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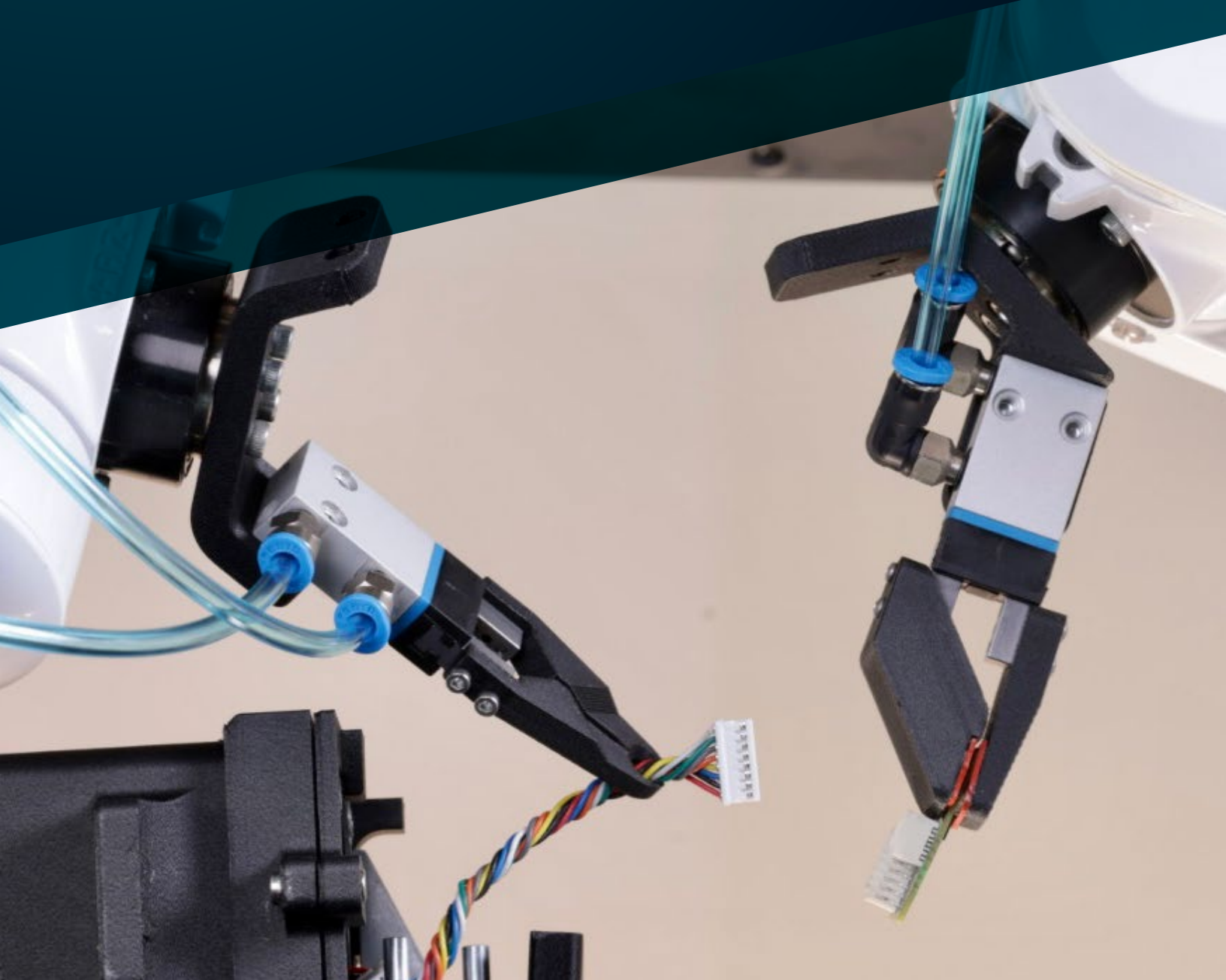
WHITE PAPER

Maximizing ROI:

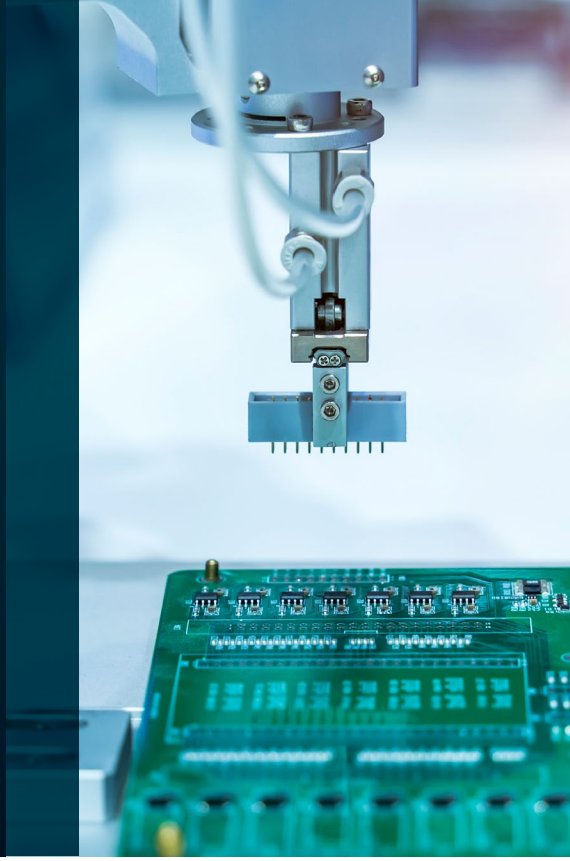
The Business Case for Advanced Automation in Human-Powered & Partially Automated Manufacturing Facilities



YOUR ROI

Introduction

While many precision manufacturing organizations have implemented basic automation over the past decade, the vast majority of them have focused on simple, repetitive tasks. While these investments have delivered incremental improvements in consistency and labor utilization, they have also created a new set of business challenges.



Manufacturing executives report that their partial automation implementations only address **50-65%** of their production processes, leaving the most complex, high-precision work to still be completely dependent on their increasingly scarce human skilled labor. This bifurcated production environment creates operational complexity that limits overall system effectiveness and constrains business growth.

The financial implications of manual operations extend beyond direct labor costs. Quality inconsistencies at manual workstations affect overall production yield, while the inability to rapidly reconfigure conventional robots significantly impairs responsiveness to changing market demands. Perhaps most critically, the strategic value of existing automation investments remains partially unrealized due to integration challenges between automated and manual processes.

Simultaneously, market pressures have intensified, with customers demanding greater product customization, shorter lead times, and enhanced quality standards. Organizations constrained by the limitations of first-generation automation find themselves increasingly challenged to meet these evolving requirements, particularly when competitors advance to more comprehensive automation solutions.

ONLY

50-65%

Production Processes

Addressed with partial automation processes

Learn how next-generation robotics maximizes your existing investments.

Learn More

The Business Transformation Potential of Advanced Automation

Next-generation adaptive robotics complete the automation journey by addressing the high-precision, complex tasks that remain beyond the capabilities of legacy robotics. This completion delivers compelling financial returns through multiple value drivers.

Organizations implementing advanced automation report gross margin improvements of **seven to 12** percentage points through a combination of human labor savings, improvements in quality, and efficiencies in material utilization. These margin enhancements translate directly to bottom-line profit in highly competitive markets where price increases simply aren't an option.

The integration of advanced robotics with existing legacy automation creates a cohesive production ecosystem that dramatically improves overall equipment effectiveness. Manufacturers typically achieve 30-50% increased throughput from existing production lines, effectively reducing the capital investment required per unit of output.

The production consistency achieved through comprehensive automation enables significant working capital improvements. Organizations report attaining **25-35%** work-in-process inventory reductions and finished goods holdings while either maintaining or improving their service levels. By achieving assembly yield rates that exceed **99.95%**, fully automated systems have been able to virtually eliminate costs related to rework, scrap, and warranty claims.

For precision manufacturers, these quality-related savings often amount to **3-5%** of total revenue.

7-12%

Margin Improvement

From implementing advanced automation

99.95%

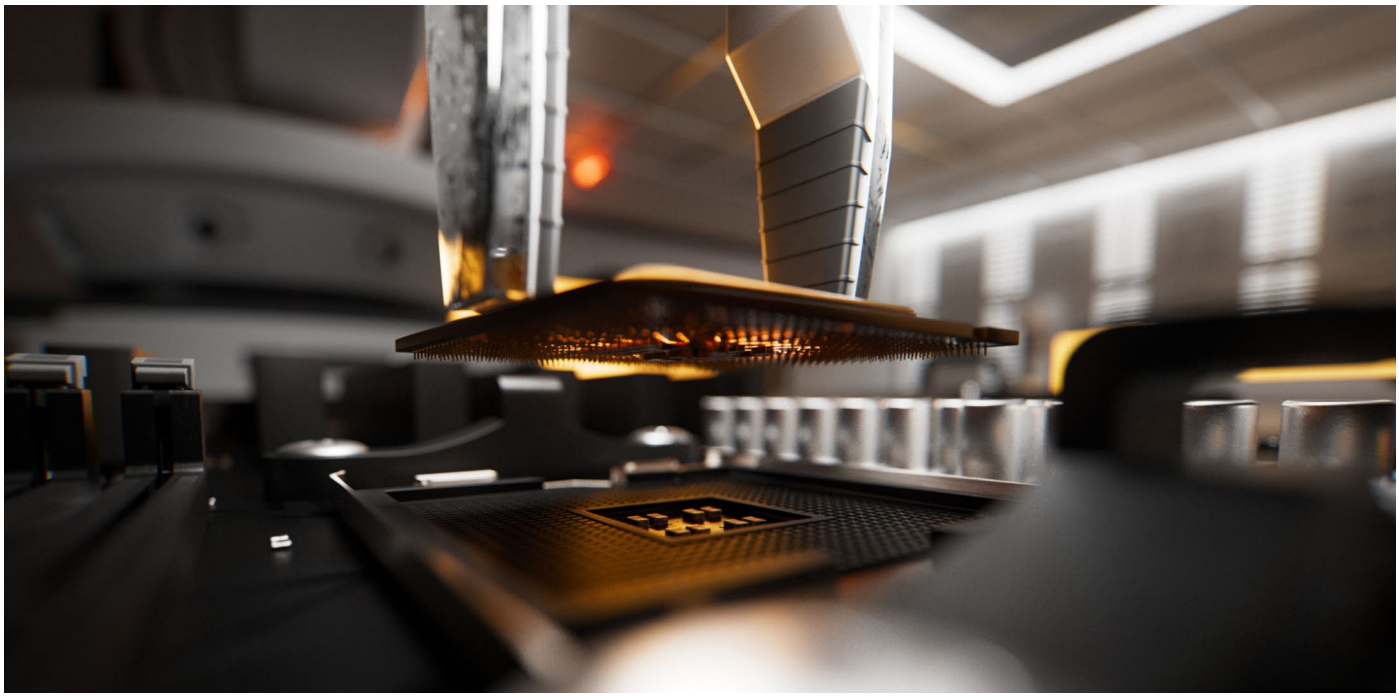
Assembly Yield

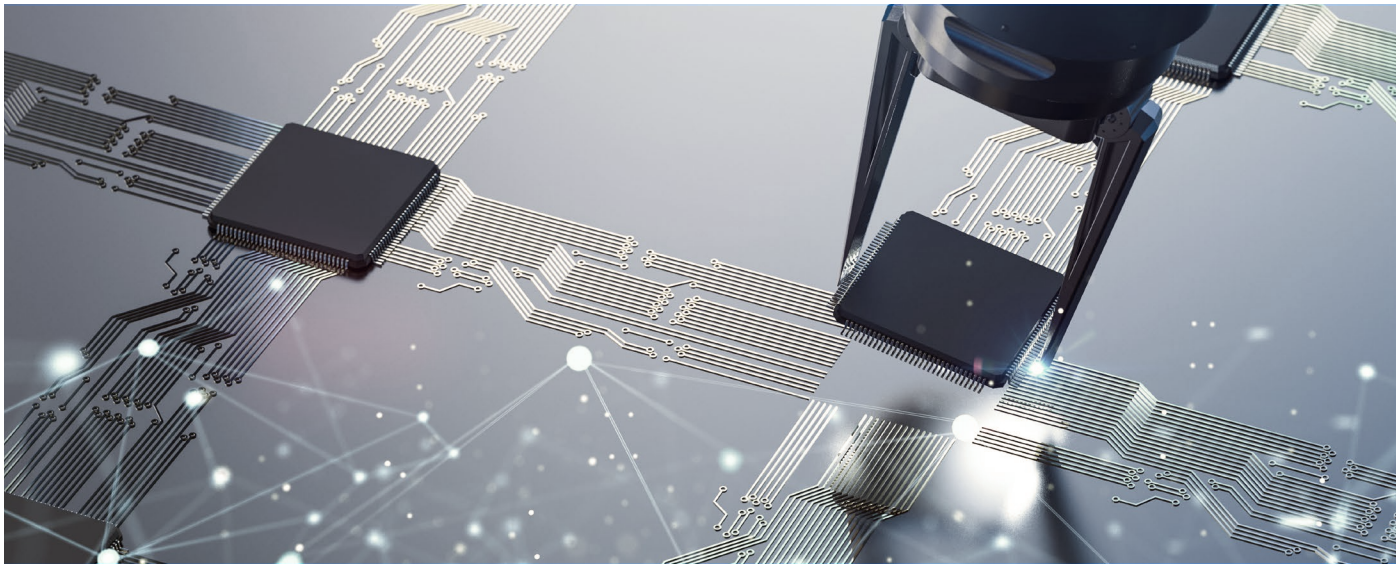
Eliminates costs of rework, scrap & warranty claims

3-5%

Savings

equal to top line revenue





Competitive Positioning

Beyond the obvious benefit of immediate financial returns, the deployment of advanced automation enables strategic advantages that, in turn, have the power to transform the organization's competitive positioning.

Next-generation systems reduce product changeover times by **80-90%** compared to legacy automation, thereby enabling economical production of smaller batch sizes and rapid response to market opportunities. This extraordinary flexibility allows organizations to pursue business that would be unprofitable with less advanced automation — opening new revenue opportunities, in addition to making them the most attractive option for an array of existing opportunities that were previously considered impossible.

The precision capabilities of advanced robotics enable manufacturers to produce complex products previously considered too demanding for automated production. In addition, the ability to quickly scale operations to meet demand enables manufacturers to fulfill contracts for products with short go-to-market timeframes. These capabilities open new market segments and revenue streams without proportional increases in operational complexity.

The combination of quality consistency, delivery reliability, and rapid response to change requests strengthens customer relationships and creates opportunities for expanded business. Many organizations report significant increases in both customer retention and wallet share following advanced automation implementation.

Rather than replacing employees, advanced automation enables their redeployment to higher-value activities, thereby addressing the growing skilled labor shortage while creating more engaging roles and professional career paths that significantly improve retention among key personnel.

80-90%

Reduction in

product changeover times

The combination of quality consistency, delivery reliability, and rapid response to change requests strengthens customer relationships and creates opportunities for expanded business.

Strategic Assessment and Prioritization

Organizations considering a move to next-generation adaptive robotics are in the best position to achieve optimal results when they begin with a business-focused assessment that identifies the most promising opportunities for advanced automation, since high-margin products constrained by manual process limitations often present immediate opportunities for transformation. Similarly, quality-critical operations where human variability creates the greatest risk deserve early attention in the implementation sequence.

Capacity bottlenecks where advanced automation would deliver maximum throughput improvement should be prioritized to ensure rapid return on investment.

Change-intensive processes where conventional automation's inflexibility creates the greatest business constraints also warrant early consideration, as the adaptability of next-generation adaptive robotics delivers particularly significant advantages in these areas.

Conducting this assessment thoroughly and then strictly adhering to the results ensures that the company's investment in advanced automation delivers maximum strategic impact rather than merely incremental operational improvement.

Integration with Existing Automation Investments

While introducing advanced next-generation adaptive robotics, it's essential to ensure that the new technology cleanly integrates with the human workforce, rather than threatening or supplanting it. In addition, protecting and enhancing the value of existing automation investments requires thoughtful integration of next-generation adaptive robotics. Successful organizations approach this integration as a business process optimization rather than merely a technology deployment.

Creating seamless workflows between conventional and advanced systems, as well as the human workforce, becomes a primary focus, eliminating the hand-off inefficiencies that often plague manufacturing facilities that have implemented legacy automated environments. Establishing unified data collection and analysis across the production environment enables comprehensive performance management and continuous improvement initiatives.

Developing consistent quality monitoring and control processes ensures that the superior precision of advanced systems elevates overall product quality rather than simply creating islands of excellence. Implementing flexible scheduling that maximizes utilization of all assets — human and automated — ensures optimal return on both existing and new technology investments, while helping them maximize the efficiency of their human workers.

This integrated approach ensures that advanced automation enhances rather than disrupts existing operations, including legacy automation and the human workforces, while maximizing total return on automation investments.

Phased Implementation for Risk Management

To manage both financial and operational risk, leading organizations implement advanced automation through carefully sequenced phases. The journey typically begins with a pilot implementation in a high-impact area to validate benefits and refine integration approaches. This controlled beginning builds organizational capability and confidence while delivering initial returns to fund subsequent expansion.

As their experience grows, organizations undertake targeted expansion, addressing additional high-value processes based on established success patterns. The lessons learned during the initial implementation accelerate these subsequent deployments while reducing implementation risk. Eventually, the organization achieves comprehensive integration, creating a fully integrated production ecosystem that optimizes total system performance.

This measured approach manages capital requirements while building organizational capability and confidence, which ultimately delivers greater total business impact than would be possible with a more aggressive implementation timeline.

CASE STUDY:

Completing the Automation Journey

A mid-sized electronic component manufacturer had automated approximately **60%** of their production processes with conventional robotics but struggled with inconsistent quality and limited flexibility in their remaining manual operations. These limitations constrained their ability to pursue higher-margin business and respond to increasing customer demands for customization.

After implementing next-generation adaptive robotics for their remaining manual processes, they achieved a **32%** reduction in total manufacturing cost per unit and a **99.98%** first-pass quality yield, virtually eliminating inspection and rework costs. The company reduced new product introduction timelines by **85%** and increased production capacity by **40%** with no facility expansion.

Most significantly, they reported a **28%** increase in revenue from existing customers in the 12 months following implementation, as their enhanced capabilities enabled them to capture business previously awarded to more technologically advanced competitors.

28%

Revenue Increase

from existing customers over 12 months

32%

Cost Reduction

per unit manufactured

40%

Increased

production capacity

Conclusion

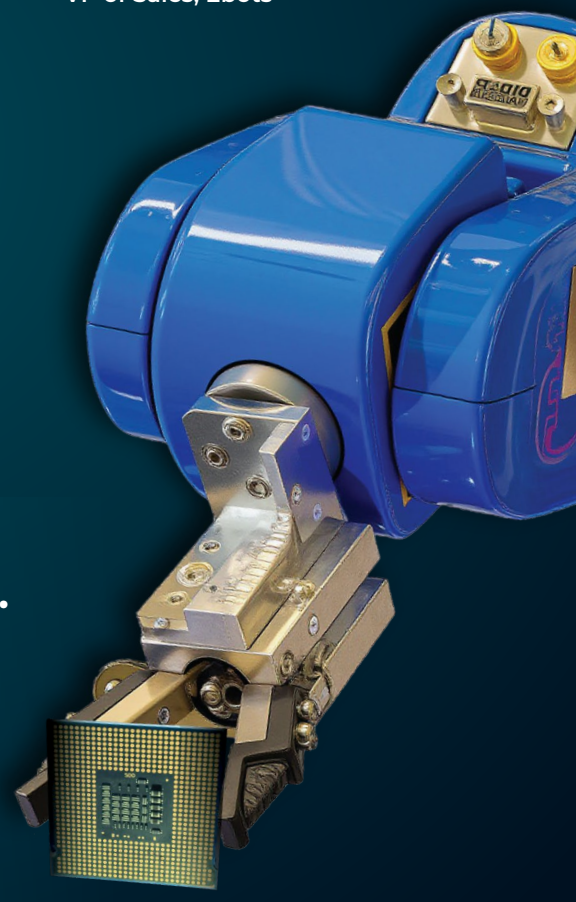
For precision manufacturing organizations that either still exclusively employ a human workforce or have implemented basic partial automation, advancing to next-generation adaptive robotics represents not merely an operational improvement opportunity but a strategic imperative. The business case extends far beyond incremental cost reduction to encompass fundamental enhancements in market agility, product capabilities, and competitive positioning.

The gaps between manufacturers relying exclusively on a human workforce and those that are partially automated, as well as those who are partially automated compared with manufacturers that employ next-generation adaptive robotics, will continue to widen as technology advances and market expectations evolve. Organizations that proactively add automation to their existing processes position themselves for sustainable competitive advantage, while those that remain tied exclusively to a human workforce, as well as those that remain partially automated, face increasing strategic vulnerability.

Executive leaders should approach advanced automation as a transformational business initiative rather than merely a technology upgrade. With proper assessment, integration planning, and phased implementation, the business benefits can exceed even optimistic projections while positioning the organization for long-term success in increasingly demanding markets.

> ***In micron-precision assembly, repeatability without accuracy just repeats the same mistake. Ebots guarantees both, delivering every placement exactly right, every time.***

Keith Dussia
VP of Sales, Ebots



Your automation journey isn't complete.

Learn how next-generation robotics maximizes your existing investments.

Learn More

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