenue streams	8%
Other	5%
None of these	24%

HOW WILL AI IMPROVE YOUR ORGANIZATION?

124 REPLIES

- **34%** Reduce downtime
- **32%** Assist with equipment repair/maintenance
- **20%** Automating sales processes
- **11%** Assisting in financial management
- **10%** Mitigating fraud and data breaches
- **8%** Managing cash flow
- **8%** Finding new revenue streams
- **11%** Other

LEVEL OF ENGAGEMENT WITH AI 124 REPLIES

Currently applying AI	19%
Planning to start in the next year	4%
In the process of evaluating	31%
Not currently using AI	46%

MAKING IT MAKE SENSE: INDUSTRY 4.0 INVESTMENTS

How much, how little and how come?

By Sadi Muktadir

To take a deeper look into the results of our 2024 Advanced Manufacturing Outlook survey, we assembled a team of 12 industry executives and senior leaders at a virtual roundtable held on August 17. They were able to examine the implementations of Industry 4.0 across the industry, and determine 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 market volatility and supply chain uncertainty.

Peng-Sang Cau, President, Nuformex

Peng-Sang Cau, President of Nuformex, a custom machining and precision parts manufacturer, was eager to jump in and address some of the adjusted statistics from the year prior, specifically why she felt there was some stagnation in the number of companies that had a plan to invest in technology over the next 12 months.

"I'm a little surprised by the numbers. I thought with COVID-19 there would be more of an inclination for companies to invest in technologies to ensure there business would be functional in times of crisis. I'm curious to see how companies are applying IIoT in their organizations and how well it's understood. Do the smaller

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companies engage in only some of it, or feel like they have to engage in all aspects of Industry 4.0 to be considered running an IIoT operation?"

Smaller businesses comprised of the majority of the survey's respondents (76% of those surveyed had less than 250 employees), and may feel like they were not participating in Industry 4.0 because they were not engaged in all aspects of it.

"It would be difficult for a small company to say they're involved with IIoT-enabled technologies, and easier for them to say they have an accounting system in place, or some kind of cloud solutions, or an ERP."

Dennis Dussin, President, Alps Welding

Dennis Dussin, President of Alps Welding Ltd. a Woodbridge, Ont.-based metal fabricator and pressure vessel manufacturer, added onto this idea. "A lot of small businesses are going to say that they don't have sensors connected to their machinery and things like that, but I do think they are using a lot of cloud-based tools, especially because of the last few years. But the description of IIoT is here, if they read it. That said, I do believe small businesses would say they're investing in technology."

Dussin also offered his thoughts on why the number of companies planning to invest seems to have stagnated.

"I think a lot of companies have been forced to invest in technology over the last few years with COVID-19 and working remotely. So I think there's a lot of companies who are saying 'Well, we just invested in a whole bunch of things.' So they're assessing if the money they spent was really worth it, and if it was productive. So we're in this kind of transition period where there's a lot of uncertainty in the economy."

Dussin also mentioned that for smaller companies, the increased interest rates in Canada may be causing a stagnation in investments as many manufacturers wait to see if there will be a recession or a safer economic environment.

Kerry Mann, National ERP Technology Lead & Partner, MNP Digital

Kerry Mann, National ERP Technology Lead & Partner at MNP Digital, an organization that helps businesses implement technology solutions so they create value and sustain infrastructure, also proposed his thoughts on the matter.

"When we look at this data it does follow the current hype cycle a little bit. There's been an inflection point with COVID-19, but we're finding that mid-market companies are heavily reliant on technical leadership and thought leadership regarding their vendors, so the solutions they're deploying are point solutions that lack integration. So while there were gains and efficiencies, they don't get integrated upstream or downstream so companies are rethinking their whole investment."

Mann also mentioned how increased concerns around cybersecurity may be affecting the survey results with regards to a planned investment in technology.

"Anytime you have connected devices they are a risk. Our ability to mitigate is proportionate to our awareness of the risk. COVID-19 heightened the awareness but the risk was always there. People are thinking twice about having connected devices because it's creating challenges from a cybersecurity standpoint."

Tony Alderdice, Vice President of Sales, Epicor

Tony Alderdice, VP of Sales at Epicor, a software company providing ERP, CRM and other solutions for businesses, also provided his thoughts on the statistics about a stagnation in investments. "Global market uncertainty is certainly a factor, and based on several discussions with Canadian manufacturing CFOs, these stats can be attributed to a combination of increased costs due to labor, higher interest rates servicing debt, and inflationary pressures, but also risk mitigation, with companies preserving cash flows and choosing to "wait and see," as opposed to taking on any large technology change (like an ERP system) at the risk of failure when they don't have the internal resource capacities for a successful deployment."

Rostyk Wynnyckyj, Co-Owner and Technical Sales Engineer, LAVA Computer MFG. Inc.

Rostyk Wynnyckyj, the Co-Owner and Technical Sales Engineer at LAVA Computer MFG. Inc., added that if you're not able to understand your implementation, it can be a barrier to seeing benefits.

"You can invest in technology, but understanding the data that comes from that technology is difficult to do and can be a barrier in deciding to make an investment."

The panel emphasized the idea that many manufacturers were taking a wait-and-see approach, whether because of the economic market, or because of recent investments made during COVID-19, and wanted to understand key investments they'd made and how the data could be used towards sustaining and helping their businesses.

101 replies

INVESTING PRIORITY OVER THE PAST 12 MONTHS	%	AVERAGE SPEND
Cloud	79%	**$59,500**
Data capturing/shopfloor	79%	**$54,000**
ERP	77%	**$79,200**
Robotics, automation	72%	**$88,900**
Advanced analytics	66%	**$47,500**
IIoT/M2M	64%	**$50,200**
3D printing, additive manufacturing	48%	**$31,100**
Artificial intelligence	40%	**$30,100**
Virtual reality	26%	**$18,700**

105 replies

TECHNOLOGY PRIORITIES OVER THE NEXT 3-5 YEARS	2024	2023
Robotics, automation	55%	54%
Data capturing machine/shopfloor	50%	36%
Advanced analytics	50%	36%
ERP	47%	26%
Cloud	40%	40%
Cyber security	40%	N/A
Cloud computing	40%	44%
Energy Management Systems	36%	N/A
Artificial intelligence	34%	39%
3D printing, additive manufacturing	30%	30%
Virtual reality	10%	13%
Other	3%	2%

107 replies

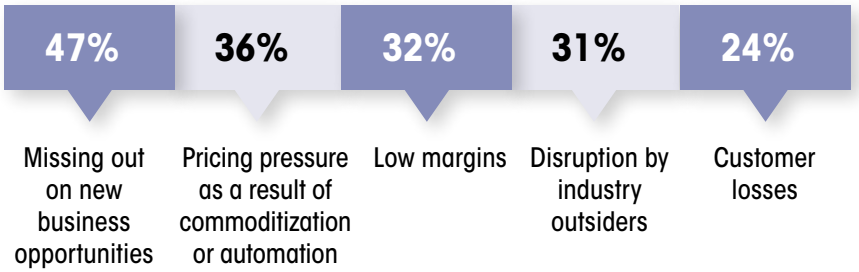
PLANNED LEVEL OF INVESTMENT OVER THE NEXT 12 MONTHS	%
Digital Transformation	
Increase Investments	50%
Maintain Investments	45%
Decrease Investments	5%
Economic Inflation	
Increase Investments	19%
Maintain Investments	74%
Decrease Investments	8%
Market Volatility	
Increase Investments	16%
Maintain Investments	76%
Decrease Investments	8%
Supply Chain	
Increase Investments	36%
Maintain Investments	58%
Decrease Investments	6%

255 replies

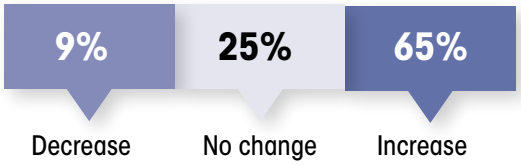
HOW IS YOUR COMPANY APPLYING IIOT	%
Improving efficiency/productivity	36%
Visibility of data from mfg. floor to management	27%
Providing more visibility into production	25%
Tracking materials, shop floor assets	23%
Analytics functionality	23%
Improving maintenance functions	21%
Developing new revenue streams	9%
Developing smart products	6%
Consolidating control rooms	4%

GREATEST THREAT IF NOT INVESTING IN TECHNOLOGY

95 replies



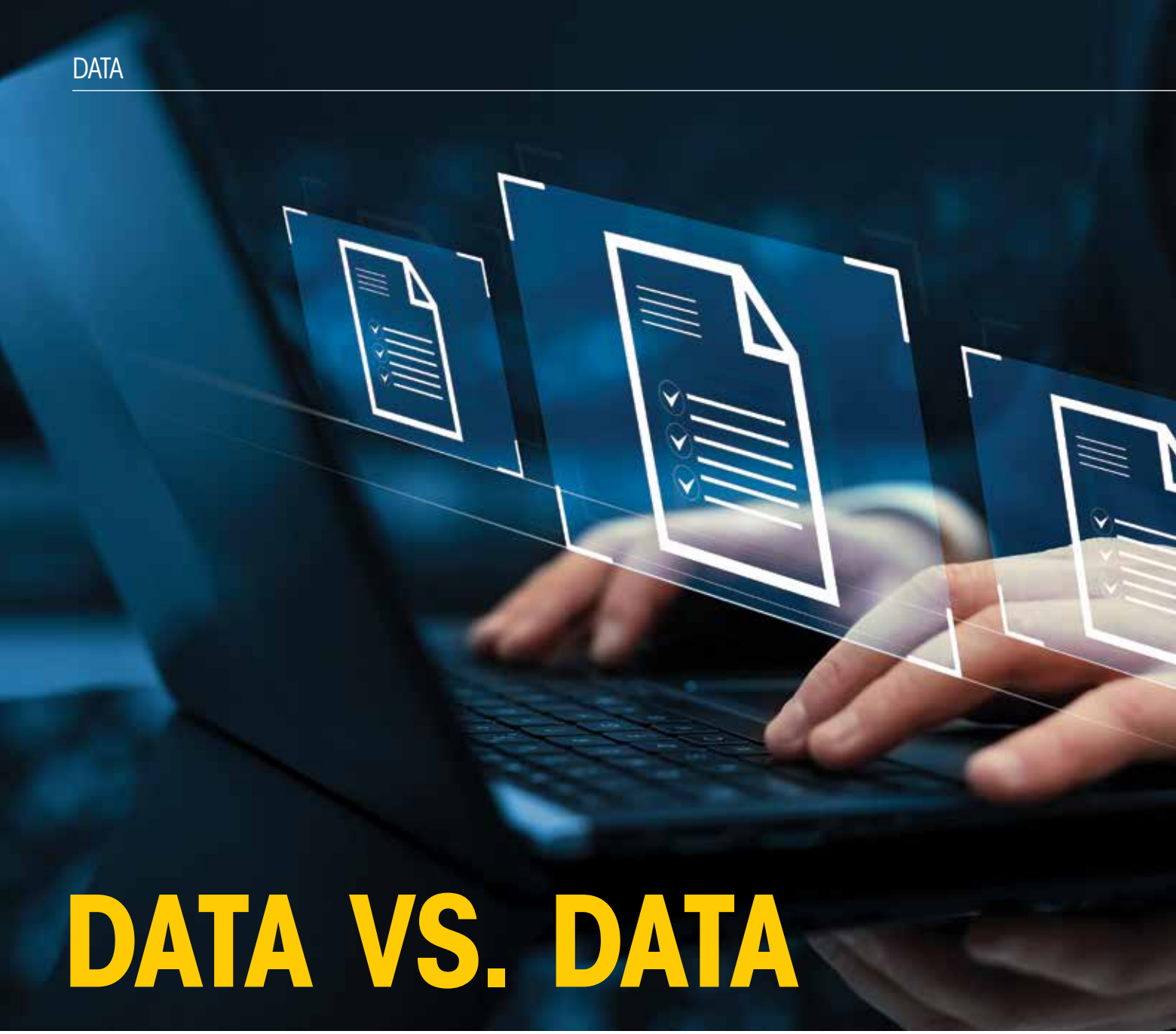
CHANGE IN INVESTMENT LEVEL TIMEFRAME OF 3-5 YEARS



AVERAGE SPEND OVER NEXT THREE YEARS

$1.8 MILLION

($1.8 MILLION IN 2023)



DATA VS. DATA

What the numbers are saying, and what the numbers are not saying

When prognosticating upon why IIoT-enabled operations have stagnated a little, the panel moved on to the role of data in the Industry 4.0 transition, and where manufacturers may be having some challenges.

Hussam Malek is a partner with MNP, where he leads the firm's efforts in transitioning small and medium-sized manufacturers towards performance and efficiency improvements through digitalization.

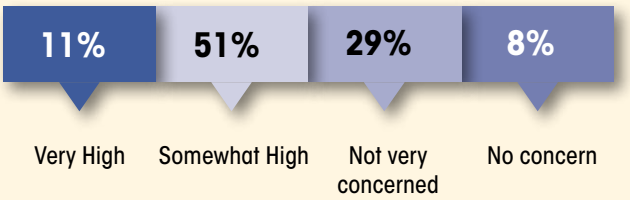
"We're realizing and noticing a lot of times that a company isn't using its ERP system and only 20-30% of the data they are collecting. The data isn't being translated into actionable items on how to actually improve the organization's throughput, efficiency, or productivity. A lot of times, those factors are too often looked at as single variables as opposed to collectively," he said.

Peng-Sang Cau spoke to her own experience on the idea of data helping a business.

"It is easy to invest in an ERP, which I went through a couple of times. The hard part, is the amount of human resources needed to capture valuable data, and I can tell you, from the number of years and hours that was put in at Transformix, we never truly got what I was promised. That's always a challenge for smaller companies. You get a portion of it, you understand the value of it, but to be honest, even as a VP at ATS Automation, there were still a lot of excel spreadsheets."

Photo: Galeanu Mihai/iStock / Getty Images Plus/Getty Images

CONCERNS ABOUT BUSINESSES NOT INVESTING IN INDUSTRY 4.0 – 97 replies



CHALLENGES IMPLEMENTING TECHNOLOGY – 97 replies

49%	Lack of skilled talent
47%	Integrating with legacy technology
43%	Resistance to change
35%	Funding challenges
33%	Too many technology choices and unsure where to start
33%	Pressure to deliver short-term results
27%	Difficulty keeping pace with the rapid pace of change
18%	Lack of leadership vision
15%	Not sure how to access available resources
9%	Fear of failure

Natalia Stephen, President and Owner of Compound Metal Coatings, Inc., added onto her data utilization strategy as a small business owner.

"We're collecting all our data on tablets because we have some larger clients who want to know about something that happened seven years ago, we have the data to tell them what we did. That traceability is so important I can be at home and know exactly what's happening in my company on every line I have."

Stephen also spoke to the new advantages that the COVID-19 pandemic has brought to her business in form of data through the tablets.

"When we integrated through tablets during COVID-19, our technicians were introducing all the data points in one place. And for us, what was very important, was providing visibility into production processes. The ability to now go back 2 or 3 years and know what product was run, at what point in time and on what line. This is very important."

Tony Alderdice also included a salient point about where companies were focused post-pandemic.

"At Epicor, we're seeing increased investments on the shop floor (like with Epicor Advanced MES and Epicor Connected Process Control), and in robotics and further automation, particularly in order to collect data that provides real-time business intelligence to make quicker decisions."

The roundtable's discussion pointed towards requiring a more integrated and holistic strategy in integrating Industry 4.0 tools across the business in order to take advantage of all the data that was being collected.

STEADY SPENDERS

Where are manufacturers investing?

The discussion transitioned towards the investments manufacturers are 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 (79%), data capturing (79%), ERP (77%), robotics (72%) and advanced analytics (66%).

Kerry Mann jumped in provide insight on the numerous categories.

"I see a bit overlap with the cloud computing. ERP could be part of cloud computing technically, what is surprising to me is seeing the data capturing spend so low (an average of $54K). We're seeing a proliferation of 3D printing, VR, AR and technologies connected to AI emerging as a trend, supporting the shifting workload from on-premises to the cloud."

Peng-Sang Cau expanded on trends in spending.

"For a lot of Canadian factories, their decision making power is around $50K. When you look at the equipment costs that are far above that, you're not going to find many Canadian companies that can afford those kind of numbers."

When looking at where manufacturers were looking to invest in the next 3-5 years, **Scott McNeil-Smith** added something from his own research at EMC.

"When we've asked our own manufacturers, what changes are you anticipating in the next five years, investing in new production, equipment and new processes has been key for them for a few years now. I'm noticing that the technologies they haven't invested in during the past 12 months, are a key focus for the next 3-5 years."

Dan McKiernan also added his thoughts here with regards to the growth in ERP spending, saying "If an SME has been a laggard in implementing or upgrading to an ERP, this is the time to do it. I think that realization is finally coming to the forefront, they're saying "We've ordered a lot of iron to improve our facilities, now let's look at some technology."

Dennis Dussin jumped on this finding as well.

"When we implemented our ERP in 2018, and when we were hit with the pandemic in 2020, I do not know how we could have run our business if we didn't have an ERP system in place, and I think a lot of SMEs are realizing that you need some kind of ERP system in place even with working remotely so that your team can get the information it needs."

Mann added a pertinent point as well about technology investments.

"COVID-19 became the inflection point, because before that many companies had the awareness that they needed to do something, but

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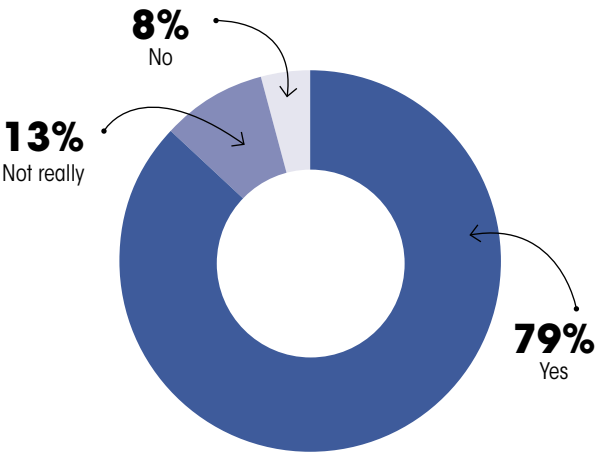
HOW DATA IS MONETIZED – 102 replies

- Improving operational efficiencies **70%**
- **30%** Adding new services to existing offerings
- Leveraging supply chain/ customers **26%**
- **25%** Developing new business models
- Developing analytics capabilities for external sale **12%**
- **11%** Partnering with similar companies
- None of the above **15%**

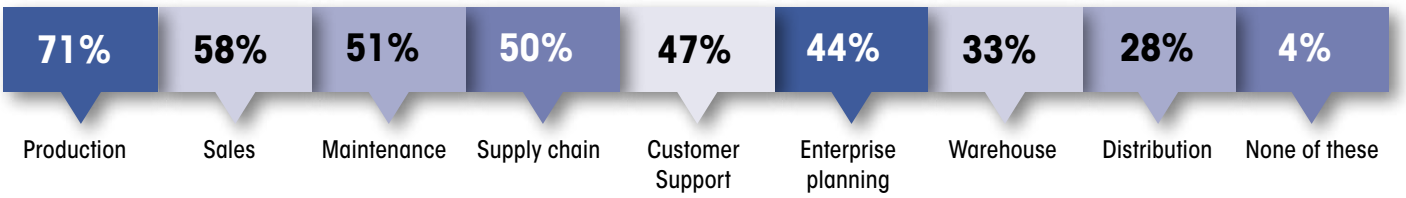
COLLECTING AND USING DATA – 101 replies

64%	Spreadsheets, such as Excel
57%	Integrated ERP for supply chain
48%	Accounting package
35%	Manual paperwork
32%	MRP
26%	Sensors-big data

USING CLOUD SYSTEMS – 101 replies



AREAS TO IMPROVE DATA – 101 replies



didn't have the fortitude for the change management required that goes with an ERP implementation."

He continued, "From our experience, technology is becoming a strategic pillar where it used to be a tactic even ten years ago, where it sat on the expense side of the ledger. Now, it's sitting on the investment side of the ledger."

Cau emphasized the need to understand investments, saying that "I think recently, there's been more public awareness around a digital transformation, and there's a lot more government money that's available for a company to do that transformation. It's also a lot cheaper than investing in automation. It's easier to understand, because you're really just investing in computers, whereas with automation, the dollar value and resources are much more complex for manufacturers to wrap their heads around because of the hardware involved as well."

Rostyk Wynnyckyj seemed to agree, "Sometimes it's actually more economically feasible to go towards investing in the digital side because you're reducing costs in the end. Because if you can put your whole sales team, your accounting team and everybody online, they can work from home, and you won't need to have as big of a building. You're actually decreasing all these other incidental costs that don't always necessarily factor in the top line items that people talk about."

BOON SEASON

The perks of investing in IIoT

The discussion moved on to the kinds of benefits manufacturers were seeing from IIoT deployments, and how much those benefits were evolving or staying the same compared to previous years.

The key benefits being seen by manufacturers according to the survey include a lower cost of operation (37%), reduced downtime (36%), increased throughput (32%), increased quality of product (29%), reduced staff requirements (19%), and increased energy efficiency (18%).

There was heightened discussion around the perception of Industry 4.0 reducing staff requirements, and how much a technology deployment may help or hamper a strapped industry.

Peng-Sang Cau started by saying "I think there's a misconception that investing in innovation will reduce staff. You always end up hiring for others don't you? I've been in the automation sector, and while you may reduce lower labour resources, you end up hiring for skilled labour, just to be able to run the machines. Especially when you're talking about IIoT and where data collection and interpretation is so important. I'm not surprised that reduced staff requirements just aren't a prioritized benefit being seen."

EMC (Excellence in Manufacturing Consortium), an organization that contributes knowledge, expertise and resources to over 13,000-member manufacturers across Canada, elucidated some of the talent challenges facing Canadian manufacturers.

"I don't think companies are in a staff reduction mode, they're more focused on maintaining the staff they have, or to grow it," said

Photo: © Cassova / Adobe Stock

JP Giroux, President of EMC. "A lack of skills to support an investment is something that's coming back in our studies as a barrier to technology deployments."

Kerry Mann from MNP agreed, saying "The opportunity is not in reducing people, it's in the upskilling and reskilling of current personnel to get the benefits out of technology. Our education sector isn't providing the internships and the skills required on the plant floor to exploit the digital technologies that are available, and the employers don't have programs in place that allow them to reskill and upskill their people adequately."

Mann's associate from MNP, Hussam Malek, also made a pertinent observation.

"A lot times when we go into an organization that's a small or medium-sized business, the management or middle management is comprised of either family, or friends, or individuals that have helped the organization go from zero to where it is today. This is a huge jump, but in order to get to that next level, a certain level of education, expertise and skillset with technology is required, and that's lacking. So we're trying to help organizations change the skillsets they have in-house."

Tony Alderdice also provided his insight on the labour challenges within the context of benefits seen by manufacturers.

"Different talent is required to implement newer technologies like IIoT to offset the manual labour shortages, yet also a lot of manufacturing companies are still operating in silos, so in order to leverage data they must collaborate across the organization more."

As a business owner, Dennis Dussin added an interesting finding that happens when you reskill and upskill leadership.

"As you improve the process through reskilling, the quality of the work on the team improves. People are more understanding of each other's roles, decisions get made faster because of transparency, and it's just an added benefit when improvements to the team have been made."

The conversation transitioned to discussing some of the key challenges to investing in new technology. 93% of respondents listed a reason for not investing in technology. The top cited reasons for not investing in technology include difficulties integrating advanced technologies in existing systems (37%), too costly (34%), lack of skills to support an investment (25%), lack of financing and support (25%), uncertainty, risk and disruption (24%), not being convinced of the economic benefit (17%), and an investment not being necessary for continuing operations (17%).

When the discussion moved towards key hurdles to investing, and Cau commenting on Kerry Mann's observation about the Canadian market, expanded on the hesitation from some manufacturers when it comes to a lagging investment in reskilling or upskilling their workers.

"I've met a VC from France who came here exclusively because they thought there was opportunities to invest in Canadian companies, but found that in their words, Canadian companies 'lacked vision.' In my experience, people say they love innovation until they're faced with something innovative."

Dan McKiernan, from Epicor, also added his thoughts on key hurdles to investing being seen by manufacturers, including with regards to staffing.

"Of course you're going to see key benefits like lowering costs, reducing downtime, and all the core elements you get from any investment, but reducing staff as a benefit should actually be attracted staff or having quality people in the organization."

Paul Green, from Mitsubishi HC Capital capped off the discussion on key reasons manufacturers were not investing.

"It's often tough to finance IIoT deployments, but if it's attached to machinery and equipment, it becomes more valuable to the lending community. We can certainly clear some of the hurdles to an investment once we start to bill for the software and utilization of the equipment as opposed to the equipment itself in a traditional sense."

BRAND NEW YEAR, BRAND NEW FOCUS

How the IIoT toolkit is being used.

The panel began discussing some of the ways manufacturers were applying Industry 4.0 tools in their businesses, and how there was an increased focus in new areas of their business, and a decrease in other areas.

The top uses of IIoT were in improving efficiency/productivity (36%), visibility of data from manufacturing floor to management (27%), providing more visibility into production processes (25%), tracking materials/shop floor assets (24%), analytics functionality (23%), improving maintenance functions (21%), and developing new revenue streams (9%).

Rostyk Wynnyckyj jumped in, noticing that the new revenue streams figure had dropped from previous years.

"There's one camp of customers that we've seen that had the bottom drop out from under them during COVID-19, and they had to pivot to figure out what they were doing, and when they're pivoting, you can pivot with them to supply what they are chasing down. While this may have accounted for new revenue streams, we're seeing now with some customers that they're pushing the hybridization and remote work model back down to a realistic level and that could account for the drop in new revenue streams for manufacturers."

Dan McKiernan, from Epicor, added on to the idea of where manufacturers were focused, commenting that "There was a lot of hype a few years ago, and I think there's a bit of fatigue this year and some normalcy going forward, so how and where the data is being used will evolve and will continue to be tightened up."

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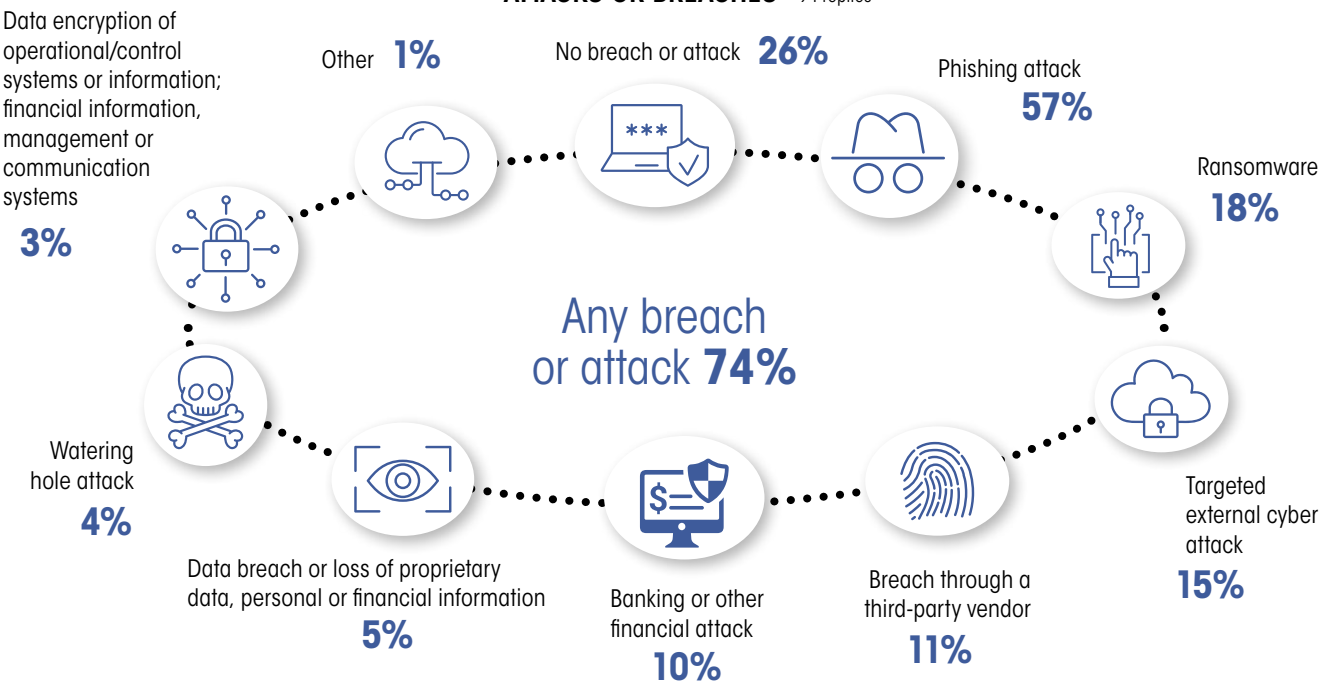
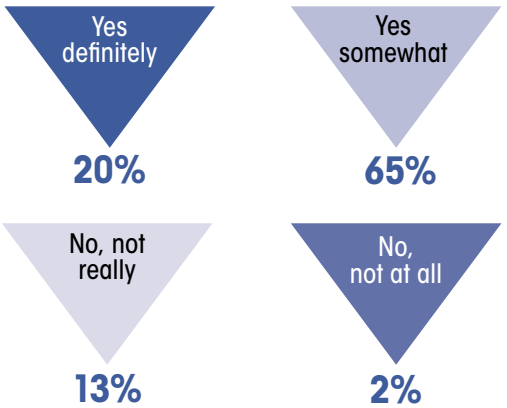
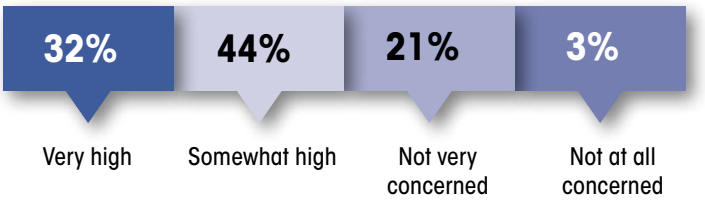
ATTACKS OR BREACHES – 94 replies



HAVE YOU DONE ENOUGH TO PROTECT YOUR BUSINESS? – 95 replies



LEVEL OF CONCERN REGARDING CYBERSECURITY – 96 replies



SECURITY MEASURES TAKEN – 95 replies

CYBER-CRIMES: AN EVOLVING THREAT

The level of concern regarding cybersecurity has stayed steady over the last few years, with 76% of manufacturers reporting concern, while 24% reported being not concerned. 74% of manufacturers reported having experienced a cyber-attack, up drastically from 56%. 57% of manufacturers reported a phishing attack, 18% reported a ransomware attack, 15% reported a targeted external cyber-attack and 11% reported a breach through a third-party vendor.

The panel's discussion gravitated towards the evolving threat of cyber-attacks and how they have evolved over the past year.

Dan McKiernan started off, saying "manufacturers are still terrified to have anything flow directly to the cloud that's not under their direct control. They want all of their IP and proprietary data firewalled off from the rest of the world."

Natalia Stephen spoke to this as well as a small business owner.

"We work with controlled goods, and because of who our clients are, we're concerned about having data in the cloud because of the risk of cyber-attacks. Even drawings, we have to destroy everything, keep everything under lock. A few months ago one of our biggest customers suffered a cyber-attack and it was a big ordeal getting back to normal with them."

Kerry Mann provided some sobering thoughts on the numbers reported in the survey, saying "I don't think these numbers are reported accurately. A lot of people are scared to say that they've been victimized. The victimization has increased through COVID-19 and afterwards and it's all types of attacks. In today's world, it's not a matter of if, it's a matter of when."

Tony Alderdice commented on the types of cyber-attacks being seen through his work at Epicor.

"Even from Epicor's own recent survey and findings, where most manufacturers see cybersecurity as a growing threat, crimeware is the top type of cyber-attack in the industry."

BEING AWARE

Natalia Stephen spoke on her experience with bolstering cybersecurity at her own company, and its growing importance for an SME.

"I'm always concerned because we're on the cloud. There are things I know and there are things which I actually don't know. I'm a chemical engineer. I don't know anything about cybersecurity unless an expert or a professional is telling me. I think it's very important that you have people who are providing these services make people aware of the importance."

Hussam Malek provided more food for thought on the importance of being aware.

"There is a lack of understanding on how serious it is, and how severe it is still. In the pandemic I had a bunch of my clients that were compromised, including one that was dark for a full month and took a huge hit to their production. The ones that get attacked realize a little too late. Brick and mortar organizations understand tangible things, like robotics and automation. At least in my experience, there's still huge reluctance to invest in digitalization and cybersecurity."

AI: A NEW DAWN

One of the new sections in the deployed survey this year was a number of questions on artificial intelligence, its usage and how manufacturing can take advantage of the advanced technology in the wake of recent developments.

Kerry Mann, starting things off by saying that "As we're talking to clients, we're noticing the element of AI that's most pervasive is machine learning in manufacturing. Currently, I think the set of technologies being used are in the areas of forecasting, predictive maintenance, and being used by energy or oil & gas companies. We see a lot of production line automation and energy management from AI as being heavily utilized in the future."

Scott McNeil-Smith, from EMC added this:

"In conversation with one of our smaller members on this, a small company in PEI, they've implemented some technology for data gathering, and they're gathering between 2000-3000 data points that they don't have the human capacity to crunch. Currently, they're looking at how AI can help them, not only to gather and track it, but also prioritize and flag what needs to be paid attention to."

McNeil-Smith went on to say that the larger the company was, the better the understanding might be. The smaller companies are at the beginning of their AI journeys, and are currently sifting through the available options to help their businesses.

Dan McKiernan also provided his insight on how AI was helping with specific issues in plants, and where the AI focus was headed with regards to manufacturing.

"It's still early days, and it's in the forefront of the news consistently. There is a little bit of hype associated with it for sure, but where you will see value brought in is in seeing AI improve the turnaround for repair and automating things in the back-end. AI is ultimately a progression from machine learning, and the next step is taking that machine learning data and having it create something useful. Everyone's excited that it's going to do something for them, so we'll see what it does in the future."

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FINAL THOUGHTS

By Sadi Muktadir

To end our roundtable conference, panel participants provided their final thoughts on the survey data and where they believed Industry 4.0 was headed.

Kerry Mann said, "It's become very apparent that good advice is key, and a lot of SME's are sick and tired of being sold to, so they're looking for trusted advisors that can guide them to invest their technology dollar in that will give compelling returns back into their business."

Dan McKiernan said, "There's a lot of upside for manufacturers to take advantage of technology that's maturing quickly. It's all on the near horizon and it's going to make manufacturing easier, and it's our job from the industry side to get that message out."

Natalia Stephen stated, "I know that some people believe that Canadian SMEs are slow to adopt Industry 4.0 technologies, but reading the report gives me hope. We can see trends and numbers rising and I think companies in Canada will invest in these technologies and catch up."

Peng-Sang Cau provided her thoughts and a more contrasting outlook on the manufacturing market in Canada.

"The willingness to take a risk is still not there. We're still a very risk averse industry. Part of it is because of our country is made up of a lot of smaller SMEs, compared to Europe for instance. I think there's something to be said in working with the provincial and federal governments and asking `how can we support Canadian manufacturing?' It's a complex industry and it does require effort at all levels of government to work with manufacturers in Canada. We don't market ourselves very well to the new generation of entrepreneurs and skilled workers but there's a lot of interesting things happening in the industry. I'm kind of sad the numbers aren't further ahead than they are so there's work to be had and a story to be told."

Hussam Malek said, "Canadian SMEs are really having to be competitive now to continue to produce and stay profitable in a market with great globalization and supply chains. So it's been tough in the SME world because there's a gap in terms of knowledge, base technology and an understanding of how to be competitive. There's an opportunity now to push and inject some of the things we've heard here today into the market. The opportunity is definitely there, despite the barriers."

Paul Green said, "We can act as a great facilitator to increase the uptake of these technologies and address the barriers related to financing, and we'd love to work with the integrators and consultants. If there's a way to leverage our platform to help increase the advent of Industry 4.0, we'd be very interested in helping those efforts."

Brendan Dorney, Director of Channel Sales, Epicor, said, "I think it's up to us to humanize and pushing the image of manufacturing forward. We need to take the fear out of much of this stuff, it's not easy but it's not impossible and there is business benefit. It's important that we show the positive applications of these changes whether its upskilling, repurposing or finding new business models, to take some of the uncertainty out of this topic."

Scott McNeil-Smith added, "I see this as a sort of slow moving trend. With SMEs, it looks like if their customers aren't asking for it directly, little is happening and it will take a lot to make it a priority. I think the solutions lies in providing a roadmap providing support for the industry to develop not only the technology, but their talent side so they can build the capabilities right now. But the industry is going to need to be led to that roadmap, whether it's by a subject matter expert or a customer."

Dennis Dussin stated, "The whole story of technology implementation and innovation is actually a story about people. We talk about skilled labour shortages, change management and a fear of change. We need to approach the story from the very human element of `how we can make a person's job better or easier?' We've got a long way to go."

Rostyk Wynnyckyj capped off the event with warm finding, "Seeing that the struggles I'm facing and the questions I have are the same ones everyone else shares is actually kind of comforting. We're not the only ones out there and that means there's an opportunity to learn from everybody else."

As manufacturers tread into 2024, they're continuing to navigate supply chain hurdles, inflation and market uncertainty to find ways to keep their businesses competitive and successful. They're using the lessons from their Industry 4.0 implementations to remain agile, safe and astute in order to respond to a quickly evolving marketplace. They're using this time to reflect on their investments and the changes the pandemic and supply chain hurdles have wrought on their industry, and how they can make the best of their technology dollar. The Canadian manufacturing industry continues to evolve, finding ways to address labour and funding challenges, and explore new digital solutions to bring new benefits in the upcoming future. While the global economy may present unforeseen challenges and hurdles, manufacturers, powered by Industry 4.0, appear poised to tackle any problem with gumption and a peerless tenacity.

"The whole story of technology implementation and innovation is actually a story about people. We talk about skilled labour shortages, change management and a fear of change. We need to approach the story from the very human element of 'how we can make a person's job better or easier?' We've got a long way to go."

Dennis Dussin, Alp's Welding

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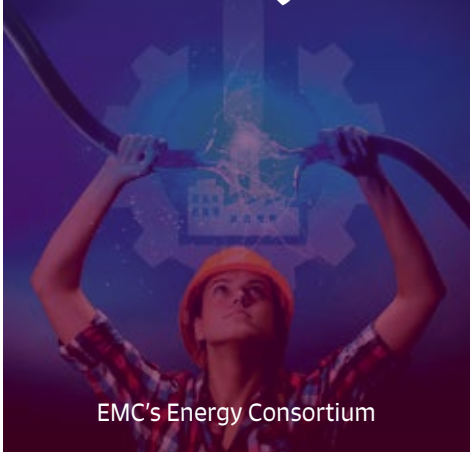

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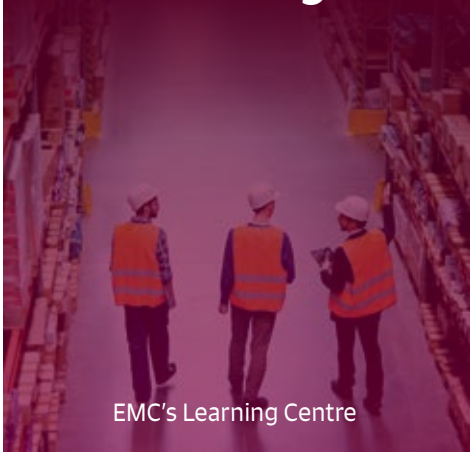

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