LEARNING TO SUCCEED: Digital Manufacturing, Augmented Service, Upskilling, and the Future of Expert Work

Realizing the Benefits of Mixed Reality – from Needs to Pilot to Rollout

KOGNITIV SPARK

EXECUTIVE SUMMARY

MANUFACTURING PROCESSES ARE TAKING GREATER ADVANTAGE OF INFORMATION TECHNOLOGIES, WITH A POWERFUL IMPACT ON THE GLOBAL WORKFORCE, INCREASING ACCESS TO KNOWLEDGE AND THE NEED FOR MORE SKILLS. IN A RESEARCH COLLABORATION BETWEEN MCKINSEY AND THE WORLD ECONOMIC FORUM ON THE "FUTURE OF PRODUCTION," THE RESULTS WERE STRIKING:

50%

By 2025, 50% of all employees will need reskilling due to adopting new technology.

2/3

2/3 of skills considered important in today's job requirements will change.

1/3

1/3 of essential skills will be technological competencies we don't even consider a requirement today.

This moves any discussion about the future of key industries to on-demand reskilling and upskilling of workers. Organizations will need the ability to deploy career-long learning and responsive career development to meet their strategic goals and retain the workforce they want.

Efficient, profitable, and agile businesses are only possible with a workforce that is nurtured to deliver effective on-the-job performance. Still, making training accessible, available, and affordable remains an enormous challenge for most organizations.

Mixed reality performance support tools (PST) have shown enormous promise, but only when properly specified, piloted, and rolled out.

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When done right, you can have a sophisticated training solution that tightly aligns with your business goals and creates new opportunities for the turbulent times ahead.

RELOCATED MANUFACTURING:
Market challenges in 2022-2024

WHAT'S NEXT?

As manufacturers, energy producers, and aerospace companies climb out of the pandemic and the attendant price variations, supply chain shocks, and demand spikes of the last few years, many are asking this exact question. The answers seemingly contradictory.

Some are very positive. Industrial production and capacity utilization have now surpassed pre-2020 levels, with signals of increased new orders for major sectors continuing through 2022 and beyond.

On the other hand, optimism around revenue growth is dampened by workforce and skill shortages. Operational efficiency and margins are suffering. In response, businesses are reshoring—transferring manufacturing jobs that went overseas back to domestic locations.

According to Industry Week, 2021 saw 224,000 U.S. jobs created due to onshoring and direct foreign investment, with 62% of those jobs attributed to onshoring alone.

According to Global Data, many North American and European businesses are looking at domestic manufacturing capabilities for transportation equipment, electronics, chemicals, and more. This can insulate businesses from supply chain breakdowns and give them access to other workforce resources. This could give businesses the agility to operate through the turbulence of an unusually quick economic rebound—and to compete in the next growth period.

MORE DIGITAL WORKFLOWS FOR A GREATER HUMAN ADVANTAGE

WHAT WE CALL DIGITAL MANUFACTURING OR INDUSTRY 4.0 IS HERE.

New technologies like deep learning, artificial intelligence, mixed reality, data analysis, robotic assistance, alone or together, are shaping today's workforce address some big challenges. When asked, 2/3 of industrial companies worldwide said that digitizing the production value chain is one of their highest priorities.

To achieve this, companies are digitizing their operations in a range of use cases:

— **Connectivity**
Enabling the flow of relevant information to the right decision-makers in real time. This can include digital performance management and oversight, and using mixed reality support tools to share interactive operational instructions and procedures.

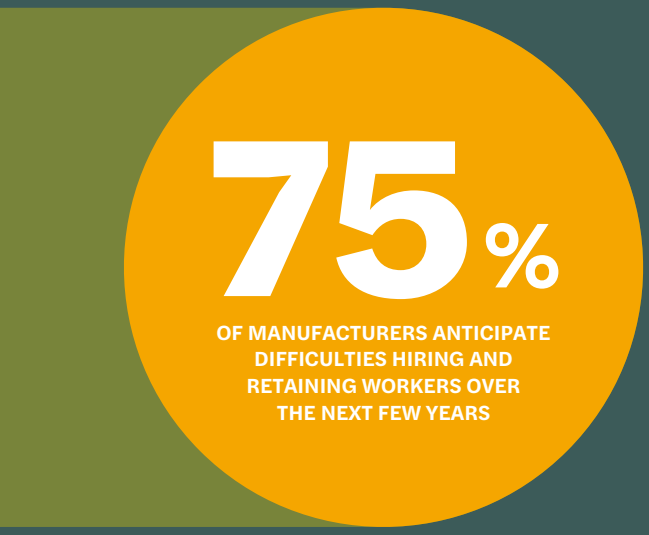
— **Intelligence**
Data analysis tools, including deep learning and artificial intelligence, can generate new insights and driver better decisions. This can include predictive maintenance, digital quality management, and AI-driven demand forecasting.

— **Flexible automation**
Leveraging new robotic technologies to improve the productivity, quality, and safety of processes, such as remote vehicle operation and cobots that assist assembly.

TACKLING WORKPLACE SHORTAGES

THE MANUFACTURING SECTOR HAS A TALENT SHORTAGE.

Many leading businesses are realizing that they cannot hire all the new skills they need. CEO polls have revealed that the majority of leaders believe skill gaps will prevent new strategies—particularly those motivated by automation and digitization—from being successfully implemented. More than half of executives in the United States and Europe agree that companies should take the lead in closing the global skill gap and preparing employees for the future of work.



A 2021 Deloitte study found that 75% of manufacturers anticipate difficulties hiring and retaining workers over the next few years. The analysts forecast 2.1 million unfulfilled jobs by 2030 in U.S. manufacturing alone. The gaps would appear at all skill levels, from entry-level positions to skilled assemblers, supervisors, welders, machinists, and mechanics.

There are many drivers at play here, and there are no simple fixes. Even businesses that have made significant investments in automation may still have trouble filling positions to supervise equipment and perform specialized labor that needs a human touch.

The new industrial workforce is different. It's more dynamic and diverse than previous generations. Today's job market entrants have new and varied expectations for their jobs and careers. Meeting workers' expectations will need to include flexible working, reskilling, and improved career mobility. Looking internally to develop talent is another approach, one that is often quicker and more efficient while also being significantly better

for morale and the company's long-term attractiveness to potential recruits.

Employers ignore these trends at their peril. Even a company like Amazon, famed for its competitive workplace, aggressive performance targets, and its seemingly limitless growth potential, the reality can be harsh. Vox reported on a mid-2021 internal report on Amazon's warehouse and transportation operations with shocking conclusions:

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"If we continue business as usual, Amazon will deplete the available labor supply in the US network by 2024."

What was one of the first retention solutions Amazon turned to? Better skills and education.

SKILLS ARE HOW EMPLOYERS CAN LEAD THE WAY

EMPLOYERS MEET THE DEMANDS OF THE MOMENT BY EQUIPPING WORKERS WITH NEW CAPABILITIES AND THE SKILLS TO MAKE THE BEST USE OF THEM.

But there are challenges. Today's industrial companies can no longer train, guide, and support their workers using processes from the past. The pandemic has caused a dramatic downturn in the amount of training delivered across industries. That has created gaps that will can only be filled by alternatives to in-person training.

Training novices, optimizing experts

Onboarding new hires can be disruptive to an organization. Successful training is essential for preventing costly mistakes and minimizing safety concerns. But pulling seasoned staff off high-value projects may not be practical. Mixed reality PST's can replace the old paper-based instruction, shortening the training that demands specialists to spend training new employees. Additionally, the knowledge is presented in a sophisticated, highly visual way that new workers overwhelmingly prefer.

Managerial flexibility

Digital training methods offer managers new flexibility to get knowledge from across the organization to where it's needed most. Mixed reality content can be created with the insight of multiple experts and be updated as workflows and techniques evolve—especially as new machines arrive and new workflow methods develop. All this without taking down equipment or production lines for training.

Responsive and on-demand training

Market dynamics have made it very difficult to predict demand. Mixed reality helps flatten the learning curve, allowing training to begin as soon as you need it.

Further improving recall and skill confidence, learners can repeat and have access to supporting instructions as often as they need. This also pays dividends in recall of training over time, and the availability of such training also helps with employee satisfaction and retention.

What is Mixed Reality?

A combination of augmented reality and virtual reality, mixed reality (MR) combines physical and digital components. The improvements in computer vision, graphics processing, display technologies, input systems, and cloud computing power sensor and imaging technologies used in MR, allow users to interact with and modify both real-world and virtual objects and situations. An intuitive system of 3D interactions between people, computers, and the environment is the end product.

In the field and during training, MR transforms into a performance support tool that can add a layer of digital content—photos, diagrams, videos, or audio—between a person and their surroundings, ensuring that the task was done as intended, like product assembly or machine operation, or repair a device.

Employees can use the 3D content as many times as necessary to learn a new skill without additional expense or risking real-life damage. As Jeremy Bailenson, the founding director of the Virtual Human Interaction Lab at Stanford University, puts it, "Mistakes are free in VR." This can drive improvements across the board, including task completion time, learning speed, product quality, workload, and technology acceptance...with fewer risks.

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Mixed reality helps flatten the learning curve, allowing training to begin as soon as you need it.

COULD MIXED REALITY BE PART OF YOUR SKILL GAP SOLUTION?

EXECUTIVES KNOW THAT PROCESS IMPROVEMENT AND WORKFORCE CAPABILITY ARE NECESSARY FOR THE LONG-TERM HEALTH AND COMPETITIVENESS OF THEIR ORGANIZATIONS.

Since the term "Industry 4.0" became popular at the beginning of the 2010s, organizations in the industrial sector have been moving to adopt digital technologies that can help their operations connect and improve.

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While still a relatively new technology, mixed reality continues to gain traction in the industrial market.

For training and skills development, mixed reality is evolving on several fronts:

- How do you capture the knowledge of experienced workers and subject matter experts?
- How do you transform this knowledge into MR workflows?
- How do you scale this technology and knowledge to frontline workers across the organization?
- How do you measure results and further optimize for performance?

The potential benefits are driving many to launch pilot projects, resulting in significant ROI for industrial organizations. Following a successful MR pilot, the Boeing Company reported a wiring production time reduction of 25% with an effective error rate of zero using early Google Glass AR hardware. In 2022, the future of the company's design and manufacturing process is now being planned, using Microsoft's Hololens headsets.

That can be used to empower new and redeployed workers more

INDUSTRIAL / MANUFACTURING	AEROSPACE / DEFENCE	SERVICE	TRAINING
Mixed reality tools can ensure that training and information access are always available. For many operations, workforce efficiency is the key to reducing waste, lowering costs, and improving responsiveness, including maximizing equipment uptime with easily accessible training.	Mixed reality is proven to enhance operational tempo and force resilience, particularly in the face of unplanned, complex, and unpredictable conditions. Increase efficiency and global operational readiness so you can focus situational awareness, mission preparedness and execution.	As it becomes harder to find skilled technicians, technical requirements and customer demands continue increasing. MR offers many opportunities to keep customer service as a core competency, including remote assistance, guided customer self-service, and rapid upskilling of staff.	In-person mentoring, classroom training, and on-the-job shadowing in production environments are costly, time-consuming, and in some cases infeasible. Opportunities for improvement with MR include onboarding, skills development, on-the-job training, eLearning, and virtual or remote training.

quickly than expected. It also solves the problem of saving and preserving knowledge before it leaves the company. The knowledge is always available when needed, and it is shown in a way that makes it easy for new workers to learn and use, *or* senior technicians to recall procedures on in-frequent tasks, over coming human memory limitations.

The result is an on-demand MR experience featuring step-by-step expert instruction and digital content designed to help workers successfully operate, set up, and maintain machinery, complete product assembly, and perform maintenance and service tasks accurately and safely.

CASE STUDY: Supporting field operations, remotely.

Rogers Electric & Machine implemented RemoteSpark to connect their field technicians with the expertise and resources they need to solve any problem, anywhere. The company saves an average of $7,000 in travel expenses per use, enabling Rogers to deliver service to clients anywhere up to 6,800% faster.

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PLANNING YOUR PILOT PROGRAM

DESPITE THIS FOCUS AND ENTHUSIASM FOR DIGITAL MANUFACTURING INITIATIVES, AND MIXED REALITY IN PARTICULAR, THERE REMAIN HURDLES.

McKinsey research found that often companies are experience pilot purgatory: despite their efforts, they don't seem to be getting anywhere. Projects can fail due to their complexity coupled with a lack of experience. A study published by the World Economic Forum in 2019 found that **70%** of industrial enterprises fail to have their Industry 4.0 efforts move beyond the pilot phase, with only **29%** actively deploying solutions at scale.

Statistics like these are the reason many organizations take a "wait-and-see" approach highlighting why choosing the right digital transformation partner is critical. To deal with this, the research points out a few important things that any digital manufacturing project needs to do well.

1. Process

Define the opportunity according to your business, not the technology. This 'bottom line forward" approach ensures that you have a clear vision for the competitive advantage you want to develop. This will allow you to choose and customize a solution according to your goals, and not try to adapt your business to the requirements of a new technology.

REMOTESPARK
CASE STUDY:
LeeWay Marine

With mixed reality remote guidance, LeeWay Marine reduces maintenance-related travel by 75%.

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2. Structure
Create a vision for your technology stack. This will help ensure you're not outsourcing key competencies but also not wasting resources on solutions best acquired through your partner ecosystem.

3. Leadership
Change always meets some form of resistance, and you can only overcome it together. That means inspiring transformation from the top but getting input and rallying support at every level of the organization. You're not just installing software; you're changing the social fabric of your organization.

These criteria show how widespread a successful digital training program can be. This puts a lot of emphasis on a pilot program designed for success. With a goal to reach or pain points to alleviate, it's much easier to create KPIs and budgets, convince stakeholders, and manage pilot programs over their lifespan.

You won't be able to solve everything at once, either: narrowing your use case increases your chances of a successful pilot. You'll end up with results that will be easier to monitor, measure, and trust.

Your guide to a successful mixed reality pilot program

The Ultimate Guide to MR Pilots:

An eBook for Industrial Enterprise

DOWNLOAD

Any successful pilot program is a synthesis of business priorities, fiscal realities, process requirements, and cultural drivers. We've created an in-depth guide to creating your next pilot, whether it's your first, or your thirtieth. This eBook is designed to equip you with the steps necessary to avoid pilot purgatory and manage a scalable MR pilot.

You'll learn how to:

- Plan your pilot
- Pick the right use case
- Pick the right MR solution
- Build end-user buy-in
- Deploy the pilot
- Assess the outcomes

THE PEOPLE SIDE:
Leadership, Feedback, and Buy-In

THE HUMAN ELEMENT IS PERHAPS THE MOST CRITICAL COMPONENT OF A SUCCESSFUL PILOT.

End-user buy-in is critical to the success of any digital transformation. If workers aren't motivated, or don't see the value, the initiative will likely fail.

To earn trust early, manage employee expectations regarding the MR solution's capabilities and the pilot. This can be done by ensuring end-users understand the pilot goals, solution functionality, and potential outcomes of the project. Be cautious not to oversell or miscommunicate, and most importantly, be clear about how end-users can benefit from this change in process. Remember that a successful mixed reality training solution can improve employee satisfaction and retention.

This also means change management processes need to be in place early, ensuring your project ambassadors can ease the transition when it's time to deploy at scale.

CASE STUDY:
Surepoint Group

Mixed reality enabled this services company to remotely help field technicians in the Oil and Gas industry. After more than 300 operational RemoteSpark support calls, the company has been able to dramatically reduce expert travel and equipment downtime, solving 60% of issues without sending experts to the job site.

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WRAPPING UP:
Final Tips for Translating MR Potential into Bottom-Line Value

Prioritize the needs of your people to increase adoption

Learning new skills can encourage a culture of common purpose and upward mobility. Upskilling encourages workers, sparks interest, and increases the uptake of corporate strategies. Offering ongoing opportunities for upskilling creates a deeper talent pool that can fill future needs and keep you competitive. Gaining demonstrable mastery of new skills boosts anyone's confidence.

Partnerships

Collaboration is key. While many partnerships will be internal, do not forget about selecting external technology and integration partners. Again, you're not just installing software; you want solution providers who are willing to work directly with you and your teams to ensure success. Key interviews, goal setting, and (ironically) on-site training and support can all help to ensure that a mixed reality solution is adopted, accepted, and contributing to the success of your organization.

Success measurement

Document the lessons learned and the key takeaways. This can include compiling KPI data, expenses, and performance calculations. Qualitative data from interviews and surveys can give end-user information that will be very important for a wider rollout.

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Meet Hololens 2: A Mixed Reality Platform built for business

The Best Platform For Piloting and Full Scale Deployment of Industry 4.0

Kognitiv Spark's MR tool, **Remote**Spark is built on Hololens 2, an ergonomic, untethered self-contained holographic device with enterprise-ready applications to increase user accuracy and output. In manufacturing, companies use it to reduce downtime and speed up onboarding and upskilling. It's also used to accelerate the pace of construction and mitigate risks earlier in the cycle.

ABOUT US

AT KOGNITIV SPARK, WE BELIEVE IN EMPOWERING THE GLOBAL WORKFORCE TO ACHIEVE MORE, OPERATE WITH CONFIDENCE, AND SOLVE ANY PROBLEM QUICKLY, SAFELY, AND ACCURATELY. THIS BELIEF GUIDES WHAT WE DO.

This document is the result of practical experience and deep knowledge of the capabilities of mixed reality solutions. Since 2016, Kognitiv Spark has worked closely with global partners to guide industrial mixed reality solution development, with an emphasis on user-centered development.

Led by an executive team with deep expertise in cybersecurity, oil and gas, industrial engineering, and aerospace and defence, Kognitiv Spark delivers robust and integrated solutions that surpass advanced performance and security requirements.

Mixed Reality Use Cases

RemoteSpark is a secure and low-bandwidth MR tool for the delivery of expert guidance to remotely located technicians, engineers, and workers. Here's how three organizations are using it today, including Return on Investment.

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Further Guides for Mixed Reality Solutions

RemoteSpark Considerations:
Benefits of Adopting Mixed Reality Solution

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RemoteSpark Considerations:
Choosing the Right Mixed Reality Solution

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The Ultimate Guide to MR Pilots:
An eBook for Industrial Enterprise

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Looking at Mixed Reality Opportunity for your Company?

Ready to Plan your Pilot?

Ready to start your company's journey by talking to an MR expert.

Equipped with these tips for running successful pilot programs, your enterprise is already one step closer to augmenting industrial operations, saving travel costs, better leveraging experts, and becoming an industry leader. We've helped industrial enterprises successfully launch remote support solution pilots and deployments that leverage a proprietary MR technology.

Contact one of our solution implementation specialists today.

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