How Augmented Reality Helps Manufacturers Cope with Labor Crunch

Manufacturers are struggling to attract, retain, and train workers amid pandemic-triggered disruptions. Manufacturing leaders can adopt mature, mobile network-based augmented reality solutions to preserve the organization's technical expertise, improve training and boost worker productivity.

The manufacturing sector is losing workers and struggling to find and train their replacements. Federal data tracks "private job separations" (which includes workers quitting and being laid off). Manufacturers lost 420,000 workers in both October and November 2021, according to IndustryWeek, citing preliminary January 2022 data from the Department of Labor's Bureau of Labor Statistics. BLS estimates that 293,000 of those leaving employees voluntarily quit last month, down only slightly from 298,000 recorded quits in October.

At the same time, according to IndustryWeek:

- The hiring rate in manufacturing fell between October and November 2021 from 482,000 to 472,000.

- Manufacturing employers also reported that the voluntary quit rate jumped compared to past years: from 64% in November 2020 to 70% in November 2022.

This loss of skills in an unprecedented tight labor market directly affects manufacturing leaders' ability to run manufacturing lines and get products into customers' hands.

> **The question manufacturing leaders are urgently asking is:**
>
> **How do I keep my business operating in this labor environment?**

Augmented reality (AR) is a mature technology. It scans real-life surroundings using a camera, analyzes the image and then overlays on it relevant digital (virtual) elements, such as photos, diagrams, animations, automated check lists, contextual step-by-step assembly/disassembly instructions, parts and inventory information, and much more. The resulting "augmented" reality can be delivered on a wireless tablet, such as an iPad, ruggedized wearable devices or specialized headsets, such as Microsoft's HoloLens 2, which uses a laser-based display.

AR Enables New Training Approaches

Augmented reality technology enables manufacturers to replace traditional, classroom and paper-based training methods with something like **a virtual apprenticeship.**

Proven AR platforms, combined with the right hardware and mobile network, let manufacturing leaders quickly capture expertise from veteran workers.

This expertise then can be shared in real-time as:

- Highly effective contextual work instructions or training, new hires.

- Immediate technical support for customers or colleagues by a remote expert to analyze a problem or evaluate performance in real-time, without being physically present.

These solutions speed up learning, reduce learner curve, boost productivity and reduce time to resolution for manufacturing tasks, maintenance and repairs.

Mobile network operators, especially when partnered with AR platform vendors, enable these solutions to be deployed quickly over a cellular network without the need for wired network infrastructure. 5G wireless services, combined with multi-access edge computing (MEC), is fast, with very low latency and high bandwidth. This combination enables real-time AR data rendering in smart glasses, headsets, or mobile devices such as tablets and extend these AR capabilities to remote manufacturing or job sites.

Manufacturing leaders can take three actions to assess AR training solutions.

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[1] "Manufacturing Contributes Little to Great Resignation, Labor Data Shows" — IndustryWeek, January 4, 2022

PRIORITIZE YOUR TRAINING REQUIREMENTS

The manufacturing labor shortage forces manufacturing leaders to leverage the know-how and skills of existing workers by facilitating their knowledge transfer to less-skilled workers and to new hires. The goal is to quickly make workers productive more quickly and maximize their safety on the job.

AR can be used to capture the expertise of veteran, skilled workers and then distributes it through contextualized, visual, step-by-step instructions and insight into specific tasks on the job. AR minimizes task interrupts and, at each step of the task, gives workers the information directly relevant to that step. There are two key results: workers become more efficient and tasks more likely to be done right the first time.

This overall AR solution also can be combined with on-site or remote mentoring or support processes: if a worker needs advice or help, they can connect with an available, more experienced colleague who can guide and provide support
.
Viewed from this perspective, AR complements automation and robotics in manufacturing as ways to cope with the labor and skills shortage.

To prioritize training requirements:

- Ascertain whether the most important upskilling need is for new and recent hires or for existing workers.

- Assess the operational problems and inefficiencies that can be overcome through improved, task-oriented training.

- Identify your "knowledge assets" – the veteran workers with the experience and know-how to do essential tasks efficiently and rightly.

- Expect and plan for resistance as workers face potentially disruptive new technologies and operational changes.

- Be flexible in leveraging the AR solution's options for distrib-uting knowledge and expertise. These options will be very different from your traditional approaches.

- New AR instructions should be reviewed and assessed for compliance with corporate policies andregulatory requirements.

- Take account of workers' differing technology experience and expectations. An affective AR solution confirms for "early adopter" workers that organization is serious about optimizing their effectiveness, safety and job satisfaction.

AR's Impact in Manufacturing

Organizations can see concrete results with AR solutions in such areas as machine operator training, field service and remote assistance, start-procedure training, and much more.

Users report faster training, greater knowledge retention, more accurate and efficient tasks.

TARGET PROVEN AR PLATFORMS

AR platforms can range from complex, centralized, customized systems with cutting-edge end user devices to much simpler, decentralized, configurable systems relying on established mobile devices such as tablets and laptops.

Clear training requirements act as a guide through the multitude of AR training platforms and their capabilities.

To achieve these results, assess the following platform capabilities:

Intuitive knowledge capture and instruction authoring:

Look for a UI design that "fits" the mobile devices you'll be deploying. Users should be able to create and distribute instructions without having to learn complex procedures.

Information dependencies:

Generally, the fewer the information dependencies, the better. For example, does the solution enable users to author instructions without having to leverage other data, such as 3D CAD files? Dependencies entail complexity (data conversion for example) and delay. If they're needed, make sure the software supports a clear process for data access, conversion and integration.

Mobile device flexibility:

The solution should be able to work with an array of end user mobile devices. In many cases, an Android or iPad tablet is all that's needed.

Easy configurability:

Adapting software via settings is a fast, cost-effective alternative to custom coding.

Wireless network performance:

Since AR is an interactive technology, the solution should be optimized for the mobile networks over which it will run, Wi-Fi, 4G/LTE, and eventually 5G.

LEVERAGE MOBILE OPERATORS' SERVICES AND SUPPORT FOR AR

Mobile network operators are well-positioned to support AR solutions. Increasingly, they act as the clearinghouse for these solutions, partnering closely with a subset of software and hardware vendors. They also coordinate with the AR partner on a full set of consulting services, from initial requirements and design, through installation and training to post-deployment customer service and support.

Mobile networks enable manufacturers to deploy AR solutions without the need for wired infrastructure. As a result, AR solutions can be deployed quickly and securely across large plant facilities or campuses and in remote locations.

5G wireless will dramatically propel, expand, and extend AR capabilities.

5G is a Paradigm Shift

" 5G has unique properties and attributes, which will define its disruptive characteristics. These include high data rates, higher system capacity, reduced latency, and massive device connectivity. Commercial 5G deployment will expand network possibilities beyond any of the previous cellular network technologies. **5G is a technological paradigm shift, not just an extension of existing technology**[2]. "

These networking capabilities will enable manufacturing leaders to:

- Deploy cost-effectively data-intensive AR devices.

- Leverage 5G for real-time AR use cases.

- Optimize in-building AR deployment, without being hobbled by network cabling.

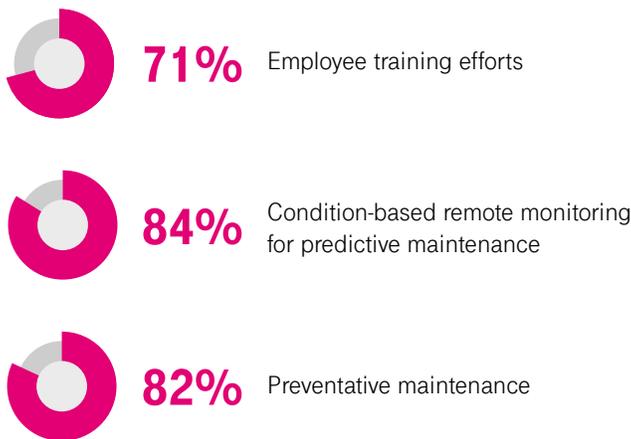- Extend data-intensive AR solutions to remote locations.

[2] "How 5G is Transforming the Manufacturing Landscape" — Manufacturing Institute, March 2021

BE BOTH REALISTIC AND PROACTIVE WITH 5G

5G wireless services are available today. A majority of manufacturers already have tested or deployed 5G in some form, according to the Manufacturing Institute's 2021 report "How 5G is Transforming the Manufacturing Landscape."[3]

In the Manufacturing Institute's report, manufacturing leaders anticipate 5G's benefits will be important in (among other areas):

71% Employee training efforts

84% Condition-based remote monitoring for predictive maintenance

82% Preventative maintenance

These leaders also anticipate that with 5G solutions:

Estimated equipment productivity will increase by roughly **42%**

Worker productivity will increase by **41%**

The chief constraint manufacturing leaders face is the availability of 5G radios for client devices, ranging from mobile tablets to AR glasses and headsets to an array of sensors and IoT devices. A second constraint is what frequency bands the various mobile operators have to offer 5G service and how those bands affect 5G performance.

To ensure effective AR training deployments, manufacturing leaders should assess mobile operator offerings in these key areas:

Available network technologies:
A range of technologies give manufacturing leaders deployment options, in terms of performance and costs. Being able to view the real-time network performance of any link is a key indicator of operator's transparency and SLA fidelity.

Customer service model:
A dedicated account team and a close working relationship with the AR partner minimizes deployment problems.

5G network status and available frequencies.

Support services:
An AR manufacturing solution is not a black box installed on the customer's premises. Effective consulting services — in partnership with the AR vendor — should cover solution design, business outcome definitions and metrics, validating devices, installing the solution and follow-up monitoring/alerting and optimization.

Partnerships with and support for client device makers integrating 5G radios.

Details of the operator's plan to migrate manufacturing customers to 5G.

[3] IBID

CONCLUSION

Manufacturers continue to lose workers, and struggle to find replacements. This loss of skills in an unprecedented tight labor market directly affects manufacturing leaders' ability to keep manufacturing lines running and get products into customers' hands. Augmented reality (AR) platforms, combined with mobile networks, enable these leaders speed up on-the-job training, improve worker skills and boost productivity for manufacturing tasks, maintenance and repairs. Mobile network operators, especially when partnered with AR platform vendors, enable these solutions to be deployed quickly over 4G/LTE and 5G, without the need for wired network infrastructure.

To learn more about T-Mobile's unique advantages in the manufacturing space, visit our website or contact 844-983-2351.

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