2023
ADVANCED MANUFACTURING OUTLOOK
REPORT

Industry 4.0 is here, are Canadian manufacturers ready?

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WHY AUTOMATION AND THE IIOT HAVE BECOME MUST-HAVES FOR SUCCESS IN MANUFACTURING

By Rory Macleod

It's hard to think of someone who has done a better job of articulating the business case for digital transformation in Canadian manufacturing than Dennis Dussin.

Speaking during a roundtable we convened with business leaders in response to the research contained in this report, the president of Woodbridge, Ont.-based Alps Welding summed up the opportunity presented by the industrial Internet of Things (IIoT) as follows: "It's about distributing the data, distributing decision-making and empowering decision makers."

Let's unpack that a little. You could argue that data within the average manufacturing company is already widely distributed – from the financial data locked in back-end systems to the performance and operational data about what's happening on factory floors. The problem is that much of that information is not collected and managed in a way that makes sense. Only with the right platform can you synthesize the data so it can be shared with all the people in a company who need it.

How automation builds confidence in business decision-making

This leads to Dennis's second point: decision-making needs to be distributed because manufacturing isn't confined to activities within a plant. There are situations that come up during on-site meetings with customers, in virtual meetings with remote team members and in locations where machinery runs largely without a human being present. Manufacturers need technology to facilitate collaboration and allow stakeholders to take the right actions quickly in order to provide a great customer experience.

Dennis's third part about empowerment spoke to the fact that, when you have visibility into the end-to-end process flow from planning to production that automation provides, you can feel confident about the calls you're making in the moment.

Another topic that came up in our roundtable was the elusive sweet spot between running a plant to maximize profitability and hitting the 'red line' where you risk equipment failures. IIoT investments need to make people feel empowered to manage manufacturing environments to pursue growth and avoiding shutdowns at the same time.

Those at the forefront of IIoT adoption already know this, of course. In fact, the research showed a seven per cent increase in manufacturers who said they were seeing benefits from technology upgrades compared with when the same survey was conducted in 2020. I've seen a similar effect across the Salesforce Canada customer base: automation becomes a force multiplier of value, whether it comes from reducing the costs of manufacturing to creating more efficiencies in common processes.

Discover the opportunities this research uncovers

During times of economic uncertainty and supply chain challenges such as those we're experiencing today, it's no wonder 89 per cent of those surveyed could cite a reason not to invest in technology. Saying no or sitting on the sidelines is relatively easy. My challenge – and my hope – for those reading this report is that you discover more reasons to say "yes."

Say "yes" to the next generation of manufacturing talent who will be looking for employers that can equip them to do their best work.

"Yes" to the customers that want greater certainty in having their orders fulfilled and receiving goods produced at the highest possible standards of quality.

"Yes" to the possibility that your organization can not only ride out the difficulties that past few years may have introduced but to achieve new levels of growth and profitability.

Technologies such as the IIoT are never simply expenditures. They are the steps you take on a journey to long-term business transformation – where you are capitalizing on data to inform the smartest decisions you'll ever make.

Rory Macleod,
Area Vice-President
Manufacturing, Automotive and Energy at Salesforce
rory.macleod@salesforce.com

A VIEW TO THE FUTURE OF MANUFACTURING

By Scott McNeil-Smith

For more than a quarter century, EMC has worked with all sizes, sectors, and levels of sophistication in manufacturing, to help build competitiveness, workforce skills, capabilities, and productive capacity.

Over the past several years, the top issue affecting Canadian manufacturers has been skills and labour shortages. Not just the absence of skills, but also an alarming absence of available talent with any skill set. Followed closely by rising costs of manufacturing and technology adoption, these critical issues are presenting many challenges for the industry when looking at the future of manufacturing.

EMC is pleased to again participate in this year's Advanced Manufacturing Outlook survey and roundtable. Looking at industry needs and perceptions (especially SME's), many companies view advanced manufacturing, Industry 4.0 and IIoT as only applying to cutting-edge firms with the latest generation of machinery and systems. Our goal is to help broaden this view to show all industries that they can successfully deploy advanced manufacturing practices, process enhancements and technology.

Through a broader lens, EMC views advanced manufacturing as "the use of innovation in skills, technology and process, to improve manufacturing methods, speed, efficiency, product quality and cost, which ultimately provides greater value to customers." Even with the most advanced approaches, people are still a key driver throughout the business, with success shaped by effective processes and systems.

People, Plant and Process

All three need to be in place, resourced and effective for the sector to truly embrace advanced manufacturing and the future.

On the people front, job vacancies are at an all-time high, plus 20 per cent of the manufacturing workforce are eligible to retire in the coming decade. This has meant traditional local labour markets have not been sufficient in meeting skills in demand or filling the vacancies. Technology is outpacing the progress of human capability, and the combined gap is causing some trepidation in committing future investment. Along with high costs of technology and difficulty integrating into current systems, the challenges have prompted many firms to delay adoption of more advanced technology needed to move forward.

The good news is, there is an opportunity for our goods-producing sectors to take an iterative approach to accelerating technological change. Many are looking to first improve their team's skills, capabilities, and processes, which are essential to then adopt, integrate, and utilize more advanced technologies, while being more skilled and experienced in how to manage the challenges related to digitalization, cybersecurity and use of data and AI.

Manufacturers who have sought to apply technology solutions, without first ensuring a skilled workforce and effective, lean production, have seen that technology under-utilized or ineffectual. On the plant front, if the people are not skilled or experienced, and effective processes in place, the technology will not be utilized to its potential. Without a strategic and balanced approach, industry will face greater challenges in sustaining their productivity, let alone trying to grow and expand.

Fortunately, there is expertise, skills training, technology support and resources available to assist. The path for excellence in advanced manufacturing depends on your people, plant, and processes.

Scott McNeil-Smith

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

EXECUTIVE SUMMARY

Over the last year, the world has seen several challenges that have affected our lives. Manufacturers depend on supply chains that are still recovering from the COVID-19 pandemic, which is not as much of a concern as it was in the previous two years. However, in 2022, additional issues have arisen, including the war in Ukraine, blockades at major North American border crossings, various protests and convoys, ballooning inflation, and in-turn rising interest rates.

Companies are still investing in advanced manufacturing, each at their own pace, as many do not want to fall behind their competition, in an increasingly competitive atmosphere.

The 2023 Advanced Manufacturing Outlook measured adoption of advanced manufacturing technologies (IIoT and Industry 4.0) among 174 senior decision makers in the Canadian manufacturing industry.

The research was conducted by R.K. Insights, between May and July 2022, for *Plant* magazine and *Canadian Manufacturing* daily newsletter, in partnership with sponsors: Excellence in Manufacturing Consortium (EMC), Salesforce, Illumiti – A Syntax company, MNP, SAP Concur, and Alps Welding Ltd. The margin of error +/- six per cent, 19 times out of 20.

In addition to the survey, we conducted a roundtable with industry experts, to gauge their reaction to the results, and discuss the future of advanced manufacturing. The discussion allowed for specific insights and stories behind the survey results.

The survey and roundtable looked at advanced manufacturing adoption, digitalization, processes, financing, cyber security, data collection, and training. It also looked at which technologies are being invested in, how those technologies will be used, and how Industry 4.0 adoption has been affected by world events.

What we saw in this year's results is that adoption of IIoT is increasing slowly. This year, 26 per cent of respondents said they are applying IIoT capabilities (up from 24 per cent in 2020), while another 26 per cent are in the process of evaluating its relevance to operations, and a further 14 per cent have a plan and are investing in technology for deployment in next 12 months. However, 20 per cent said they are not familiar with IIoT capabilities (down from 24 per cent in 2020), and 14 per cent said it is not applicable to them.

Diving deeper, when we asked how companies are applying IIoT, we found that organizations are improving efficiency/productivity (43 per cent), providing more visibility into production processes (28 per cent), improving maintenance functions (28 per cent), analytics functionality (24 per cent), tracking materials, shop floor assets (23 per cent), tying in business data from shop floor to top floor (20 per cent), developing new services/revenue streams (14 per cent), consolidating control rooms (14 per cent), and developing smart products (12 per cent).

When we asked what sort of benefits were seen; 78 per cent said they saw a benefit. The main benefits cited by respondents were: increased throughput (38 per cent), reducing downtime (36 per cent), increased quality of product (33 per cent), product innovation (23 per cent), reduced staff requirements (20 per cent), reducing time to market (18 per cent), and new revenue streams (18 per cent).

For those who have not invested in technology, there are a plethora of reasons. However, as many would expect the top reason cited is that the technology is too costly (33 per cent). A few others were difficulties integrating advanced technologies in existing systems (30 per cent), lack of skills to support investment (27 per cent), uncertainty, risk and disruption (23 per cent), lack of financing and support (20 per cent), concerned about exposure to cyber security threats (17 per cent), lack of adequate information about advanced technologies (16 per cent), not sure where to start (16 per cent), not convinced of economic benefit (16 per cent), investment not necessary for continuing operations (15 per cent), among others.

Many of these reasons and how they can be overcome are covered in the report. Conversely, what happens to those that do not invest in IIoT? Companies are worried, 71 per cent of respondents said they are concerned for their companies if they do not invest in IIoT (18 per cent very concerned, 53 somewhat concerned); with 22 per cent not very concerned, and six per cent not at all concerned.

As with any industry that competes with others, the two main goals are to stay ahead of the competition and to grow its customer base. This played out in our survey, those who said they are concerned about not investing in IIoT, the main reasons were falling behind the competition (49 per cent), followed by losing customers (36 per cent). The other worries were disruption by industry outsides (32 per cent), pricing pressure because of commoditization or automation (29 per cent), or low margins (29 per cent).

Switching gears, the survey found that only 56 per cent of respondents mentioned having experienced a cyber-attack or breach at their company. Of those, 41 per cent had a phishing attack, 14 per cent had a data breach or loss of proprietary data; personal or financial information, 14 per cent had a breach through a third-party vendor, 12 per cent through data encryption of operational/control systems or information, financial information, or management or communication systems, 11 per cent was a targeted external cyber-attack, 11 per cent was banking or other financial attack, and seven per cent stated a different type of attack.

The advanced manufacturing, or Industry 4.0 space is an industry onto itself, and many manufacturers are struggling with what to update, what to keep the same, and how to stay ahead of the competition. Read our report for the complete findings, insights, and breakdowns.

Mario Cywinski, Editor, Plant Magazine

Engagement and applying
IIOT TECHNOLOGIES

Many companies see the benefits of advanced manufacturing technologies, but not all have a plan on how to implement them into their operations.

By Mario Cywinski

For many in the manufacturing space, the COVID-19 pandemic has had a slew of negative impacts. However, *Plant*'s Advanced Manufacturing survey found that 45 per cent of respondents said they have increased their planned spend on advanced manufacturing initiatives (35 per cent somewhat, 10 per cent significantly) over the next three years. A further 41 per cent said it had

no effect on their spend, while only 13 per cent said they had decreased their planned spend because of the pandemic (seven per cent somewhat, and six per cent significantly).

How much are companies planning to spend? Of the 94 per cent of respondents who said they plan to invest in the next three years, they plan to invest an average of $3.5 million. This is a significant increase over last year's survey, which showed an average

Photo: metamorworks/iStock/Getty Images

Nearly all (92 per cent) of respondents thought that "technology enables me to keep up with ever evolving customer expectations." This is significant, customers expectations are evolving, much like technology and products themselves are. As a result, 94 per cent of respondents also said, "my business has a growing need for digital transformation".

"Most of our customers, even those who make a product, are finding that the opportunity to add value and differentiation is in the tailoring of the product, and post-sales services associated with the product to create new revenue streams," said Peter Coffee, VP for strategic research, Salesforce. "It's paramount to connect your product so that you can be measuring its behavior, identify warning signs, use machine learning techniques that allow for proactive customer care instead of reactive damage control. These are important benefits, but they don't show up on your profit and loss statements, as opportunities for cost reduction, and they are opportunities for value creation."

While 91 per cent of respondents see IIoT as a business growth opportunity, 81 per cent think that while it is a great concept, it is challenging to implement.

"In the Canadian market, when we're talking about these manufacturers, the vast majority are considered small with under 100 employees. As a result, it is difficult for them to go through the pandemic and supply chain issues, and then not have the skill sets they need in house to develop an advanced manufacturing plan or even figure out who to ask to help plan these things," said Hussam Malek, partner, consulting, MNP. "There is a fundamental challenge in that small size market, where they have been very dynamic in the way they do things, through experiential knowledge. Now they are trying to put IoT or a digital system in place on top of how they do things, and they're like "It's not working for us." I think that's part of the discussion that we need to have, how do we get the small enterprises to a point where they have the knowledge-based capability to understand what they're lacking to make these systems work, but also look at it as an investment, because they see it truly as a cost."

For many companies, even those who may want to or need to invest in advanced manufacturing technology, they simply cannot afford the downtime that replacing machinery will entail. Almost three-quarters (73 per cent) of respondents said that "machinery replacement is a massive investment and will cause downtime we can't afford." This figure has increased from 68 per cent last year, and 62 per cent in 2021.

"With respect to our customers going down the technology route because there is much demand for production, the risk factor in the downtime it takes to do these integrations is almost insurmountable for some of these companies," said Stephen Loftus, CEO, Innovative Automation. "It's the companies that have gone down this road and are finding issues with dealing with production, because the

investment of $1.4 million. While it is great to see companies willing to spend money on advanced technologies, our roundtable panelists are concerned that many do not have a plan in place and may experience buyer's remorse.

"In my experience where I've seen technology projects fail, is where there is a lack of plan and a lack of prioritization amongst the things that they want to accomplish within their organizations. It's important for organizations to sit down and understand what's most important to their business, and just take it step-by-step," said Krishan Chauhan, director of business operations, Canada, SAP Concur. "If there's one thing that I'm hearing consistently it's that you have to plan and you have to prioritize, and then, once you prioritize, you have to execute seamlessly, because if you don't, there's going to be all sorts of challenges at which point, it's hard to come back out of that and see it from a macro level once you're in it."

ORGANIZATION

CHALLENGES IMPLEMENTING TECHNOLOGY – 95 replies

47% ▶ Lack of skilled talent

38% ▶ Integrating with legacy technology

38% ▶ Resistance to change

36% ▶ Funding challenges

31% ▶ Difficulty keeping pace with the rapid pace of change

24% ▶ Pressure to deliver short-term results

23% ▶ Too many technology choices and unsure where to start

19% ▶ Fear of failure

18% ▶ Lack of leadership vision

14% ▶ Not sure how to access available resources

9% ▶ Exclusive / None of the above

production numbers are high now the risk is increasing. They're planning to shut something down for a week to do an integration or an upgrade to equipment. They have no buffer in their production schedule, as the demand is high currently."

Interestingly, while many respondents believe that Industry 4.0 is useful and needs to be adopted at some point, only 62 per cent said that their company has a plan/roadmap for DX/I4.

"Given all this risk, a lot of companies just don't know where to start. Which goes back to the importance of a plan, and probably the importance of just asking "what are the critical processes, and where in your critical processes would a system of predictive connectivity actually improve the process?" said Jayson Myers, CEO, NGen. "Even in some very sophisticated companies that have focused primarily on production rather than on data and digitization, there's a big organizational and cultural change that needs to be implemented. I can certainly see why companies would say it's too costly, and the costs are not just monetary costs, the cost of that disruption and the cost of implementing the plan successfully."

While we mentioned earlier that most companies plan to invest in advanced manufacturing in the next three years, what exactly are they looking at investing in. When we asked "what they plan to invest in over the next three to five years," the top responses were robotics and automation, with 54 per cent; followed by cloud computing at 44 per cent, and IIoT/M2M at 40 per cent. A few others that had over a third support were AI (39 per cent), data

capturing (36 per cent), and advanced analytics (36 per cent). One thing to remember is that it is critical to make sure that the investments are being made in the right areas of the company.

"What I've seen a lot is the "where do we start" and having that strategic score card is critical to this, so you could go into a plant that has 10,000 pieces of equipment, or a plant that has 50,000, and for both, understanding the production critical equipment and having a score card will help determine where to start," said Kristina Sturek, director, US projects, Illumiti. "It's important to step back, and look at your critical areas, throughput challenges, and equipment availability, and then assess these areas. What is it that we want to measure, what do we want to improve, where do we need our cost savings and improvements? Then choose that one area based on the analysis and reliability assessment, that is where your pilot should start, after a period of six to 12 months your business case will write itself, you are going to see the cost savings by increasing your equipment uptime, reducing wrench time, reductions in materials and overtime costs, especially with predictive maintenance."

One other aspect to keep in mind is that for companies that rely on getting products from others in the supply chain, having all those companies on the same page is a must. Along that respect, 87 per cent of respondents said they use cloud systems to store their operational data.

"How do we get an Industry 4.0 message to the entire supply chain, because you need visibility throughout, it's not good having one of your vendors providing you that visibility, but the majority aren't, because they're not quite there yet," said Lorraine Howell, Vice-President, research and development, Illumiti. "You need an evangelist approach to the concept of Industry 4.0 to get everyone on board and understand the need to have that visibility for the next pandemic. We're kind of blinded in the world that we live in today. How do we get people comfortable in providing that visibility? It goes back to your original concerns that customers have about the cost and the risk to their business."

Mario Cywinski is the editor of Plant magazine, MRO magazine, and Food and Beverage magazine, contact him at mcywinski@plant.ca.

APPLYING IIoT – 173 replies	Total	Currently applying	Have a plan	Evaluating	Not familiar
Improving efficiency/productivity	**43%**	78%	50%	51%	6%
Providing more visibility into production processes	**28%**	54%	38%	27%	6%
Improving maintenance functions	**28%**	61%	33%	22%	3%
Analytics functionality	**24%**	48%	42%	20%	0%
Tracking materials, shop floor assets	**23%**	46%	25%	18%	9%
Tying in business data from shop floor to top floor	**20%**	35%	29%	20%	3%
Developing new services/revenue streams	**14%**	26%	33%	9%	0%
Consolidating control rooms	**14%**	24%	21%	18%	0%
Developing smart products	**12%**	24%	8%	13%	3%
Not currently applying IIoT	**37%**	2%	13%	24%	83%

WHICH OF THE FOLLOWING PROCESSES ARE YOU LOOKING FOR AI TO IMPROVE AT YOUR ORGANIZATION OVER THE NEXT 12 MONTHS?
102 replies

25% ▶ Managing cash flow

25% ▶ Mitigating risk and compliance in invoice management

23% ▶ Auditing expense reports

21% ▶ Mitigating risk and compliance in employee spend

21% ▶ Invoice payment authorization processes

18% ▶ Managing taxes and identifying reclaim opportunities

16% ▶ Employee expense reimbursement process

4% ▶ Other write in

37% ▶ None of these- not planning to adopt any AI technologies in the next 12 months

DO YOU CURRENTLY USE AI TECHNOLOGIES IN ANY OF THE FOLLOWING SPEND MANAGEMENT PROCESSES? 102 replies

Currently applying AI	**28%**
Planning to start in the 12 months	**14%**
In the process of evaluating	**23%**
Not currently using AI for any spend management processes	**35%**

HOW PREPARED WAS YOUR COMPANY TO DEAL WITH THE PANDEMIC? 102 replies

		CURRENTLY APPLYING IIOT	EVALUATING IIOT
Prepared	**77%**	**76%**	**77%**
Not really prepared	**22%**	**24%**	**20%**
Not at all prepared	**1%**	**0%**	**3%**

RATE THE FOLLOWING – 118 replies

94%	My business has a growing need for digital transformation
92%	Technology enables me to keep up with ever evolving customer expectations
91%	I see IIoT as a business growth opportunity
85%	Systems are designed with input from those who use them
85%	Cloud services have made my business more resilient
82%	Emerging technologies allow small companies to compete globally
81%	Industry 4.0 is a great concept, but challenging to implement
80%	Upper management at our company supports industry 4 0
74%	Investing in new technology raises the company's cyber security risk
74%	I know where to find government programs to help with new technology investments
73%	Machinery replacement is a massive investment and will cause downtime we can't afford
62%	Our company has a plan/roadmap for DX/I4 0

WHICH OF THE FOLLOWING HAVE YOU SEEN AT YOUR COMPANY SINCE THE PANDEMIC - 102 replies	2023	2022
Changes since the pandemic	93%	97%
Increase in remote working	60%	66%
Changing customer needs/expectations	44%	61%
Migration of assets to the cloud	36%	37%
Increased use of advanced technologies in operations	31%	45%
Increase of nearshoring/insourcing	31%	32%
Increased use of advanced technologies in business decision making	29%	36%
Other	2%	1%
None of these	7%	3%

BENEFITS FROM TECHNOLOGY UPGRADES 174 replies	TOTAL
Experienced a Benefit	**78%**
Increased throughput	**38%**
Reducing downtime	**36%**
Increased quality of product	**33%**
Product innovation	**23%**
Reduced staff requirements	**20%**
Reducing time to market	**18%**
New revenue streams	**18%**
Other	**5%**
None of these	**22%**

IIoT ENGAGEMENT – 174 replies

26%	Currently applying IIoT capabilities
14%	Have plan, investing in technology for deployment in next 12 months
26%	In the process of evaluating its relevance to operations
20%	Not familiar with IIoT capabilities
14%	Not applicable

Biggest challenges when implementing
NEW TECHNOLOGY

There are two sides of the spectrum, companies that have invested in production processes and are seeing the pay off and companies that are worried to make the leap.

By Monica Ferguson

I n the 2023 Advanced Manufacturing Survey, we asked respondents about their company's engagement with IIoT. Interest in IIoT has been growing since 2020 (24 per cent), in terms of current application. We saw some growth versus 2022 (26 per cent of companies saying that they are currently applying) and last year (23 per cent).

Those who are applying IIoT, 78 per cent said they are improving efficiency, while gaining more visibility into production processes (45 per cent) and using the analytics functionality (45 per cent). Overall, 78 per cent are seeing benefits with technology upgrades, an increase from 71 per cent in 2020. The top benefits cited are increased throughput, reduced downtime and increased quality of product.

On the other hand, 89 per cent of companies could cite a reason to not invest in technology. The most cited reasons are the cost, difficulties integrating advanced technologies in

existing systems and lack of skills to support investment.

Inquiring which technologies companies intend to invest in over the next three to five years, most cited investments in robotics and automation, cloud computing and IIoT/M2M.

A whopping 93 per cent plan to invest in technologies in the coming years.

Our roundtable participants weighted in on the roadblocks companies are seeing. Though many respondents seem eager to implement IIoT in the next three to five years, our roundtable participants weighed in on where they see gaps.

"It's not as straightforward as people would like to think. It's amazing what it can do, but you must have a very open mind toward both the novelty and synergy of the opportunity, and the challenge of making it scalable in production volume over time," said Peter Coffee, VP for strategic research, Salesforce.

First things first, be prepared

"Companies get captured by the idea of artificial intelligence (AI), the potential of AI, and say that they're going to develop a plan to invest in AI. Without asking themselves 'Are we prepared? Do we have a process? Do we have a purpose for making an investment and turning it into a good business case that's going to deliver on real business outcomes at the end of the day?'" said Jayson Myers, CEO, NGen. "I think there is an awful lot of wishful thinking on the part of companies that say that they're going to be investing in AI, and maybe another advanced technology here without really knowing what the real requirements for successful implementation are."

Implementing a process and a plan is essential so that companies get the answers to the right questions, opposed to answers to the questions they already know.

"Adding intelligence in the absence of process is not going to give you artificial intelligence. It's going to be connected to the sources of

"It's not as straightforward as people would like to think. It's amazing what it can do. But you must have a very open mind toward both the novelty and synergy of the opportunity, and the challenge of making it scalable in production volume over time. -Peter Coffee

data that are structured and cheap. Those will typically be your systems of record, and it will become an automated expert on what happened yesterday," said Coffee. "The real opportunity is to cross-connect silos, which is a cultural challenge to deal with unexpected interactions across data which requires an attitude of I'm going to allow the system to do discovery rather than merely asking the system to do 'learning' on where I tell it what it should be studying."

Top three challenges

Overall, 91 per cent of manufacturers face challenges developing and implementing technology strategies, the top cited challenges are: lack of skilled talent (47 per cent), integrating with legacy technology (38 per cent) and resistance to change (38 per cent). Let's take a closer look at how our roundtable responded to these concerns.

Lack of skilled talent

"When we talk about retaining talent where you have a generation of millennials that use technology for anything and everything. It is a challenge to ask those very same people to file an expense excel spreadsheet manually," said Krishan Chauhan, director of business operations, Canada, Sap Concur.

Recent graduates entering the workforce are familiar with the latest technologies. Having certain data entry systems in place could turn talent away and towards companies that have simplified the process.

"Looking at something as simple as an expense reporting process, most companies are using an excel spreadsheet of some sort to track their expenses. Employees hate it," said Chauhan. "They must document each one of their expenses on this excel spreadsheet. They have a pile of receipts that they have to scan into their computer, put it into an email and then send it off to their manager for approval."

Integrating with legacy technology

This example of spreadsheets can also be looked at regarding the challenges of legacy technology.

The survey revealed that spreadsheets remain the number one (60 per cent compared to 70 per cent in 2020) way of collecting and using data. However, their use is showing a consistent downwards trend, while moving towards integrated ERP (52 per cent) and MRP (29 per cent).

"When we talk about some low-hanging fruit, and where organizations can get some good and quick cost savings it's important to look at some of these systems, because, although they're not sexy, they can really give you the visibility into the data you spend, and then you can start making some business decisions," said Chauhan.

Stephen Loftus, CEO, Innovative Automation, discussed his experience with transitioning a company from legacy technology to a new process.

"We couldn't sustain our growth and projected growth with the system that we had, though it had served us well for 25 years," said Loftus. "We had to lay out our objectives for employees, communicate what we're trying to accomplish, and why this tool was going to help us do that. There's a lot more data when you're dealing with a bigger corporation of multiple locations and multiple business units, which is what we're going through, and we needed these tools to do it."

Resistance to change

Resistance to change is a natural emotional response, especially when it concerns technology and the potential it has on changing the landscape of jobs. The panel discussed the importance of working as a team when bringing in new technology and ensuring workers are part of the change rather than being replaced by the change.

"When you're bringing in a change, I think the critical thing for your people is to tie it to your objective, strategy, and purpose. To say, 'we are bringing in this new technological investment,' whether it's AI or another system, and saying, 'this is here, we're not going to change the purpose of the organization. We're not going to change where we're going strategically. We're using this as a tool to get there,'" said Dennis Dussin, president, Alps Welding.

The change management piece was largely discussed in term of resistance to change.

"I've seen it many times where an organization invests in technology, they don't have a proper change management plan, they go through the implementation process and the utilization of the technology is miniscule, because there wasn't that change management plan. And then they're kind of digging themselves back from that hole and trying to do it all over again," said Chauhan

Ensuring there is communication with change management that outlines a concrete plan how workers are involved and can provide feedback are key markers in successful automation.

"When bringing in AI, if you engage your teams, implement it correctly, and allow it to learn over time, it will still take some time to see expected results," said Kristina Sturek, director, US projects, Illumiti. "When implementing AI, there is an element of machine learning/anomaly detection taking place, depending on your application, and this part takes time for the machine to learn behaviors, results are never overnight. What we have seen with some of our customers is that results begin to materialize within six months, but the true benefits come in 12-18 months."

Monica Ferguson is the associate editor of Plant magazine, MRO magazine and Food and Beverage magazine at Annex Business Media.

DEMOGRAPHICS

GENDER
164 replies

80% Male

20% Female

AGE – 163 replies

- **7%** Over 65
- **16%** 26-35
- **31%** 36-45
- **21%** 46-55
- **24%** 56-65
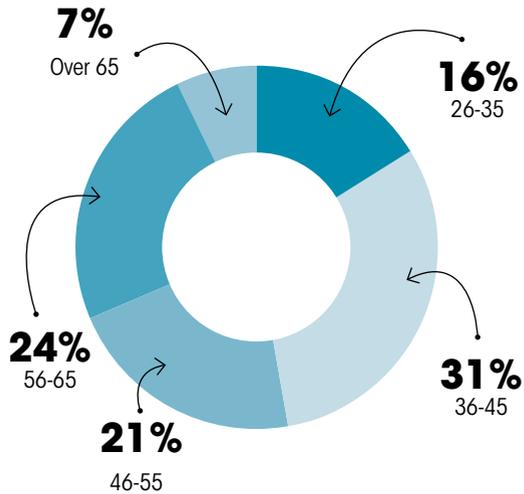
NUMBER OF EMPLOYEES
160 replies

Less than 50	33%
50 – 249	29%
250 – 499	13%
500 – 999	8%
1,000 – 4,999	11%
5,000 or more	7%

COMPANY REVENUE – 158 replies

$1M to <$5M	25%
$5M to <$10M	13%
$10M to <$30M	16%
$30M to <$50M	7%
$50M to <$100M	13%
$100M to <$250M	3%
$250M to <$500M	9%
$500M to <$1B	5%
$1B plus	10%

LOCATION
160 replies

- Yukon / NWT / Nunavut **0%**
- British Columbia **13%**
- Alberta **7%**
- Saskatchewan **1%**
- Manitoba **2%**
- Ontario **53%**
- Quebec **13%**
- New Brunswick **3%**
- Nova Scotia **6%**
- Newfoundland & Labrador **1%**
- PEI **1%**

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INDUSTRY SECTORS – 161 replies

Industry	%
Miscellaneous manufacturing	20%
Fabricated metal product	17%
Machinery	13%
Electrical equipment, appliance and component	10%
Food manufacturing	9%
Plastics and rubber products	7%
Aerospace product and parts	6%
Computer and electronic product	6%
Chemical	5%
Paper manufacturing	4%
Motor vehicle parts	3%
Printing and related support activities	3%
Transportation equipment	3%
Clothing manufacturing	2%
Motor vehicle body and trailer	2%
Primary metal	2%
Wood product	2%
Beverage and tobacco product	1%
Furniture and related product	1%
Motor vehicle	1%
Non-metallic mineral product	1%
Non-durable goods industries	1%
Petroleum and coal product	1%
Ship and boat building	1%
Textile product mills	1%

EDUCATION – 164 replies

- **3%** Other/Write-in
- **10%** High school or less
- **10%** Trade/technical diploma
- **18%** College diploma
- **57%** University degree
- **4%** CEGEP
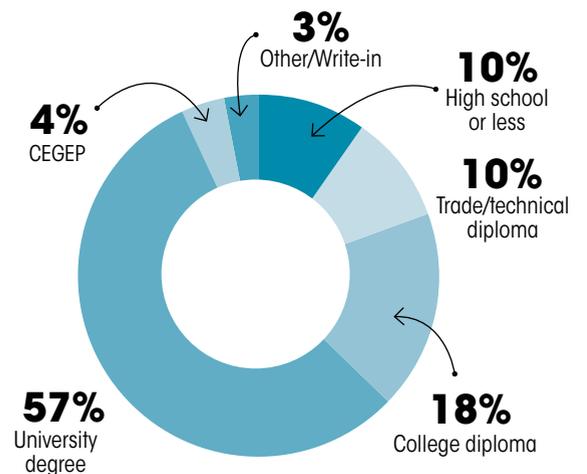
DEMOGRAPHICS

WHICH OF THE FOLLOWING BEST APPROXIMATES YOUR TITLE/ROLE – 161 replies

Administrative Management	12%
Owner/partner	12%
Design Engineering	12%
Production/Operations Manager	12%
Director	11%
CEO/President	7%
Plant Engineering	7%
Technician/Technologist	7%
Plant Manager	7%
IT/Systems Manager	7%
Maintenance Manager	6%
Vice-president	6%
Purchasing/Supply Manager	6%
Safety manager	6%
Materials Manager	5%
Logistics Manager	5%
Quality Assurance Manager	4%

WHAT IS YOUR ROLE IN YOUR COMPANY – 165 replies

10% Other

13% Have controlling ownership stake in the company and management role

8% Have an equal partnership stake in the company and management role

7% Have a minority ownership stake in the company and management role

**62%** Have a management role in company only
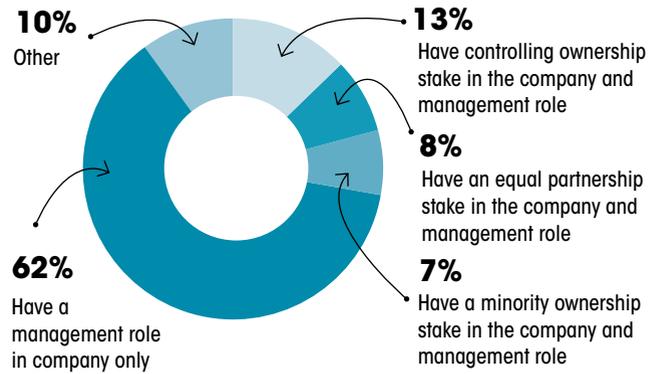
WHICH OF THE FOLLOWING BEST DESCRIBES YOUR LEVEL IN YOUR ORGANIZATION? – 161 replies

C-suite executive/ owner/ principal/partner/president	19%
Vice-president/director/senior executive management	15%
Other senior position	22%
Other mid-level /management	33%
Junior role	6%
Other - Write In	5%

PROCESS

LEVEL OF AUTOMATION – 104 replies

1% No automation systems in place

18% Primarily machine-driven systems, minimal human intervention

16% Minor automation, processes mostly require human intervention

26% Machine-driven, some human intervention

39% Machines, processes require significant human intervention
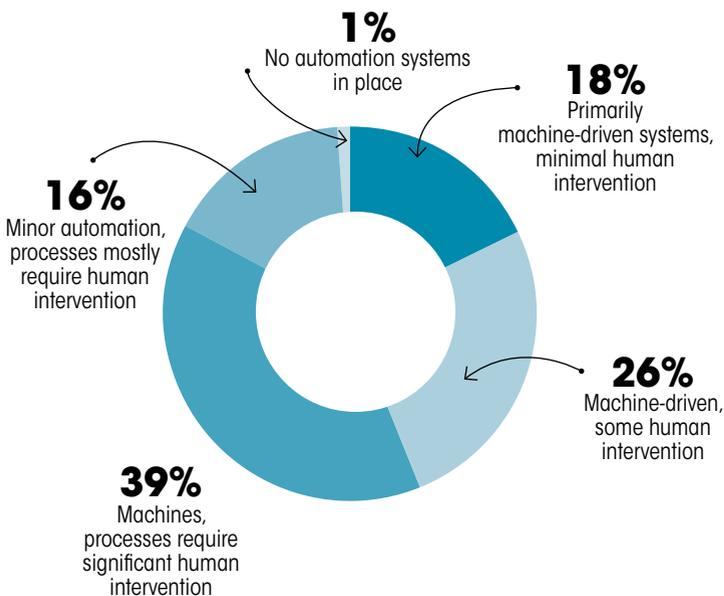
USING MACHINE LEARNING – 95 replies

23% One area of the organization

31% Several areas of the organization

8% Throughout the organization

38% Not at all

DON'T BE LEFT BEHIND

Different companies spend a varying amount on a cross-section of technologies, what happens when companies don't invest?

By Mario Cywinski

As part of the Advanced Manufacturing survey and report, we asked our expert roundtable panelists to speak about what happens to companies that do not invest in technology.

Photo: © iuriimotov / Adobe Stock

to produce this much. We want to do that every month to make money," and what they did was, they burned the furniture. If you burn the furniture, you're going to get your products out and you're going to get your money. However, what's going to happen next is that three weeks later your plant's going to go down, and you're going to be in a shutdown situation. As you've ran it to red line, and you've cost yourself even more than what you just saved.

Dennis Dussin, President, Alps Welding

Customer losses are the biggest concern to worry about. We've taken on a couple of new customers recently that have left competitors and come to us. The main reason they cite is that the competitors have lost control of their processes, their ability to make schedules and meet commitments with supply chain issues. You must have processes first, and then you must have good control of visibility of them. We are a fragmented industry, a lot of small companies that haven't made investments. They don't necessarily have a lot of these processes. In turn, we've made those investments, and we are winning from that.

The last couple of years has taught us that we should be very concerned about companies, large and small, that aren't making investments in technology. If you look at who's disappeared during the pandemic, and those still around, they have invested in technology. I don't see how you can be competitive, have effective processes and serve customers in today's environment, if you're not making those investments. The number of people not concerned should be in the single digits, close to zero.

We're in the custom manufacturing world, driven by craftsmanship and skills, and not trying to replace that, but to facilitate that. We're trying to most efficiently use the skills that we have. We're trying to get people the right information and give them the right processes, so we can make the most of the people that we have. That is where technology is for us; it's about improving the work of people, not replacing the work of people.

Kristina Sturek, Director, US projects, Illumiti

You're going to lose your competitive edge in the market space, since your cost of goods sold is going to be much more competitive with technology. If you don't have the knowledge that technology provides available to you, and the right people to analyze that knowledge, you're going to keep spending more money on the problem. Instead of looking at the root cause of the problem, which you will get to by using IIoT and AI. As well as getting data to help make critical decisions, which lets you make your products at a reasonable rate.

We can have all this data at our fingertips, but how we process that has a lot to do with how we run our plants. A good example is our cars, which would go 140 miles an hour, however, if we rode our cars at 140 or more all the time, they are going to breakdown. It's the same with our equipment. People will get this data, and say, "Okay, three months ago, we ran our production schedule at X, and we were able

CONCERN ABOUT CYBER RISKS

94 replies

- 1% Not at all concerned
- 19% Very concerned
- 47% Somewhat concerned
- 33% Not very concerned
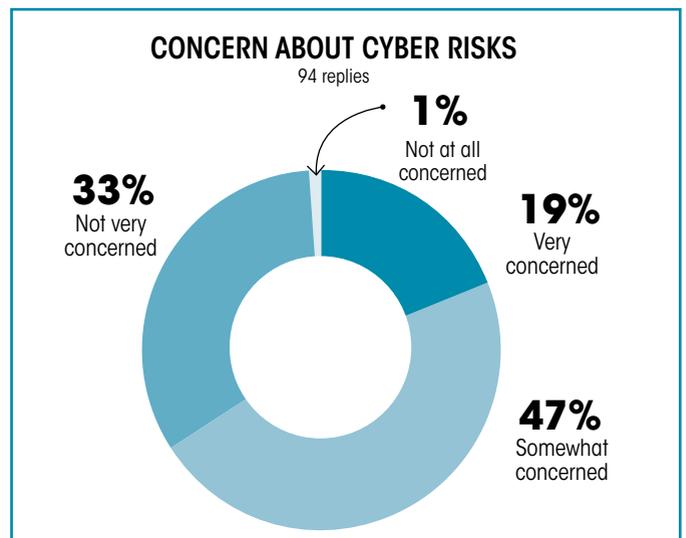
Hussam Malek, Partner, Consulting, MNP

Companies that don't invest are going to be losing customers and will be affecting their profitability when it comes to material costs. Looking deeper, you need to make sure that IoT is giving you the type of data to help make decisions. When it's not, you are basically operating your business the way you have in the past, which is based on natural trends of what you are used to for the past 25 years. The problem is those trends have changed drastically, and now we are in a global competitor and globalized environment; therefore, not having that information and data is going to impact your profitability.

Today, we are noticing the new generation is coming in and trying to swipe screens being used at the manufacturing organizations. They are used to their iPad or iPhone however a HMI on a machine is usually more functional than user friendly. Lack of technology or data can cause new employees to feel frustrated as they get trained through experiential knowledge of older employees or old paper documents.

Technology based on-boarding and decision making is crucial to retain new talent. If the data is not there to make intelligent decisions, it gets frustrating, and we're noticing high turnovers. Companies that are successful are the ones who are introducing the newest technology and IoT systems, that are helping organizations make data driven decisions.

Jayson Myers, CEO, NGen

Losing employees and not being able to attract younger people into your workforce is a major concern. Younger people coming into the advanced manufacturing workforce are expecting companies to be up-to-date in terms of the technologies they are using.

Another group of companies, maybe in as much risk as the ones that are not adopting technology, are the companies that are

INVESTMENT

95 replies

INVESTING PRIORITY OVER THE PAST 12 MONTHS	%	AVERAGE
Robotics, automation	76%	$86,900
Cloud computing	86%	$73,800
ERP	74%	$72,300
IIoT/M2M	69%	$70,000
Data capturing machine/shopfloor	78%	$62,400
Artificial intelligence	57%	$52,600
Advanced analytics	70%	$50,800
3D printing, additive manufacturing	58%	$50,400
Virtual reality	36%	$23,800

99 replies

TECHNOLOGY PRIORITIES OVER NEXT 3-5 YEARS	2023	2022
Robotics, automation	54%	60%
Cloud computing	44%	41%
IIoT/M2M	40%	44%
Artificial intelligence	39%	32%
Data capturing machine/shopfloor	36%	50%
Advanced analytics	36%	36%
3D printing, additive manufacturing	30%	39%
ERP	26%	34%
Virtual reality	13%	24%
Other	2%	3%
No investments planned	7%	2%

HAS THE AMOUNT YOU INTENDED TO SPEND ON ADVANCED MANUFACTURING TECHNOLOGY CHANGED BASED ON THE GLOBAL PANDEMIC?
97 replies

13% Decrease since the pandemic
41% No change
45% Increase since the pandemic
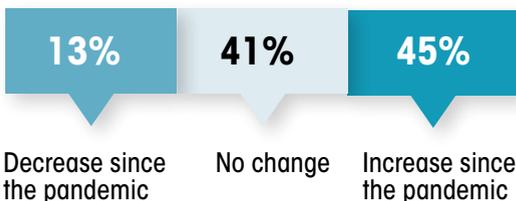
WHAT IS YOUR INTENDED SPEND ON THE ABOVE TECHNOLOGIES OVER THE NEXT THREE YEARS?
99 replies

94% Plan Investment
$3.5 Average Investment (in millions)

adopting the wrong technology or the technology in the wrong places of their operations, or fail to see the opportunity of technology, and just try to replace existing systems with new technology. In many ways that could be even more damaging since you're using up a lot of cash and investing it into technologies that aren't delivering on the business objectives that you've set for the organization.

Peter Coffee, VP for Strategic Research, Salesforce

This reminds me of a product configuration system that was built where complex products had power supplies and storage units, and the question was, if the cable that was included was going to be the right length to connect two of the subsystems, depending on the configuration chosen. These were issues where if they were delivered with one missing cable, an expensive delivery was effectively not made. The system was in use for several years. Over that time, it grew to an expert system with many rules, half of which needed to be updated every year. I was at a conference when they proudly unveiled the system and presented it. The following year, they brought the knowledge management tool they had to build to maintain the system, which turned out to be a far more difficult task, since it involves people continually being engaged to update things. Getting the demo was easy, building the sustainable production system was more difficult. This example was from the late 1980s; however, it's not a new lesson. It is now a lesson that is being learned by companies that are now discovering that building the demo is one thing, building the right product is another thing, sustaining a production system at scale over period of several years is simply a different challenge. It is a far more organizational and cultural challenge than it is a technical one.

Mario Cywinski is the editor of Plant magazine, MRO magazine, and Food and Beverage magazine, contact him at mcywinski@plant.ca.
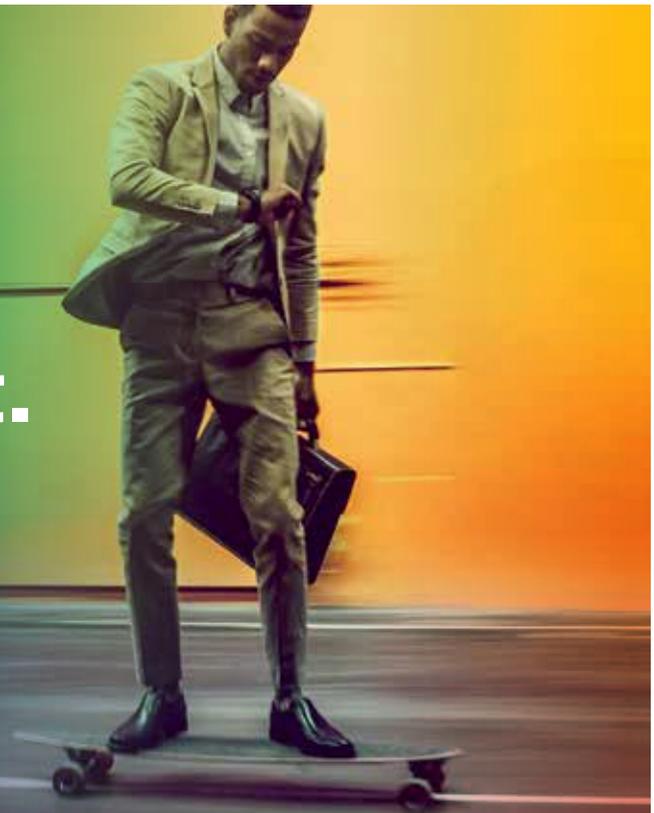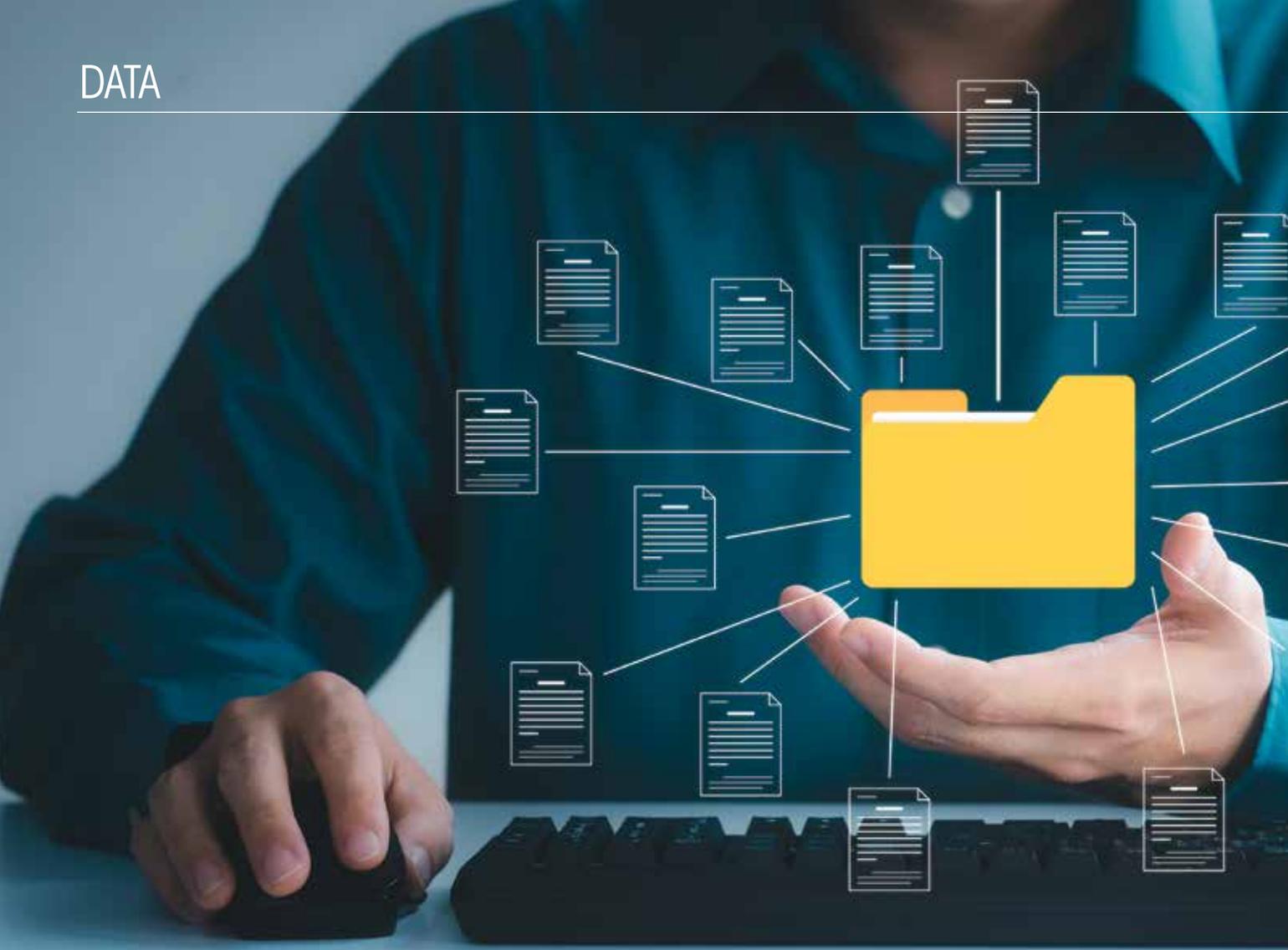
DATA COLLECTION AND MANAGEMENT

Companies are increasingly collecting and monetizing data, while using the cloud, and data sharing within their organization.

By Mario Cywinski

As part of the 2023 Advanced Manufacturing Survey, we asked respondents how they are collecting and using data. What we found is that while 60 per cent still cite spread sheets (excel) as the number one option, that is down from 70 per cent in the 2020 survey, and 66 per cent in 2022). The other two categories to see a drop were manual paperwork at 22 per cent (down from 43 per cent in 2020, and 30 per cent in 2022); and an accounting package at 42 per cent (46 per cent in 2020, and 44 per cent in 2022).

On the flip side, three categories are up since 2020. The biggest was integrated enterprise resource planning (ERP) at 52 per cent (35 per cent in 2020, and 46 per cent in 2022); followed by manufacturing resource planning (MRP) at 29 per cent (26 per cent in 2020, but down from 35 per cent in 2022), and sensors big data at 22 per cent (14 per cent in 2020, but down from 29 per cent in 2022).

What these results demonstrate is the reliance on manual and/or paper options typically available in a single location are declining, albeit slowly. Cloud-based solutions are slowly being adopted by more companies.

"There is a lot of desire to integrate technology among different people within organizations. A movement to ERP as opposed to MRP, and having information in the cloud, where it's all about getting multiple people in multiple places able to access that information, and how production and distribution functions can benefit from information sharing," said Dennis Dussin, president, Alps Welding. "It's great to have the data, but it's also about distributing the data, distributing decision making, empowering decision-makers. It's a positive trend, where over the last couple of years a lot of people have been working remotely, and many organizations have been

challenged with giving the right people access to the right information to do their jobs. People are now investing in technology that facilitates that kind of inter-departmental or inter-functional data transfer and decision making."

What is encouraging to see, is 89 per cent of respondents are looking to monetize their data in some way. This is up 15 per cent since the 2020 survey (74 per cent). When we asked "how or why are companies trying to monetize their data, number one is to improve operational efficiencies (66 per cent); followed by developing new business models (41 per cent); adding new services to existing offerings (33 per cent); leveraging supply chain/customers (31 per cent); developing analytics capabilities for external sale (22 per cent); and partnering with similar companies (11 per cent).

"Looking at how companies are monetizing their data, we need to be looking beyond just the operational efficiencies, in turn, we also need to look at how to deliver greater value to customers. We're seeing a bit of a trend in that direction as this is an important consideration in terms of how companies are thinking about data, and their business as a whole," said Jayson Myers, CEO, NGen. "You can become more efficient, but at the end of the day, unless you're delivering value through your product or service to your customers, the efficiency isn't going to lead to long-term business sustainability."

Looking at data in a different way, we asked respondents what area of their business would benefit most from data sharing. While each area may have data, they may only keep data within that area, and not share it with the whole organization. What we found was that 96 per cent of manufacturers can cite at least one area where data sharing would benefit the organization.

"For us, having just gone through an ERP system upgrade, and understanding that the raw information that's coming out of it isn't going to be a benefit to every employee. Therefore, creating tools to analyze that data that's allowed us to create tools that automate people's decision making," said Stephen Loftus, CEO, Innovative Automation. "It's another step in the automation process, the data is allowing us to make those decisions, no different than any person analyzing that data and making the decision. Now we can do things in an automated process, it keeps things moving forward and speeds up timeline."

According to respondents, the main areas of an organization that would benefit from data sharing are production (65 per cent); supply chain (51 per cent); sales (46 per cent); customer support (43 per cent); enterprise planning (36 per cent); distribution (36 per cent); and warehouse (31 per cent).

"If you had to pick an area (of the business that needs data) which one, would you start with? When you interpret that question, is production first, or is production the one that's going to need data. However, who do they need data from?" said Rory Macleod, area vice-president, manufacturing, automotive and energy, Salesforce. "Looking at a lot of the customers that we're talking to, we see this right across the board. If they're trying to get pricing configuration information to their dealers, where is that coming from? What's being tied into the back end. I think there's a lot of manufacturers that just need that end-to-end process flow and view the customer and the production all the way across."

While bigger companies are more familiar with the type of data they need and want to collect, a small to medium sized company might not. They know they need to collect data, but for many, the task is overwhelming.

"When it comes to small to medium-size enterprises, sometimes a challenge is understanding what type of data to collect. A lot of times what happens is an organization that isn't sophisticated enough, has a lot of data, and they're not sure what to hold on to, what to analyze, and what to prioritize. It's the analysis paralysis, and I've seen some clients get into that phase because they're like data, data, data. They want to make every decision through data, which is great, but sometimes that data doesn't exist, or you have too much, and you don't know how to process it. Therefore, it's about prioritizing what the biggest benefits are for the organization, and how all that data can be used," said Hussam Malek, partner, consulting, MNP. "Basically, looking at listing the top 10 priorities and in what order you want to be able to look at that data to help benefit your organization. Otherwise, the analysis through paralysis takes place at times for these organizations, and they won't have the capability and the systems to be able to handle all the data."

Mario Cywinski is the editor of Plant magazine, MRO magazine, and Food and Beverage magazine, contact him at mcywinski@plant.ca.

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HOW DATA IS MONETIZED – 94 replies

66% Improving operational efficiencies

41% Developing new business models

33% Adding new services to existing offerings

31% Leveraging supply chain/customers

22% Developing analytics capabilities for external sale

11% Partnering with similar companies

11% None of the above
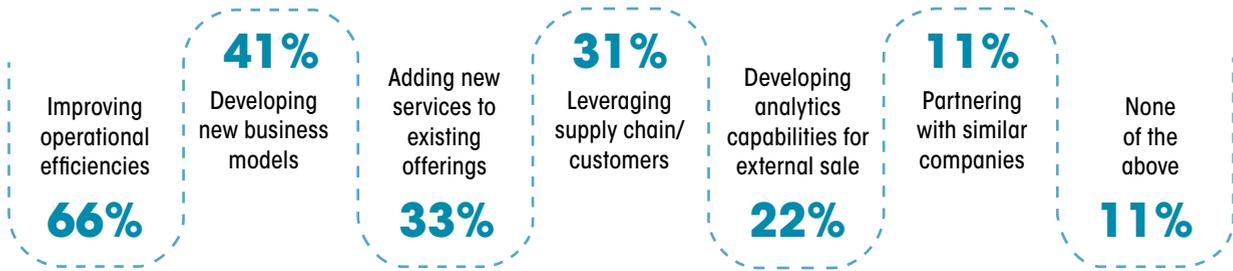
COLLECTING AND USING DATA – 95 replies

60%	Spreadsheets, such as Excel
52%	Integrated ERP for supply chain
42%	Accounting package
29%	MRP
22%	Sensors-big data
22%	Manual paperwork
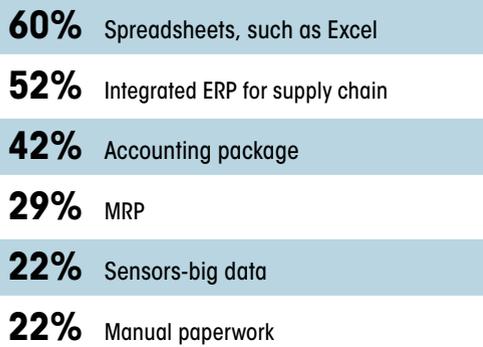
USING CLOUD SYSTEMS – 94 replies

4% No

9% Not really

87% Yes
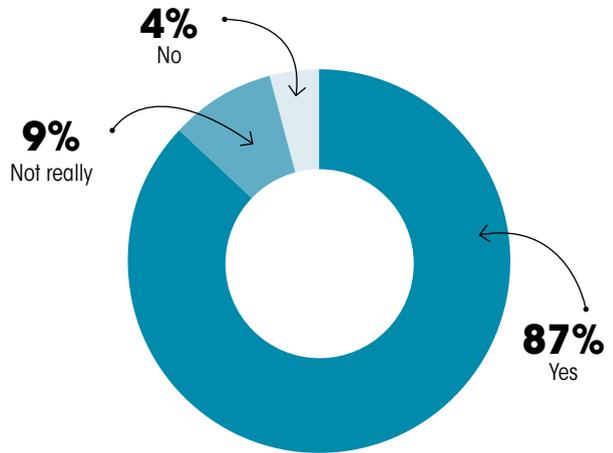
AREAS TO IMPROVE DATA – 96 replies

Production	Supply chain	Sales	Customer support	Enterprise planning	Distribution	Warehouse	None of these
65%	51%	46%	43%	36%	36%	31%	4%
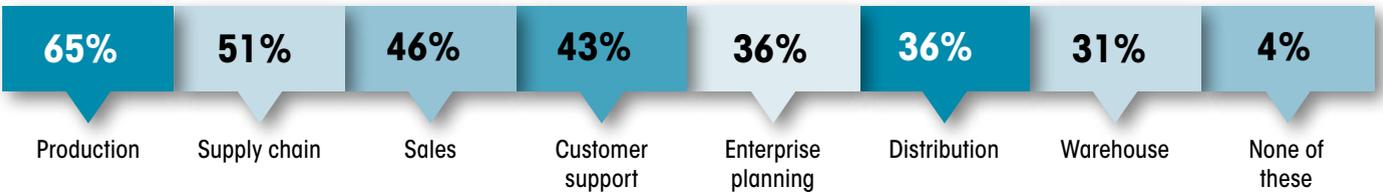
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ARE YOU PROTECTED FROM A CYBER-ATTACK?

Only 56 per cent of survey respondents said that they have experienced a cyber-attack or breach at their company.

By Mario Cywinski

Cyber-attacks are becoming more common, and the type of attack cited as the most common was a phishing attack at 41 per cent; this was followed by 14 per cent who had a data breach or loss of proprietary data; personal or financial information, 14 per cent had a breach through a third-party vendor, 12 per cent through data encryption of operational/control systems or information, financial information, or management or communication systems, 11 per cent was a targeted external cyber-attack, 11 per cent was banking or other financial attack, and seven per cent was other.

Photo: © ipopba / Adobe Stock

"More than half of companies are blissfully unaware that they've suffered an attack, these numbers are measures of delusion. The idea that a piece of open-source code is buried in systems, and in some cases down in layers that were never even designed to have a regular update cycle has caught companies off guard," said Peter Coffee, VP for strategic research, Salesforce. "If this wasn't a wake-up year, I don't know what will be."

What is concerning is that 44 per cent said they have had no breach or attack. During our roundtable discussion, our panelists had some great insight into these numbers. With many believing that the numbers are artificially low, and in fact, the number who have had an attack is higher.

"I think the number of people think that they have experienced a cyber-attack is far lower than the number who probably have. The other thing that concerns me is there seems to be more of a reliance or

"Our internal pulse data shows that careless, untrained or unaware employees are the top source of vulnerability for most firms."

- Scott McNeil-Smith

dependence on a technology solution rather than a human solution. Given that 95 per cent of all problems are human problems," said Jayson Myers, CEO, NGen. "For those who think that they've done enough, and for those who think that they haven't had some form of a cyber-attack, let alone a breach - I am very concerned about that."

CYBERSECURITY

ATTACKS OR BREACHES – 94 replies

No breach or attack
44%

Phishing attack
41%

Breach through a third-party vendor
14%

Watering hole attack
5%

Any breach or attack **56%**

Data breach or loss of proprietary data, personal or financial information
14%

Banking or other financial attack
11%

Targeted external cyber attack
11%

12% Data encryption of operational/control systems or information; financial information, management or communication systems

GOVERNANCE POLICY IN PLACE – 99 replies

Yes definitely
36%

Yes somewhat
40%

No, not really
18%

No, not at all
5%
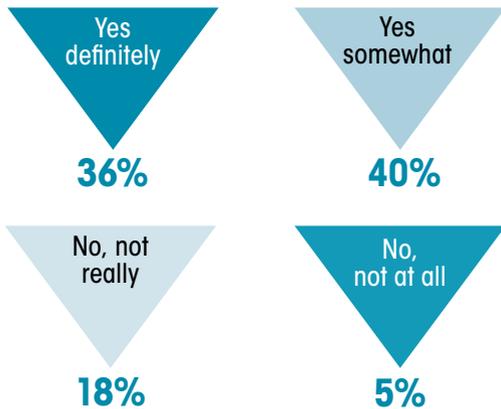
PROTECT YOUR BUSINESS FROM CYBER-ATTACKS – 92 replies

18%
Yes definitely, we have taken all possible precautions

63%
Yes somewhat

16%
No, not really

2%
No, not at all
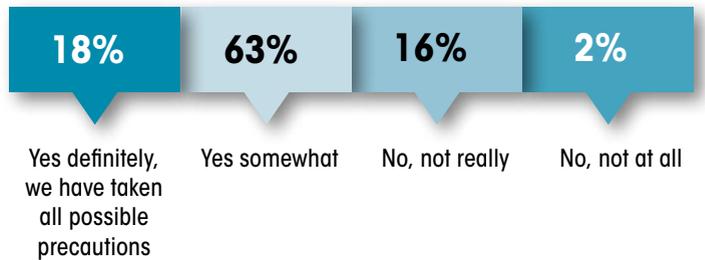
SECURITY MEASURES TAKEN – 94 replies

70%
Security infrastructure

52%
Cybersecurity risk assessments/ review

46%
A cybersecurity strategy

44%
Data privacy controls

33%
A cyber breach response plan

23%
Crisis management procedures and/ or a business continuity plan

3%
None of the above
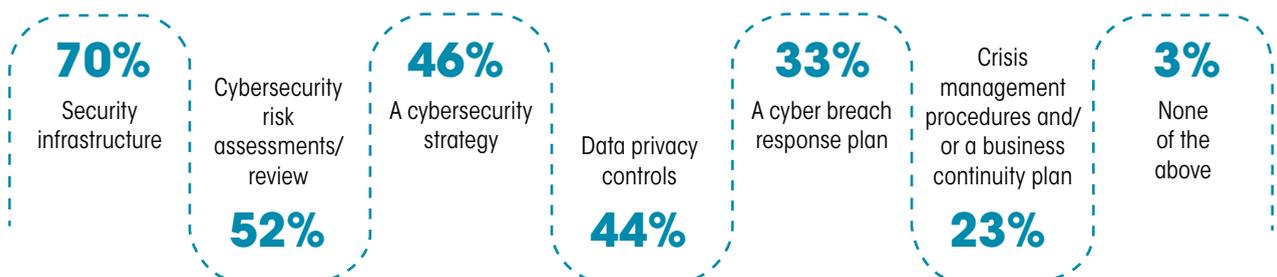
REASONS FOR NOT INVESTING IN INDUSTRY 4.0 – 174 replies

%	Reason
33%	Too costly 33%
30%	Difficulties integrating advanced technologies in existing systems
27%	Lack of skills to support investment
23%	Uncertainty, risk and disruption
20%	Lack of financing and support
17%	Concerned about exposure to cyber security threats
16%	Lack of adequate information about advanced technologies
16%	Not sure where to start
16%	Not convinced of economic benefit
15%	Investment not necessary for continuing operations
11%	Lack of support or services from government
11%	Weak customer demand
8%	Lack of support or services from external vendors
2%	Other
11%	None of these

BIGGEST THREATS IF YOU DO NOT INVEST IN INDUSTRY 4.0 TECHNOLOGIES – 94 replies

Falling behind the competition	49%
Customer losses	36%
Disruption by industry outsiders	32%
Pricing pressure as a result of commoditization or automation	29%
Low margins	29%
Exclusive / None of the above	13%

CONCERN LEVEL IF NOT INVESTING IN INDUSTRY 4.0 TECHNOLOGIES – 94 replies

| 18%	53%	22%	6%
Very concerned	Somewhat concerned	Not very concerned	Not at all concerned

A big part of avoiding cyber-attacks is educating the company's workforce on how to avoid getting scammed. Especially for more sophisticated attacks.

"Our internal pulse data shows that careless, untrained or unaware employees are the top source of vulnerability for most firms. With employees, it's not just a technical vulnerability, but potentially socially engineered ones, manufacturers should look out for. This is where attackers are using technology to gather sophisticated information on companies and individuals, then using that information to engineer access by contacting the company directly and fooling people into opening the gates," said Scott McNeil-Smith, VP of manufacturing sector performance, Excellence in Manufacturing Consortium (EMC). "This can include pretending to be customers, suppliers, and service providers, to access financial, IP and other information, to redirect payments or enable further, more comprehensive cyber-attacks. It's getting harder to tell the difference between real and fake, so having cybersecurity procedures in place that includes educating staff, and policies for

access and monitoring controls, and maintaining and testing back-ups is vital to protect against what could happen if something does hit the fan."

Our survey found that 97 per cent of respondents have undertaken measures to protect their company against a cyber-attack. Of those 70 per cent have a security infrastructure, 52 per cent have taken on a cybersecurity risk assessment/review, 46 per cent had a cybersecurity strategy, 44 per cent have data privacy controls, 33 per cent have a cyber breach response plan, and 23 per cent have crisis management procedures and/or a business continuity plan. While three per cent have not taken any measures to protect themselves.

"Our IT team is constantly phishing us, and if anybody clicks on one, you're locked out of the system until you go through an educational process. Not everybody gets to do the educational piece, but a lot of people are subject to it. Workers are shut down in the middle of the day and must do an educational piece on what to look for in emails," said Stephen Loftus, CEO, Innovative

> **"Several major companies have recently been shut down because of a cyber breach on the part of one of their critical suppliers."**
>
> **-Jayson Myers**

Automation. "What you believe is suspicious is really part of your IT structure that you have to build, and you need a fairly strong team, either internally or a contract that is aware of these potentials, and is dealing with either educating or separating, so that you carry on with your daily work in an efficient manner."

While most companies have taken steps to help protect themselves against attacks, our survey found that only 18 per cent of respondent feel their company has taken all possible precautions. With 63 per cent feeling that their company have somewhat done all it can, and 18 per cent (16 per cent not really, two per cent not at all) have not done all they can.

"It would be interesting to know how many companies do a risk analysis of their suppliers. To hear the degree to which they've undertaken cyber-security defenses as well. Several major

companies have recently been shut down because of a cyber breach on the part of one of their critical suppliers," said Myers.

"EMC is seeing this too. Cyber attackers aren't necessarily going directly after a large multi-national directly, but potentially could find a way in through one of the smaller suppliers in the chain. We've seen that sort of side-door tactic too, making it important to look at and secure all points of access" said McNeil-Smith.

Ultimately, it's up to the company to show that they have genuine concern for their company being safe from cyber-attacks. The survey found that only 66 per cent are concerned with those risks to their company, meaning that one-third of all companies are not very or not at all (one per cent) concerned.

"As my colleague Bruce Schneier would say 'You don't put something in a safe, and then leave the safe sitting on the street corner. You put the safe in a room with a closed door, with a lock, with a camera watching the door with people paid to watch the monitors of the camera'," said Coffee. "Layers and limitations of privilege will be successful in ways that merely hoping that people will read their training instructions, simply will not be successful."

Mario Cywinski is the editor of Plant magazine, MRO magazine, and Food and Beverage magazine, contact him at mcywinski@plant.ca.

2023 Advanced Manufacturing Outlook Roundtable Panelists

SPONSORS

Krishan Chauhan
Director of Business Operations, Canada
SAP Concur

Peter Coffee,
VP for Strategic Research
Salesforce

Dennis Dussin,
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