Expert Insights

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AR and VR in the workplace

Extended reality reimagines how work is done

IBM **Institute for Business Value**

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Key takeaways

Reimagine how and where work is done with XR

Extended Reality (XR)—a collection of technologies including Augmented Reality (AR) and Virtual Reality (VR)—is transforming workers' training, workflows and engagement.

Enhance employee productivity and reduce costs with XR

XR workplace solutions have significantly reduced employees' time to complete tasks, enabled the quick mastery of skills, and vastly reduced errors and the need for service calls.

Cultivate a vibrant, collaborative workplace with XR

XR applications are perfectly suited to support remote working by empowering employees to virtually troubleshoot or fix malfunctions, and by creating virtual environments for hands-on team interaction.

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Accelerating from aspirational to necessary

For businesses adapting to today's different normal, it may seem as if reality itself has shifted. Companies are struggling to cut costs without sacrificing their ability to quickly take advantage of emerging opportunities. Disrupted supply chains are being reshaped. Go-to-market strategies are being redefined.

Above all, companies need to build resiliency and flexibility into their processes, work platforms, and employee enablement. They have to stay nimble to respond to a rapidly changing environment and customer demands. Which is why they need, as never before, the benefits that Extended Reality (XR) offers.

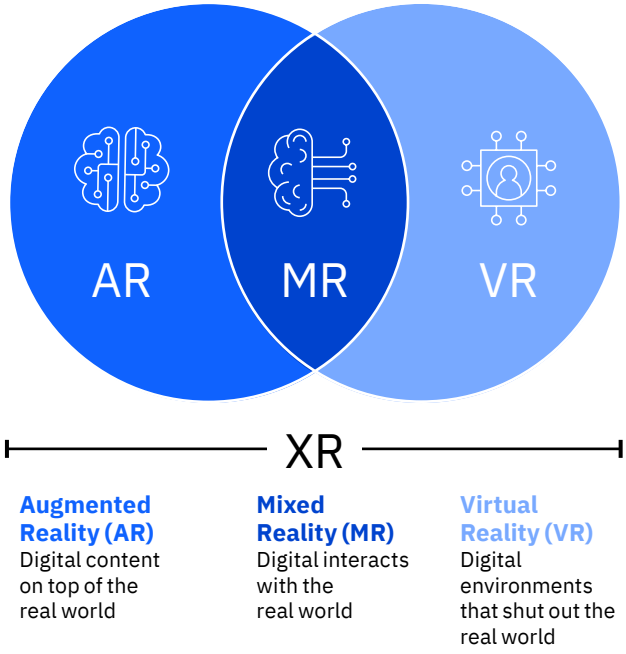
The technologies we collectively refer to as XR are: Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), which includes other hybrid, immersive experiences (see Figure 1 on page 2).

XR has been "just around the corner" for years. The promise of XR appeared imminent with the ubiquity of smartphones and the convergence of exponential technologies such as AI and the Internet of Things (IoT). 5G's arrival in waves around the world is providing needed speed and bandwidth. Companies across industries have successfully deployed XR solutions, with customer service and support a favorite target for more than half of the organizations planning, implementing, or expanding AR.[1] Forty percent of small-to-midsize businesses indicated they are currently evaluating AR/VR, with Gartner estimating as many as 70 percent could do so by 2022.[2]

Yet, despite mounting enthusiasm for XR, by the end of 2019, widespread adoption was still beyond the horizon. And then COVID-19 hit.

Figure 1

The collection of technologies that make up XR.



Source: IBM Instiute for Business Value.

Suddenly, remote work was a necessity, travel next to impossible, and companies found themselves in crisis mode. Doing things differently seemed daunting, but people found creative ways to adapt. As organizations implemented new digital approaches to get work done, the benefits of these changes emerged. Even after the pandemic runs its course, it's likely many companies won't want to revert to old methods. Reality has shifted, and with it, the advantages of XR have soared from aspirational to essential.

XR is no longer a futuristic technology looking for mainstream usefulness. As workers worldwide become accustomed to video conferencing, interacting digitally in a more immersive, virtual experience is not a big leap. Some XR applications have already morphed from "reality plus" to expectations for everyday experiences. For example, the backup cameras on today's cars with superimposed digital guidelines for parking is a form of XR most drivers now take for granted. The trope of people wearing cumbersome headsets, oohing and aahing as they reach for objects "not there," will shortly be a quaint memory, like the 1980s-sized boxes spouting long antennas once called "mobile phones."

XR can provide organizations with opportunities for greater efficiency, accuracy, and productivity for their workforces. But equally importantly, it can help deliver what companies sorely need now: the elasticity to prosper despite adversity, trim costs, and act quickly.

XR is for real life and real work

XR enables digital information to live in the physical world so that people can see, hear, touch and interact with it. Combined with AI, XR becomes an extension of the human senses and how we perceive physical environments. When organizations implement XR, not only are they improving employee experiences, they are empowering employees to offer improved experiences for customers (see sidebar, "XR at work today: Transforming the way insurers process claims").

Imagine a traditional field service repair. Repair technicians travel to a location and try to diagnose the problem based on previous experience. If unable to resolve it, they call in an expert. In the meantime, the customer waits. Not a good experience.

Despite mounting enthusiasm for XR, by the end of 2019, widespread adoption was still beyond the horizon. And then COVID-19 hit.

Now imagine that workflow enabled with XR and AI. In addition to their own insights, the technicians turn to AI's machine learning capabilities to help them troubleshoot the issue, drawing on the experiences of thousands of other technicians and historical data. And, to avoid unnecessary delays, the technicians have arrived with the parts most likely to be malfunctioning based on analysis from an AI-enabled inventory system linked to historical data. AI verifies the solution and walks the technician through the repair using a digital overlay on a tablet or other mobile device. The customer is up and running quickly. A good experience.

In addition to improved customer experiences, XR solutions are delivering measurable return on investment (ROI) to the business. Companies using AR have reported a 46 percent reduction in time to complete tasks, and average productivity improvements of 32 percent.[3] As organizations are having to reimagine strategies to provide safe and effective work environments for their employees, it's easy to see why XR is quickly moving from proof-of-concept prototypes to mission-critical tasks.

If XR is to be an essential new approach for working, what's the best way to get started? There are three key areas where XR can have the greatest impact: *training, workflows,* and *employee engagement*.

Faster, smarter training

According to a top IT industry trade association, training is one of the most common uses of XR. Compared to traditional training, VR-based training can reduce training time by 40 percent, and improve employee performance by a whopping 70 percent.[4] And, once XR becomes the norm for visual recognition and guidance, overall training becomes simpler. For example, technicians no longer need to be trained on parts numbers and other specifics of a machine if they can rely on XR to recognize the components for them.[5]

XR at work today: Transforming the way insurers process claims

A US-based mutual insurance company is creating an XR claims solution that leverages AR and AI-powered mobile capabilities. When measuring roof damage, claims assessors turn to an app that uses AR underpinned with visual recognition to interpret what the user is seeing, and AI to offer a conclusion or recommendation. This enables assessors to recognize animal, hail, or mechanical damage in real time with a measurable confidence level. The app is designed to work both online and offline, a key consideration for field agents where connectivity might not be available, or in disaster situations when the need for reliable solutions is paramount.

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Written assembly instructions are time-consuming to create and often difficult to follow. XR supports a faster learning curve by providing immersive demos and step-by-step tutorials in context with the physical manifestations of the subject matter. For example, complicated 2-D schematics in a manual can become interactive 3-D holograms that walk the user through the process.[6] It also enables employees to train for hazardous situations, or learn how to use equipment that could be harmful if used improperly. Much as flight simulators enable pilots to gain experience while still on the ground, XR experiences can safely train workers such as first responders and emergency utility crews how to undertake potentially dangerous tasks.

No longer are organizations limited by employee proximity, the ability to travel, or the time needed to respond. With XR, the best instructors can quickly be paired with trainees practically anywhere in the world. For example, during the pandemic, doctors can use smart glasses during examinations to teach remote medical specialists about the specifics of new potential outbreaks.

Companies are facing a threatening brain-drain of experience, skills, and institutional knowledge as Baby Boomers retire. Capturing their valuable insights in a way that's easily transferable is often overlooked until it's too late. Before leaving the workforce, older employees can be equipped with smart glasses to record their workflows with commentary, which can be easily accessed later by others.

As companies identify new areas where training is needed, XR's experiential learning can help employees acquire skills to meet the necessary performance levels faster. By using AR instead of documentation, one manufacturer reported astounding results: a 90-percent increase in the number of trainees with little or no experience who could perform a complex, 50-step operation correctly the first time.[7]

Productive workflows reduce costs

For the greatest impact, XR should be a central part of what a business does, not just an ancillary, one-off application. When integrated effectively to improve how work gets done, its utility can significantly improve productivity leading to reduced costs. Research indicates that AR can reduce mistakes and unnecessary service calls by as much as 90 percent.[8]

Often simply overlaying the right digital information onto a physical environment can make a big difference. An international shipping and logistics company increased productivity by 25 percent when it provided workers with AR glasses that display a digital pick list and direct them to the product or package location.[9] A major international airline is using AR to help reduce the time and effort it takes to determine if a flight is ready to depart (see sidebar, "XR at work today: What's on the tarmac?")

As companies design physical products, the data generated can be used to form a digital twin of the product that matches the real-world version. Developers can then use the twin to create an AR experience for the many employees who will be handling, selling, servicing, or answering questions about that product.

Manufacturing can benefit from XR's product line planning, product development, and iteration using digital prototypes and multi-user collaborative environments. For example, the Audi e-tron GT is the first vehicle in the VW Group to dispense with an actual prototype in their 3P (production, preparation, process) workshops. Using VR glasses and controllers, employees from various departments test all assembly processes entirely virtually.[10]

When malfunctions occur, the operational impact and cost of being offline can be significant. If there is a critical breakdown on an isolated oil rig, for example, on-site technicians can quickly link to off-site experts via an XR program. The expert can assess the problem and provide step-by-step instructions by annotating the technician's device screen.

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Enhanced employee engagement, better experiences

As companies reshape their operations around intelligent workflows, these new virtual employee experiences need to be designed with the same care and rigor that customer experiences receive. By providing meaningful enhancements to physical experiences, XR can, at times, even compensate for deficiencies in an employee's physical environment.

When the pandemic caused employees around the world to work remotely, they had to pivot overnight to collaborate digitally, often via videoconferencing platforms, which are typically limited to a grid of faces, conversations, and static screens being shared. XR can give remote collaboration a huge boost. Isolated workers can come together in a virtual environment, gaining a fuller sense of being in the same "place" as their colleagues. With the rich engagement possibilities XR affords, team members in different locations can virtually manipulate digital objects as they might physical ones—but with the retention, search, and analysis advantages digital content and objects have over physical ones.

In response to COVID-19, companies are prioritizing the need for employees to feel engaged and connected to their colleagues and leaders. While this area is nascent, there are signs that XR is helping to fill the gap. One company, in response to the sudden need for so many remote workers to find better ways to collaborate productively, launched a VR collaboration and meeting app, then made it available free-of-charge as part of an open beta program.[11]

Conversely, XR can also provide employees with a private virtual workspace. This can be especially helpful and appreciated if employees' physical locations don't afford them the privacy they need.

XR at work today: What's on the tarmac?

Currently in field trials internationally, a container ID scanning app can visually recognize cargo containers on the airport tarmac. It displays a content overlay that shows the goods inside, along with container positions, dangerous goods, and missing or offboarded passengers with checked baggage in the containers. Recognition is done using on-device machine learning and images consumed from the device's video stream and processed in real time. At a glance, ramp officers can now quickly see if a container is ready for loading, making flight turnaround more efficient and improving departure times.

Ultimately, XR will be a primary tool an organization uses to cultivate a vibrant, productive culture.

XR-enabled experiences offer the type of workplace advantage that is becoming increasingly important to attract and retain top technical talent. For those employees raised on digital technology, mobile devices, and video games, XR in the workplace is simply an extension of the digital engagement they enjoy in their personal lives. In fact, not having XR at work could signal to job seekers that the company they're considering isn't willing to invest in the tools they need to perform at their best.

Studies indicate that 44 percent of Millennials believe their current workplaces are not "smart" enough.[12] Attracting and retaining this generation of digital natives will be critical for employers because in just five years, Millennials are projected to make up 75 percent of the global workforce.[13] XR can vastly widen the possibilities for creating engaging employee experiences, and millennials are eager to use it: Sixty-six percent say VR training will allow them to learn from anywhere, on their own time, and 73 percent say virtual sharing tools are important.[14]

Ultimately, XR will be a primary tool an organization uses to cultivate a vibrant, productive culture. Whether it's replacing physical events that are no longer possible or practical with virtual ones, or creating the digital equivalent of the "office water cooler," the creative blend of virtual and physical environments will help bring to life a company's values.

Action guide

Use Extended Reality to reimagine how work is done

XR applications support a better way to train, to work, and to engage employees with improved experiences. While COVID-19 may have fueled interest in XR, XR's benefits will continue to resonate well after the pandemic has waned. The organizations with a head start have moved on from pilots to building and scaling XR solutions that are connected to backend systems and empowered with AI. Here's how all organizations can accelerate their progress:

– **Seize this opportunity to reinvent workflows**

  Steer clear of simply layering XR onto existing workflows. Invest the time to reimagine improved processes. Consider the unique capabilities of AR, VR and MR, and assess the employee impacts, business value, downstream operational implications, and effects on customer experience.

– **Start fast for quick wins**

  Start with the XR application that is easiest to implement while offering the highest potential return. Take an agile, human-centric design approach to rapidly develop an application and continually iterate improvements.

– **Transform your workplace culture**

  Instead of positioning XR as a one-off solution, continue to look for opportunities across your enterprise where human troubleshooting and decision making could be enhanced or automated with XR and AI to quickly scale and democratize expertise.

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