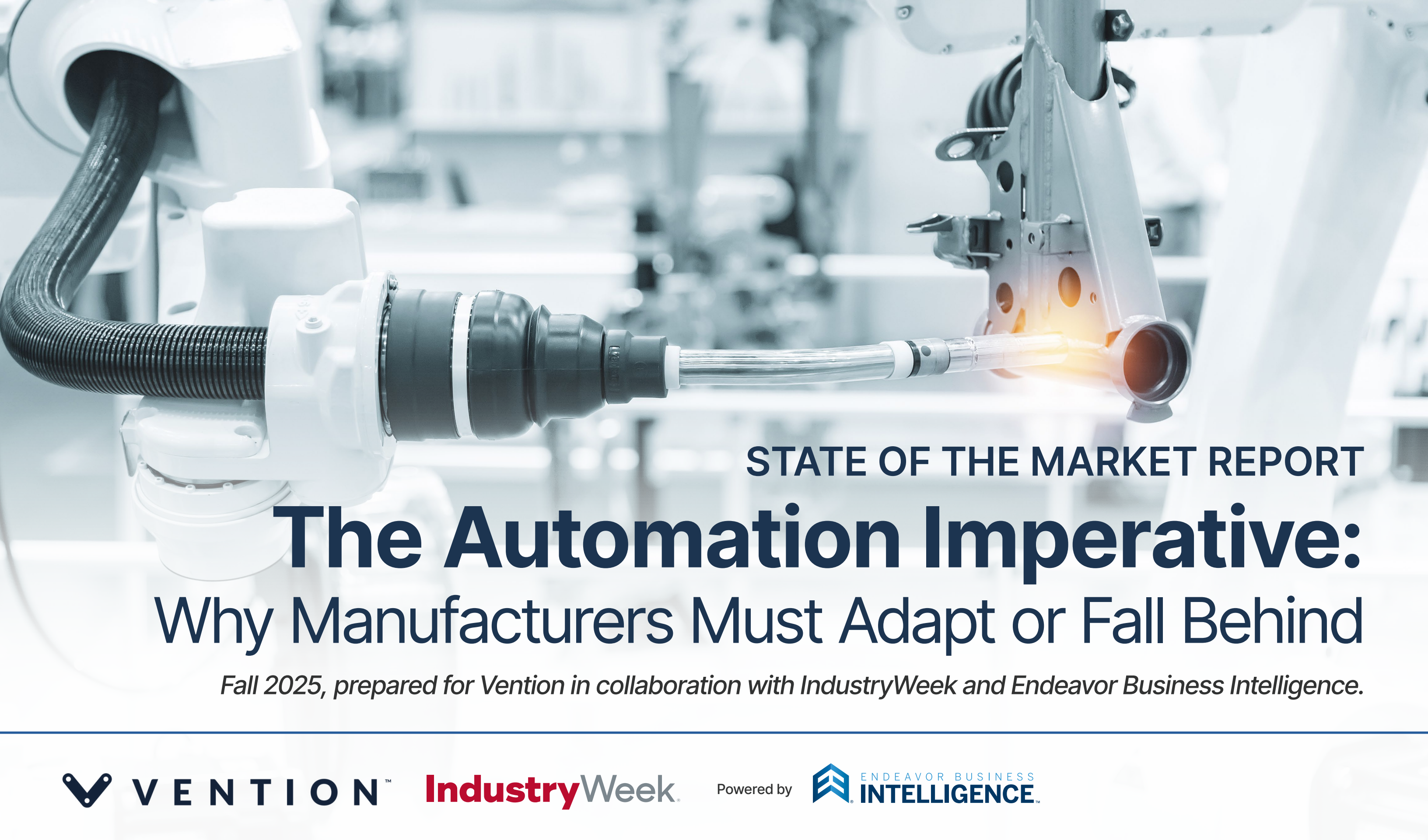




STATE OF THE MARKET REPORT

The Automation Imperative: Why Manufacturers Must Adapt or Fall Behind

Fall 2025, prepared for Vention in collaboration with IndustryWeek and Endeavor Business Intelligence.



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The Automation Imperative: Why Manufacturers Must Adapt or Fall Behind

TABLE OF CONTENTS

I. Executive Summary	3
II. Introduction	4
III. Who Responded: A Glimpse into the Manufacturing Sector	5
IV. Biggest Challenges: Navigating the Headwinds	6
V. State of Performance: Meeting Projections	6
VI. Experience with Automation: Adoption, Impact, and Future Growth	7
VII. Lessons Learned: Optimizing Automation Success	10
VIII. Conclusion	13



I. EXECUTIVE SUMMARY

Automation is now an indispensable pillar of modern manufacturing, with a resounding 92% of the manufacturers surveyed calling it critical for long-term competitiveness. Despite this consensus, the U.S. lags in implementation, with only 37% of facilities reporting significant or full automation – highlighting a competitive gap in global robot density at a critical moment of need. Manufacturers call the lack of skilled workers their No. 1 internal challenge (49%) and No. 2 external challenge (54%), further underscoring the urgent need for automation.

At the core of the automation gap, manufacturers cite complications with the process or journey of adoption as a key barrier. Top challenges include a persistent lack of internal expertise (50% in planning), difficulties integrating new systems (49%), managing project expectations, and finding a systems integrator.



"46% of manufacturers plan to invest in robotics and automation within the next 24 months."

In addition to onboarding challenges, there are also underlying customer satisfaction issues. Fewer than half (48%) of respondents were "completely" satisfied with their most recent project with a significant portion reporting systems didn't perform as expected (33%), budget overruns (32%) or supply chain delays (27%).

Despite implementation challenges, most projects ultimately deliver meaningful gains. Almost eighty percent of respondents report satisfactory outcomes, most often improved product quality (52%), higher throughput (50%), and reduced operating costs (48%).

That payoff is fueling continued investment: 46% of manufacturers plan to invest in robotics and automation within the next 24 months. This momentum underscores automation's critical role in overcoming workforce shortages and unlocking operational gains. Put simply, automation has become a strategic imperative. But traditional approaches to planning and integration are falling short—too slow, too fragmented, too complex. A faster, smarter path forward is now essential.

II. INTRODUCTION

The manufacturing landscape is undergoing a profound transformation, driven by global competition, complex supply chains, and persistent workforce challenges. In this dynamic environment, manufacturers seek innovative solutions to maintain competitiveness, enhance productivity, and ensure long-term viability. Survey data confirms that automation is becoming central to this shift, reshaping efficiency, quality, and adaptability across the sector.

This report provides a data-driven analysis of automation's impact, implementation challenges, and future trajectory within the manufacturing sector. Drawing insights from a comprehensive survey, we explore what drives successful automation projects and what hinders their full potential.

The core thesis of this report is clear: Automation is undeniably critical for long-term competitiveness, with 92% of manufacturers viewing it as essential to invest. The commitment is strong—73% of companies are planning to increase investments in the next three years, with nearly half (46%) specifically targeting robotics and automation. However, a significant proportion of manufacturing automation projects frequently fall short of initial expectations. Specifically, 33% of projects do not perform as expected, and 32% go over budget, 31% noted delays in delivery and installation, 10% noted

longer timelines and more work than expected, leading to dissatisfaction among manufacturers. This gap between commitment and execution disproportionately affects small and medium-sized enterprises (SMEs), further exacerbating the United States' relatively low robot density ranking — the U.S. ranks 10th worldwide, according to the International Federation of Robotics — and impeding its global manufacturing competitiveness.

The data strongly suggests that traditional approaches to automation planning, and integration are often protracted, overly complicated, and fail to hit the mark. This highlights an urgent and crucial need for a new, streamlined approach to planning and integrating automation to ensure projects better meet expectations, are delivered more quickly, and yield superior results.

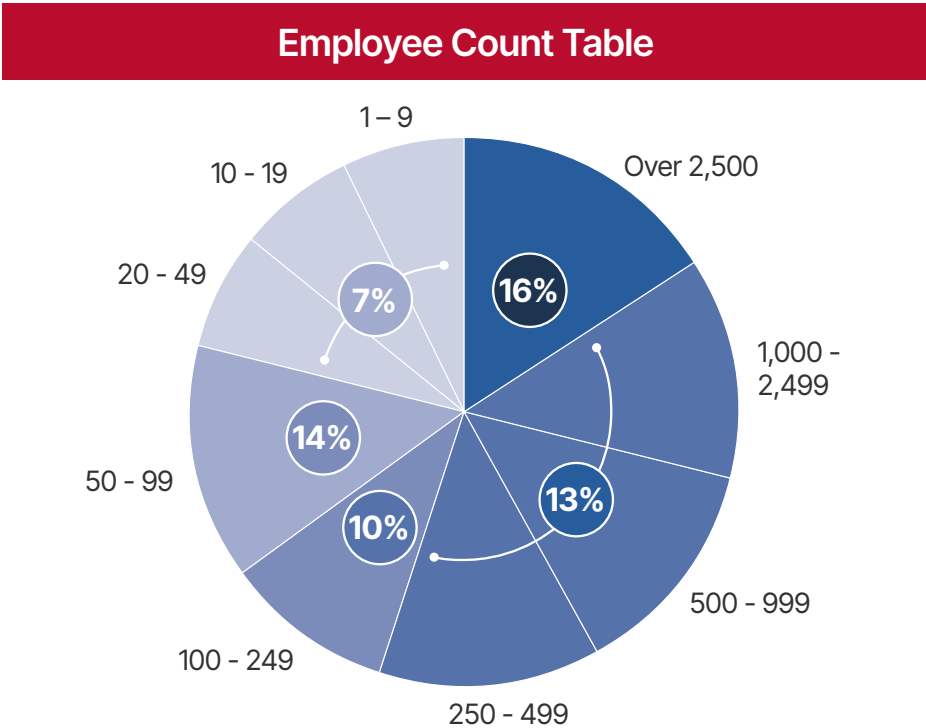


III. WHO RESPONDED: A GLIMPSE INTO THE MANUFACTURING SECTOR

This report’s insights are drawn from a diverse cross-section of the manufacturing industry, capturing perspectives from executives, managers, and operations leaders across industries and company sizes.

Respondent Demographics:

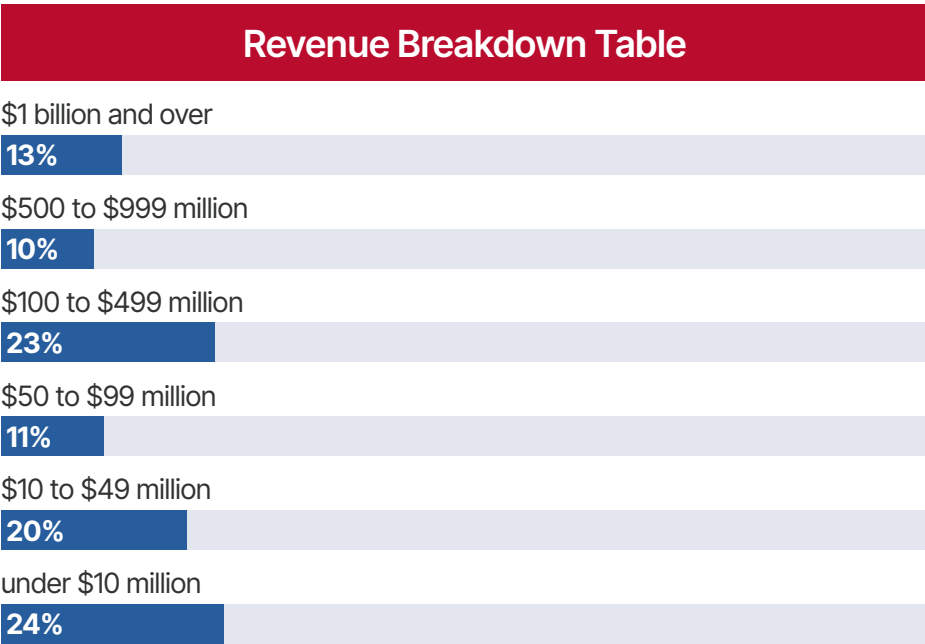
The survey captured perspectives from key decision-makers and operational leaders. Managerial and executive levels were strongly represented (32% Manager & Senior, 29% Corporate & Executive Management), indicating widespread strategic involvement in automation. Operational insights came from 18% in Operations Management, with CEOs (13%)



and Manufacturing Engineering (11%) providing additional top-level and technical views.

Primary Product/Industry:

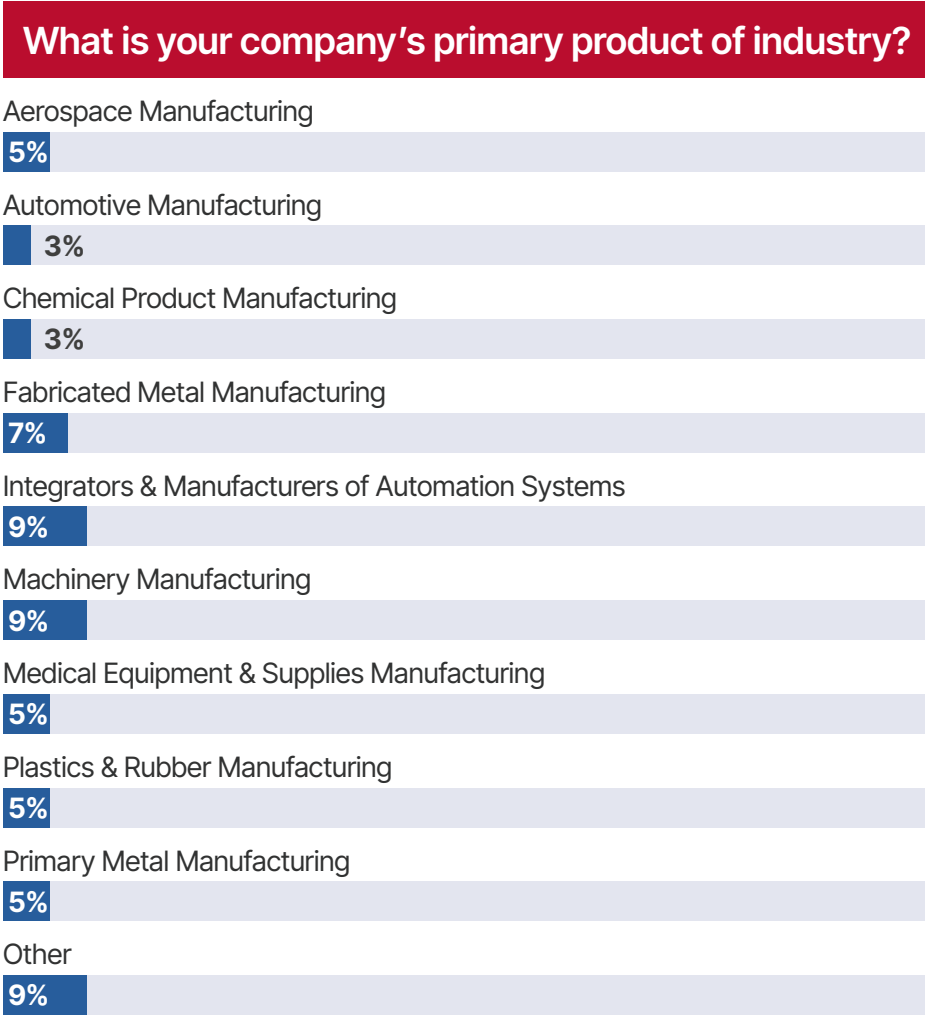
The broad applicability of automation is evident in the diverse industries represented. The largest segments included Computers & Electronics (14%), Machinery Manufacturing (9%), Integrators & Manufacturers of Automation Systems (9%), and Fabricated Metal Manufacturing (7%). Additional participation from Medical Equipment & Supplies Manufacturing (5%), Plastics & Rubber Manufacturing (5%), Aerospace Manufacturing (5%), and Primary Metal Manufacturing (5%) further highlights automation’s growing impact across a wide range of manufacturing sectors.



Company Firmographics:

Participating companies varied significantly in size and annual revenue. Employee counts ranged from over 2,500 people (16%) to 50-99 employees (14%). Revenue distribution was equally broad, with 24% under \$10 million and 23% between \$100 million to \$499 million, reinforcing the relevance of the survey’s insights across different scales.

All respondents; n=214



IV. BIGGEST CHALLENGES: NAVIGATING THE HEADWINDS

Manufacturers face a complex array of external and internal challenges that can impede growth and automation adoption.

External Challenges:

Among external headwinds, tariffs and shifting government policies (59%) rank as the most significant concern, with workforce availability a close second (54%). In contrast, access to capital is less frequently cited as a barrier, suggesting that policy uncertainty and labor shortages—not financing—pose the greater threat to competitiveness.

Internal Challenges:

The most pressing internal issue is the lack of a properly trained/skilled workforce, cited by 49% of respondents. This directly impacts the ability to plan, implement, and operate automation technologies, underscoring the inherent need for automation to bridge labor shortages. Other significant internal challenges included eroding margins (40%) and aging equipment (39%). Encouragingly, leadership complacency (43%), culture (42%), and lack of strategy (42%) were not seen as major barriers—signaling that many organizations are ready for change if the right solutions are available.

V. STATE OF PERFORMANCE: MEETING PROJECTIONS

Despite the challenges, surveyed manufacturers largely maintain stable organizational performance. Nearly two-thirds are performing in line with projections, indicating consistent operations. A promising 23% are performing above projections, suggesting robust growth and successful strategic execution. This positive outlook provides a fertile ground for further automation investments.

23% of manufacturers are performing above projections, suggesting robust growth and successful strategic execution.

49% cite lack of properly trained/skilled workforce as their #1 internal challenge—underscoring the urgent need for automation.

Nearly two-thirds of manufacturers are performing in line with projections, maintaining stable organizational performance despite external headwinds.

VI. EXPERIENCE WITH AUTOMATION: ADOPTION, IMPACT, AND FUTURE GROWTH

The survey data details automation adoption, its impacts, and future investment plans.

Adoption Remains Limited:

Only 7% of facilities are fully automated, and 30% report significant automation. This combined 37% highlights a critical competitive gap for the U.S. manufacturing sector compared to other leading industrialized nations, as indicated by international robot density reports. While adoption is limited, the results show respondents agree automation is key. The low adoption rate signifies substantial untapped potential for increased efficiency and competitiveness.

Key Areas of Implementation:

Automation is strategically implemented in material handling (48%), quality control (42%), and machining (40%), pointing to core operational enhancements. By contrast, welding (14%) was the least implemented, suggesting future expansion opportunities.

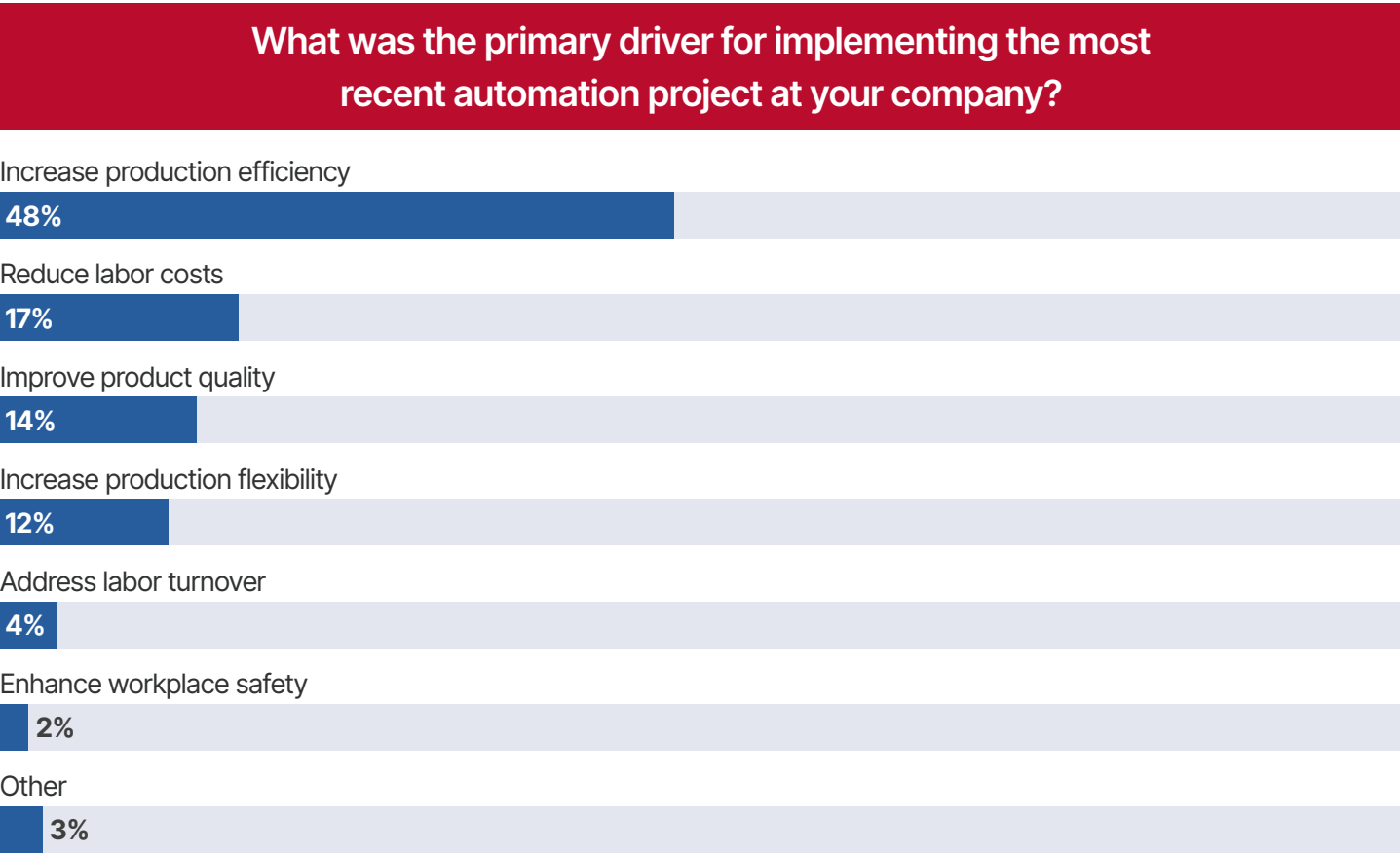


Implemented Automation:

Technologies: Industrial control systems (50%), conveyance systems (45%), and machine vision systems (45%) are widely adopted. Automated guided vehicles (14%) remain less common, indicating growth potential.

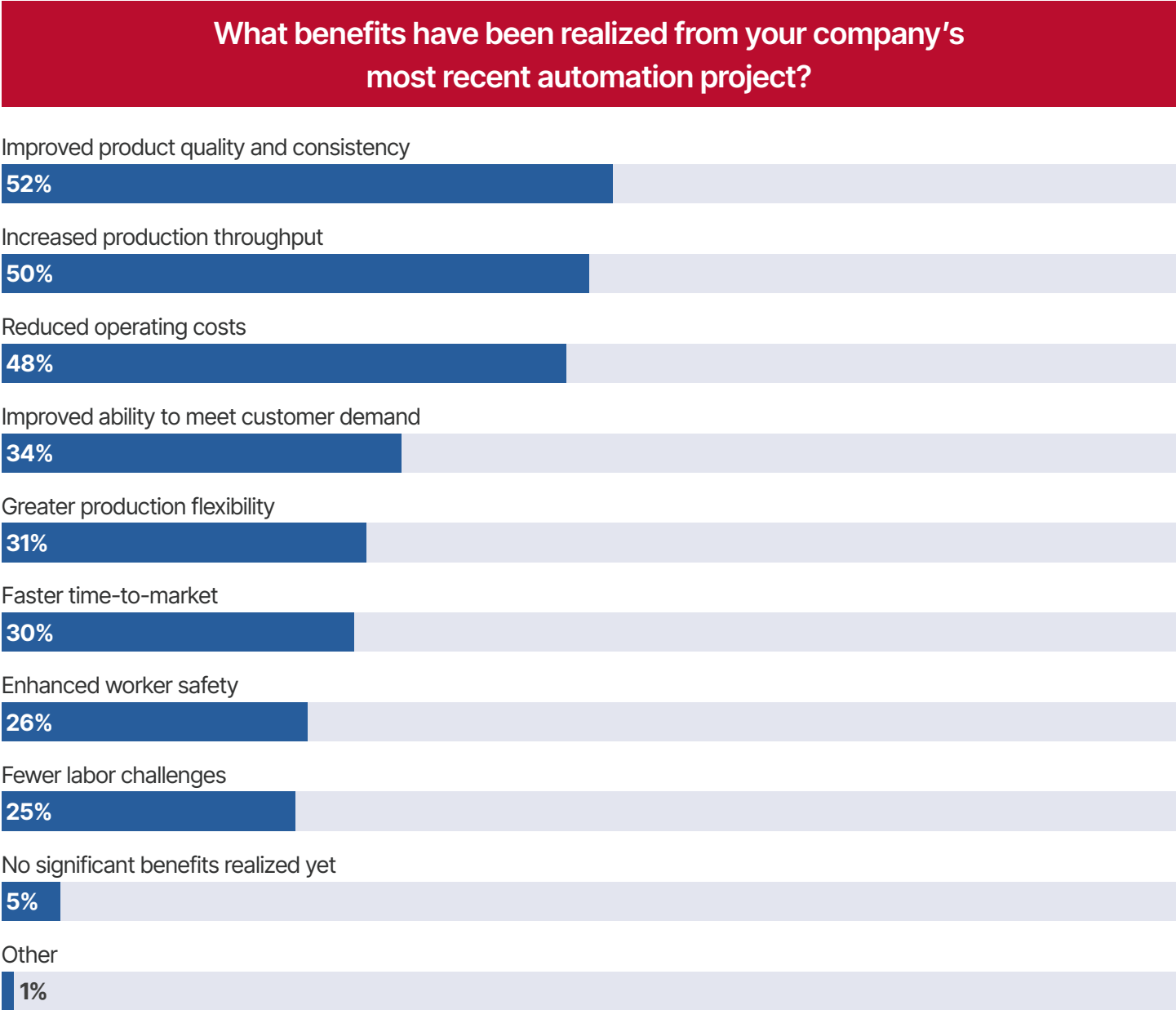
Drivers for Automation Implementation:

Primary motivations are operational efficiency, with 48% citing increased production efficiency as their main driver. Reducing labor costs (17%) and improving product quality (14%) also underscore automation’s multifaceted benefits.



All respondents; n=214

Tangible Benefits of Automation:



All respondents; n=214
Average number of responses given=3

These benefits demonstrate automation's profound positive impact on a manufacturing organization's bottom line, operational excellence, and strategic capabilities.

Automation Project Performance and Satisfaction:

Overall, manufacturers report high satisfaction with outcomes: 77% of projects always or usually meet expectations, and 78% are satisfied with their most recent project's outcomes. This high satisfaction with *outcomes* contrasts with challenges faced during *implementation*, highlighting automation's long-term value.



What overall strategic investments are you planning in the next 24 months?

Manufacturing equipment

61%

Employee training and education

55%

Robotics / automation

46%

Artificial intelligence

45%

Infrastructure

39%

Safety equipment / processes

38%

Workforce recruitment

38%

ERP or other back-office system

26%

Organizational intelligence / IoT

26%

Culture and employee engagement / retention

24%

Organization development and marketing initiatives

23%

Customer resource management (CRM)

22%

Key executive / leadership roles

22%

Human capital management (HCM) technology solutions

15%

Augmented reality / virtual reality

10%

Don't know / Not sure

2%

All respondents; n=214
Average number of responses given=5

Future Automation Investments & Goals:

Commitment to automation is accelerating, with 73% of respondents anticipating increased investments in the next 1-3 years. Specifically, 46% plan to invest in robotics and automation within the next 24 months. Goals for these investments include further increasing efficiency (64%), reducing labor challenges (46%), and expanding automation to new areas (46%).

These investments are a direct response to persistent internal and external challenges. The biggest external challenge cited by three-in-five respondents (59%) is tariffs and government policies. Write-in comments further elaborate on this, with respondents expressing concern over government policy inconsistencies, uncertainty about tariffs,

and their impact on profitability. The most significant internal challenge is the lack of a properly trained and skilled workforce, cited by half of the respondents (49%). Other internal challenges include eroding margins (40%) and aging equipment (39%).

Company-Wide Strategic Investments:

Automation is part of a broader wave of strategic investments. Manufacturers are directing resources toward new equipment (61%), employee training and education (55%), robotics and automation (46%), and artificial intelligence (45%). Together, these priorities reflect a recognition that technology, infrastructure, and human capital must advance in tandem for automation to succeed.

VII. LESSONS LEARNED: OPTIMIZING AUTOMATION SUCCESS

While automation offers significant long-term benefits, implementation often presents challenges. Understanding these lessons is crucial for future success.

Factors Contributing to Project Satisfaction:

Success often stems from automation’s ability to “solve the original problem with minimal ongoing maintenance,” delivering “consistent, measurable results,” and exhibiting “reliability” and “consistent performance and reduced human error.” Many respondents simply stated, “It worked.” Success metrics included “time saving and reliability gains in daily workflows,” leading to “increased efficiency dramatically” and “freeing up more time for additional work.” Meeting financial and operational goals, with projects “delivered on time and meeting ROI

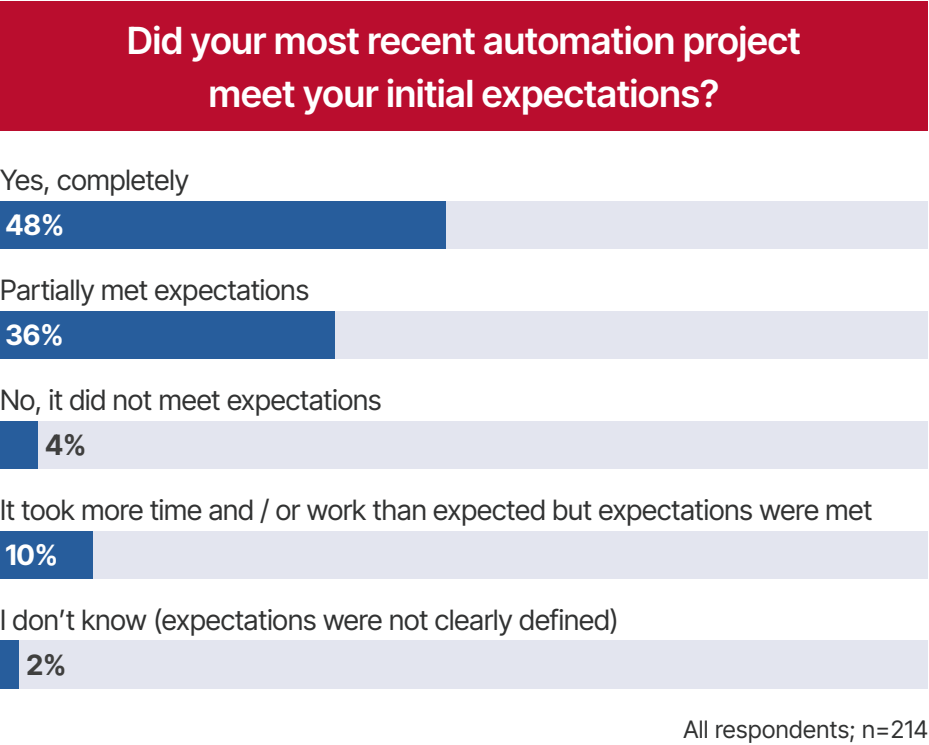
77% of automation projects always or usually meet expectations, with 78% of manufacturers satisfied with their most recent project’s outcomes.

and expectations,” was paramount. Improved product quality and consistency were also frequently cited. To yield successful results, respondents indicated that planning and clear communication were crucial, with one respondent highlighting “having clear, well-defined goals from the start.” Projects where “everything actually went as projected” were “incredible.” Finally, “ease of use & integration” were highly valued, contributing to smoother adoption.

Success stems from automation’s ability to deliver ‘consistent, measurable results’ and ‘solve the original problem with minimal ongoing maintenance.’

Automation Project Expectations:

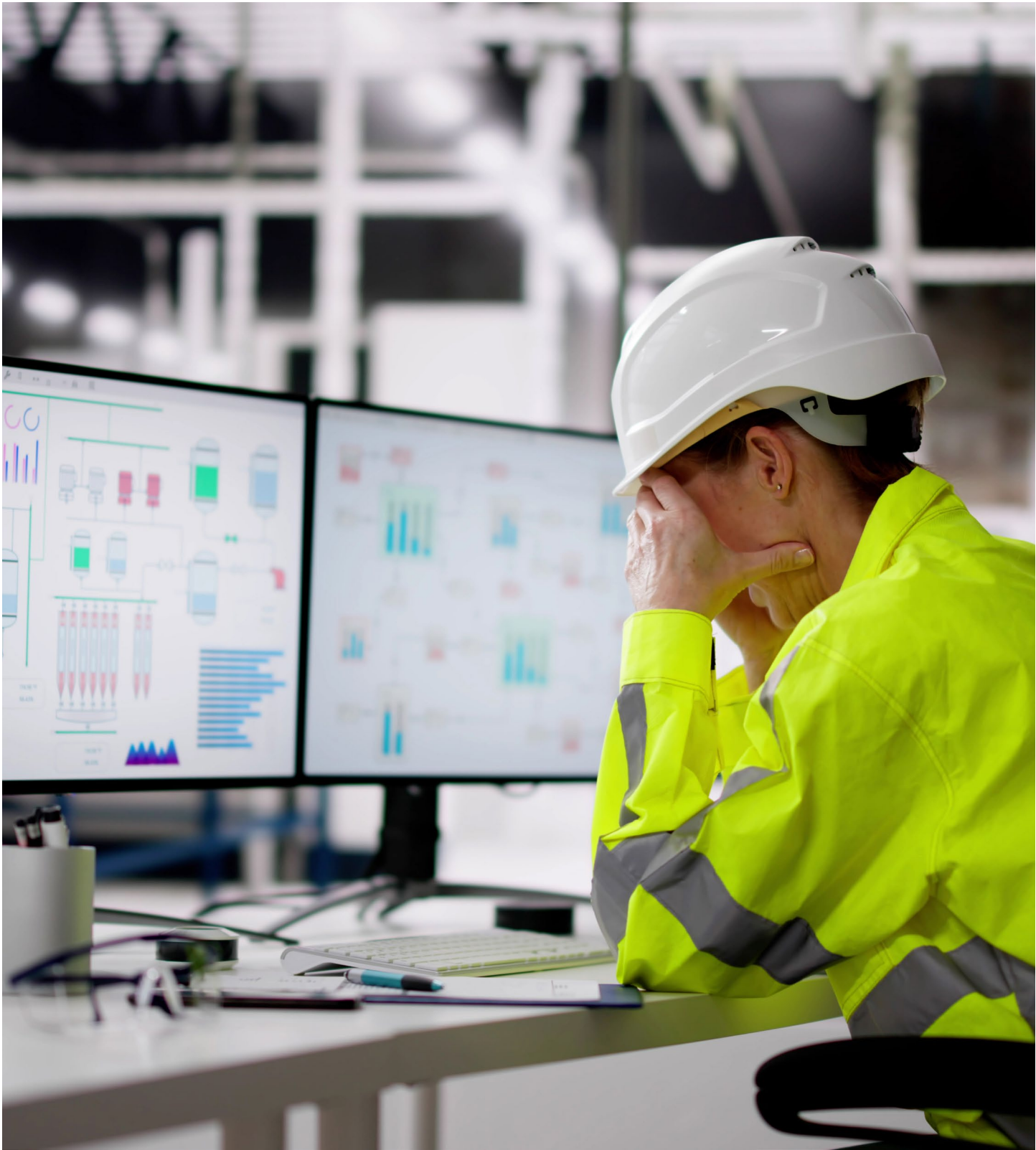
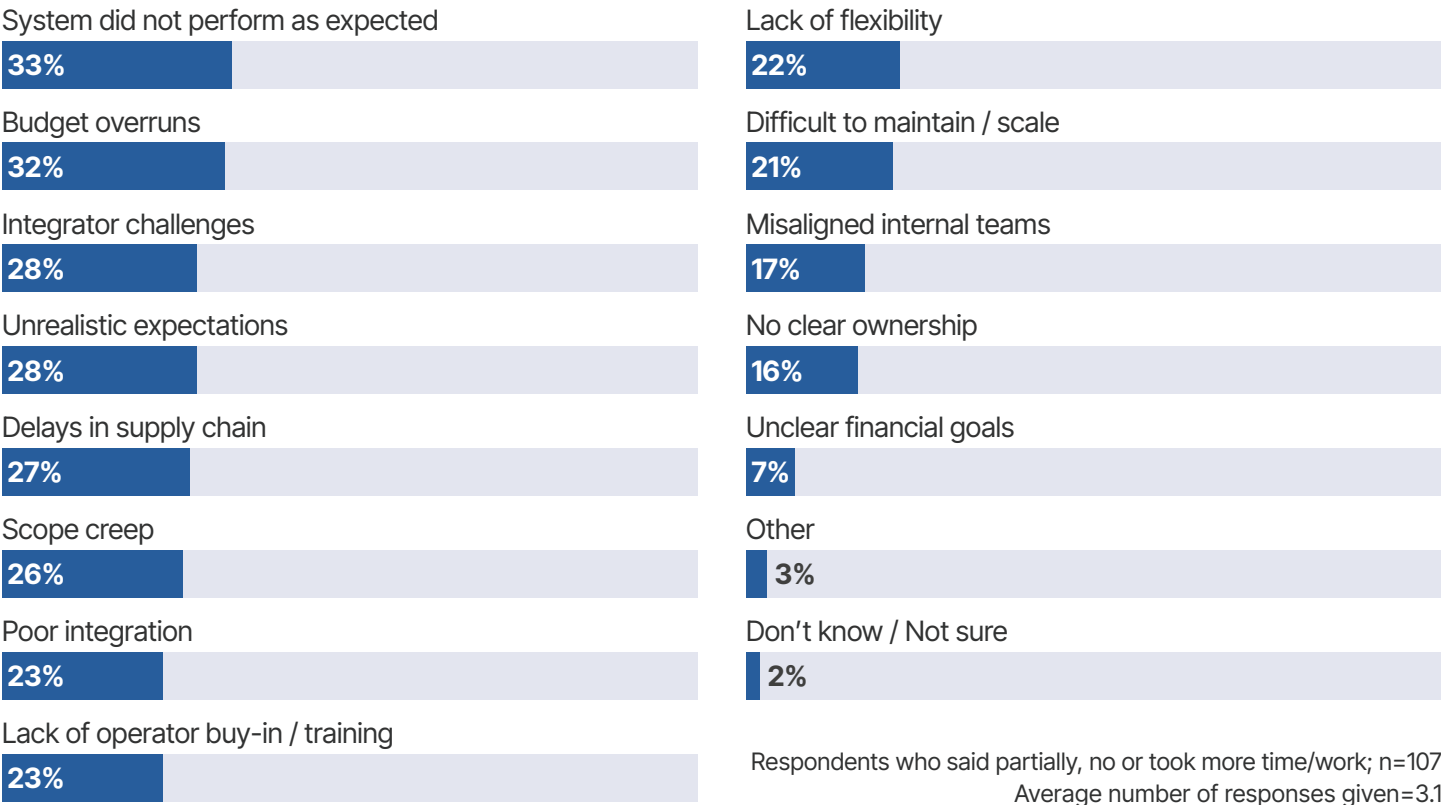
While 77% of projects generally meet expectations, only 48% of recent projects met initial expectations “completely”, indicating a gap between initial aspirations and final outcomes that ultimately balloon total project costs.



Reasons for Projects Not Fully Meeting Expectations:

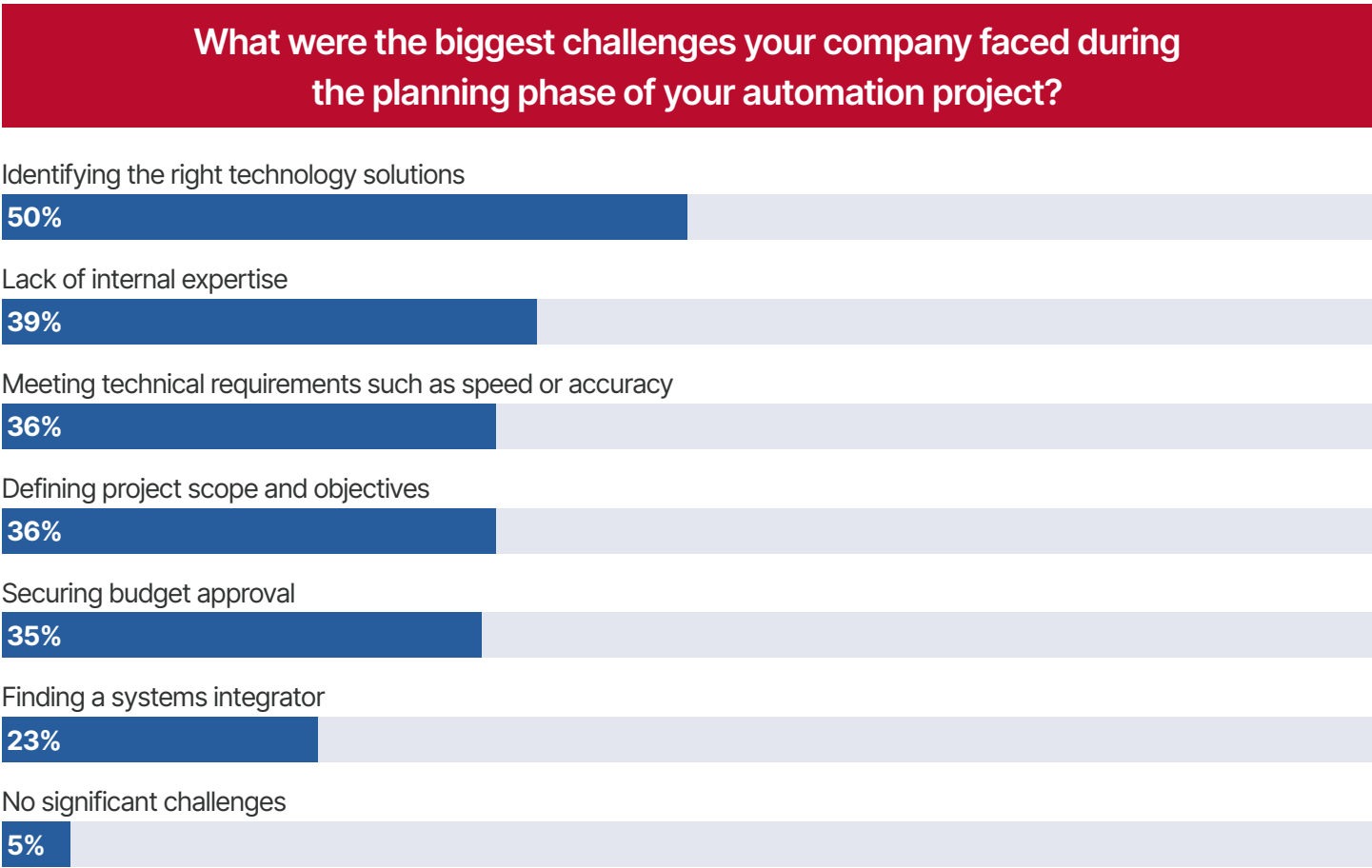
Common reasons included the “System did not perform as expected” (33%) and “Budget overruns” (32%), emphasizing the need for rigorous planning. The single greatest challenge, however, was integration with existing equipment and systems (49%), followed by unexpected technical issues (38%) and delays in delivery or installation (31%). Internal alignment issues such as “Lack of operator buy-in/training” (23%) and “Misaligned internal teams” (17%) also played a role. For smaller manufacturers, projects “took more time and / or work than expected” (19%), even when eventually successful.

What were the primary reasons your most recent automation project did not fully meet expectations or was considered unsuccessful?



Challenges during Planning Phase:

Half of respondents (50%) cited “Identifying the Right Technology Solutions” as their biggest challenge, reflecting broad internal capability gaps. A further 39% specifically pointed to “Lack of Internal Expertise,” and 36% identified “Meeting Technical Requirements” as another major obstacle.



All respondents; n=214
Average number of responses given=2.3

Challenges during Implementation Phase:

Beyond integration, “Unexpected Technical Issues” (38%) and “Delays in Delivery or Installation” (31%) were prominent, highlighting the need for robust project management.

Automation Vendor Support:

Most respondents (79%) expressed satisfaction with vendor support, indicating reliable external partnerships.

Important Attributes of Automation Providers:

Manufacturers prioritize “Industry Expertise and Experience” (66%) and “Competitive Pricing and a Transparent Cost Structure” (64%), seeking knowledgeable partners offering clear value.

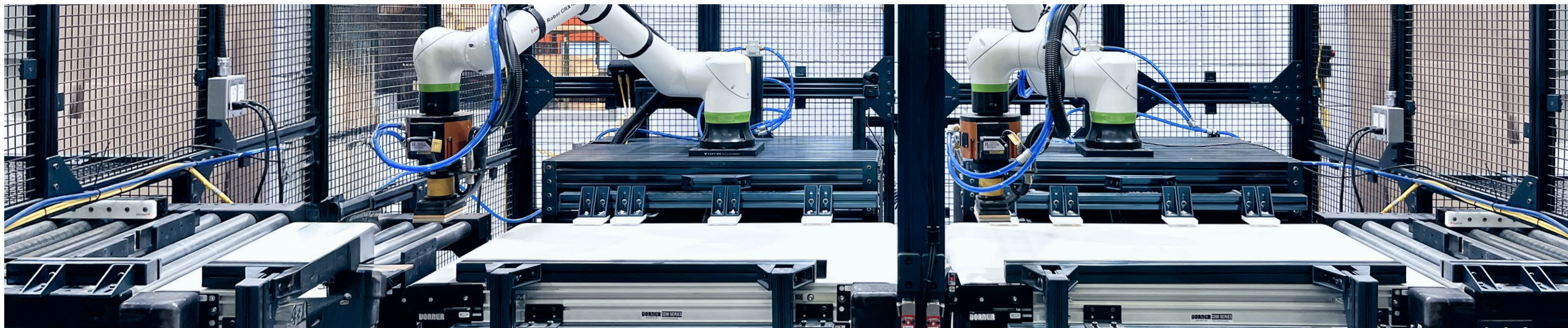
Valuable Aspects of Automation Solutions:

When evaluating solutions, the most valuable aspects are:

- 1. Easier integration with existing equipment and systems (63%)
 - 2. User-friendly interfaces and intuitive operation (57%)
 - 3. Faster setup and deployment times (51%)
 - 4. Customization and flexibility (49%)
 - 5. Scalability for future growth (48%)
- Manufacturers seek solutions that minimize disruption, are easy to adopt, and can evolve with their needs.

Automation Serving Small and Medium-Sized Enterprise (SMEs):

While 43% overall believe automation serves SMEs well, a closer look at small manufacturers reveals significant proportions felt it was “not well at all” (9%) or “not well” (20%), suggesting a need for tailored solutions for this segment.



VIII. CONCLUSION

Automation is unequivocally critical for the long-term competitiveness of the manufacturing industry. The overwhelming consensus (92% agreement) signals a fundamental strategic shift. As manufacturing demands evolve—with increasing complexity, shorter lead times, and heightened quality expectations—traditional approaches must adapt to meet these challenges. The U.S.'s relatively low level of significant or full automation (37%) compared to global benchmarks highlights a significant opportunity for growth and enhanced competitiveness through accelerated adoption.

While automation delivers clear benefits—improved product quality (52%), increased throughput (50%), and reduced operating costs (48%)—the journey to these gains is challenging. A significant proportion of projects (33%) fail to perform as expected, and many (32%) go over budget, leading to dissatisfaction with initial expectations for nearly half of manufacturers. These issues are exacerbated by persistent internal challenges like the lack of a properly trained workforce (49%) and implementation hurdles such as

integrating with existing equipment (49%). However, these challenges are driving innovation in how manufacturers approach automation. New integrated platforms and modern project management approaches are emerging to address these pain points—offering streamlined planning, faster deployment, and better system integration. This evolution opens opportunities for more efficient, accessible automation solutions that can help manufacturers, especially SMEs, overcome traditional barriers and achieve their goals more reliably.

Despite these hurdles, the industry's commitment to automation remains robust, with 73% of companies planning to increase investments in the next three years, and nearly half (46%) specifically targeting robotics and automation. Additionally, 45% of manufacturers are planning investments in artificial intelligence, signaling a broader embrace of advanced technologies to enhance competitiveness. This forward-looking perspective, coupled with high satisfaction rates once automation is successfully implemented, points to a clear path forward.

The Path to Enhanced Competitiveness:

To truly unlock automation's full potential and enhance global manufacturing competitiveness, a new approach is needed—one that directly addresses the identified pain points. This requires continued and strategic investment in automation, emphasizing three key areas.

- 1. Addressing Internal Capabilities:** Investing in comprehensive employee training and education is a direct way to bridge the skilled workforce gap. This approach, which aligns with the need for better-trained workers cited in the report, can cultivate internal expertise and empower the next generation of workers with modern digital and AI tools, such as AI-based CAD, Python programming, and simulation environments.
- 2. Fostering Seamless Integration:** Prioritizing solutions that connect easily to existing equipment and deploy rapidly can reduce complexity and accelerate timelines. This addresses the significant challenges of integrating with legacy systems and the need for user-friendly technology identified in the survey. Digital-first platforms, pre-engineered solutions, and user-friendly interfaces ensure a smoother implementation process and a faster return on investment.

- 3. Expanding Access for SMEs (Small to Mid-sized Enterprises):** Small and mid-sized manufacturers require automation that is modular, affordable, and fast to deploy. An ecosystem-based approach can eliminate custom one-off projects and lower upfront costs, ensuring these businesses can adopt automation at the same pace as larger competitors. This ensures smaller manufacturers are not disproportionately affected by implementation challenges and can remain competitive in the market.

By embracing this strategic approach, manufacturers can move beyond traditional limitations, accelerate their automation journey, and secure their position in the competitive global landscape, delivering better results more quickly. To learn more, visit [the Vention website](#).

