Improve Efficiencies with IoT, Remote Monitoring, and Augmented Reality

The digital thread—a communication framework that connects traditionally siloed elements in manufacturing processes and provides an integrated view of an asset throughout the manufacturing life cycle—is leading to new process innovations that improve operations and boost profitability. The Internet of Things (IoT), remote monitoring (RM), and augmented reality (AR) are all key ingredients that enable enterprises to spin that digital thread.

These technologies facilitate increased efficiencies that can improve productivity and save money through improvements like reducing mean time to repair and reducing scrap and reworking. They also open opportunities for making the business smarter, upgrading or expanding existing products and services, or cultivating new revenue sources.

Connecting physical assets (e.g., remote sensors) via IoT helps organizations work more efficiently. Depending on the devices themselves and their specific applications, these assets can collect information, send and receive data, and act on the information they process and store. This connectivity results in faster processes, the ability to track performance and maintenance needs, or elimination of the need for human intervention.

The State of the Technologies

Sensors and IoT assets produce an abundance of data: IDC estimates that by 2025, connected devices will generate almost 80 billion zettabytes of data. In tandem with artificial intelligence like machine learning, organizations are using this data to garner insights, support decision-making, and stimulate the product development process.

RM, which goes hand in hand with IoT, allows organizations to track the movement of people and machinery and to share work across diffuse environments, including collaborating and sharing files and work products. AR, an overlay of virtual objects to enhance a real-world environment, uses data from sensors and IoT devices and supports improved operations and efficiencies and product development.

The convergence of these three technologies can lead to real change in enterprises t.that establish connected digital threads and digital-first ecosystems. McKinsey estimates that IoT alone will generate $5.5 trillion to $12.6 trillion in value globally by 2030. Meanwhile, 80% of companies in

a [BCG study](#) expect IoT-AR solutions to become the norm in their industries.

Uncovering Actionable Insights

These technologies boost profitability by increasing efficiencies, improving margins, and providing real-time visualizations of what is happening in the business. As a result, organizations uncover actionable insights that facilitate more informed decision-making.

Examples include:

- Analyzing data for predictive maintenance of factory floor equipment to reduce downtime.

- Implementing AR training for employees to reduce production errors and reduce total training time for new hires.

- Connecting IoT devices to collect and store real-time data to uncover trends and reveal patterns of use that could speed up or improve product development or redesign.

- Using IoT and RM to monitor product use or service and identify issues that are getting in the way of profits. This can be a technology issue, such as interoperability or connectivity challenges that hamper use, or a process issue, like identifying part of the supply chain that is slowing down movement of raw materials or inventory. [McKinsey](#) notes that 23% of companies are using IoT for operations management, and 16% are using it for product development.

A key area in which the digital thread contributes to revenue streams is product development. IoT and RM can uncover information about customers at all stages of the buying cycle. Using that data, businesses learn how to address their needs more effectively—by improving or upgrading existing products, identifying cross-selling opportunities based on usage, or uncovering a need for new products based on customer behavior.

Commercial

The connected technologies of the digital thread give everyone from line workers in manufacturing plants to executive management in front offices access to the data they need, when they need it. Enterprises in the commercial space are using IoT, RM, and AR to eliminate blind spots in their processes, predict maintenance needs, and identify new market opportunities. Factories are expected to see the largest potential [economic value from IoT](#) by 2030.

Medical

Successful medical devices—from a home health device that helps a patient manage a disease to diagnostic equipment in a hospital setting—are complex systems with thousands of parts that have to work right, all the time, to protect patient health.

Medical device companies are using IoT, RM, and AR for activities such as:

- Monitoring traceability from design and development to deployment in the field

- Measuring key performance indicators (e.g., powerbattery levels, device vibration, or temperature) to enable repair before a product breaks

- Gathering data (e.g., performance or usage trends) for product upgrades and next-generation product development

Defense

The defense industry must prioritize the most critical, tactical assets to be ready to deploy, often on the front lines of conflict. This need for speed and efficiency drives decision-making, and defense enterprises are slow to change and trust new solutions. Deloitte reports that 30% of U.S. aerospace and defense companies are currently implementing digital thread initiatives.

Here, the digital thread:

- Speeds the process from design to delivery and improves production efficiency

- Improves logistics and resource optimization

- Provides tools that allow one person to do the job of several people

Creating a Digital-First Organization

Building a digital thread using IoT, RM, and AR to boost revenue and profits requires having or creating processes and a culture to support them. Elements that support a digital-first organization include:

- A digital-savvy workforce that can manage and operate the equipment and assets, analyze the data, and think strategically about how digital initiatives improve the business.

- An accessible infrastructure for capturing and sharing the data—along with reliable data storage and transmission—so people can easily find and access the information.

- Convergent technologies such as machine learning or artificial intelligence to analyze data and provide insights to improve business operations and product design.

- A robust cybersecurity infrastructure that ensures networks and data are secure and private while complying with all relevant regulations.

When building a digital thread, it is necessary to define goals for the technologies that effectively and efficiently solve business challenges and also align with the business goals and objectives. A subsequent action is to set key performance metrics and milestones to measure program success. For most organizations, the first steps to adoption are to engage with an organization that understands a digital-first landscape (to learn what digital first means for their own organization) and then to adopt a pilot program for IoT, RM, or AR.

It's important to think about adoption of these technologies as future-proofing the organization. Also be sure to look at the transformation for the business and its operating model as a whole as opposed to thinking about adopting IoT, RM, or AR individually or as a single project to complete. Making this transformation has significant potential value: Gartner expects 63% of enterprises will achieve financial payback for IoT projects in three years.

A Final Word

Building a digital thread is a strategic move for any enterprise and one that can materially contribute operational efficiency, resulting in increased margins and overall profitability. The journey starts with understanding the current state and thinking strategically about how to use advanced technologies such as IoT, RM, and AR and the data they produce to increase efficiencies, reduce margins, and create new lines of revenue.

Smart connected products and operations and the analytics and operational efficiencies they enable can add real value to all areas of an enterprise ready to make the investment. Whether directly via product improvement or development or indirectly by increasing efficiencies, these technologies are already changing people's lives for the better.

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