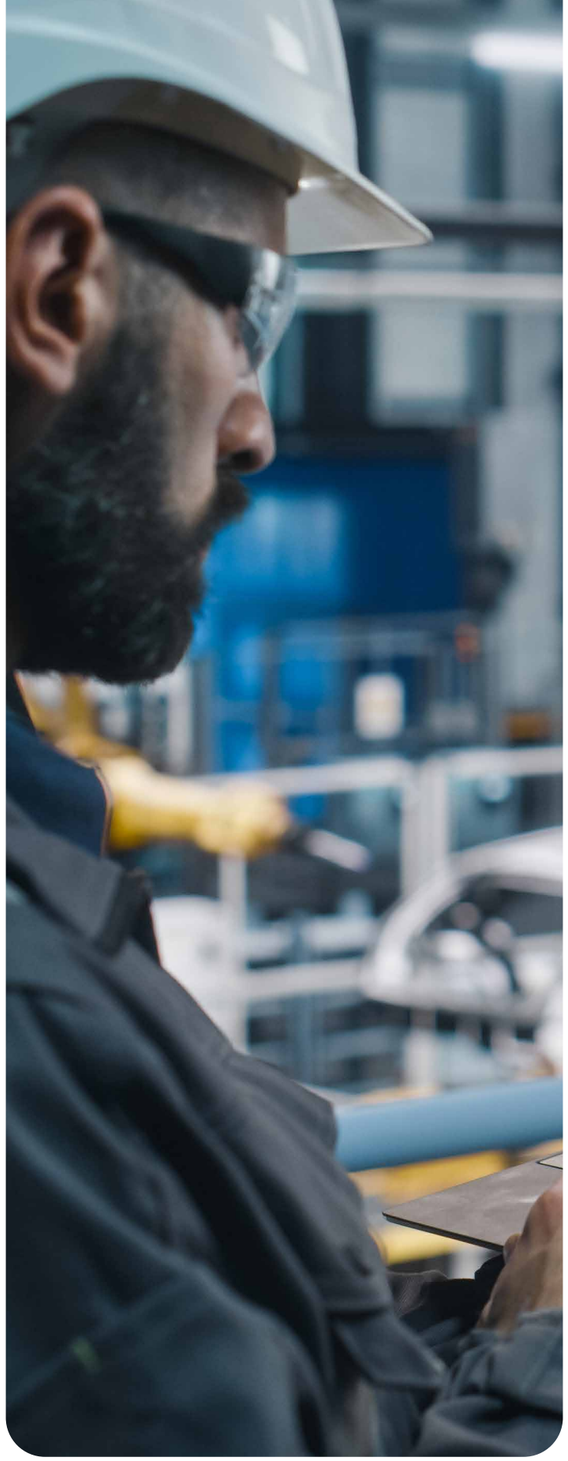

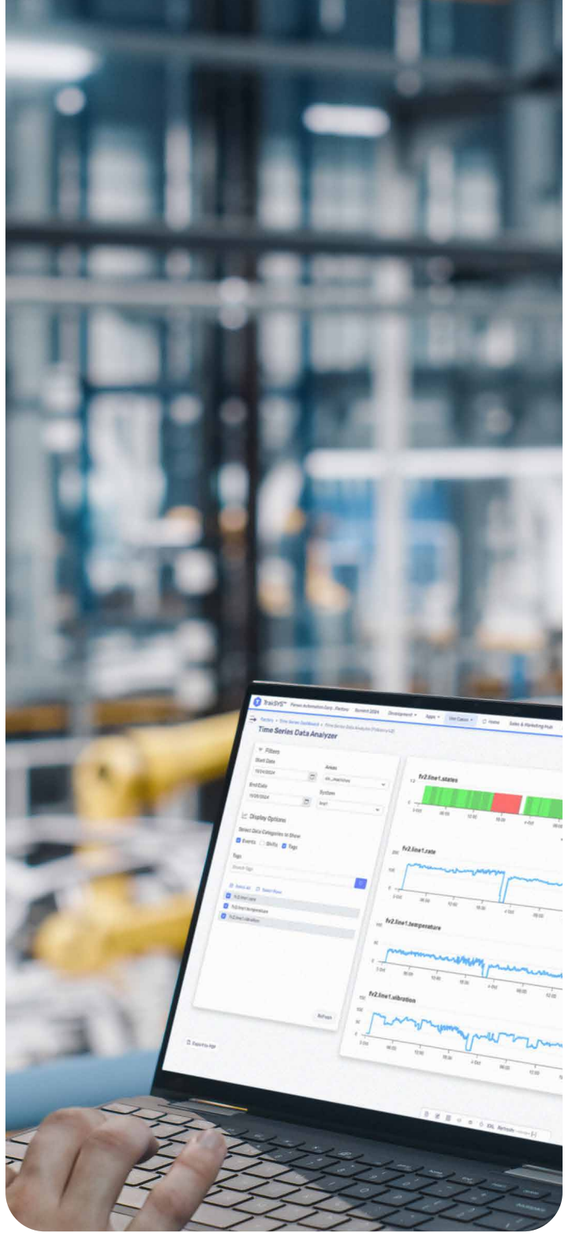

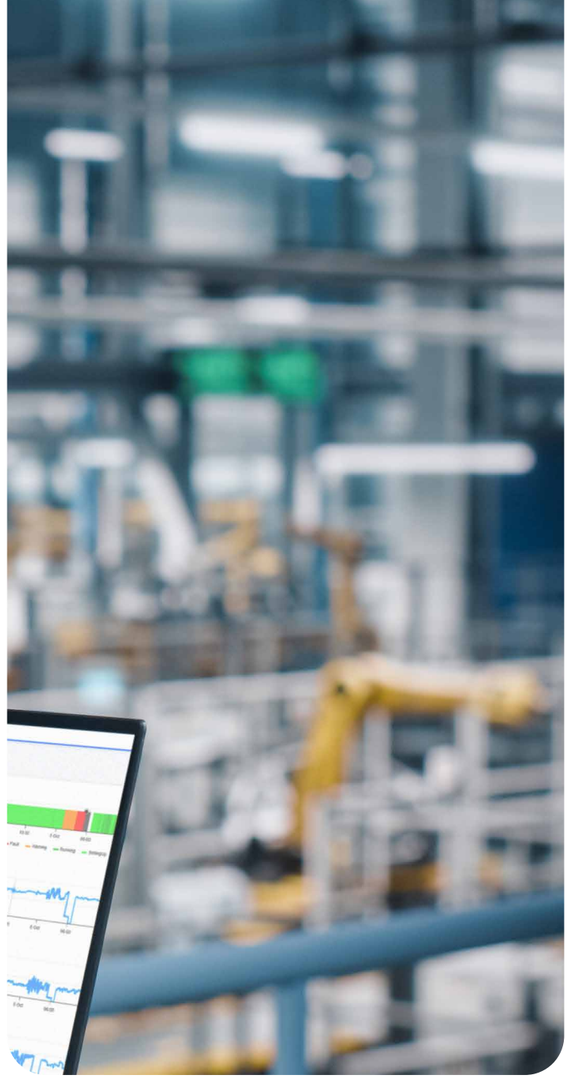

PARSEC™

NORTH AMERICA

2024 State of Manufacturing Survey

Balancing risk and reward in the age of digital transformation

PARSEC™

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The results in this report are from an online survey of manufacturing professionals that was fielded in 2024. There were 600 North American respondents to the survey.

Letter from the CEO

If one word captures the current state of manufacturing, it's *complexity*. Supply chains span continents, distribution networks are expanding, and consumer expectations continue to rise. Meanwhile, climate change and extreme weather events force businesses to rethink operations. Technology offers solutions but also introduces new challenges—demanding investment, retraining, and redefined processes.

Where does this leave manufacturers? At a crossroads. Faced with significant challenges, 22% of our surveyed respondents now cite supply chain issues as "extremely" challenging, up from 10% the year before. Yet, the opportunities are equally transformative. Facilities that embrace digitalization and advanced technologies can see tangible rewards: enhanced quality, reduced downtime, and clearer operational insights. For example, manufacturers who have completed digitalization initiatives report overwhelmingly positive outcomes, with 83% rating their results as "good" or "excellent."

The question is no longer whether to adopt new technologies but how to do so effectively. This year's survey reflects the industry's struggle to balance risks and rewards. While less than one-third of manufacturers have completed their digitalization efforts, progress is accelerating—50% are now actively implementing strategies to modernize operations. At the same time, reshoring initiatives and talent shortages are redefining priorities, placing a premium on adaptability and resilience.

Our 2024 State of Manufacturing Survey captures these insights directly from 600 North American manufacturing professionals. While every facility has unique challenges, one message is clear: manufacturers have a remarkable opportunity to reimagine their futures. Those willing to invest in the right strategies will lead the industry forward.

At Parsec, we're proud to be part of this transformation. Our TrakSYS solution empowers manufacturers to not only navigate complexity but to thrive in it. Together, we can turn today's challenges into tomorrow's competitive advantages.

Eddy Azad
Parsec Founder and CEO

Executive Summary

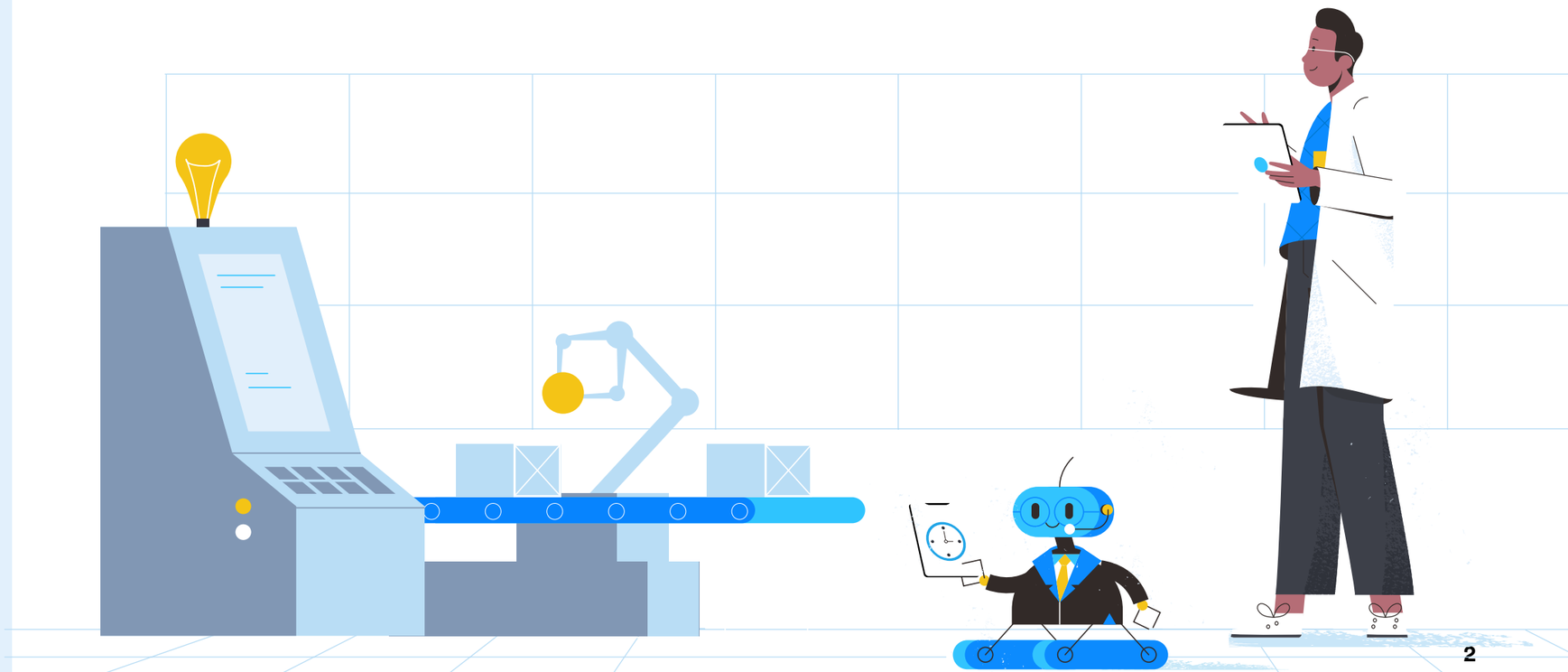
We connected with 600 manufacturers across North America to uncover the key challenges, opportunities, and trends shaping the industry. The findings reveal a sector navigating a delicate balance between tradition and transformation, with manufacturers exploring new strategies to address persistent obstacles while leveraging advanced technology for long-term success.

Supply chain challenges remain a top concern.

Nearly three-quarters (71%) of respondents describe supply chain issues as “very” or “extremely” challenging, driven by economic downturns (38%) and lack of visibility (36%). In response, manufacturers are shifting their approach, adopting strategies such as supplier diversification (41%) and technology implementation (36%) to build resilience.

Reshoring remains elusive for many.

While reshoring offers clear benefits—including enhanced regulatory compliance (41%) and improved quality control (38%)—nearly half (47%) of respondents have no plans to pursue it. For those that do, challenges such as finding suitable facilities (45%) and securing skilled labor (44%) remain significant barriers.



Talent gaps hinder progress.

The industry faces a mounting skills gap, with technology specialists (52%) and engineers (44%) cited as the most difficult roles to fill. This challenge is compounded by the need for upskilling as manufacturers adopt new technologies. A lack of skilled talent is already stalling initiatives like artificial intelligence adoption for 30% of respondents.

Digitalization is gaining momentum.

While only 32% of respondents have fully completed their digitalization initiatives, half are actively implementing them. The results are promising—83% of manufacturers who completed their digital transformations rate their outcomes as “good” or “excellent,” with standout successes in sectors like food & beverage (92%) and pharmaceuticals (90%).

AI sparks optimism.

Despite being a relatively new frontier, 79% of respondents describe their facilities as “somewhat” or “very” prepared to adopt AI, with 83% anticipating widespread use within four years. However, readiness varies widely, with challenges like data accessibility (44%) and technological integration (39%) posing hurdles..

MES adoption unlocks potential.

Manufacturing Execution Systems (MES) remain underutilized, with only 49% of respondents currently using MES platforms. Yet, those who have integrated MES and ERP systems report significant benefits—96% rate their experience as “good” or “excellent,” citing improvements in supply chain visibility, quality control, and decision-making.

The survey underscores the urgency for manufacturers to embrace digital transformation while addressing foundational challenges such as labor shortages and supply chain vulnerabilities. With advanced technology like TrakSYS, facilities can transform complexity into opportunity, building resilient, efficient, and forward-thinking operations.

Headcount

- **25%** | 1-99 Employees
- **42%** | 100-999 Employees
- **25%** | 1,000-9,999 Employees
- **7%** | 10,000+ Employees

Manufacturing Type

- **20%** | Discrete Manufacturing
- **22%** | Process Manufacturing
- **21%** | Batch Manufacturing
- **21%** | Repetitive Manufacturing
- **17%** | Job Shop Manufacturing

Department

- **9%** | Engineering
- **7%** | Executive Leadership
- **4%** | Finance/Accounting
- **12%** | Information Technology
- **4%** | Logistics/Transport
- **4%** | Maintenance Management
  - **46%** | Manufacturing Operations
  - **5%** | Product Development
  - **3%** | Procurement
  - **4%** | Quality Management
  - **2%** | Warehouse Management

Level

- **14%** | C-Suite (CEO, CIO, CISO, CTO, Owner, Partner, etc.)
- **35%** | Senior Vice President/Vice President
- **51%** | Director/Senior Director, Managing Director

Industry Overview

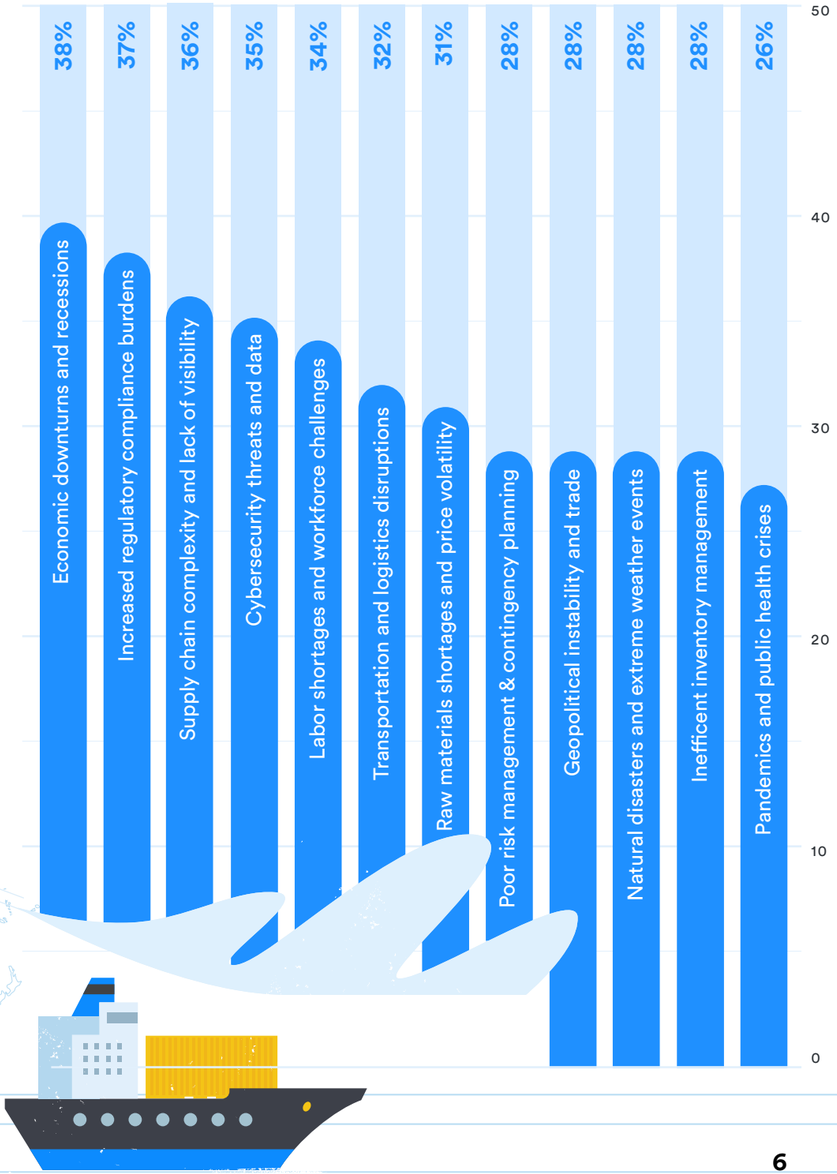
As North American manufacturers continue their trek toward Industry 4.0, they must also contend with broad, industry-wide challenges like strengthening their supply chains, deciding whether to reshore operations, and matching talent with job vacancies. None of these challenges can be addressed through quick fixes; rather, they will require big-picture thinking and a shift in strategic vision.

Supply Chain

Global supply chains are increasing in complexity. Prolonged geopolitical tension alters trade patterns and forces contingency plans into action, while extreme weather threatens infrastructural integrity and endangers both cargo and personnel. Through it all, manufacturers are under greater pressure to operate more sustainably, provide more transparency to stakeholders, and curb offshoring. These challenges can—and will—push many businesses to the limit.

Nearly three in four (71%) of manufacturers say supply chain issues are “very” or “extremely” challenging. Top challenges include economic downturns (38%), lack of visibility (36%), increased regulatory requirements (37%), and labor shortages and challenges (34%). Whether North American manufacturers can withstand these challenges is tantamount to a coin flip—51% said their facility’s supply chain was resilient, and 49% said theirs was fragile.

Which of the following, if any, were supply chain challenges your company faced in the last year?



Of course, many supply chain challenges are beyond any facility's control. Even the most prepared manufacturers—like the 60% who report being "very" or "extremely" prepared for supply chain challenges—can find themselves in an equipment-threatening heatwave or in the path of a hurricane. Indeed, more than one-quarter (28%) cited extreme weather as a top supply chain challenge.

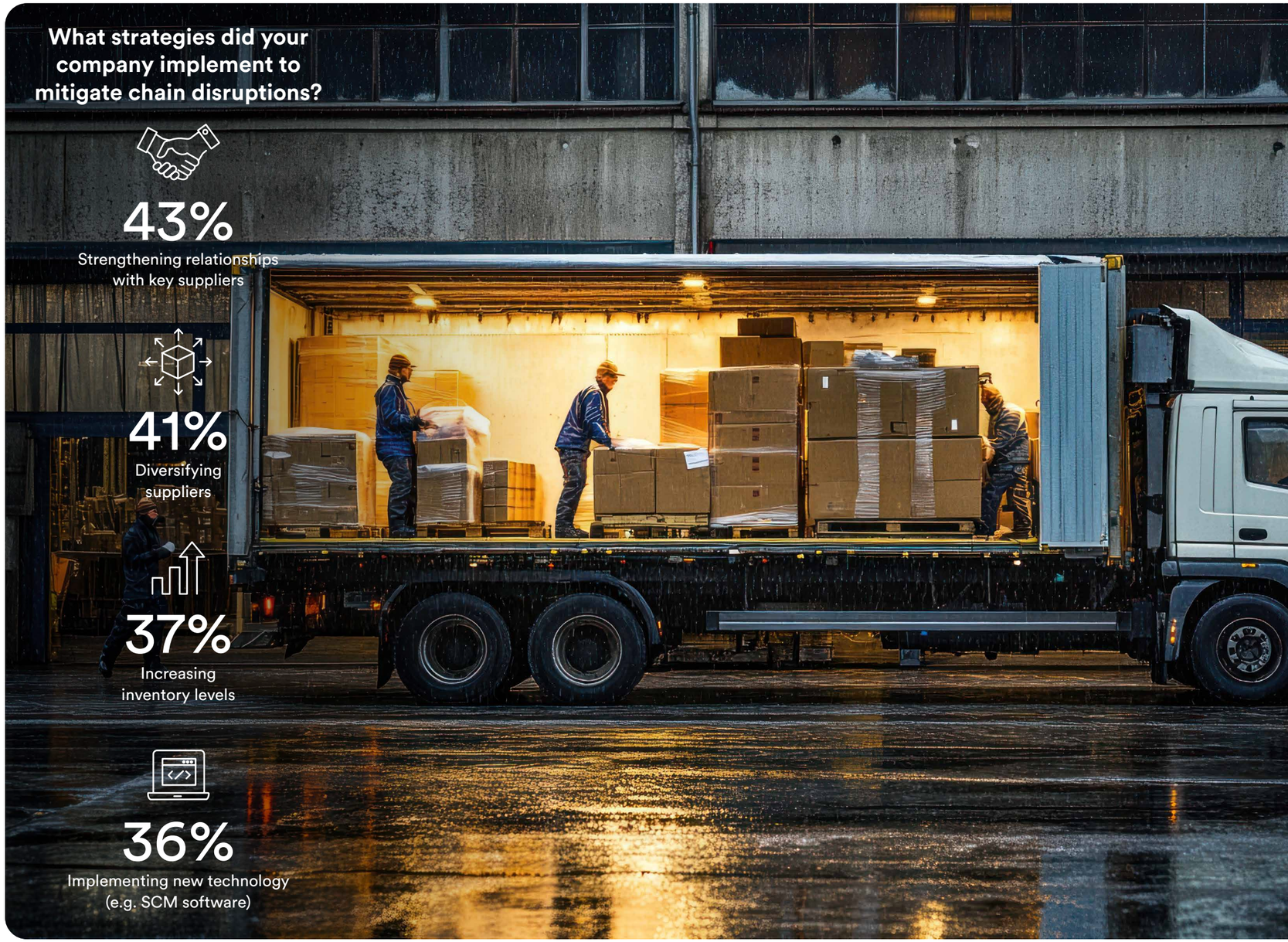
But manufacturers have homed in on the factors they can control. Top supply chain mitigation tactics included strengthening supplier relationships (43%), diversifying suppliers (41%), increasing inventory (37%), and implementing new technology (36%).

Manufacturers who describe the state of their supply chain as fragile...

42% Currently use an MES

53% Are not considering implementing an MES

5% Other



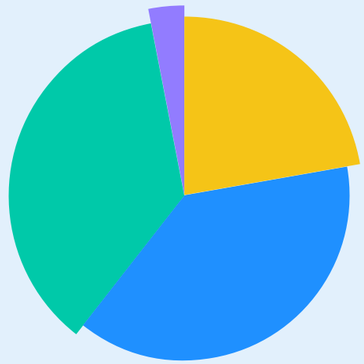
For manufacturers, the philosophy of “just in time” has been replaced by “just in case.” To prepare for supply chain disruption, facilities are bolstering their Plan A with robust Plans B, C, and D. This means securing backup—and backup backup—suppliers and inventory. It’s not enough to expect the unexpected; manufacturers must count on it.

More than one-third (36%) are, at best, “somewhat” prepared for supply chain challenges. To best position themselves, these facilities must dedicate time, effort, and resources toward bolstering their operations. If they fail to act, they risk falling even farther behind their competitors. After all, manufacturers’ customers have backups in place, too, and they’ll take their business elsewhere if needed.

Parsec Pointers

- Make sure your production can adjust to external factors. AI-enhanced, real-time algorithmic production scheduling is a must for facilities whose workflows need to turn on a dime.
- All facility personnel should be briefed on how production may shift when a supply chain disruption strikes. With so much on the line, the last thing manufacturers need is for their facility to be the hold-up. Educate teams now to minimize confusion when it counts.
- An MES collects all pertinent manufacturing data and gives teams a complete, contextualized, actionable view of their entire operation. This perspective is instrumental in ensuring a facility is prepared—every step of the way—for potential disruption.

How prepared is your organization to address current supply chain issues?



22% Extremely prepared	38% Very prepared
36% Somewhat prepared	3% Not too prepared

Reshoring

Between continued supply chain disruptions, shifting trade policies and tariffs, government incentives, and social pressures, manufacturers are being encouraged to bring their operations closer to home. Doing so could not only help facilities meet customer demand but fortify operations through shortened supply chains. However, many manufacturers struggle to reconcile the benefits of reshoring with the costs.

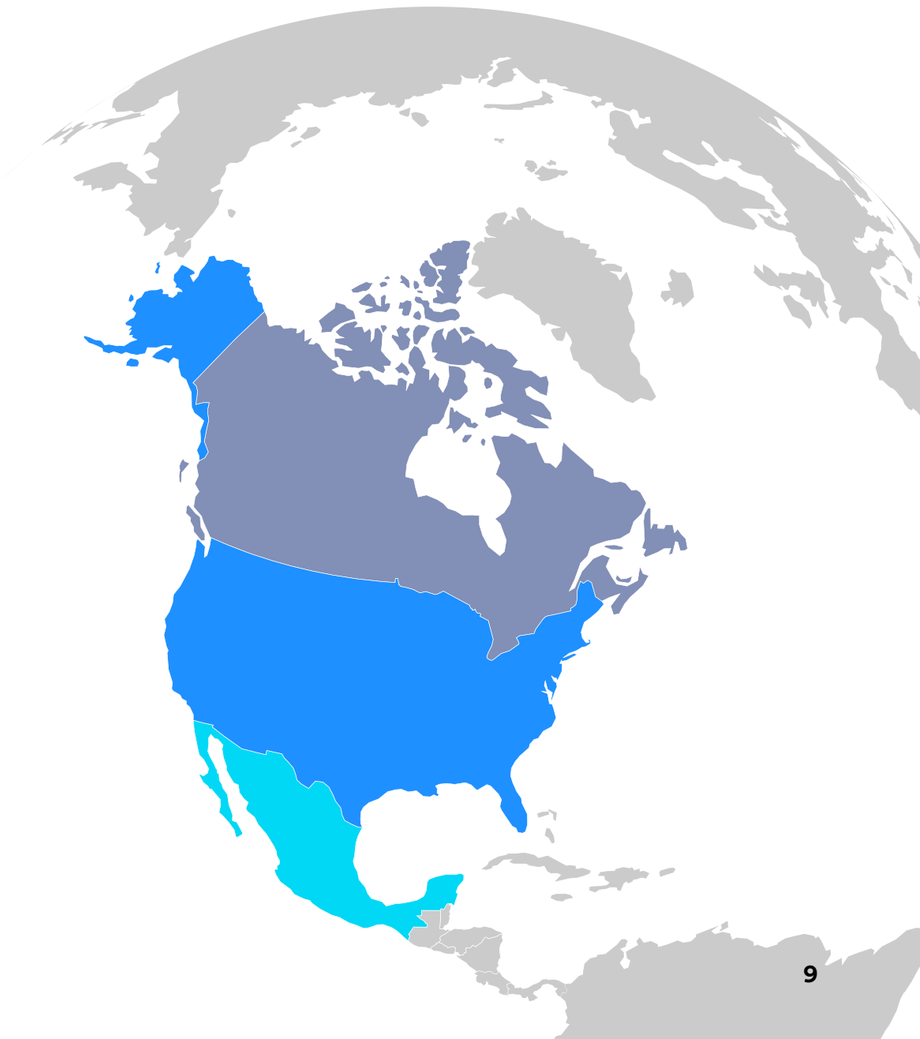
Across the industry, the U.S. is breaking even on reshoring; 17% say they have shifted or plan to shift production out of the U.S., and an equal share say they have shifted or plan to shift production into the U.S. Canada is faring better, with more manufacturers planning to reshore (17%) than offshore (12%). Mexico is faring better still, with 28% planning to reshore and 19% planning to offshore.

Surprisingly, almost half of North American manufacturers (47%) said they had no plans to re- or nearshore. Continuing to offshore is seemingly worth the potential risks of supply chain vulnerability and public scrutiny. If they do move forward with reshoring, manufacturers anticipate challenges like finding suitable facilities and infrastructure (45%), identifying and securing a skilled workforce (44%), and adjusting logistics and transportation networks (40%).

How are North American nations netting out in terms of reshoring?

To view other countries' net reshoring scores, see page 11

+5%	0%	+9%
Canada	United States	Mexico



On the other hand, nearly one-third (31%) plan to reshore or have completed their initiatives to do so. The most popular reasons for reshoring include regulatory compliance (41%), reducing supply chain risks and vulnerabilities (41%), improving quality and control (38%), and supporting local economies and job creation (37%).

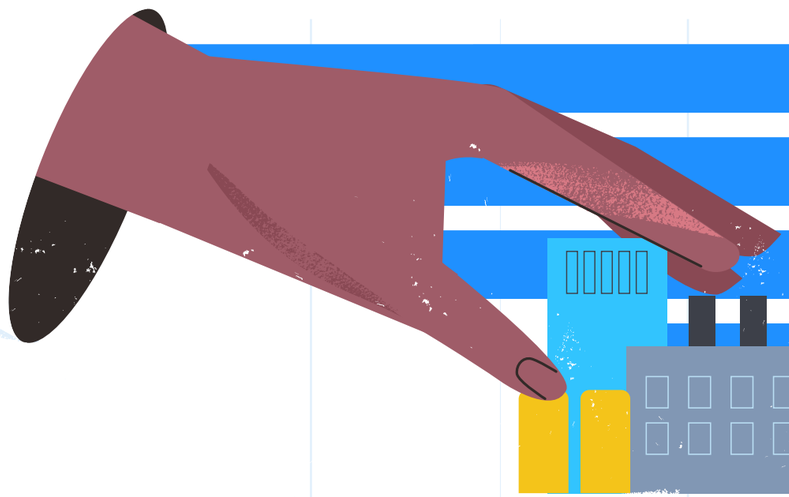
The manufacturers who did reshore found that connected technology solutions helped smooth the transition. Manufacturers using MES throughout the reshoring process said that the tool helped strengthen collaboration with partners (48%), improve decision-making and problem-solving (45%), and increase operational efficiency (40%).

Reshoring is not only beneficial for local economies but can help manufacturers fortify their operations and boost resiliency. It does require considerable logistical coordination, but the long-term benefits (e.g., tax incentives, reputational improvement, local job creation) will position facilities advantageously for continued success.

Parsec Pointers

- Reshoring is a significant undertaking, and it doesn't happen overnight. A focused incremental approach can help manufacturers do it correctly the first time.
- Lean on technology solutions to examine offshore production, identify shortcomings, and determine whether re- or nearshoring could help address any issues.

In which of the following ways, if any, has MES helped your organization's nearshoring and reshoring initiatives?



Net reshoring scores across the globe*

+10%

Mexico

+5%

Canada

+3%

Spain

+1%

Ireland

+1%

Netherlands

0%

United States

-1%

Italy

-1%

United Kingdom

-2%

Germany

-3%

France

Labor

Labor remains a challenge for North American manufacturers, curbing their ability to meet customer demand and continue or complete their digital transformations. After all, the more advanced technology manufacturers implement, the more technical staff they need to operate and maintain it.

Manufacturers must be able to adapt and evolve—not only with the market but also with the available tools and resources. This means identifying, attracting, and retaining skilled personnel. But this is often easier said than done. Top staffing challenges include finding qualified candidates (43%, down from 50% in 2023), training and onboarding (38%), evolving tech (37%), shifts in demand (37%), and an aging workforce (37%).

Which of the following staffing challenges, if any, does your company struggle with?

43%
Finding qualified candidates

38%
Training and onboarding

37%
Evolving technology that requires experience

36%
Wage competition

33%
Retention

28%
Loss of interest in the field

Geographic limitations

Shifts in industry demand

Workforce aging out

Other considerations like reshoring also complicate the situation—nearly 4 in 10 (39%) manufacturers believe it will increase demand for skilled labor, putting technical skills at a sky-high premium. The most challenging roles to fill include technology specialists (52%), quality assurance staff (47%), engineers (44%), maintenance workers (38%), and production workers (37%).

These technical roles are pivotal to manufacturers' ability to pursue Industry 4.0 and achieve true digitalization. Without skilled staff, facilities will find their progress stalled. Indeed, nearly one-third (30%) say a lack of skilled talent is preventing them from adopting AI. Meanwhile, less technical responsibilities (e.g., basic data entry and management) are increasingly susceptible to being assumed by AI, with 43% of North American respondents believing manufacturing jobs will be displaced by automation.

The manufacturing industry is undergoing a significant labor shift in tandem with its technology shift. As new roles come into high demand, others may fall by the wayside through the advancements afforded by technology. But a labor shift doesn't have to translate into labor lost.

Parsec Pointers

- Manufacturers have enormous opportunity to up- and reskill their staff. These workers possess invaluable institutional knowledge and should be encouraged to stay and contribute their talent. Rather than let go of staff whose responsibilities can be handled by advanced technology, leaders must teach them new skills. It will take time, resources, and iteration, but the rewards will be well worth the effort.

- Be proactive in team communications. Before anyone has the chance to feel left behind or replaced, leaders should communicate their determination to retain staff and improve efficiency through technology. The importance of empathy cannot be overstated here.

2024 State of Manufacturing Survey: North America

Top sustainability initiatives

41% ⇩
Carbon footprint reduction

40% ⇧
Sustainable materials sourcing

39% ⇧
Energy efficiency

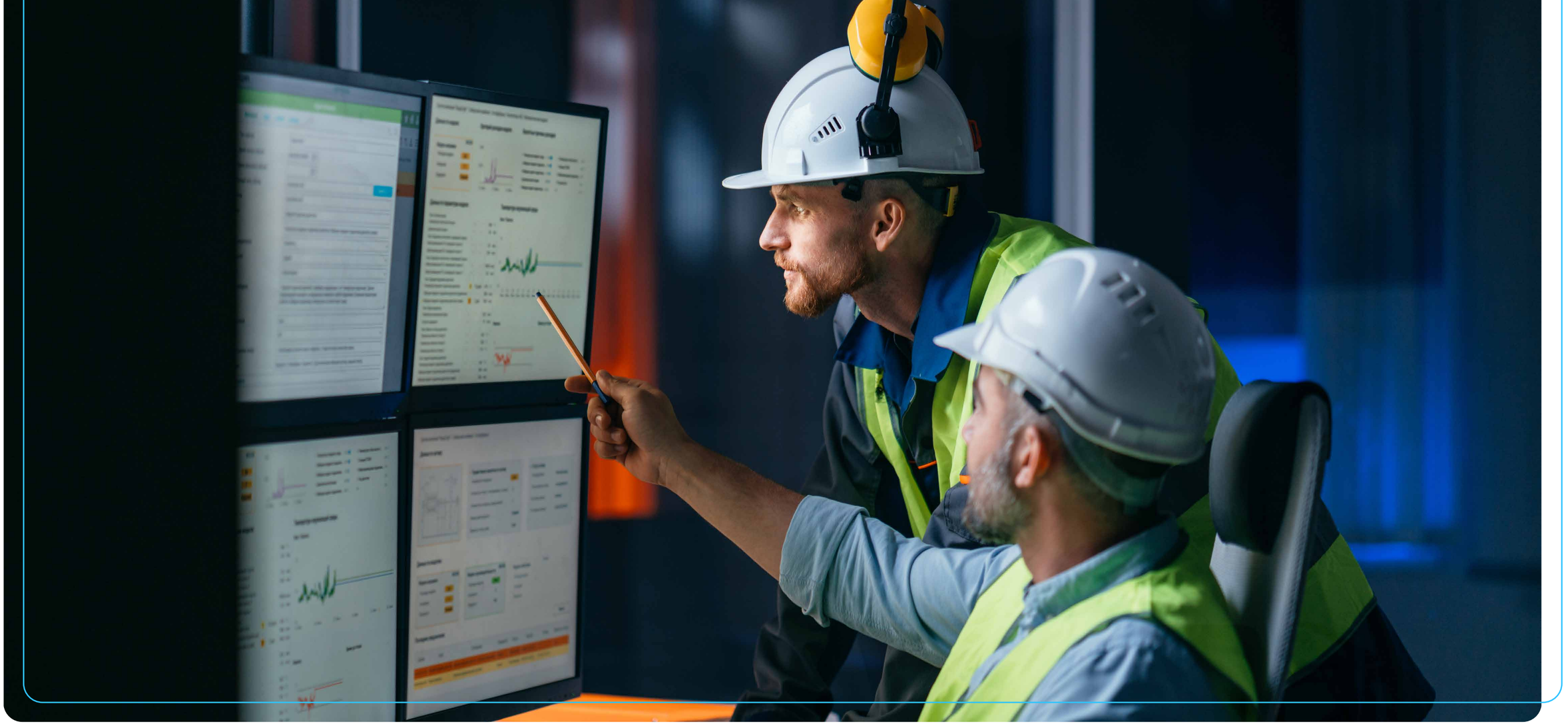
37% ⇩
Waste reduction

35% ⇧
Water conservation

92%
view sustainability initiatives **positively**

43%
view sustainability initiatives **very positively**

28%
of manufacturers implemented (or plan to implement) MES to improve sustainability



Digitalization Initiatives

Advanced technology can support manufacturers as they address challenges related to the supply chain, reshoring, and labor—but digital transformation is still very much a work in progress for the industry. To reach Industry 4.0, manufacturers must modernize non-digital processes, adopt automation to streamline workflows, and embrace data-driven operations with the help of AI. In this regard, it's clear there's still room for improvement.

Digitalization Initiatives

The digitalization process can be challenging for manufacturers as it requires reimagining workflows, training staff to use new tools, and thinking through a data-first lens. If handled well, teams will emerge on the other side of Industry 4.0 with more efficiency than ever before.

A poorly managed digitalization initiative, on the other hand, can result in team dissatisfaction and confusion. Just 32% of digitalization initiatives have been completed, and 50% are still in the implementation phase. Those who have undergone digitalization report positive results, with 83% rating their initiatives as “good” or “excellent,” up from 71% in 2023. But a closer look reveals a degree of nuance to these findings.

What is the state of your department’s digital transformation initiatives?

- **3%** We are researching options
- **15%** We have planned our digital transformation strategy
- **32%** We are in the early stages of implementation
- **18%** We are well into the implementation process
- **32%** We have completed implementation

Manufacturing vice presidents appear to have more positive sentiments about their results than those at the director level. The vast majority (91%) of VPs and above rate their facility's digitalization initiatives as "good" or "excellent," compared to just 76% of directors, suggesting that those farther from the operations may have rosier perspectives of these intense undertakings.

Different manufacturing sectors appear to have distinct digitalization experiences as well. More than 9 out of 10 (92%) of food & beverage manufacturers rate their department's digitalization initiatives as "good" or "excellent"— higher than any other sector. By contrast, just 61% of chemical manufacturers rated their initiatives as such.

Manufacturing sectors with "good" or "excellent" digitalization initiatives...

92% Food & beverage

90% Pharmaceutical

87% Automotive

86% Medical devices

86% Computer & electronics

83% CPG

61% Chemical manufacturing

Food & beverage manufacturers rate their department's digitalization initiatives ***higher than any other industry.***

2024 State of Manufacturing Survey: North America

Fully capitalizing on the value of digitalization requires data fluency, and manufacturers are making progress in this regard. More than half (56%) have a data-driven digital strategy in place, and 42% are currently implementing such strategies or plan to do so. More comprehensive than mere point solutions, data-driven strategies are required to attain the full benefits of AI and connected platforms like MES.

Parsec Pointers

- Keep your teams top of mind during the digitalization process. They are the backbone of any manufacturing organization and are often closest to the technology; they need ongoing support. Change management should be an evergreen priority.
- VPs should frequently check in with their reports during digitalization initiatives to learn about pain points and opportunities for improvement. They may not be aware of the tactical steps involved in these complex endeavors.

Does your company have a data driven digital strategy in place?

56%
Yes, we have this in place

42%
We are in the process of implementing/ planning on doing so

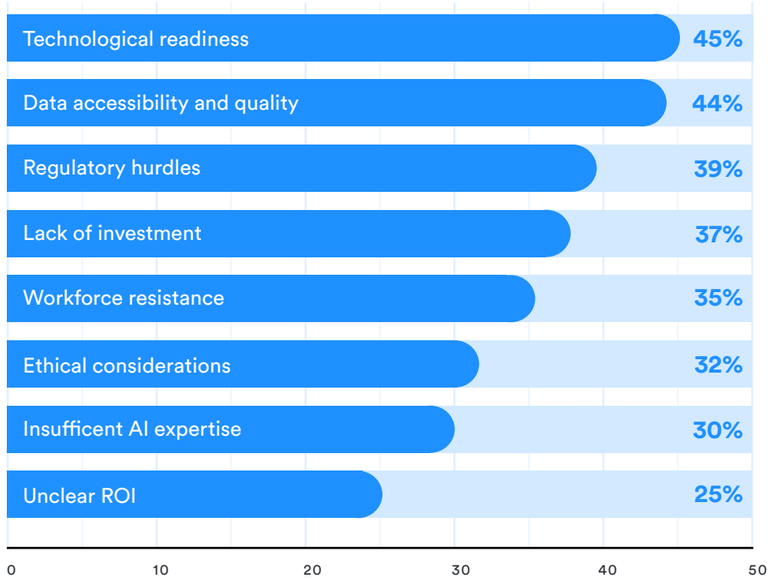
2%
No, and we have no plans for this

Artificial Intelligence

Artificial Intelligence (AI) has taken the world by storm since OpenAI debuted ChatGPT in November 2022. Tech enthusiasts and professionals quickly realized its potential to transform industries—and manufacturing is no exception.

Manufacturers are eager to reap the rewards of AI: optimized production processes (47%), accelerated product design and development (39%), enhanced supply chain optimization (38%), and improved problem-solving and decision-making (35%). Still, almost one-quarter (21%) of manufacturers are “not too” or “not at all” prepared for AI. Top barriers to implementation include tech readiness (45%), data accessibility (44%), insufficient expertise (30%), and unclear ROI (25%).

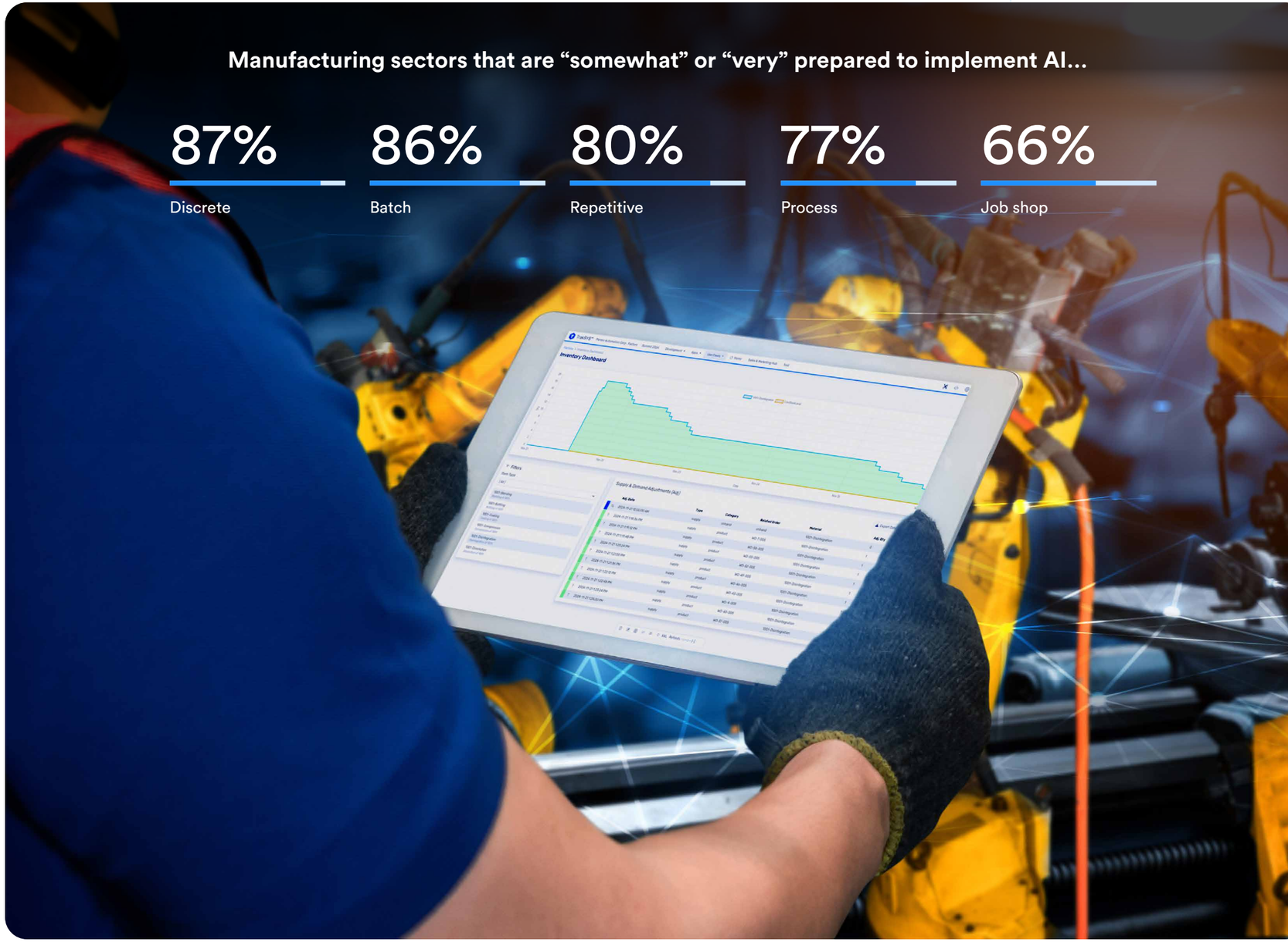
What are the biggest challenges facing your business in becoming AI ready?



When it comes to advanced technology, a measured approach can beget long-term success. Many of these barriers will need to be cleared to achieve digitalization. Even if they're not yet ready for AI, manufacturers need to ensure their facilities continue moving forward.

Despite AI's relative novelty to the industry, nearly 4 in 5 (79%) say they're "somewhat" or "very" prepared to implement the technology, including 87% of discrete manufacturers.

These results are surprising, given that just 56% report having a data-driven strategy in place. Leveraging AI comes with risks, and manufacturers know it. They cite data privacy and security vulnerabilities (48%), tech integration (39%), and intellectual property risks (37%) as top concerns. If they move forward with AI without a mature data-driven strategy in place, manufacturers could be setting themselves up for significant future challenges.



How prepared do you feel your organization is to adopt and leverage AI effectively?

15%	Very prepared
65%	Somewhat prepared
18%	Not too prepared
2%	Not at all prepared

Of those who haven't yet implemented AI, nearly half (44%) anticipate incorporating it into daily activities within 1–2 years, and 39% anticipate adoption within 3–4 years. As these manufacturers lay the groundwork for AI, they should ensure their facilities have the right data oversight and change management procedures in place.

Within the industry, there is a large range of tech readiness and enthusiasm. But manufacturers are nearly unanimous (with 97% agreement) in one key area: they say it's "somewhat" or "very" important for enterprise software solutions, like MES and ERPs, to have AI capabilities.

Parsec Pointers

When it comes to AI, don't put the cart before the horse. Before moving forward, make sure of the following:

- Your organization has a robust, informed, data-driven strategy in place.
- Your facility has a mature, digitalized framework that can withstand the additional pressure AI will introduce.
- Your teams are briefed and trained on the benefits, reasons, and objectives behind AI adoption.
- You've defined clear use cases and KPIs for all AI applications.

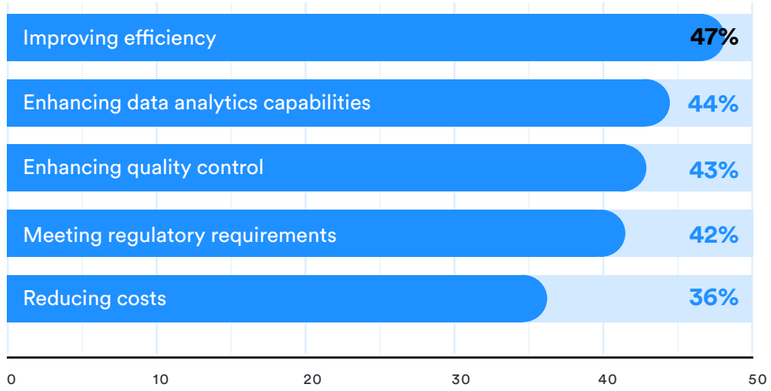
When do you anticipate your business will incorporate AI technology in daily activities?

Connected Platforms

Connected platforms help manufacturers synthesize and contextualize their data, helping inform future production with the benefit of historical insights. Two such platforms, MES and ERPs, are especially popular and powerful as they facilitate business planning and production optimization.

Overall, North American manufacturers highly value these technology solutions. More than half (51%) upgraded or adopted MES in the last year, and 85% did so with ERP. Reasons for upgrading/adopting included improving efficiency (47%), enhancing data analytics (44%), enhancing quality control (43%), meeting regulatory requirements (42%), and reducing costs (36%). The ROI of these technology investments is "good" or "excellent," according to 83% of new software adoptees—including 91% of medical device manufacturers.

What were the main drivers for adopting new technologies in your manufacturing processes?

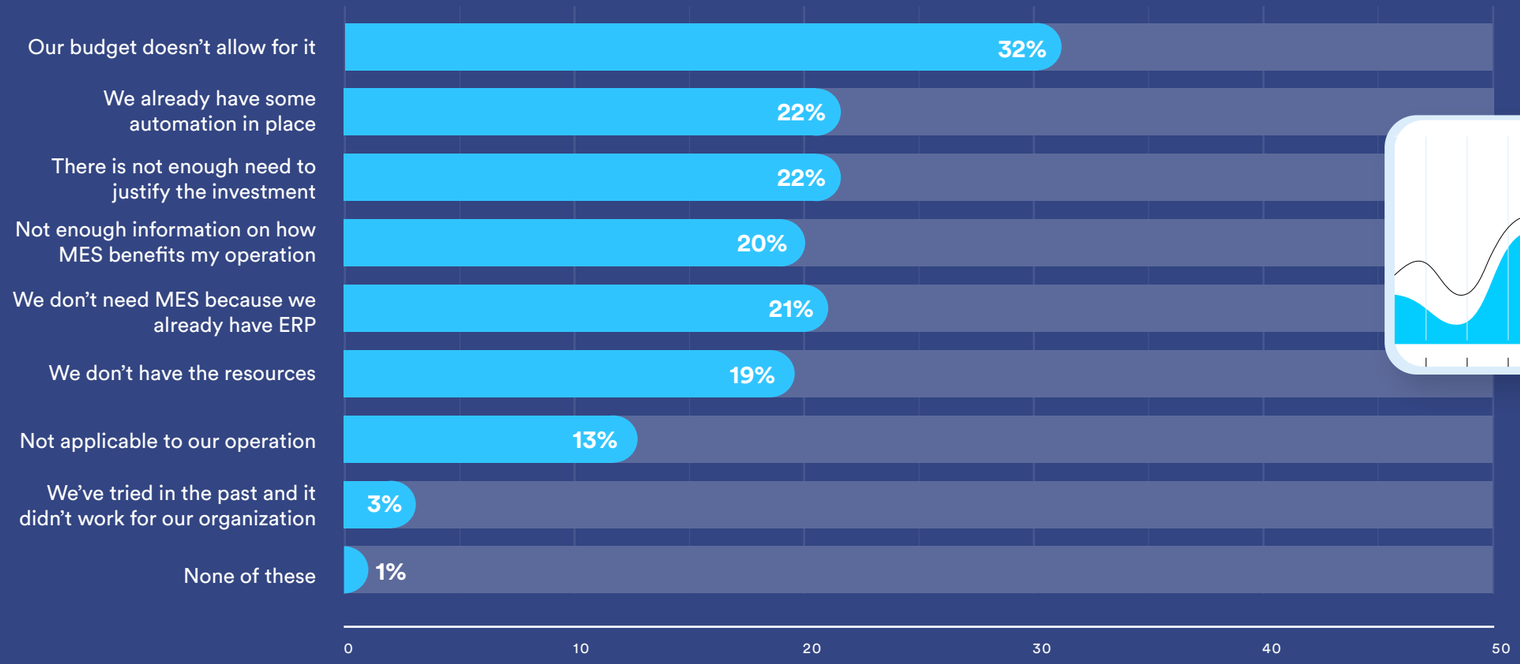


Manufacturers who rate the ROI of MES/ERP as "good" or "excellent," by sector...

Though the two software solutions offer complementary yet distinct advantages, many manufacturers still seem to view ERPs as alternatives to MES. The majority (87%) of manufacturers use an ERP, while just 49% use MES. What's more, one-quarter (25%) are not even considering implementing an MES. When asked why, they cited budgetary restrictions (32%), the presence of some automation (22%), insufficient need (22%), and the presence of an ERP (21%).

Of those who have an ERP but not an MES, 81% said they believed their ERP data to be sufficient. This reveals a clear knowledge gap among potential users, as the majority (88%) of manufacturers who have implemented MES are "very" or "completely" satisfied with their MES, including a whopping 95% of process manufacturers.

Why is your organization not currently using or considering implementing an MES?



Top motivators for MES implementation include supply chain resilience (43%), superior planning (42%), quality improvements (38%), maximized asset utilization (37%), and cost reduction (36%).

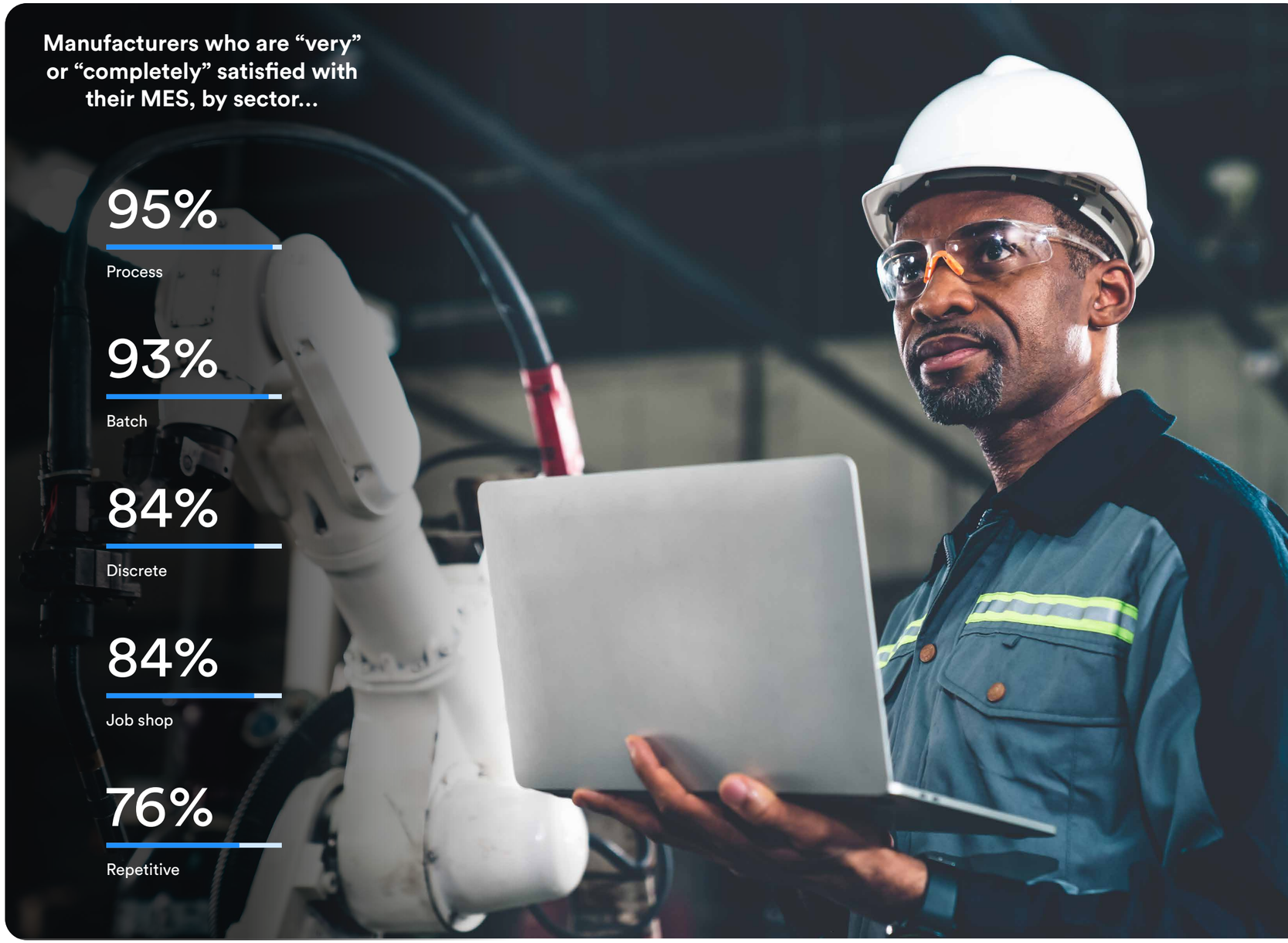
As individual solutions, MES and ERP are undeniably powerful. But together, they unlock the comprehensive efficiency and intelligence that facilities need to achieve true digitalization. Of those who have integrated both ERP and MES, 96% rate their experience as “good” or “excellent.”

Once users have both an ERP and MES in place, each solution’s unique benefits become clear—as does the importance of having both solutions. Nearly all (90%) are “very” or “completely” satisfied with the delineation of responsibilities of their ERP and MES. Top benefits of ERP/MES integration include improved supply chain visibility (43%), stronger regulatory compliance (42%), enhanced decision-making (41%), and improved data accuracy and consistency (40%).

How would you describe the experience of interfacing MES with your ERP system?

37%	Excellent	0%	Terrible
59%	Good	0%	Poor
4%	Fair		

Manufacturers who are “very” or “completely” satisfied with their MES, by sector...



Why did your organization implement, or why are you considering implementing, an MES for your operations?*

43%

Supply chain resilience

42%

Superior planning

38%

Improve quality

37%

Maximize asset utilization

36%

Cost reduction

34%

Improve ability to establish benchmarks and KPIs

33%

Competitive edge

32%

Improve efficiency

31%

Enterprise-wide visibility

28%

Improve sustainability

*3% of respondents selected none of these

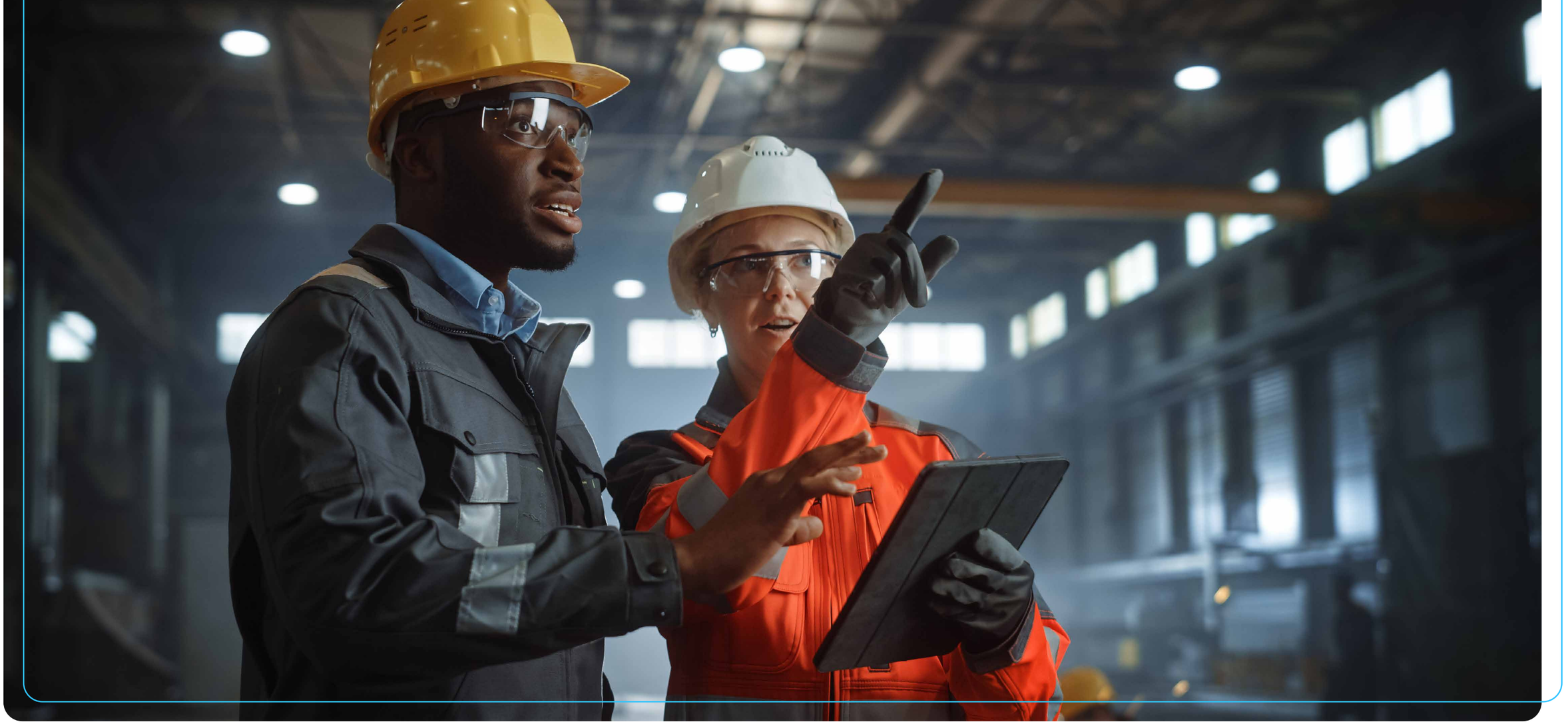
As individual solutions, ***MES and ERP are undeniably powerful.*** *But together, they unlock the comprehensive efficiency and intelligence that facilities need to achieve true digitalization.*

Which of the following benefits have you found in integrating your MES with your ERP?

- **37%** Greater flexibility and adaptability
- **40%** Improved data accuracy
- **43%** Improved supply chain visibility
- **38%** Increased customer satisfaction
- **42%** Stronger regulatory compliance
- **37%** increased operational efficiency
- **41%** Enhanced decision-making
- **33%** Enhanced financial performance

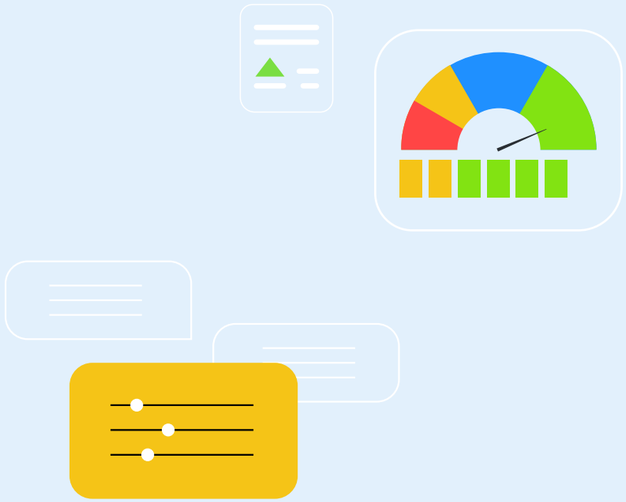
Parsec Pointers

The combination of ERP and MES can deliver comprehensive benefits to a manufacturing facility; one solution is not a replacement for the other. To achieve true digitalization and automation, manufacturing leaders should consider implementing both solutions throughout their facility.



Conclusion

Conclusion



As advanced technology matures and customers adjust their expectations, manufacturers must lean in and address the questions they've been grappling with: should they stick with what they know and hope it's enough to meet continued success? Or should they embrace this new, efficient, tech-forward framework and leave behind some of their tried-and-true practices? What are the risks? What are the rewards?

Disruption is now part and parcel of the supply chain, and manufacturers risk continuity and reliability if they don't do everything to shore up their operations ahead of time. Contingency plans, partners, and materials must be mapped out long before they're needed. To build trust, manufacturers must communicate proactively and transparently with customers and suppliers. Advanced technology gives facilities the end-to-end visibility they need to monitor their supply chains, identify potential weaknesses, and bolster their resilience.

Re- and nearshoring can help manufacturers reduce—but not eliminate—the risks concomitant to global cargo distribution. In some cases, moving production closer to home will come with some concessions, like forgoing relatively inexpensive labor and looser restrictions. But these losses are well worth the gains. Reshoring stimulates local economies and creates demand for highly skilled workers, which manufacturers need now more than ever. It also boosts reputational capital, making facilities more appealing not only to potential business partners but to prospective employees.

Many manufacturing workers have expressed concern about being "replaced" by AI. It is true that some workers' duties can now be performed faster and more reliably by advanced technology, and leaders do their facilities a disservice by avoiding this truth. In the short term, deliberately eschewing production optimization may seem like an effective way to nurture employee trust, but in the long term, it can easily backfire through lost business, delayed digitalization, and employee attrition. Refusing to adapt and advance is not an appealing characteristic of manufacturing leadership. Instead, leaders must demonstrate their forward thinking by reskilling their loyal employees and embracing the advanced technology that can make their facility a better place to work.

The age of digitalized manufacturing is here, and some facilities have capitalized on the opportunity. These early adopters have embraced automation, AI, the Industrial Internet of Things (IIoT), and connected platforms like MES and ERP. Their facilities are more efficient than ever before; their teams have learned to work with advanced technology; their customers have never been happier. But not all manufacturers are there yet. Many facilities are still just grasping toward Industry 4.0, whether through a reluctance to take the perceived risk or an inability to allocate the necessary resources. The facilities that do not evolve will fall behind those that do.

But even riskier than a slow evolution is a rushed one. Advanced technology must be preceded by a sound, data-driven strategy and a careful roll-out to all teams and stakeholders. If implemented haphazardly, tools like AI can wreak havoc on a facility's security, operations, team, and business continuity. A methodical approach is a responsible one, and a philosophy of incremental improvement will lead manufacturers to the rewards of digitalization while minimizing the risks.

While the industry is in this liminal period, manufacturers who opt for stagnation may be able to delay the ramifications for a time. But ultimately, the risks of not pursuing digitalization will be impossible to avoid. Advanced technology is here to stay, and it has been designed to make manufacturers' lives easier. The direct rewards of digitalization—including optimized production, data proficiency, and augmented team intelligence—are almost too numerous to count, but perhaps most valuable is the philosophy of continuous improvement that such an undertaking creates as a byproduct.

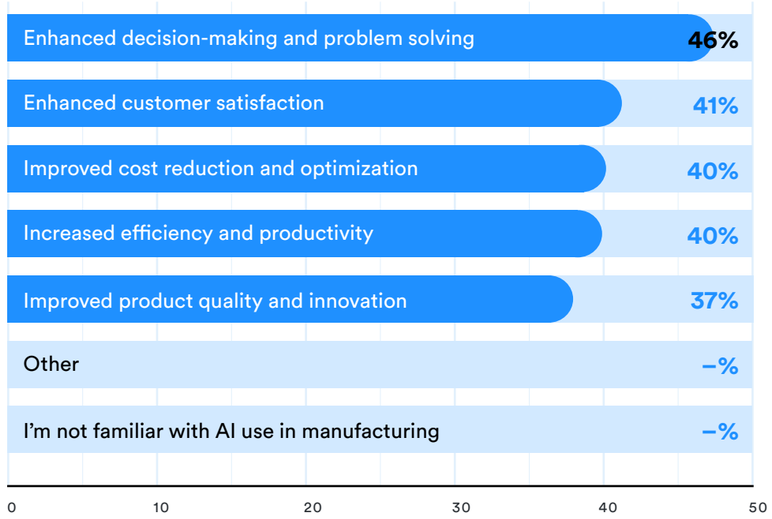
Continuous improvement means pursuing any avenue for marginal efficiency; it means learning for the sake of learning; it means embracing curiosity; it means being willing to take a risk. To achieve true staying power, manufacturing leaders must look beyond one specific destination and revel in the journey itself. Those who embody this philosophy will propel their teams not just to Industry 4.0 but to the wild blue yonder beyond.

Research Methodology

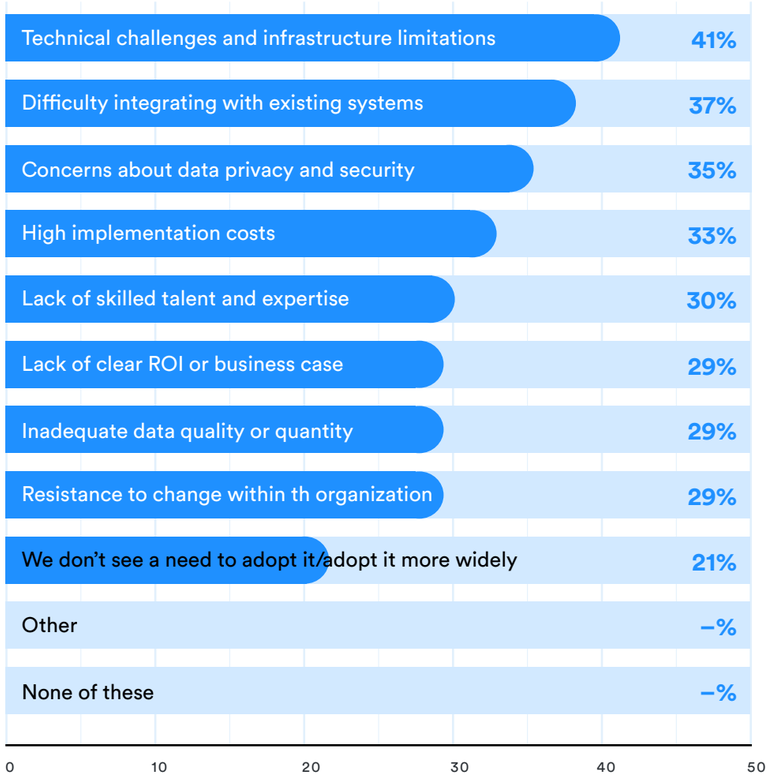
The Parsec Automation Survey was conducted in partnership with Wakefield Research (www.wakefieldresearch.com) among 600 North American manufacturing professionals with a minimum seniority of director between September 5 and September 15, 2024, using an email invitation and an online survey. Respondents worked in any of the following roles: engineering, executive leadership, finance/accounting, information technology, logistics/transport, maintenance management, manufacturing operations, product development, procurement, quality management, warehouse management.

Appendix

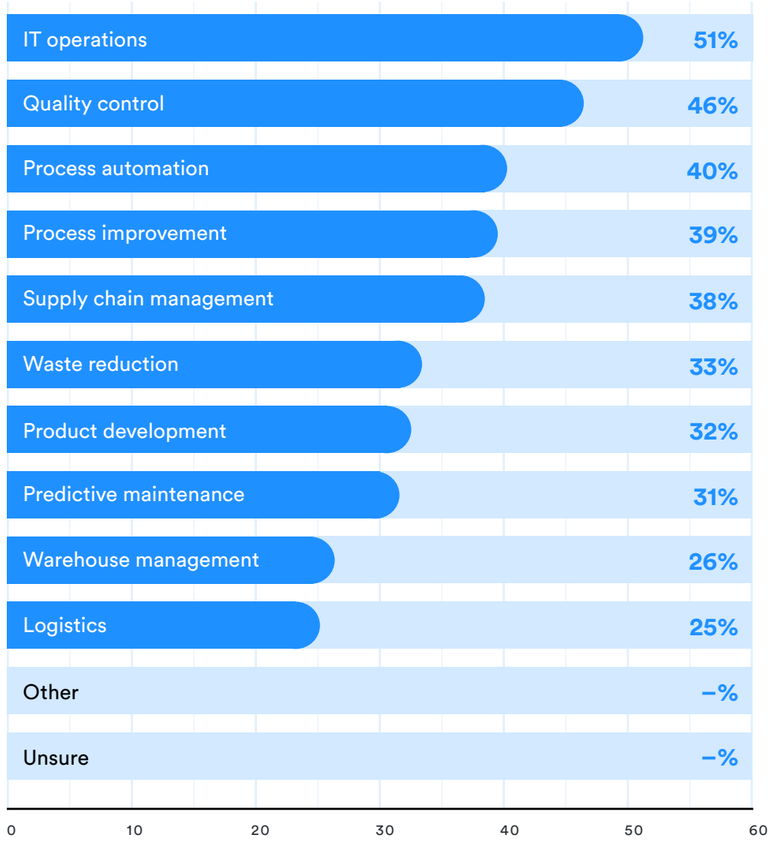
What are the benefits of implementing Artificial Intelligence (AI) in manufacturing?



Which of the following barriers are preventing or would prevent your organization from wider adoption of AI?



In which of the following manufacturing business functions have you seen or do you anticipate seeing AI have the most impact?



To what extent has your organization adopted AI technologies?

32% We've fully adopted AI and have extensive implementation across departments

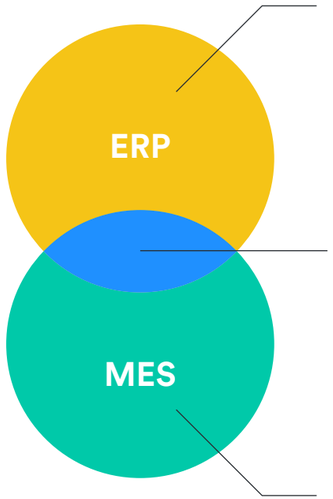
25% We've adopted AI across some departments, but haven't completed our plan

36% We are just beginning adoption and have pilot projects underway

7% We haven't adopted AI technologies, but are exploring potential

1% We have no plans to adopt AI at this time

ERP vs. MES integration



- Integrates enterprise-level data from departments like manufacturing, finance, HR, and more
- Connects to broad business systems like payroll and accounts receivable
- Collects data in real time

- Improved quality and traceability
- Optimized resource utilization
- Enhanced visibility and context
- More accurate demand forecasting

- Integrates data at the production level related to machinery, processes, inventory, order fulfillment, and more
- Connects to shop-floor machinery via smart devices and IIoT
- Analyzes performance in real time

PARSEC™

At Parsec, we're driven by a clear mission: making the management of complex manufacturing operations as simple as possible. To accomplish this, we've leveraged our 30+ years of manufacturing software development experience to create TrakSYS, a best-in-class operations management software platform deployed at thousands of factories across 140+ countries.

TrakSYS is designed to provide actionable intelligence that helps manufacturers reduce production costs, optimize resources, improve quality, and increase profitability. From improving operational efficiency to enhancing regulatory compliance, TrakSYS transforms data into a strategic advantage, enabling facilities to thrive in the digital era. With TrakSYS, manufacturers can confidently adapt to change, embrace innovation, and achieve lasting success. Together, we're shaping the future of manufacturing.

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