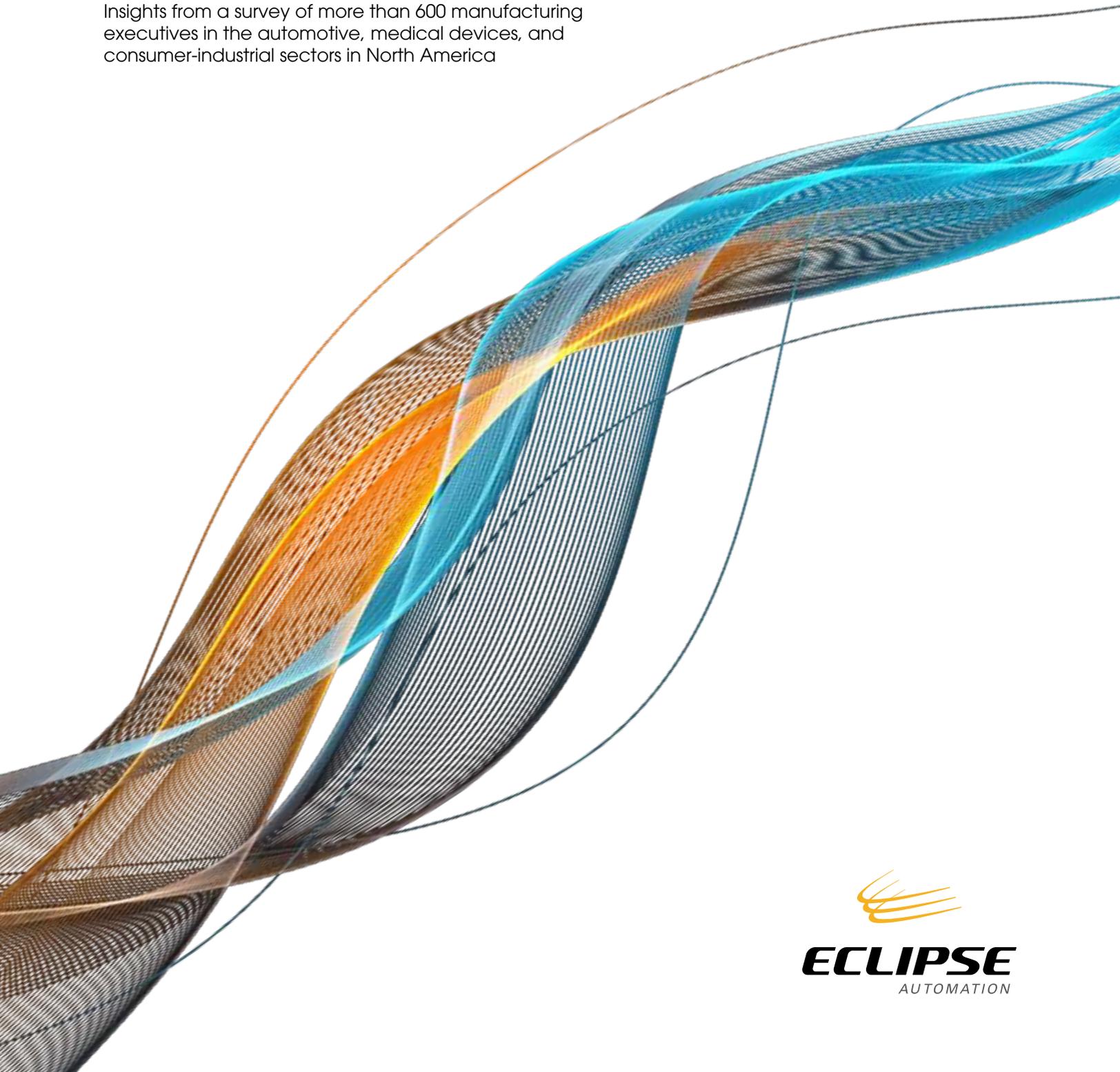# The State of Factory Automation in North America in 2026

Insights from a survey of more than 600 manufacturing executives in the automotive, medical devices, and consumer-industrial sectors in North America

ECLIPSE
AUTOMATION

FOREWORD

Factory automation at a turning point

Manufacturers in the US, Canada, and elsewhere face global uncertainty marked by intensifying competition, international trade issues, and rapid technological change. Yet within this unpredictability comes opportunity. Factory automation offers them a strategic method of sharpening their competitive edge and making their supply chains more resilient.

A major driver of factory automation is the fact that demand for skilled workers continually outstrips supply. In the first half of 2025, nearly 500,000 manufacturing job roles went unfilled in the US and Canada[1]. As companies shift production homeward and reinvest in local capacity, persistent skills shortages are intensifying the need to automate. For many, automation is no longer a choice, but a requirement for boosting productivity, profits, and workforce adaptability.

To assess how manufacturers are responding, Vantage Research, in partnership with Eclipse Automation, surveyed over 600 leaders across three key sectors: Automobiles, medical devices, and consumer-industrial goods. While up to 70% of US[2] and 60% of Canadian[3] manufacturing companies report using some form of automation, the survey reveals that maturity varies widely, with significant implications for performance.

Manufacturers are on a strategic journey. The survey maps five stages of maturity, from the most basic machines performing repetitive tasks with minimal data capture, to fully autonomous operations run with self-learning systems, advanced AI, and a limited need for human intervention.

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1. EXECUTIVE SUMMARY

This report on factory automation in North America is based on a survey of more than 600 executives and managers in three industries: automobiles, medical devices, and consumer-industrial products. Researchers also conducted interviews with eight subject-matter experts. For an explanation of the methodology, click here.

606
managers/executives surveyed

80%
US

20%
Canada

Key findings

1 **Factory automation is a necessity, not a choice.** Ongoing labor shortages—nearly 500,000 roles unfilled in North America in early 2025—are accelerating automation efforts. Reshoring, rising competition, and technological shifts are pushing manufacturers to adopt automation, not just for efficiency, but to remain viable in an evolving market.

2 **Strong business cases are founded on quick ROI and strategic starting points.** Leading firms justify automation investments with a clear focus on return on investment. They balance short-term "quick wins" with long-term automation strategies aligned to business goals— building momentum and organizational support over time.

3 **People and technology must evolve together.** Success depends not only on having the right tools but also on managing workforce needs for new skills, as manufacturers rapidly expand their use of artificial intelligence (AI). Top performing companies are more likely to upskill employees, increase worker autonomy, and communicate upfront about the workforce impacts of automation. This helps ease adoption and improves outcomes.

4 **Automation maturity varies widely in key manufacturing sectors.** In the automotive, medical device, and consumer-industrial goods sectors, the survey reveals large disparities in automation maturity. Most companies report some use of automation, but only a small fraction are progressing toward advanced capabilities, such as autonomous systems and AI. This indicates uneven progress and performance gaps in these industries.

> **Based on an analysis of the survey data, the report dug deeper to uncover five factors that define automation success.**

What defines automation success

Benchmark analysis: Out of a total of 606 responses, the analysis compares 135 companies that fully accomplished their automation goals with 89 firms that had little or no success in doing so (the remaining 382 respondents were excluded from this part of the analysis to sharpen the comparison). This revealed clear differences in approach and outcomes, and highlighted what successful automation looks like and how to achieve it.

Successful automation starts with a strong business case. Automation leaders must always make a strong business case to justify investment in new projects, and successful automation begins by focusing on the right objectives. Top performers prioritize the goal of a high return on investment (ROI).

Five drivers of factory automation excellence distinguish automation leaders from laggards: Integration, structured data, balanced governance, accountability, and lifecycle management.

1 Integration across systems

- Successful companies are three to four times more likely to have fully integrated automation across all levels of the tech stack than less successful ones.

- Integration encompasses automation alignment with broader corporate operational goals.

2 Access to structured data

- Companies that meet their automation goals are three times more likely to work with structured data.

- Structured data is critical for setting measurable targets and tracking project effectiveness. It is also needed for creating increasingly complex analytical models (from human-defined ones to AI/ML-produced models, and then to Generative AI ones) to scale up data processing and extract insights faster.

3 Balanced governance

- For high-performing firms, IT (top-down) typically leads automation, but collaborate closely with engineering (bottom-up).

- For less successful firms, engineering tends to take the lead, much more frequently than for the successful ones.

- Balanced leadership between IT and engineering is an indicator of success.

4 Collaboration and clear accountability

- Cross-functional teams are needed for the successful implementation of an automation project, but leaders go further.

- Highly successful companies often nominate a head of automation who is accountable to senior leadership.

5 Quick wins and the long game

- Successful companies pursue projects that will achieve quick wins while managing automation over a multi-year horizon.

- In this way, short-term gains build momentum for long-term improvement in line with overall business goals.

These five success factors are necessary, but not sufficient, drivers of success in achieving automation goals. The right combination of people and technology is crucial.

Automation success depends on combining the right tools and talent

- Skills gaps exist across all firms, but successful ones manage workforce change better.

- Manufacturers are more likely to achieve their objectives if they identify and skillfully communicate the expected impact of automation on the workforce before implementation.

- In leading firms, workers gain more responsibility through automation. In lagging firms, automation is more likely to reduce worker autonomy than in best performers.

The rest of the report explores these themes more deeply and offers the perspective of eight subject-matter experts.

2. MAIN REPORT

The business case for automation

Manufacturing automation is a key ingredient of success and resilience, and to perform it well requires a wide range of attributes. To find out what factors lead to effective automation, the analysis of the survey compared the 135 respondents who said their companies fully accomplished their top three automation goals with the 89 whose firms largely failed to meet their objectives (i.e., little or no success in achieving their automation goals). By finding and analyzing the most significant differences between the two groups of respondents, this report is able to help define what successful automation looks like and how to achieve it.

Contrasts in success

Comparing the companies that fully accomplished their top three automation goals in the past three years with the firms that failed to meet their objectives

606 North American firms (a third each in the automotive, medical devices and consumer industrial sectors) rated themselves from 1 to 5, with 1 "No accomplishment of main goals" to 5 "Full accomplishment of main goals."

In the past three years how close did your company come to fully achieving its top objectives?
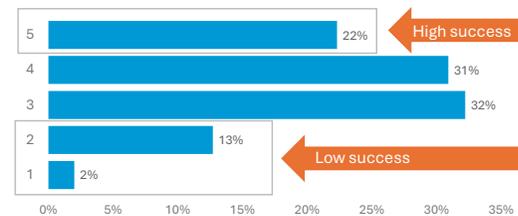
Successful automation begins by focusing on the right objectives, based on a sound business case. Installing a robot or setting up an automated production line should be aimed at non-financial targets, such as reducing machine downtime and predictive maintenance. But there also needs to be broader objectives, including financial ones, because factory automation projects will be measured in ways that every corporate investment is evaluated.

A holistic approach to automation is essential. Nicholas Yeo, Senior Director, Tech Ops Robotics and Digital at Johnson & Johnson, says that, to be successful, companies need to start with diagnostics, clarify the problem, and then design the full system (people, processes, and data) around automation. "Think of it as a design process meant to use automation as a multiplier, not just a one-to-one replacement of a robot for a human, for example," Yeo explains. "Automation is about using a multiplier to enhance your production."

> **" Automation is about using a multiplier to enhance your production. "**
>
> Nicholas Yeo, Senior Director, Tech Ops Robotics and Digital, Johnson & Johnson

The survey asks manufacturers to select the top three objectives for their automation program over the past three years. For the 135 successful companies, these were lower costs, reduced operational complexity, and a higher ROI. Less successful companies were even more focused on cutting costs. But what sets apart the more successful ones is the focus on ROI. Successful firms are more than twice as likely to cite a higher ROI as a top target.

Make a strong business case for automation

Top performers prioritize improving ROI. The less successful do not.

The top three objectives for successful companies were lower costs, less operational complexity and higher ROI.

What were the most important objectives of your manufacturing automation program over the past three years?

Automation Objective	High success companies		Low success companies	
	Rank	%	Rank	%
Lower costs and reduced waste	1	34%	1	43%
Reduced operational complexity	2	30%	4	22%
Higher ROI	3	23%	12	10%

3 THE STATE OF FACTORY AUTOMATION IN NORTH AMERICA IN 2026

> **" Prioritize your digital and automation initiatives by expected return—those delivering the greatest business value should lead. "**
>
> Jonathan Hobgood, Global Head of Advanced Manufacturing Technology, GE HealthCare

In interviews, automation professionals frequently stressed the need for automation champions to make a strong business case for their key projects. ROI is a central objective in doing so, because it encompasses both cost and revenue impacts as well as non-financial and financial metrics. It requires close collaboration among operational engineers, IT professionals, and financial personnel.

"Every automation proposal must be grounded in a solid business case. Ask: Does it reduce rework? Accelerate revenue? Increase productivity?" asks Jonathan Hobgood, Global Head of Advanced Manufacturing Technology at GE HealthCare. "If the ROI isn't compelling, redirect resources to higher-impact opportunities. Prioritize your digital and automation initiatives by expected return—those delivering the greatest business value should lead."

Big opportunities for smaller and less experienced firms

Contrary to what many may think, the success of automation programs does not greatly depend on whether a company is large or has been automating for many years. Smaller and less experienced companies can take heart from this. They can be as successful as bigger and more mature manufacturers.

17%

companies with annual revenue between $500m–$1 billion fully accomplished top 3 objectives in the past 3 years

Take company size first. The survey finds that the larger the company, the more likely it is to be successful, but despite this, there is a sizable number of successful companies among the smaller ones, too. 17% of companies with between $500 million and $1 billion in annual revenue fully accomplished their top three objectives in the past three years.

Size doesn't matter much

Smaller firms had plenty of success and scarcely more automation failures than large ones

In the past three years, how close did your company come to fully achieving its three most important manufacturing automation objectives?

Companies that:

	$500m-$1bn	> $1bn	
Achieved all 3 objectives	17%	Achieved all 3 objectives	25%
Achieved hardly any objectives	16%	Achieved hardly any objectives	14%

Failures occur almost as frequently among large companies as small ones: 14% of large companies with revenue greater than $1 billion admit they achieved little or no success in their automation efforts, only slightly less than the 16% of smaller firms.

"You can't just throw money at a custom automation project, and Fortune 500 companies often think they can. But the hardest thing in automation is finding the right people, such as engineers and programmers. That's the bottleneck," says Robby Komljenovic, Former Chief Executive Officer of Acieta, an automation integrator[.]

Automation maturity does not inevitably lead to success, either. It is true that the more advanced the level of automation, the more likely they are to be successful. But the less advanced also have a high degree of success. In fact, many manufacturers will have factories that are at varying levels of maturity and produce different goods, thus fragmenting data collection and hampering decision making. Integrating them and lifting them to a common standard of automation is highly complex, often requiring the right vendor with the appropriate expertise to guide a company to success.

Most of the highly successful smaller companies are at stage 2 of automation (discrete automation programming of robotic arms and other technologies) and are thus at a lower stage of maturity than companies at stages 3, 4, and 5. For all successful companies regardless of size, the ratio of success is between 14% and 21% for the first four stages of automation. It jumps to 30% for successful companies that are in stage 5.

This data suggests that the opportunities for successful automation are considerable at all stages of maturity and company size. Effective automation depends on the way a company implements and manages the process throughout its journey. A clear road map to achieve business goals ensures factories focus on key performance indicators and the sequencing of investments. This is the path toward a higher ROI.

Five drivers of automation excellence

Setting appropriate objectives for a company's automation programs is a good start, but achieving these goals depends on multiple factors. The survey finds five drivers of automation excellence.

1 Integration across systems

Achieving a high ROI on an automation investment entails many factors, one of which is integration. A strong business case for automation involves demonstrating how well the program fits with other operations of the company that are on the roadmap. This requires integrating automation projects at each level of the technology stack, from the lowest level (the monitoring of physical devices) to the highest (meshing with enterprise-wide applications, such as ERP and CRM systems).

One of the biggest differences between more and less successful companies is the degree of integration of their automation projects. On average, the successful companies are three or four times more likely to be fully integrated than the less successful ones. In fact, between 29% and 45% of less successful companies have not integrated their automation systems at all with the four levels of the technology stack. For these firms, automation projects are isolated from some of the systems that might monitor them and track how a given investment benefits other parts of the operations[5].

Integration is a key to success

There are big differences between more and less successful firms regarding the degree to which automation projects are integrated into each of four technology stack levels.

How closely integrated are your manufacturing automation systems at each tech stack level?

Technology Stack Level	% Fully Integrated – High Success Firms	% Fully Integrated – Low Success Firms
Enterprise Applications: ERP, IBP, CRM, SRM, PLM	62%	14%
Manufacturing Operations Management: MES, WES, WMS, Fleet	55%	12%
Process Monitoring: SCADA, HMI, Connectivity Platform	60%	24%
Monitoring of Physical Devices: PLC, Robotics, Sensors, Visual	74%	28%

Douglas Woods, President of the Association for Manufacturing Technology, spearheaded MTConnect, which fosters interoperability of automation systems and robotics. Thanks to such efforts, there has been considerable progress among manufacturers in connecting automation equipment to central computer systems.

"In the past, you could connect any printer to a laptop, but people couldn't connect any two things on the factory floor," Woods recalls. "Everybody thought that their proprietary solution was the best solution. Luckily for robotics, people finally got together, and they now have a standardized robotic operating system. People in our industry recognized that no one's dominant enough to dictate what the communication protocol should be and that they needed to get together."

2 Access to structured data

Hand in hand with integration goes structured data; without it, managers are severely hampered in setting measurable targets, tracking the effectiveness of their automation projects, making optimal use of them for a range of operations, and controlling the way they work with other parts of the factory. Firms cannot integrate their automation systems without access to structured data and vice versa. Only then will they be able to extract the full value, both downstream and upstream, from their automation investment.

There is a very wide gap between more and less successful companies in their access to structured data. Successful companies are three times more likely to have access to structured data than less successful ones.

Structured data helps set targets

There is a big gap between more and less successful companies in access to data. Successful companies are three times more likely to have access to structured data than less successful ones.

For decision making, how readily available is structured data?

Full access to readily available structured data

High success companies	34%
Low success companies	10%

0% 10% 20% 30%
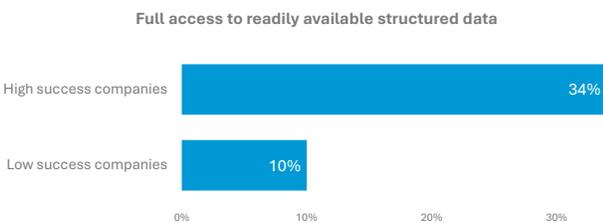
Scott Reynolds, Senior Security and Network Engineering Manager at Johns Manville and President of the International Society of Automation, says that data infrastructure is essential to making informed decisions for automation and can be a significant obstacle for many. "I can't imagine how you'd even figure out where the appropriate investments are without proper data collection in place," he says.
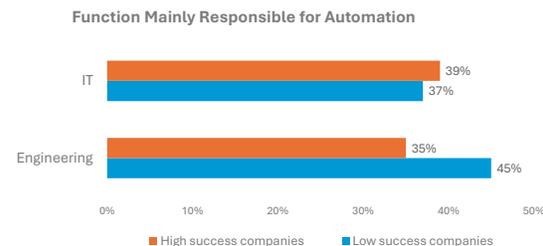
3 Balanced governance

Governance plays a significant role in improving the ROI of automation projects, whose success often depends on taking both a bottom-up and a top-down approach to implementation. This can be seen in the way the IT function frequently works with engineers to manage projects effectively. The former will be primarily responsible for data integration and will tend to take a top-down approach; the latter works to ensure that operations on the shop floor run smoothly during automation integration. Engineers, thus, tend to take a bottom-up view.

Among the successful firms surveyed, IT is more likely to take the lead in implementing automation, but the difference between engineering and IT leadership preferences is small. In less successful companies, engineers are more likely to lead and the gap between the two functions is twice as wide as among successful ones. A greater parity of IT and engineering roles, therefore, is likely to be more effective.

Take a balanced approach to governance

At successful companies, engineers (bottom-up) and IT professionals (top-down) collaborate closely.

Which function is responsible for leading the implementation of manufacturing automation?

Function Mainly Responsible for Automation

IT	39%
IT	37%
Engineering	35%
Engineering	45%

0% 10% 20% 30% 40% 50%

■ High success companies ■ Low success companies

Reynolds says that bridging IT and operational technology requires shared terminology and clarity of roles. He emphasizes using standards such as ISA-95 and assigning clear lines of accountability by means of Responsibility Assignment Matrices.

> ❝ *I can't imagine how you'd even figure out where the appropriate investments are without proper data collection in place.* ❞
>
> Scott Reynolds, Senior Security and Network Engineering Manager, Johns Manville

Automation will enable automobile makers to shift from defense to offense

The North American automotive sector is at a pivotal moment.   Electrification is redrawing the boundaries of production, software is becoming central to vehicle value, and consumer expectations are evolving quickly. At the same time, automakers face intensifying regulatory scrutiny, rising ESG demands, and tighter capital constraints.

In this environment, automation is a strategic response to systemic disruption. AI-driven manufacturing, flexible robotics, and integrated data systems offer carmakers a way to navigate complexity and reimagine their operations.

"AI and robotics will help us deal with the scale and skills gaps that have kept entire industries offshore," says Jay Douglass, Chief Operating Officer of the Advanced Robotics Manufacturing Institute.

We surveyed 606 manufacturers across North America, including 203 managers and executives in the US and Canadian car   industry. The survey data highlights five ways automation programs can help car makers mitigate these effects and gain a competitive advantage.

Key findings from the survey

1. *Attack costs*
- Having focused on cutting costs in the past three years, 31% of firms are aiming to increase their market share in the next three years.

- Success will depend on fully integrating these automation investments within their technology stack.

- The firms achieving greatest automation success are those that have invested in better access to structured data.

2. *AI will help strengthen supply chains*
- AI will be the highest priority for the industry's manufacturing-automation strategy in the next three years, according to 50% of car executives and managers.

- Almost half say AI will be used for real-time decision making, helping companies to anticipate disruptions and optimize production schedules.

3. *Operational flexibility*
- Forty-six percent say AI will enable real-time decision making, so operations can be adjusted dynamically.

- Advanced robotics and automation technologies enable firms to respond quickly to changing trade policies, materials shortages, and shifting consumer demand.

4. *From defense to offense*
- Having focused on cutting costs in the past three years, firms are aiming to increase their market share in the next three years. Success will depend on full data integration.

- Currently only 30% of automobile makers say they have integrated their automation systems with enterprise-wide platforms.

- A mere 15% of companies have fully integrated structured-automation data for decision making and analytics.

5. *Plan from beginning to end carefully and broadly*
- The most effective strategies manage automation as a full life-cycle investment, say 33% of respondents.

- The car firms that report greater success with automation are more likely to involve cross-functional teams from the outset.

6. *Increase worker autonomy*
- Many employees fear automation will cost them their jobs, but automation can empower employees.

- Some 42% of car companies say automation enhances workers' autonomy compared with 28% that say it reduces autonomy.

What this means for the industry

Having long been pioneers in automation, car companies are now entering a new phase of strategic change. Automation and AI-driven manufacturing are no longer just tools for cost reduction, but are becoming integrated, enterprise-wide imperatives for navigating systemic industry disruptions. By treating automation as a comprehensive investment that empowers employees and leverages data, firms can move beyond a defensive posture to a growth-focused offense.

4 Collaboration and clear accountability

Both successful and unsuccessful firms are equally likely to create cross-functional teams to implement an automation project. This makes a lot of sense: No single function can achieve success alone, and it must collaborate with others to achieve the company's automation goals. But highly successful companies are more likely to nominate a head of automation who is clearly accountable to an executive. Less successful companies tend to diffuse responsibility through a steering committee.

Take some quick wins in a long-term program

Successful companies focus on managing the entire life cycle of their automation projects and they start with a few quick wins.

What three key factors contribute to a successful manufacturing automation strategy?

Success Factors	High success companies		Low success companies	
	Rank	%	Rank	%
Emphasis on managing entire life cycle	1	31%	2	24%
Careful project planning and management	2	30%	1	25%
Starting with a few quick wins, then expanding scope	3	28%	8	16%

The lesson here is to ensure there is buy-in from all functions affected by automation and to set up a team with a wide array of skills and backgrounds. At the same time, it is more effective to ensure a single person oversees the team and has clear reporting lines to senior management.

5 Quick wins and the long game

Successful companies achieve their goals in two seemingly contradictory ways. They focus on managing the entire life cycle of their automation projects, which can take several years, and yet they start with projects that are expected to achieve a few quick wins. Based on these positive case examples, they then expand their scope. The wins help build confidence and offer lessons in what works and what doesn't.

"Strategic focus is critical," says Jonathan Hobgood. "Rather than spreading resources thin, we must build momentum through targeted wins that clearly solve business problems. That's how you create a flywheel effect—success breeds interest, and suddenly everyone wants in. This accelerates scaling of proven technology solutions across your network of factories."

> **Rather than spreading resources thin, we must build momentum through targeted wins that clearly solve business problems.**
>
> Jonathan Hobgood, Global Head of Advanced Manufacturing Technology, GE HealthCare

Jeff Burnstein, President of the Association for Advancing Automation, has this advice: "Pick a project where there's a high likelihood of success because you've had some outside consulting, a system integrator, somebody who understands what it takes to succeed. A mistake that companies often make is when they start with a project that is so difficult for humans to implement. They just assume robots can do it. What you want to do is start smart. Think about applications in your company that you can have a win with early on that will build confidence in the technology."

For all 606 manufacturers surveyed, the most important factors contributing to a successful automation strategy are a strong emphasis on managing the entire life cycle of an automation program and careful project planning. These two drivers are essential if companies are to take full advantage of automation and achieve factory transformation powered digitally and by people.

Automation in consumer industrials: From cost reduction to growth acceleration, slowed by key gaps

LEARN MORE IN OUR INDUSTRY DEEP DIVE ↗

Consumer industrial manufacturers—makers of household goods, building products, and small appliances—face some of the most complex dynamics in North America: thin margins, volatile input costs, fragile supply chains, and persistent labor shortages. Tariff uncertainty and climate-related disruptions add further pressure.

We surveyed 606 manufacturers across North America, including 203 in consumer industrial companies. For the latter, the data shows automation is helping them move beyond a focus solely on cost control, as companies look to strengthen resilience, improve quality, and pursue growth.

Key findings from the survey

1. *Shift from cost control to market differentiation*
- In recent years, firms have used automation mainly to reduce costs (37%), boost productivity (29%) and simplify operations (25%)

- Now, priorities are shifting: companies want to automate to deliver stronger ROI (32%), expand market share (28%), and raise product quality (25%)

- This reflects a move away from defensive cost-cutting toward using auto mation as a tool for resilience, differentiation and long-term competitiveness.

2. *Use AI to define the next phase of automation*
- Companies see AI's value in intelligent automation (42%), human–machine collaboration (37%), and resilient supply chains (31%).

- Cloud (39%) and digital twins (30%) are also rising priorities for future investment.

3. *Supply chain pressure shapes AI usage*
- 31% of respondents ranked real-time supply chain optimization among the top AI applications.

> ❝ *At the end of the day, you need an owner of the project.* ❞
>
> Scott Reynolds, Senior Security and Network Engineering Manager, Johns Manville

> ❝ *Automation is a career advancement opportunity, instead of a career killer.* ❞
>
> Scott Reynolds, Senior Security and Network Engineering Manager, Johns Manville

4. *Coordinate leadership to boost expansion*
- Automation ownership is dispersed across IT, engineering, and finance, with only 15% of budgets controlled at the C-level.

- Just 17% of companies fully achieved their automation goals in the past three years.

5. *Strengthen data integration*
- 60% of respondents report only moderate-to-no availability of structured data.

- Integration weakens at higher automation levels: while 52% achieve full integration at Level 1, just 21% do so at Level 4.

- Weak data foundations prevent predictive, AI-enabled automation.

6. *Workers need technical and soft skills*
- Automation is reshaping roles, giving engineers more influence (31%) and operators greater autonomy (38%).

- Critical skills include advanced computer knowhow (43%), critical thinking (34%), and collaboration (29%).

What this means for the industry

Consumer industrial companies are at an inflection point . To move beyond improved efficiency toward resilience and growth, they must centralize automation leadership, strengthen data integration, and prepare their workforce for AI-enabled transformation. For firms willing to invest in governance, data, and skills, automation is becoming a catalyst not just for efficiency, but for resilience, quality, and long-term competitiveness.

Smart people + the right technology + effective change management

The five success factors outlined above are necessary, but not sufficient, drivers of success for companies to achieve their automation goals. Manufacturers must also combine effectively the right skills and technology, both in terms of software and hardware, if they are to maximize the benefits of automation. Managing the workforce and the technology is perhaps the most difficult part of custom automation.

It is easy to understand why. Both successful and unsuccessful firms cite two major challenges when it comes to automation: Skills gaps and limited data. Paradoxically, successful automation requires highly skilled workers[6]. Intelligent machines make it even more imperative to employ well-trained people to run them[7].

Although both successful and unsuccessful manufacturers lack skilled workers, they manage the impact of automation on the workforce differently. When asked how automation has affected workforce roles, 47% of successful companies say workers end up with more responsibility, twice as many as say less responsibility. For less successful firms, the responsibility gap is only 2%: Almost as many say automation results in less autonomy for workers as in more.

Empowering workers is therefore likely to enable better management of automation, but a successful transition to a more automated workforce is difficult. It's well known that employees are likely to resist changes if they fear they will be replaced by machines. But manufacturers are more likely to achieve their objectives if they identify and skillfully communicate the expected impact of automation on the workforce before implementation. If employees are promised more autonomy and the promise is kept, then they are more likely to be satisfied and productive.

Successfully enabling workers and technology requires a careful balance. Forrester Research describes an "automation triangle" of physical automation, software automation, and the workforce. "It's about understanding how you balance those to the best effect," says Paul Miller, Vice-President and Principal Analyst at Forrester. "There are 30-40 different tasks that I might be called upon to do. Some of those are best done by a robot, some by AI, and some by me. The question is how to carve them up to make best use of those three different ways of getting a job done."

Companies' need for skills and effective change management is likely to intensify with the increasing adoption of artificial intelligence technology. Managers and executives in the survey say that the importance of AI will surge in the next three years. But successful companies will emphasize AI even more than less successful ones (51% to 42%).

Combine skilled people and smart tech

Empowered, skilled workers are essential to unlocking automation's full value. Automation tends to empower workers at successful companies. Engineers and executives gain influence, too.

What are three main ways in which manufacturing automation has affected workforce roles and responsibilities?

Impact of automation on workforce	High success companies			Low success companies		
	More	Less	Net	More	Less	Net
Autonomy of workers as a whole	47%	24%	*22%*	36%	34%	*2%*
Engineers' influence on automation design	41%	23%	*18%*	38%	12%	*26%*
Engineers' influence on automation management	23%	18%	*5%*	35%	10%	*25%*
Executives' influence on automation management	35%	9%	*26%*	28%	10%	*18%*

"AI on the end of a robot arm changed everything. Robots started to get smarter—and now they can learn on their own," says Jay Douglass, Chief Operating Officer of the Advanced Robotics Manufacturing Institute. "AI and robotics will help us deal with the scale and skills gaps that have kept entire industries offshore."

The gap between successful and unsuccessful automation projects may grow as AI becomes more common. This is likely because there is expected to be a difference in AI usage between more and less successful companies.

Both types will use AI most frequently for intelligent automation. This combines AI and robotic process automation to simplify complex tasks and workflows by incorporating machine learning and natural language processing. The more successful firms, however, will focus almost as much on predictive maintenance and adaptive, real-time decision making as on intelligent automation. They clearly believe that AI will assist them in making the right decisions efficiently and, thus, increase the ROI of automation still further.

> **❝ AI on the end of a robot arm changed everything. Robots started to get smarter—and now they can learn on their own. ❞**
>
> Jay Douglass, Chief Operating Officer, Advanced Robotics Manufacturing Institute

Smartly pick the right technology

Manufacturers will require new skills to make the most of a surge in AI usage for automation. Top performers plan to use AI for different purposes than less successful ones.

What will be the three most important applications of AI for manufacturing automation in the next three years?

High Success Companies	
Intelligent automation	41%
Predictive maintenance	40%
Adaptive, real-time decision-making	39%

0% 10% 20% 30% 40%

Low success companies	
Intelligent automation	37%
Human-machine collaboration	36%
Supply chain optimization	31%

0% 10% 20% 30% 40%
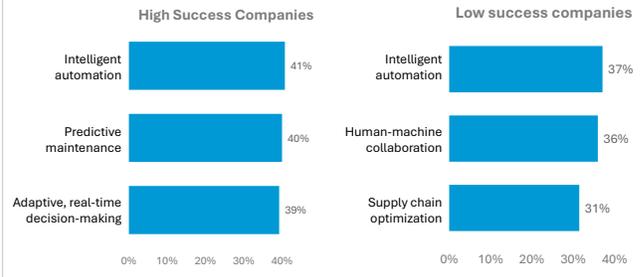
Automation helps medical device makers balance precision with resilience

Medical device manufacturers face some of the toughest demands in North America: Strict regulatory oversight, complex compliance requirements, fragile supply chains, and ongoing labour shortages. Reshoring pressures and cost volatility add to the challenge.

We surveyed 606 manufacturers across North America, including 200 in medical devices companies. For these firms, the data shows automation is helping them build resilience, improve quality, and maintain competitiveness.

Key findings from the survey

1. *Redesign, don't retrofit*
- The most successful medical-devices firms approach automation as enterprise-wide programs, not bolt-on fixes.

- 33% of leaders manage the full automation life cycle, while less successful firms often retrofit legacy processes.

2. *Data integration is critical*
- 59% of respondents report only moderate or limited availability of structured data.

- Leaders are far more likely to integrate automation data into quality and compliance platforms, creating actionable insights.

66 *The data needs to give you decision insight. If it doesn't help you make decisions, stop collecting it.* 99

Nicholas Yeo, Senior Director, Tech Ops Robotics and Digital at Johnson & Johnson

3. *Skills gaps remain the top barrier*
- 42% of the least successful firms cite skills shortages as a major hurdle, compared with 33% of leaders.

- The most advanced companies are building internal training programs to close the gap.

4. *Practical solutions outperform flashy investments*
- Leaders emphasize agile, cost-effective solutions over high-cost, high-visibility technologies.

- 29% start with quick wins before expanding scope, while 27% ensure cross-functional teams oversee execution.

5. *Integration separates leaders from laggards*
- 65% of successful firms have fully integrated automation systems at level 4 of the tech stack.

- By contrast, only 8-21% of less successful firms report the same.

6. *AI is reshaping automation*
- Respondents expect AI to take a much larger role in the next three years.

- Priority areas include intelligent automation, human–machine collaboration, and adaptive, real-time decision making.

7. *Worker autonomy increases with success*
- Among leading medical device firms, 51% say automation has increased worker autonomy, compared with just 29% who report reductions.

- Less successful firms show the opposite trend.

What this means for the industry

Medical device companies are moving toward enterprise-wide, data-driven, and AI-enabled automation programs. Success depends on integrating systems, addressing workforce skills, and adopting pragmatic solutions that align with regulatory and operational priorities. Automation isn't plug-and-play, but for companies that invest in data, skills, and integration, it is becoming a catalyst for both precision and resilience.

Digitizing the factory: The next era of automation

The findings of this report provide a clear and urgent message: Factory automation is no longer a tactical upgrade; it is a strategic journey. As manufacturers across North America navigate economic uncertainty, labor shortages, and technological disruption, automation has emerged as a defining factor in long-term competitiveness.

Three strategic lessons for manufacturers

1 Successful automation is driven by integration, data, and ROI clarity

The most successful automation efforts aren't siloed—they span the business. Leading manufacturers in our survey approach automation as a business-wide strategy, integrating systems across the tech stack, prioritizing structured data, and anchoring initiatives in clear ROI goals. These firms are not just adding automating; they are digitizing their operations to enable faster, more agile decision-making.

2 People and technology must evolve together

Automation is not about replacing workers; it is about enabling them to do more. Companies that are transparent about how automation will affect roles and that deliver on promises of greater autonomy, are more likely to retain talent and boost productivity. As AI and robotics take on more tasks, the workforce must evolve towards roles in oversight, optimization, and decision-making.

3 Factory automation is a journey, not a destination

Manufacturers are moving through distinct stages — from basic automation to discrete systems, integrated operations, and ultimately, lights-out hyper-automation. This journey is rarely linear. Many companies manage a mix of factories with heterogeneous technologies and varying levels of maturity. The path to homogeneity—where systems, data, and processes are harmonized—requires the right vendor partnerships, intellectual property, and a clear strategic roadmap.

Manufacturing automation is no longer optional or isolated, it is a strategic imperative that demands the convergence of data, processes, and people to build the intelligent factory of the future. The most successful manufacturers are those that treat automation as a holistic program, not a series of disconnected upgrades.

Forward-thinking manufacturers are transforming their operations by integrating structured data into every layer of the technology stack, tying automation directly to business goals, and empowering teams across functions. The result: Adaptive, high-performance factories built to scale up innovation. From modernizing legacy brownfield sites to designing greenfield facilities, the key is to unify systems and people around a shared vision of agility, resilience, and measurable returns.

The next era of factory automation will be defined by intelligent orchestration, where machines, data, and human decision-making are harmonized to drive continuous improvement. It's not just about digitizing production; it is about creating a dynamic ecosystem where automation supports workforce autonomy, predictive maintenance, and strategic foresight. Vendors can assist and guide at every step of the way.

As manufacturers move toward hyper-automation, the journey will require scalable platforms, flexible architectures, and a culture of collaboration. The intelligent factory of the future is already taking shape, and it begins with a commitment to unify, connect, and reinvent. This journey is not without its challenges. But the rewards—greater agility, resilience, and competitiveness—are substantial. These factories will be defined not just by cost efficiency, but by flexibility, sustainability, and intelligence. Now is the time to lay the foundation.

Methodology and survey overview

Vantage Research surveyed over 600 manufacturing leaders across the US (80%) and Canada (20%) in April – May 2025 through our survey resource Curious Insights.

Participants were divided equally among three key sectors: Automotive, medical devices, and consumer-industrial goods (such as household goods, small appliances, building and utility products).

Respondents came from key operational functions, including plant operations, supply chain, engineering, and IT, and represented companies with annual revenues of $500 million or more. This provides a comprehensive view of automation challenges and priorities from both strategic and operational perspectives, and for both small/medium and large-scale manufacturers.

The survey tested a central hypothesis:

> *Automation in manufacturing is entering a new phase, fueled by a more pragmatic approach, smarter machines, an intelligent workforce, and a break from tradition.*

The survey questions also tested the current dynamics of the sector such as:

- As roles shift and workforce dynamics drive new purchasing and planning, companies' automation maturity determines their ability to integrate and capitalize on new solutions, including AI.

- End-to-end planning and support matter more than ever for strategic automation.

The survey results were analyzed and the main findings discussed with a team from Eclipse Automation (see next page for a statistical summary).

The survey results were complemented and validated by primary insights from a series of eight subject matter experts in a series of interviews with Vantage Research:

Jeff Burnstein
President
Association for Advancing Automation
in LinkedIn

Jay Douglass
Chief Operating Officer
Advanced Robotics Manufacturing Institute
in LinkedIn

Jonathan Hobgood
Global Head of Advanced Manufacturing Technology
GE HealthCare
in LinkedIn

Robby Komljenovic
Former Chief Executive Officer
Acieta
in LinkedIn

Paul Miller
Vice-President and Principal Analyst
Forrester
in LinkedIn

Scott Reynolds
Senior Security & Network Engineering Manager
Johns Manville
in LinkedIn

Douglas Woods
President
Association for Manufacturing Technology
in LinkedIn

Nicholas Yeo
Senior Director, Tech Ops Robotics and Digital
Johnson & Johnson
in LinkedIn

We are extremely grateful to the interviewees for their insights, as well as the manufacturing employees who answered the questionnaire, and the team from Eclipse Automation for their stimulating collaboration.

Survey questionnaire

Demographic questions

A. Which of the following best describes your job title?

| C-level executive |
| Senior vice president |
| Vice president |
| Director |
| Senior manager |
| Manager |
| Other (TERMINATE) |

C-level executive	Senior vice president	Vice president	Director	Senior manager	Manager
6%	12%	16%	26%	26%	14%
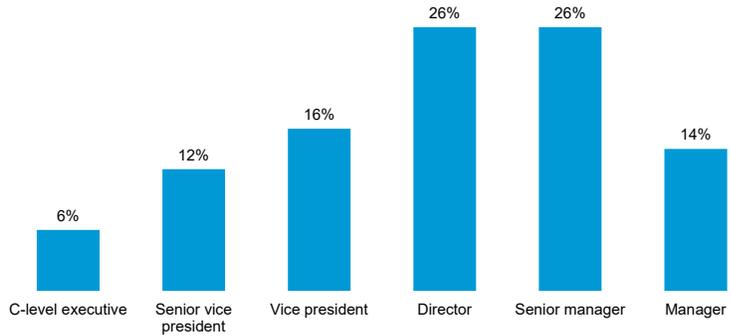
B. Where are you permanently located?

| US |
| Canada |
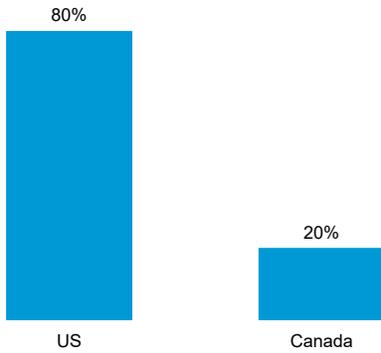
US	Canada
80%	20%

C. Where are your manufacturing plants located? Select all that apply.

| US |
| Canada |
| Elsewhere |

US	Canada	Elsewhere
89%	42%	14%
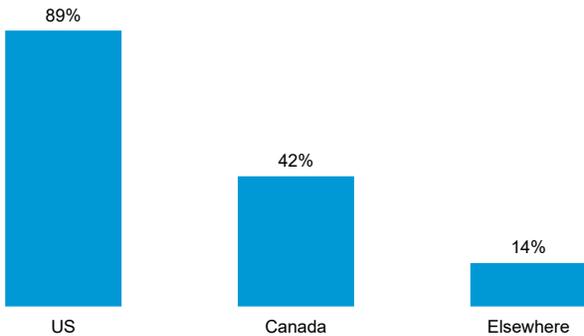
D. Which of the following functions do you work in? Select all that apply.

| General management |
| Finance & accounting |
| Plant operations & maintenance |
| IT |
| Operational planning |
| Supply chain and procurement |
| HR |
| Research & development |
| Engineering |
| Risk & compliance |
| Other (terminate) |

General management	Risk & compliance	Finance & accounting	Plant operations & maintenance	IT	Operational planning	Supply chain & procurement	HR	Research & development	Engineering
16%	7%	8%	13%	19%	10%	7%	8%	7%	6%
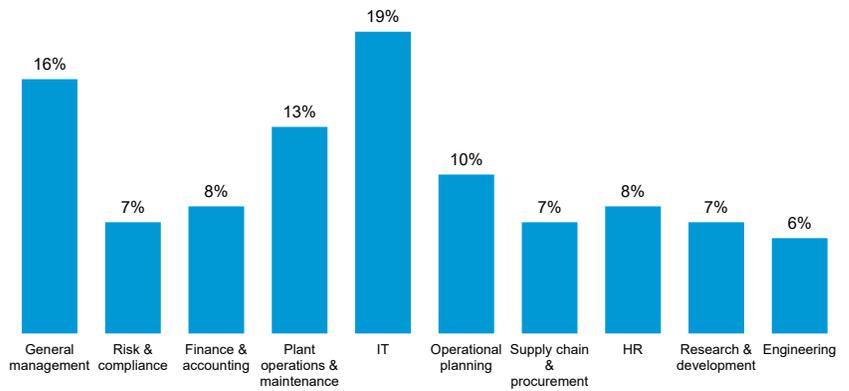
E. Which industry does your company operate in?

| Consumer-industrial (e.g., consumer goods, such as household goods, small appliances, building and utility products) |
| Medical technology (e.g., diabetes equipment, surgical instruments, catheters) |
| Automotive (e.g., OEMs, cars and trucks, EV and ICE parts manufacturers) |
| Other (terminate) |

Consumer industrial (e.g., consumer goods, such as household goods, small appliances, building and utility products)	Medical technology (e.g., diabetes equipment, surgical instruments, catheters)	Automotive (e.g., OEMs, cars and trucks, EV and ICE parts manufacturers)
33%	33%	33%
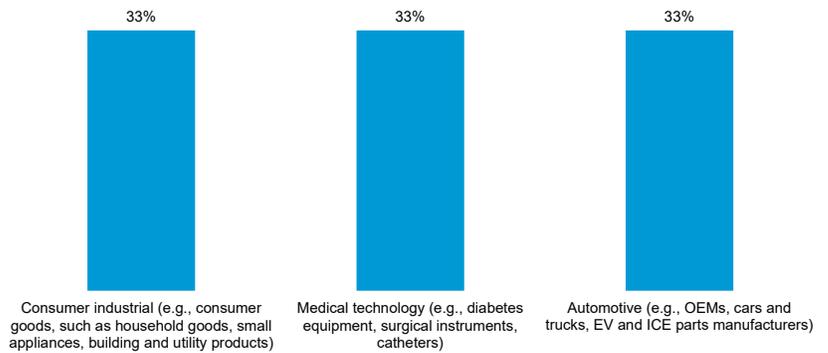
F. What is your company's revenue in USD in the most recent financial year?

| More than $5 billion |
| $1.1 to 5 billion |
| $751 million to $1 billion |
| $500 million to $750 million |
| Less than $500 million (terminate) |

More than $5 billion	$1.1 to 5 billion	$751 million to $1 billion	$500 million to $750 million
24%	47%	18%	11%
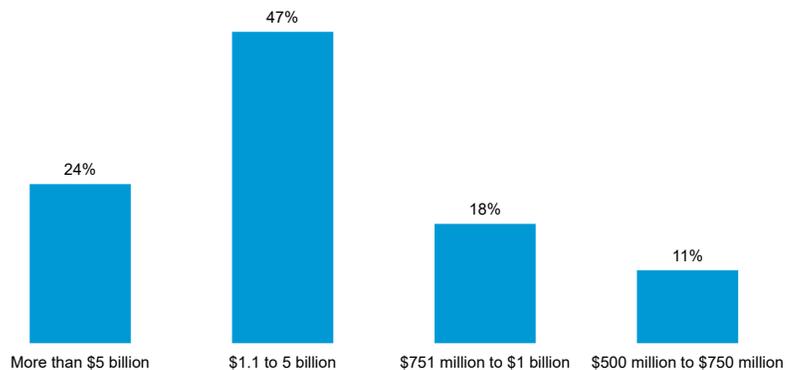
G. Educational background: What was your specialization in post graduate studies?

| Engineering |
| Business |
| Science and mathematics |
| Data analytics and information technology |
| Other |
| I don't have a postgraduate degree |

Engineering	Business	Science and mathematics	Data analytics and information technology	Other	I don't have a postgraduate degree
31%	24%	10%	25%	7%	12%
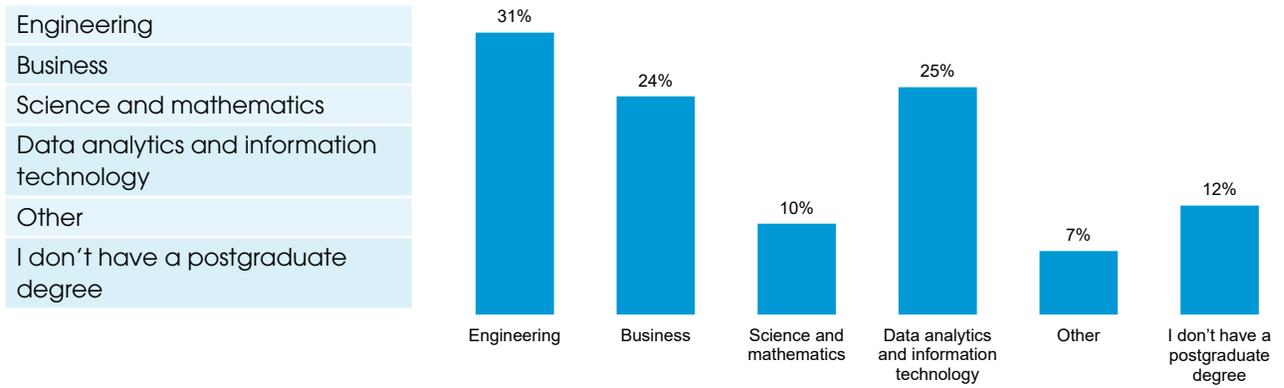
H. Screening question: Are you familiar with your company's manufacturing automation efforts?

| Yes |
| No (terminate) |

Yes
100%
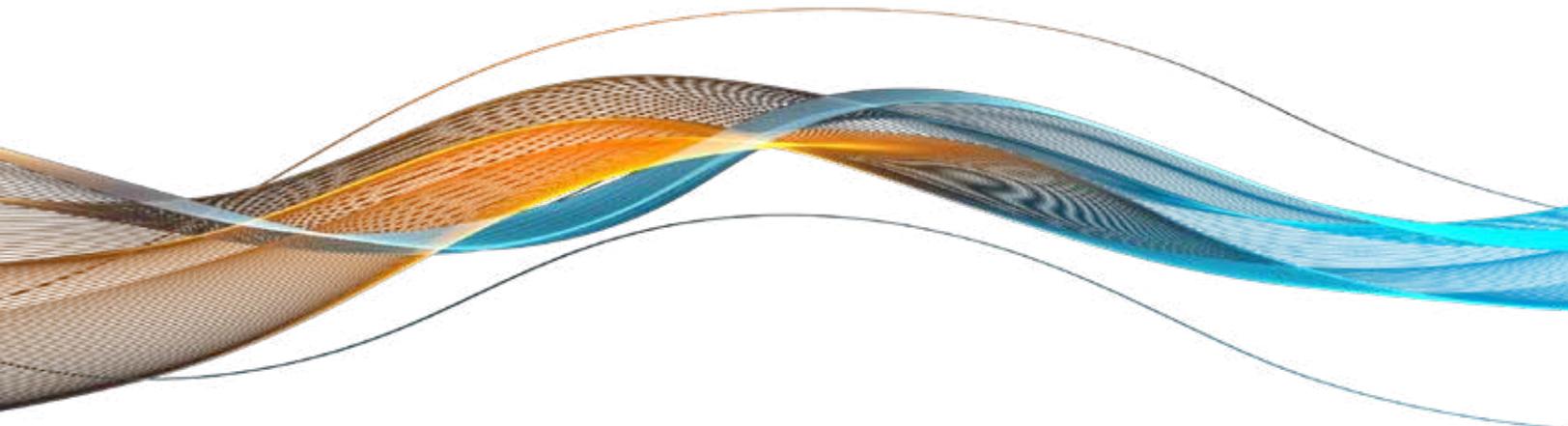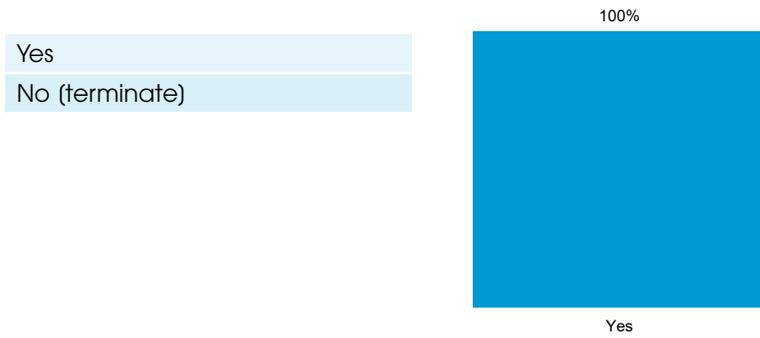
Automation adoption and maturity level

1. Which stage best describes your current level of manufacturing automation?

Consider your main manufacturing operation (or most of your plants, if you have several). Please select one of the following stages that best reflects your present situation:

Bar chart values:
- Basic Automation: 17%
- Discrete Automation: 30%
- Connected & Data-Driven: 25%
- Artificial-Intelligence-Enhanced & Partially Autonomous: 16%
- Fully Autonomous & Self-Learning: 12%
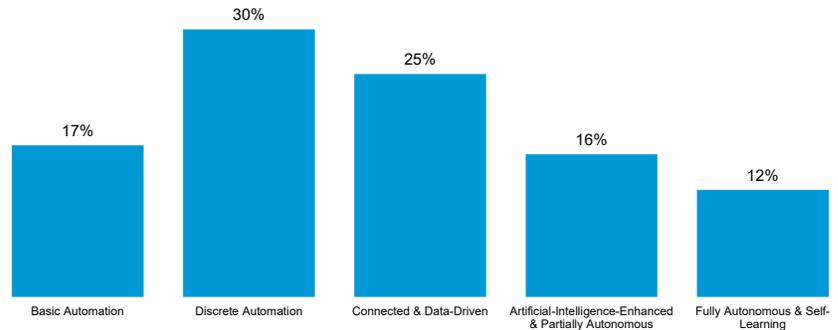
A. Basic Automation

– Primarily manual processes with limited use of basic machines or robots for repetitive tasks
– Little to no real-time data collection or AI

B. Discrete Automation

– Programming of robotic arms and other technologies to automate multiple tasks along the production line in different parts of the factory
– Human-machine interfaces to monitor the system and make adjustments

C. Connected & Data-Driven

– Use of sensors or IoT devices for data collection
– Some early AI or predictive maintenance tools, but not widespread or autonomous

D. Artificial-Intelligence-Enhanced & Partially Autonomous

– AI/ML tools actively optimize certain processes
– Collaborative robots assist human workers, but full autonomy is still limited

E. Fully Autonomous & Self-Learning

– Advanced AI and digital twins (or similar technologies) in continuous use
– Systems adapt to real-time changes with minimal human intervention

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2. On a scale of 1 to 3, how far along are you within that stage?
Select only one number in the range 1–3.

1 = Just started and/or some elements in place

2 = About halfway implemented, mostly implemented, still refining

3 = Fully implemented

Bar chart values:
- 1 = Just started and/or some elements in place: 29%
- 2 = About halfway implemented, mostly implemented, still refining: 43%
- 3 = Fully implemented: 27%
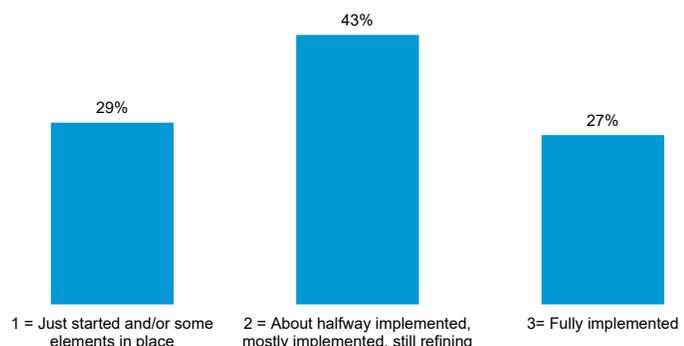
Objectives and impact

3. **What were the three most important objectives of your manufacturing automation program over the past three years, and which will be the three most important in the next three years? (**Select up to three in each column)

■ Past three years ■ Next three years

Objective	Past three years	Next three years
Higher return on investment	18%	28%
Lower costs and reduced waste	38%	23%
Increased market share	16%	31%
Reduced operational complexity	27%	21%
Improved productivity	24%	18%
Less machine downtime	17%	10%
Improved traceability	14%	18%
Optimized supply chain	13%	23%
Better product quality	15%	20%
Faster speed to market	12%	20%
Bigger/smaller product range	12%	9%
Increased output	20%	12%
Faster innovation	14%	20%
More flexibility	13%	23%

4. **In the past three years, how close did your company come to fully achieving its three most important manufacturing automation objectives?**

Select from 1 to 5, with 5 being the full (or almost full) accomplishment of the main goals

Rating	Percentage
1 - No accomplishment of main goals	2%
2	13%
3	32%
4	31%
5 - Full accomplishment of main goals	22%
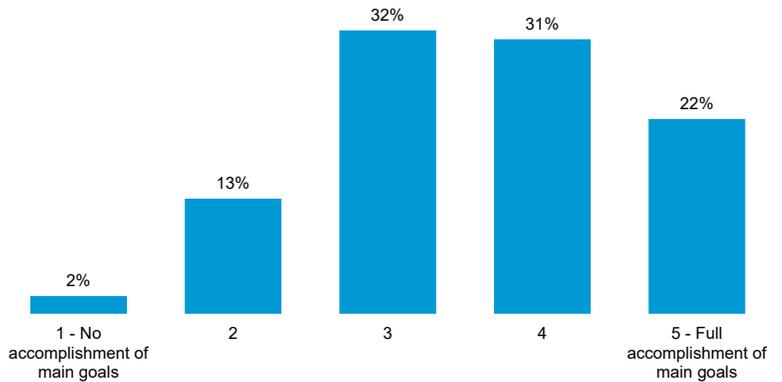
5. **Which three of the following metrics do you primarily track to measure the impacts of manufacturing automation?** (Select up to three)

Return on investment
Overall equipment effectiveness
Speed to market
Scrap rate
Throughput time
Cycle time
First pass yield
Downtime
Resource utilization
Error rate
Size of product portfolio

Error rate	Size of product portfolio	Return on investment	Overall equipment effectiveness	Speed to market	Scrap rate	Throughput time	Cycle time	First pass yield	Downtime	Resource utilization
22%	22%	30%	25%	20%	15%	18%	33%	14%	41%	25%
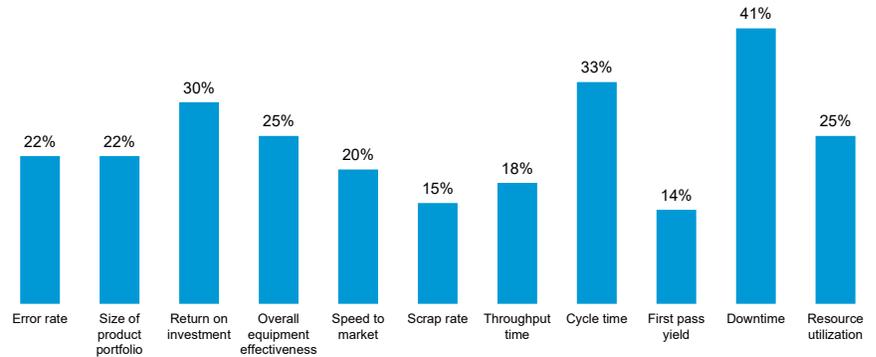
Governance

6. **Who is responsible for leading manufacturing automation implementation projects in your organization?** (Select one from each column)

Seniority

C-suite
A SVP or SVPs
A VP or VPs
A Director or Directors
A Senior Manager or Senior Managers
A Manager or Managers
Other (title/position)

C-suite	SVP or SVPs	VP or VPs	Director or Directors	Senior Manager or Senior Managers	Manager or Managers
3%	11%	26%	39%	15%	5%

Function

General management
Finance & accounting
Plant operations & maintenance
Operational planning
R&D
Engineering
IT
Supply chain & procurement
HR
Research & development
Engineering
Risk & compliance
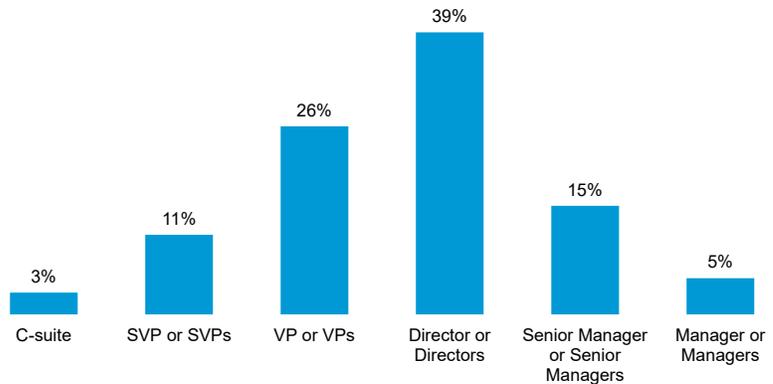
General management	Finance & accounting	Plant operations & maintenance	Operational planning	R&D	Engineering	Supply chain & procurement	HR	Risk & compliance	IT
19%	12%	31%	23%	12%	40%	9%	6%	2%	38%
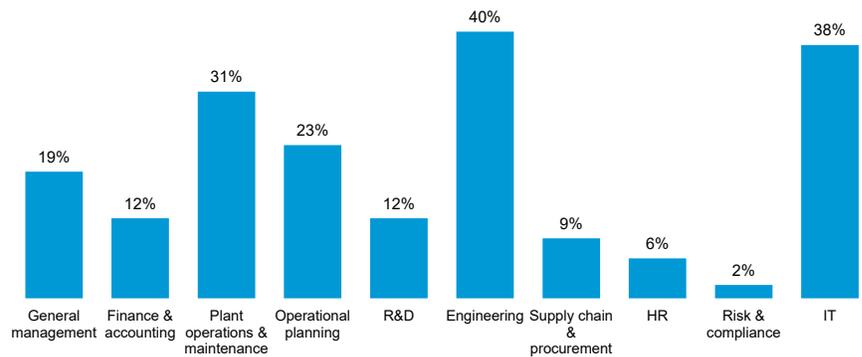
7. Who holds the budget and makes purchasing decisions for manufacturing automation technology?
(Select one from each column)

Seniority

| C-suite |
| A SVP or SVPs |
| A VP or VPs |
| A Director or Directors |
| A Senior Manager or Senior Managers |
| A Manager or Managers |
| Other (title/position) |

C-suite	A SVP or SVPs	A VP or VPs	A Director or Directors	A Senior Manager or Senior Managers	A Manager or Managers
14%	35%	26%	16%	5%	4%

Function

| General management |
| Finance & accounting |
| Plant operations & maintenance |
| Operational planning |
| R&D |
| Engineering |
| IT |
| Supply chain & procurement |
| HR |
| Research & development |
| Engineering |
| Risk & compliance |
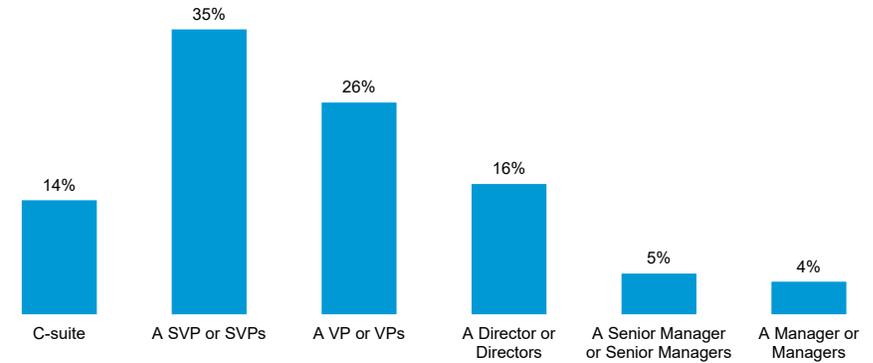
General management	Risk & compliance	Finance & accounting	Plant operations & maintenance	Operational planning	R&D	Engineering	IT	Supply chain & procurement	HR
11%	1%	13%	15%	12%	7%	21%	15%	4%	1%

8. How is the automation program lifecycle managed, from pre-planning to post-implementation?
It is managed by:

| A steering committee or no steering committee And/or: |
| Cross-functional team/s |
| A team comprising a single function, such as operations |
| Solely engineers working in various functions |
| Solely engineers working in the engineering department |
| The head of automation, who reports directly to an executive |
| R&D teams |

A steering committee	No steering committee	Cross-functional team/s	A team comprising a single function, such as operations	Solely engineers working in various functions	Solely engineers working in the engineering department	The head of automation, who reports directly to an executive	R&D teams
14%	2%	20%	15%	9%	11%	18%	10%
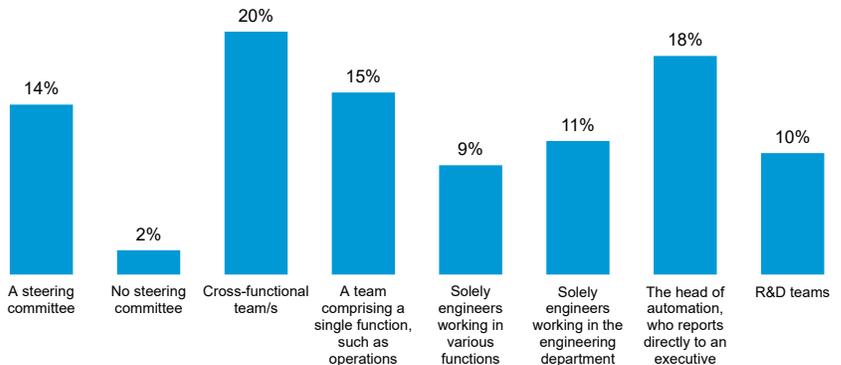
Implementation and challenges

9. **Referring to this diagram, how closely integrated are your manufacturing automation systems at each level of the technology stack?** Choose from 1 to 3, with 1 = not integrated; 2 = somewhat integrated; 3 = fully integrated)

Enterprise

Level 4
Enterprise Applications
ERP, IBP, CRM, SRM, PLM

Plant / Warehouse

Level 3
Manufacturing Operations Management
MES, WES, WMS, Fleet

Level 2
Process Monitoring
SCADA, HMI, Connectivity Platform

Level 0/1
Monitoring of Physical Devices
PLC, Robotics, Sensors, Visual

Production Lines & Equipment

■ 1 = Not integrated ■ 2 = Somewhat integrated ■ 3 = Fully integrated

	Level 4	Level 3	Level 2	Level 0/1
1 = Not integrated	29%	22%	12%	15%
2 = Somewhat integrated	45%	46%	44%	33%
3 = Fully integrated	26%	32%	44%	52%

10. **For decision making and analytics, how readily available is structured data (e.g., data from IoT, sensor logs, production metrics, quality control records)?** (Select one)

i. Not available–Data is not currently/rarely collected or available

ii. Limited availability—Some data is collected, but access is inconsistent or unstructured

iii. Moderate availability—Data is collected on a regular basis, but its integration and access present challenges

iv. Highly available—Data is structured, accessible and used for decision making

v. Fully integrated—Data is seamlessly structured, easily accessible and actively used to drive automation and process optimization

Not available	Limited availability	Moderate availability	Highly available	Fully integrated
3%	14%	43%	25%	15%
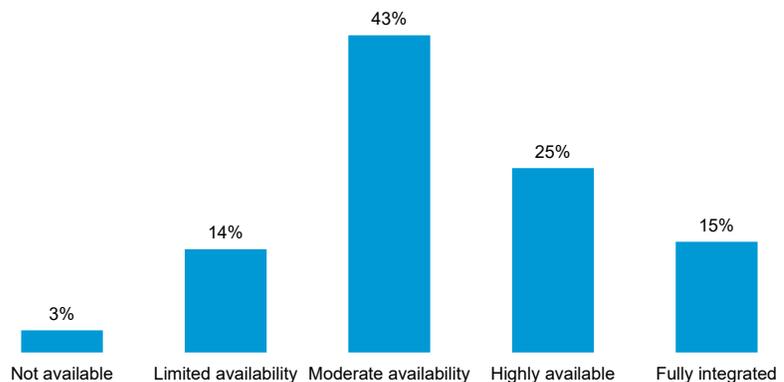
11. In the past three years, what were the three main challenges faced during automation implementation?
(Select up to three)

There was limited access to structured data	32%
Budgetary constraints	25%
Inferior manufacturing-automation products	12%
We underestimated the speed of change in manufacturing automation technologies	23%
Investment in new automation systems was poorly planned	19%
Too restrictive government regulation	17%
Too much internal red tape	8%
The company's leaders and the implementers lower down were not aligned	17%
We lacked leadership from the top echelons of the company	15%
We lacked the skilled manpower to implement it successfully	34%
We faced significant cybersecurity issues	15%
We were implementing it too slowly	13%
We were trying to implement it too quickly	17%

12. What three key factors contribute to a successful manufacturing automation strategy? (Select up to three)

Integration with existing processes	22%
Clear KPIs and performance metrics	17%
Close OT-IT collaboration	19%
Creating an enterprise-wide plan for all systems including automation	27%
Starting with a few quick wins and then expanding the scope	20%
Adequate resourcing in terms of finance and manpower	22%
Careful project planning and management	31%
Close alignment with overall corporate strategy	15%
Strong emphasis on managing the entire life cycle	31%
Ensuring it is managed by a cross-functional team	21%
Putting an engineer in charge	16%
Vendor selection	14%
Putting a senior executive in charge	18%

Technology

13. What three types of technology were the highest priority for your manufacturing automation strategy in the past three years and which will be in the next three years? (Select up to three)

Legend: ■ Next three years ■ Past three years

Technology	Next three years	Past three years
Vision Systems	10%	12%
Custom Automation vs Off-shelf products	12%	23%
Manufacturing automation as a service	27%	17%
Automated storage and retrieval	11%	22%
Robotics & automated guided vehicles	15%	10%
Digital twinning technologies	27%	6%
Cloud computing	33%	41%
Edge computing	20%	23%
Head-mounted display	12%	15%
3D printing	13%	21%
IoT (Internet of Things)	23%	34%
Artificial intelligence and machine learning	48%	25%

14. What will be the three most important applications of AI for manufacturing automation in the next three years? (Select up to three)

- Robots and cobots
- Predictive maintenance
- Quality control
- Generative design
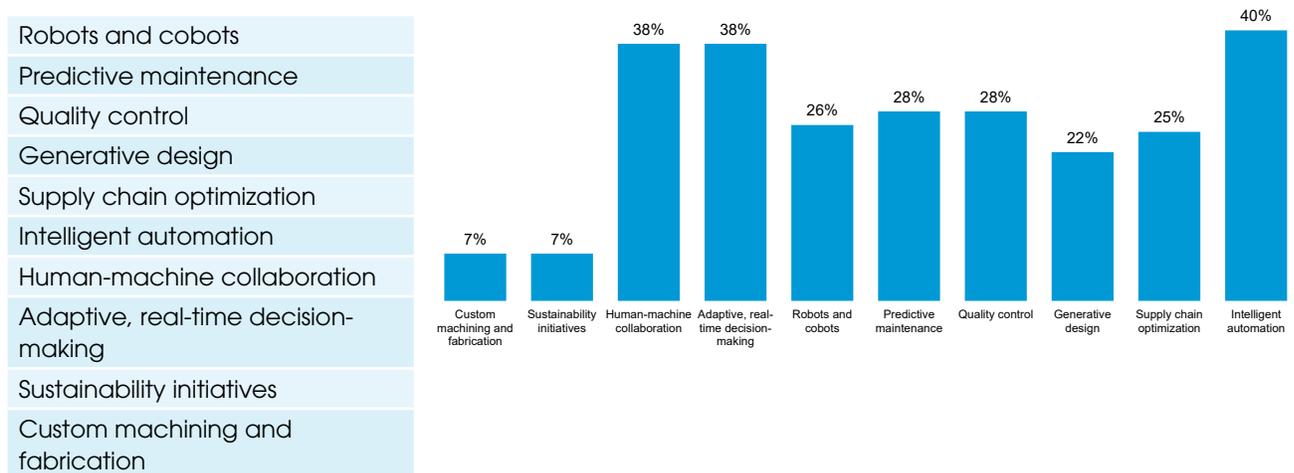- Supply chain optimization
- Intelligent automation
- Human-machine collaboration
- Adaptive, real-time decision-making
- Sustainability initiatives
- Custom machining and fabrication

Application	Percentage
Custom machining and fabrication	7%
Sustainability initiatives	7%
Human-machine collaboration	38%
Adaptive, real-time decision-making	38%
Robots and cobots	26%
Predictive maintenance	28%
Quality control	28%
Generative design	22%
Supply chain optimization	25%
Intelligent automation	40%

Workforce

15. What are the three main ways in which manufacturing automation has affected workforce roles and responsibilities? (Select up to three)

The size of the workforce has fallen

Workers have more responsibility and autonomy

Workers have less responsibility and autonomy

Engineers have more influence on automation design

Engineers have less influence on automation design

Engineers have more influence on automation management

Engineers have less influence on automation management

Executives have more influence on automation management

Executives have less influence on automation management

Category	Value
The size of the workforce has fallen	31%
Workers have more responsibility and autonomy	40%
Workers have less responsibility and autonomy	30%
Engineers have more influence on automation design	38%
Engineers have less influence on automation design	16%
Engineers have more influence on automation management	33%
Engineers have less influence on automation management	16%
Executives have more influence on automation management	34%
Executives have less influence on automation management	13%

16. What three skills are critical for successful manufacturing automation? (Select up to three)

Collaboration

Imagination

Critical thinking

Clear communication

Advanced computer skills

Skills to train the next generation of workers

Effective leadership at the top of the company

Effective leadership in the middle of the company

Fast decision-making

Category	Value
Collaboration	35%
Imagination	23%
Clear communication	25%
Advanced computer skills	43%
Skills to train the next generation of workers	32%
Effective leadership at the top of the company	22%
Effective leadership in the middle of the company	24%
Fast decision-making	25%
Critical thinking	32%
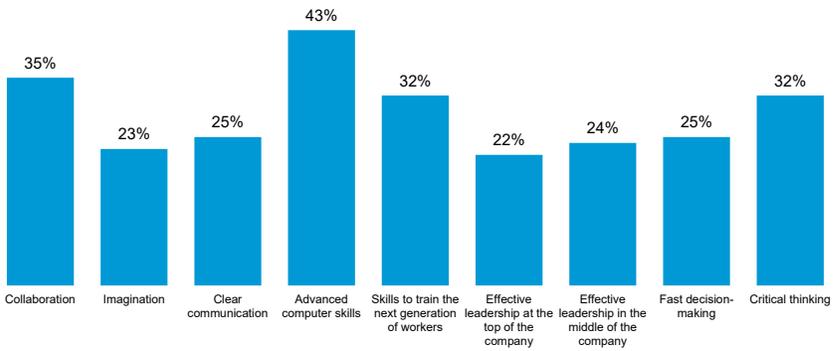
17. Over the next three years, what challenges do you foresee for business leaders in purchasing manufacturing automation and technology? (select up to three)

High initial investment costs – The upfront expenses for advanced automation and technology are significant and may strain budgets
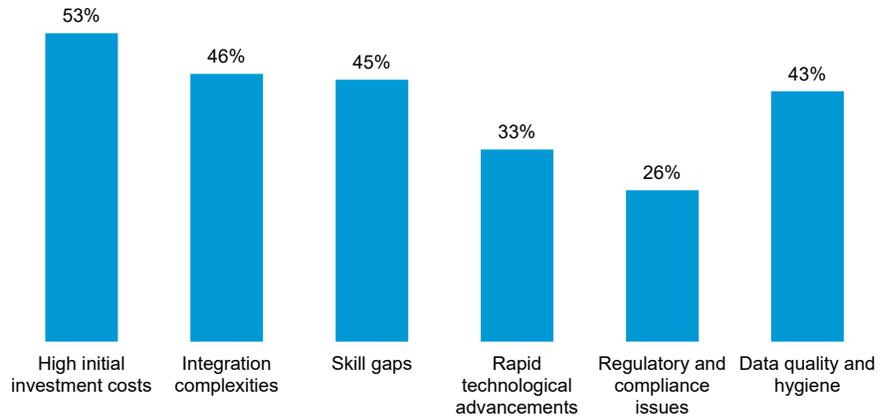
Integration complexities – Challenges in integrating new technologies with existing systems and processes

Skill gaps – Lack of skilled workforce to operate and maintain advanced manufacturing technologies

Rapid technological advancements – Difficulty in keeping up with the pace of innovation and ensuring long-term relevance of purchased technologies

Regulatory and compliance issues – Navigating complex regulations and ensuring compliance with industry standards

Data quality and hygiene – high levels of unstructured disparate data that is unconsumable for processing and analysis

Challenge	Percentage
High initial investment costs	53%
Integration complexities	46%
Skill gaps	45%
Rapid technological advancements	33%
Regulatory and compliance issues	26%
Data quality and hygiene	43%

About Eclipse Automation

Founded in Cambridge in Ontario, Canada in 2001, Eclipse Automation delivers manufacturing automation solutions for clients across the nuclear energy, life sciences,transportation, consumer, industrial, food & beverage, semiconductors, and aerospace & defense sectors.

Our cross-industry experience allows us to adapt proven technologies and best practices from one sector to another, enhancing precision, performance, and reliability for every customer. With operations across Canada, the US, and Europe, we continue to grow our reach and capabilities to meet the evolving needs of global manufacturers in every sector.

contact@eclipseautomation.com

About Vantage Research

Vantage Research creates thought leadership for clients across industries and geographies by reaching highly targeted, hard-to-reach audiences. Our thought leadership work combines evidence-based analysis with primary insights that offer a perspective on the future direction of global business. It is based in Saint Louis, Missouri.

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About Curious Insights

Curious Insights, which conducted the online survey, specializes in the delivering end-to-end research needs of Fortune 500 companies, startups, research/analyst firms, and others. At the heart of our services is a data and human insights approach to give our clients the greatest return on their investments. Curious Insights is based in New Delhi, India.

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Endnotes

1   414,000 in the US, according to the Federal Reserve Bank of St Louis, and 35,000 in Canada, according to Statistique Canada

2   https://www.fuqua.duke.edu/duke-fuqua-insights/us-companies-ramp-automation-and-ai-inflation-persists

3   https://dais.ca/wp-content/uploads/2023/09/Automation-Nation-AI-Adoption-in-Canadian-Businesses-2.pdf

4   Stanley Black & Decker's failed greenfield investment in an automated plant is a cautionary tale. "Why America's largest tool company couldn't make a wrench in America," Wall Street Journal, July 22, 2023

5   A case study from Propel Software highlights how product lifecycle management (PLM) tools helped a fast-growing manufacturer align materials, suppliers, and contract manufacturers—demonstrating the value of integration in automation. "With Control in the Users' Hands," Manufacturing Tomorrow

6   OMRON's work with AI in manufacturing shows how skilled operators can train machines, which in turn help train less experienced workers. This symbiosis between human and machine is central to sustainable automation. "Realising the Potential of AI on the Factory Floor," Financial Times

7   "Yes, excessive automation at Tesla was a mistake. To be precise, my mistake. Humans are underrated."—Elon Musk, 2018. Source: Forbes