

Why Companies Are Investing in IoT, Remote Monitoring, and Augmented Reality

Organizations of all sizes are leveraging technology to drive critical business decisions and boost competitiveness. This digital journey involves connecting assets and collecting data that can be used for actionable insights.

Three key technologies are leading companies to improved operational capabilities: the Internet of Things (IoT), remote monitoring (RM), and augmented reality (AR). Each in its own way contributes to a modern, digital enterprise.

Let's quickly review the meaning of each term.

- **Internet of Things:** A network of interconnected devices that collect, exchange, process, or analyze information in real time, via the internet, without human interaction.
- **Remote monitoring:** The use of sensors, software, and user input to observe equipment, assets, and people from a central location, no matter where the objects are located. RM allows organizations to understand the movement of people and machinery and to share expertise across diffuse work environments. [IDC](#) predicts that by 2023, 40% of G2000 companies will develop new processes as remote operations first.
- **Augmented reality:** An interactive experience that overlays a virtual layer of objects and sensory input to enhance a real environment. Merging the digital world with the physical world creates an immersive and flexible user experience. This technology supports improved operations through employee training and knowledge transfer.

Organizations are building out their capabilities for data-driven operations and product development that leverages next-generation technologies like artificial intelligence, blockchain, 3-D printing, and advanced robotics. The most mature enterprises have discovered a mix of innovations that work best for them.

Challenges

Companies face several key considerations when deciding whether to invest in any new technology. There is understandable concern about large investments of time and money.

Here's a look at some of the primary challenges for companies to resolve.

Workforce Management

Digital natives bring their comfort with technology into the workplace and have the skills needed to drive a digital-first organization. Companies strive to have enough in-house talent to deploy advanced technologies—including installing the equipment and sensors and analyzing the data.

Legacy Systems

Outdated software, equipment, infrastructure, or systems may be unable to support increased levels of processing and the accelerated pace of business that new technologies facilitate. This requires adapting legacy systems to work with the new technologies or decommissioning and replacing existing systems to meet the new requirements of a digital business model.

Cybersecurity Risk

The IoT and RM open new avenues for compromising data and enterprise due to factors like the scale of the data organizations are managing, the number of devices, and the fact that third parties are often involved. To be secure, any organization working with these technologies must have a clear sense of how information flows in to and out of the organization, the assets involved, and which assets need to be most secure.

Why Invest Now?

Data is the most valuable asset within any modern organization. Information from sensors, machines, processors, and people can be captured, measured, and analyzed for a variety of uses, such as optimizing and automating operations, improving task efficiencies, enhancing R&D, and upgrading production.

Across industries, businesses are facing up to the risks—including workforce management challenges, the impact of not updating existing infrastructure and legacy technology, and security risks—and making the investment. In 2021, a Microsoft survey showed that 90% of organizations in sectors like manufacturing and energy invested in IoT technology, with 82% saying at least one project had reached the use stage.

By 2024, IDC estimates, 60% of G2000 companies will invest in knowledge networks to support AR and virtual reality (VR) for field service and asset management, resulting in a 25% decrease in mean time to repair.

One key reason to invest now is what IDC calls the looming loss of talent, expertise, and knowledge. The aging workforce is a perennial challenge—in 2019, half of manufacturers lacked the people and resources they needed. And the pandemic has led to record levels of attrition across all age groups.

Another motive for investing in the IoT, RM, and AR is that other enterprises are already investing. IDC predicts an explosion of worldwide spending on AR and VR—a five-year compound annual growth rate of 54.0%.

Expected investment in AR/VR in the commercial and public sectors in 2024:

- **Discrete manufacturing: \$5.9B**
- **Process manufacturing: \$5.1B**

Source: IDC

Commercial

Manufacturing is one of the biggest sectors on the leading edge of IoT, RM, and AR technologies in the commercial space. Integrated manufacturing requires connected devices (both physical and digital) and RM for visibility along with AR for maintenance and training. These technologies eliminate blind spots, enable predictive maintenance, highlight new opportunities, facilitate remote collaboration, and provide data analytics and insight to optimize performance and drive business value.

[Gartner](#) projects that the manufacturing sector will spend up to \$670 billion on the IoT by 2023. Meanwhile, according to Forrester¹, 85% of mature manufacturing companies use the Industrial Internet of Things (IIoT, the system of connected devices used in manufacturing) to support the factory floor, and the IIoT is the top investment priority for those who are lower on the maturity scale. Real-time monitoring of equipment and productivity is one of the top two investment priorities for mature manufacturing firms.

Once the product gets off the factory floor, manufacturers are using RM and the IoT to get regular feedback from assets in the field—both to improve the customer experience and to shape product development and speed up subsequent releases.

RM also boosts security by enabling monitoring of assets in multiple locations. This is especially true with continuous monitoring and a single interface to allow real-time observation and intervention if needed.

Medical Devices

Global regulations require traceability and auditability for medical devices and their components—from the initial design through implementation in the hospital, lab, clinic, or patient's home. This protects patients and ensures manufacturers can remove dangerous or defective devices from the market.

Beyond protecting patient health, traceability has benefits for the manufacturer, facilitating R&D, next-generation product design based on real-time performance data, quicker replacements of failures, and more.

The ability to track and monitor these devices can be challenging for many companies, with manual and cumbersome processes that create a time lag to get information from the field back to the people who need it (e.g., maintenance and R&D teams). And though it is cumbersome, this approach works, and established companies are not eager to take the risk to adopt new technologies—even when they know these technologies could improve the processes.

At many organizations, the use of the IoT and AR could improve efficiencies for quality control teams, regulatory groups, R&D, and end users. Medical devices are highly complex systems that must work 24/7/365 without fail. The ability to receive real-time data makes a difference—anomaly detection and predictive maintenance enable manufacturers to get ahead of potential breakdowns. Instead of waiting for something to go wrong and the situation to become an emergency, for example, a connected device could report statistics and key performance indicators in real time so that teams could get ahead of potential breakdowns.

With devices like artificial joints, MRI scanners, and wearable biosensors, the Internet of Medical Things (IoMT), the system of connected medical applications and devices, is growing. [Gartner](#) estimates the market is worth \$158.1 billion.

AR is useful in the medical device field because it takes a lot of time to articulate the build instructions for these complex machines. With AR, the manufacturer can assemble the product in a more natural way, without a lot of words (which is helpful for breaking through language barriers in global organizations), and the field service organization can service the device without carrying a 70-page manual to the site. With the growing use of tech in medical training and surgical procedures, AR is an advance whose time has come.

RM of patients empowers healthcare workers to collect information on patients to inform care decisions. [Twenty-six percent of U.S. adults](#), about 70 million people, are expected to use remote patient monitoring solutions by 2025.

Defense

With the flow of classified information and rules needed to protect it, the defense industry is generally risk averse—despite having big R&D budgets to invest in technology. Enterprises in the defense sector are using IoT, RM, and AR to streamline efficiencies, though lagging behind commercial industries in adoption.

One core reason for this deficiency is that defense contractors have been unable to attract the kind of labor force needed to compete as digital-first organizations. An aging workforce and a typical 30% turnover rate heighten the urgency of attracting digital-native employees.

The defense sector is evolving to become more like its commercial counterpart, as modern soldiers, for example, require real-time information at their fingertips. The most important accomplishment in this space is getting information into people's hands so they can make the right decisions in a timely manner. The U.S. Army, for example, is [using AR](#) to improve soldiers' situational awareness, precisely locate their positions, and see in the dark. Investments in AR in the defense sector are projected to reach [\\$5.8 billion](#) by 2026.

However, the industry has to prioritize the most critical and tactical assets to keep the military ready and thus has not always been able to focus on new technology. The risk of failure is high, and the U.S. Department of Defense and defense contractors must have a high level of trust in any third parties working on technology enablement.

A Final Word

No matter the industry, the path to adoption for any of these technologies starts with understanding the business case and answering some tough questions: What is the value of the IoT, RM, or AR to the organization? What will we do with the data and the insights gathered? What is the cost of not adopting? Once questions like these are answered, it is time for a pilot project—test it out in a small area of the business as proof of concept.

Boston Engineering Corporation | 300 Bear Hill Road Waltham, MA 02451
boston-engineering.com | info@boston-engineering.com