

CPG Manufacturers Leverage XR for Improved Efficiency, Training and Safety on the Frontline

Using wearable technology to bridge the gap between humans and machines

The manufacturing industry is in the midst of a major transformation - the largest since the Industrial Revolution - driven primarily by a confluence of increased automation and a labor shortage unmatched in modern times.

After decades of plodding and hesitant change, COVID-19 brought several years of extreme upheaval and forced an accelerated disruption upon the industry, with varying degrees of success. Manufacturers of all kinds are still finding their way in this new digitized landscape; for those that don't just want to survive, but thrive, digital transformation will be essential.

Within the larger manufacturing ecosystem, there lies the smaller- but vital - consumer packaged goods (CPG) industry. These companies make the products that consumers regularly buy and use in everyday life, such as toothpaste, pet food, canned goods, and beauty products.

CPG manufacturers have traditionally lagged other industries in the digitization and automation of their operations in favor of a focus on manufacturing excellence and traditional lean principles.[1]

While there are still growth opportunities within those operational areas, a quickly changing world is making it difficult to find success through these methods alone, and the pressure is on CPG companies of all sizes to adopt new technologies and stay competitive.

Digitization and Automation

Digitization is the first step toward automation and involves the process of converting anything that's in a hard copy to a digital format. A good example would be moving a user manual from a three-ring binder to a digital format that can be processed by a computer.

Automation improves processes that are already being offered. It leverages machines or software to accomplish repetitive tasks with little to any human intervention.

An Automated Way of Working

The manufacturing industry has been exploring factory automation in the hope of increasing productivity and reducing costs since the first automated machines were introduced in the 1960s. Today, modern advances in robotics, machine learning and wearable technology are helping speed the adoption of automated technology as machines match or surpass human performance in a range of work activities - with no discernable signs of slowing. McKinsey predicts that up to 57% of manufacturing could be fully automated in the next 20 to 25 years,[2] and it's expected that the costs of automation and the corresponding technologies will drop by 65% by 2025,[3] making the path to automation accessible to even more small- and mid-size manufacturers.

> *Up to 57% of manufacturing could be fully automated in the next 20-25 years.*
>
> ***- McKinsey & Company***





Growing demand for consumer goods is spurring job creation around the world, with global consumption expected to grow by $15 trillion between 2020 and 2030, yielding 170 million to 190 million new jobs.[4] With the increase in automation technology, manufacturing experts predict that artificial intelligence (AI) will create new opportunities for highly-skilled roles not traditionally seen in CPG companies, such as data scientists, software developers, AI specialists, and experts in robot repair and maintenance.[5]

But despite the wide availability of high-paying roles and frenzied demand for skilled workers, many of today's CPG manufacturers are still finding it difficult to hire and retain a qualified workforce capable of keeping up with the demands of a more digitized factory.

The manufacturing industry, which had already lost nearly 7.5 million jobs since 1980,[6] faced further challenges when COVID-19 hit in March 2020 and the industry saw what's known as The Great Resignation: millions of workers leaving the workforce and taking their decades of knowledge and experience with them. This exodus of workers affected almost every industry, but manufacturing was hit the hardest with a nearly 60% jump in worker resignations compared to pre-pandemic numbers.[7]

These mass resignations have left manufacturing companies that have not yet moved to some form of automation scrambling to retain intellectual property and questioning how to train the next group of employees safely and efficiently. A diminished workforce and an increasingly competitive industry landscape forced many of these more traditional companies through an abrupt technology shift over the last two years, with wearable technology often serving as the tip of the spear. This was not always met with success and left many small companies frustrated, scared to make another big investment, and less attractive within the labor market. Even the CPG firms that were already operating hybrid factories and able to adapt their operations more quickly are still limited by the difficult process of attracting and retaining the skilled humans needed to keep their factories running smoothly.

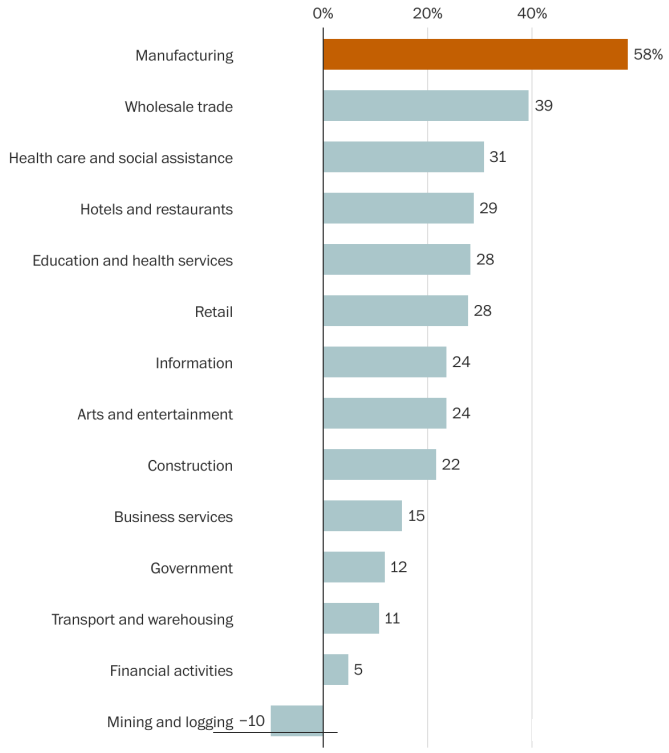
Many CPG manufacturers stepped up to face these significant staffing challenges in 2021 by raising wages and introducing new benefits to attract and retain employees, but the signs are clear that the manufacturing industry worker shortage will continue through 2022 and beyond.[8] According to Deloitte's 2022 Manufacturing Industry Outlook,[9] record numbers of unfilled jobs are likely to continue to limit higher productivity and growth in 2022, with an estimated shortfall of 2.1 million skilled jobs by 2030. Another 4.3 million people quit their jobs in January 2022 alone, mainly in the manufacturing and hospitality industries.[10]



Assisted Reality allows users to keep their hands free for the work

Manufacturing has seen the biggest growth in job quitting

Percent change in quits level in late 2021 vs. pre-pandemic



Note: Three-month averages (seasonally adjusted) used to smooth out data volatility.

Source: Bureau of Labor Statistics THE WASHINGTON POST THE WASHINGTON POST



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Bridging the Human-Machine Divide

What's become especially clear in recent years is that the CPG organizations that can innovate and manage through workforce shortages and adapt to a rapid level of change will come out ahead. While greenfield factories like those from Tesla and other truly new industries serve as an example of what a highly automated hybrid factory could be, most CPG manufacturers working with legacy factories and existing factory lines would like to upgrade for more autonomy and flexibility-and that requires a high level of change management and investment.

To help ease this process, many companies are turning to assisted reality technology as a bridge connecting executives and frontline workers alike with existing Internet of Things (IoT) infrastructure and paving the way for enhanced training, data collection, knowledge transfers and predictive maintenance. In this white paper, we look at the current state of wearables in the CPG manufacturing industry and explore the ways manufacturers can best implement this technology to increase productivity, reduce downtime and maintain and grow a skilled workforce.

> *Manufacturers are making progress and seeing results from more connected, reliable, efficient, and predictive processes at the plant. In 2022, 45% of manufacturing executives surveyed, expect further increases in operational efficiency from investments in the industrial Internet of Things that connect machines and automate processes.*
>
> ***- Deloitte 2022 Manufacturing Industry Outlook***

Assisted Reality in Modern Factories

Assisted Reality (aR) technology is a part of the larger Extended Reality (XR) world that includes augmented reality (AR), mixed reality (MR) and virtual reality (VR).

While XR technology has traditionally been long on promise and short on delivery due to tech limitations, higher costs and a general sense that the tools are faddish or niche, it now stands to secure a hold on the enterprise. Investments in wearable technology are increasing around the world, with the current XR market value of around $26 billion projected to surpass $460 billion in 2026.[11]

> *Unit shipments of smart glasses hardware in the industrial and healthcare sectors are expected to grow globally by a factor of 12.8 between 2020 and 2025. Unit shipments to manufacturing, logistics and energy and utilities sectors are also projected to grow by a factor of 10.8 in the same period.*
>
> ***- ABI Research***



AR and VR are often hailed as the next great leap in boosting worker productivity, but these XR technologies aren't always practical when used as manufacturing or frontline tools. They can be inappropriate or even unsafe for workers in many use cases. This brings us to aR technologies such as head-mounted displays (HMDs), which safely bring together the real and the digital world to create new kinds of interactivity and perception while allowing frontline workers to maintain full situational awareness. HMDs allow a user to view a screen within their immediate field of vision, hands-free, and access necessary information when they need it.

A wearable appropriate for the manufacturing industry is an industrial-strength aR device that connects frontline workers within factories and throughout entire companies with the data and expertise needed to successfully complete job tasks safely and efficiently. aR wearables also allow users to interact hands-free using vision, voice and head gestures. They can be operated in hazardous and very noisy conditions of up to 100 decibels, making them ideal for busy factory floors.

> *HMDs and motion-tracked controllers provide a new level of biometric data that can improve business processes and products. When XR is used for collaborating on training or design, the resulting data on how people interact can be particularly insightful.*
>
> ***- Forbes***

Today's CPG Manufacturers are Using AR Wearables in a Variety of Important Ways



1. Data collection

The power of data collection for companies and frontline workers using assisted technology cannot be overstated. Wearables allow new forms of data to be collected and leveraged into greater factory efficiency and lesser downtime, which is crucial-according to a recent report by Deloitte, downtime costs manufacturers around $50 billion every year.[12]

Many of the companies utilizing RealWear assisted reality devices also note the importance of the tight integration with software applications from Microsoft, Zoom, Cisco and many others for data collection, voice controls and other UI features.

2. Predictive maintenance and repair

Wearables play an essential role in predictive maintenance, keeping equipment running reliably, identifying faults at an early stage and solving problems quickly regardless of location.

Due to travel restrictions during the pandemic, Nemco Food Equipment was unable to put specialists on the road to help manufacturers maintain their specialized equipment for the food industry. As a result, Nemco explored how to better support its frontline operators and settled on RealWear's assisted reality wearable solutions for remote collaboration.

Nemco began its initial rollout internally by supplying some of its new technicians with the devices. Typically, new technicians require a specialist to accompany them to a site. However, thanks to the deployment of RealWear devices, new technicians were able to have instant access to a specialist working remotely, mitigating travel and providing an effective workaround in light of the travel restrictions.[13]

> *RealWear's device has created a new way of working for us that will extend beyond the pandemic, even when travel restrictions are loosened.*
>
> ***- Claus Skræm***
> ***Service Manager***
> ***Nemco Machinery A/S***

3. Training and collaboration

Poor training in a factory setting can increase the risk of severe injury or death, and the best safety practices are useless, unless the worker can properly identify or understand the risks. Creating standardized operating procedures are key to training, and HMDs allow workers to access that content quickly and easily while maintaining situational awareness and keeping their head-up and their hands-free. Fast access to important checklists and procedures help manufacturing workers make sure they're following safety protocols.

Today's workers embrace change and expect technology, support and modern tools to help them do their jobs. HMDs are beneficial for remote training and provide innovative ways to educate a new generation of workers, keeping them engaged and excited to grow their skills.

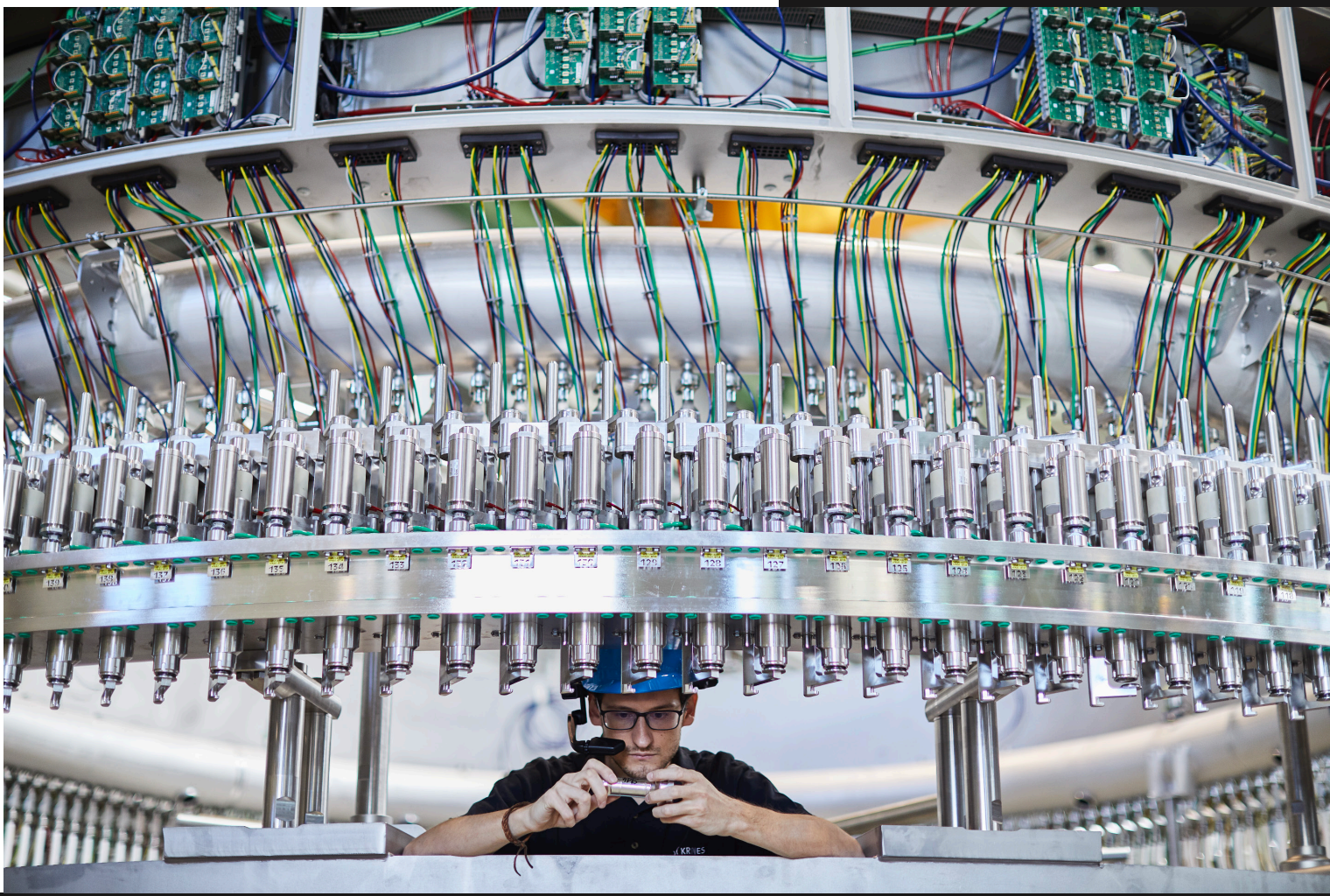
Industrial-grade HMDs also offer everything a worker needs to have a video call with a remote expert. Powerful connectivity and a high-resolution, interchangeable camera enable real-time collaboration by giving the remote expert the exact same view as the onsite worker.

For example, a legacy employee in one factory can walk a new employee in a different facility through the process of maintaining crtain machines or fixing an issue on a production line in real-time. This live, first-hand experience is much more valuable to the new employee and can also be saved and used for later training purposes, maintaining the legacy knowledge.



Honeywell uses a head-mounted wearable to bring live data documents, work procedures and health and safety information into view for employees in industrial facilities and factories.

If an industrial employee needs assistance, Honeywell can connect field personnel with remote experts in real time.



4. Safety and sustainability:

The pandemic changed the way people worked and helped many companies embrace the notion that a hybrid model is here to stay. While the world shut down to mitigate COVID-19, factories were forced to come up with creative solutions for site visits and safety inspections to keep employees healthy and limit exposure. aR devices allowed many companies to complete these visits remotely without compromising detail or safety.

The remote live visits also extended to repairs and training, which not only helped companies reduce the time and cost associated with travel but also aided in their goals of reducing carbon emissions-without negatively impacting collaboration. For example, when the Global Supply Excellence Team within Mars Petcare was tasked to streamline its production facilities, including minimizing maintenance downtime and increasing workers' skills and safety, it turned to RealWear assisted reality wearable solutions running Microsoft Teams.

This tight software/hardware integration gave workers on the factory floor safe, fast and hands-free access to equipment files and off-site coaching, reducing work travel for Mars coaches by more than 35%.

A Practical Model for the Future of Work

In a recent McKinsey study of more than 3,000 business leaders in seven countries, one in five top executives said that they and their peers in the C-suite lack sufficient understanding of new technologies.[14] The adoption of digitization and automation technology is a struggle for manufacturing companies of all sizes, and there is no one-size-fits-all model. An old-fashioned machine shop might take 20 years to become fully digitized, but it's important to start taking the small steps now that could lead to big results down the line.



Shown above: Realwear Navigator® 500, an industrial strength assisted reality device.

The vast majority of CPG manufacturers are working with an existing factory with legacy production lines, and many will dive straight into the deep end of automation software and XR devices thinking technology is the solution. While it is definitely part of the solution, companies need to ensure they're moving mindfully so the technology will stick in the long term. And remember-even in factories with high degrees of automation, there are still a lot of things that real people have to do.

Based on RealWear's engagement with hundreds of companies across a variety of industries-including leading CPG manufacturers-we have identified three best practices that are key to a successful implementation strategy for an assisted reality solution:

Safety is Key

Workplace safety is one of the most important conversations in the manufacturing sector. According to the U.S. Bureau of Labor Statistics, manufacturing accounted for 15% of all private industry nonfatal injuries and illnesses in 2019.

Training is a huge factor in manufacturing safety. Poor training can increase the risk of severe injury or death, and the best safety practices are useless unless the worker can properly identify or understand the risks.

Fast access to important checklists and procedures via HMDs help manufacturing workers ensure they're following safety protocols.



Step 1: Understand where you are in your digital transformation journey

There are certainly companies out there ready to turn every asset in their factory into a digital twin, but the majority of manufacturers aren't there yet. The first step is to ask yourself what the business is ready for next. What is the business outcome, and can it be described in economic terms?

Step 2: Identify a pilot use case for wearable technology

Once you have a consensus on the business outcome, it's time to look for a pilot use where the use of wearable technology would be obviously beneficial. Consider, for example, Colgate-Palmolive, a multinational conglomerate with leading brands in the personal care, oral hygiene, household products and pet care industries:

- The challenge: The company was constantly flying equipment experts all over the world to install, maintain and repair manufacturing equipment. This was expensive and caused major delays and production downtime.
- The solution: Colgate-Palmolive used RealWear assisted reality devices to enable its team of global experts to virtually collaborate with front-line workers, eliminating the travel required of subject matter experts and reducing the production downtime caused by offline equipment or scheduling delays.

Step 3: Commit to adoption over time

Once a use case has proven successful and demonstrated the savings associated with aR technology, you can turn your attention to the adoption of HMDs within the company over time, focusing on change management and making sure it's a positive thing for your workforce before moving to use case number two, five or 10.

- The future: Once Colgate-Palmolive tested the RealWear assisted reality solution through successful pilots in eight locations, the company decided to standardize the RealWear device for all global manufacturing operations moving forward.

The Future is Digital, Powered by Humans

Gone are the days when a standard technology hardware budget consisted only of buying rugged laptops and handhelds. The technology necessary for the future of work is here in assisted reality devices, but it's still vital that they are well-integrated with existing systems and meet the strict safety standards necessary in an industrial manufacturing environment.

And because none of this hardware would be useful without the humans that wear it, it's critically important to collaborate closely with frontline workers to ensure that the technology is being used to its full potential and that workers feel empowered to improve their knowledge and skills. With good quality hardware, well-integrated software, a skilled employee base and strong test cases in place, assisted reality solutions can offer a comfortable and beneficial experience that benefits frontline workers and company executives alike.

> *We like to meet the customer where they are in their digital transformation journey, not where we'd like them to be.*
>
> ***- Sanjay Jhawar, Co-Founder and Chief Strategy Officer, RealWear***



Colgate-Palmolive's global deployment signifies that industrial wearable computing has crossed the chasm into mainstream manufacturing companies.

This has been a textbook example of how to move with energy and purpose, from evaluation through pilot to global deployment.

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