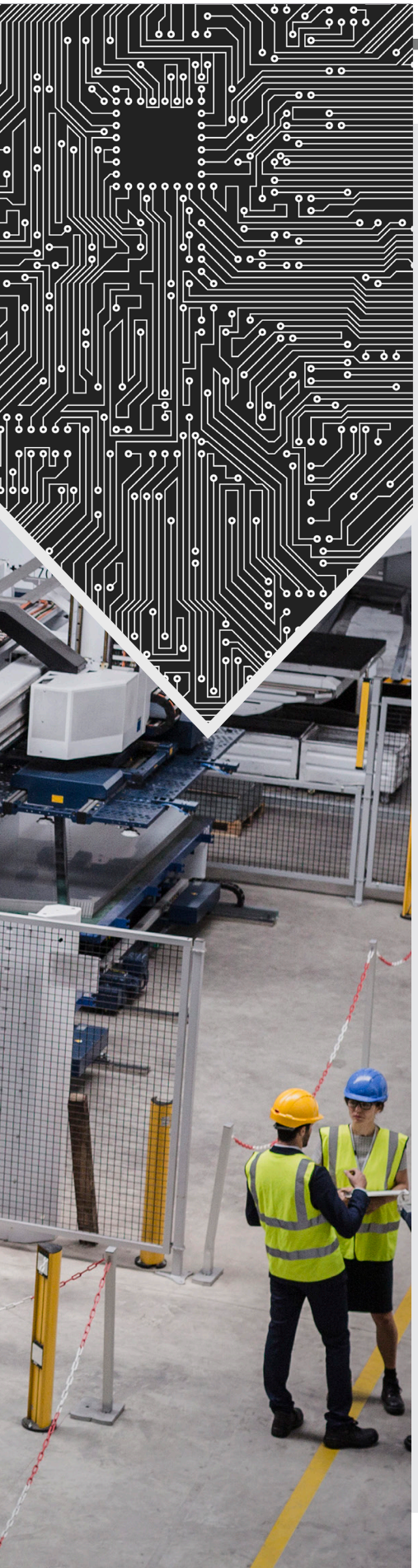
The Factory of the Future

HOW THE CONNECTED WORKER WILL REVOLUTIONIZE THE FACTORY



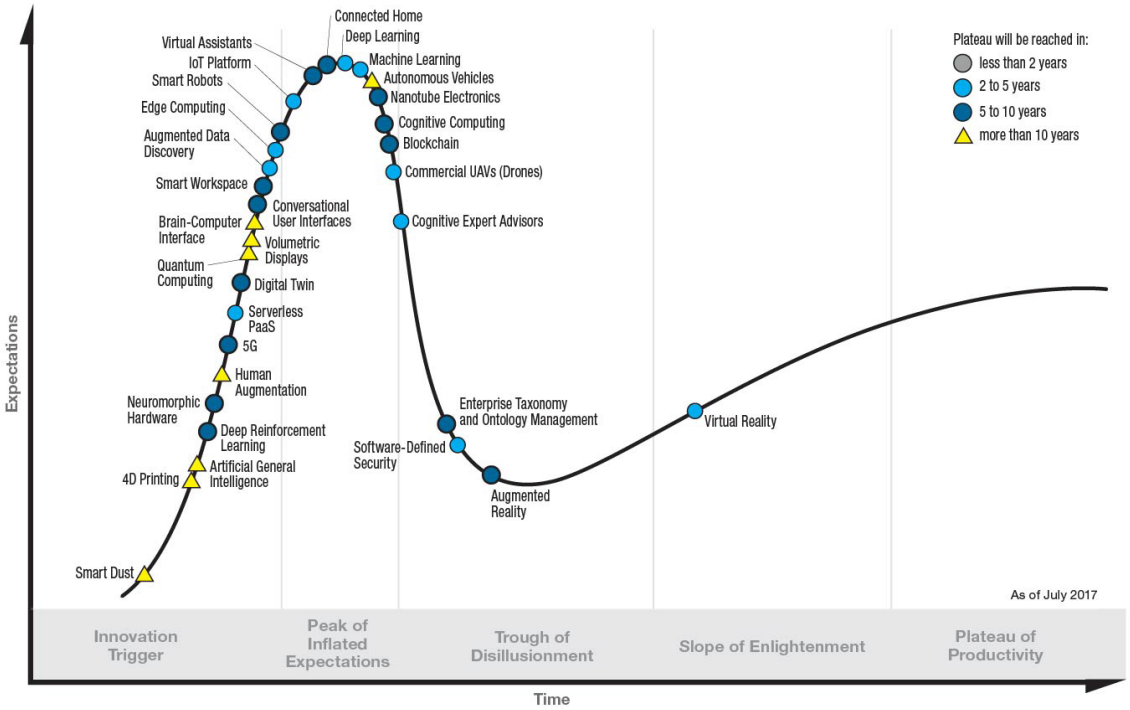
The Reality of the Factory of the Future

By Sanjay Jhawar, President, RealWear

The hype surrounding immersive connected worker technology has slowed, but digital transformation and its benefits are achievable today with the right tools and approach. Learn what this means for the factory of the future, and how manufacturers can overcome internal resistance to new transformation efforts.

Over the past several years, manufacturers have implemented consecutive waves of connected worker technology as a part of digital transformation efforts. Few businesses, however, have successfully capitalized on the promise of the digitized factory of the future. The truth is that though connected worker programs stand to change how manufacturing companies operate, they need a bridge technology adapted to the unique needs of the factory enterprise and its workers.

When ruggedized tablets, immersive virtual reality (VR) and augmented reality (AR) solutions were first launched, they were all the rage, and manufacturers experimented with them widely between 2014 and 2016 in initiatives designed to bring workers into the digital future. Industry experts made all sorts of marketing claims and predictions about their potential to rapidly change how industrial workers complete their duties and the value the emerging technologies would bring to organizations. At the time, more than one-third of manufacturers said they were either currently adopting or planning to adopt VR and AR technologies in the next three years.[1]



gartner.com/SmarterWithGartner

Source: Gartner (July 2017)

Today, the impact of these technologies hasn't lived up to early projections. Gartner estimated in 2018 that it would take another five to 10 years before the technologies reached a mature level.

"Businesses already experiment with VR but hesitate to fully commit," Gartner Principal Research Analyst Tuong Huy Nguyen said.[2] And according to a 2017 PwC survey[3], companies' ability to leverage technology and get the desired value from their investment has stagnated or decreased over the past several years.

> **"Businesses already experiment with VR but hesitate to fully commit."**
>
> TUONG HUY NGUYEN
> Principal Research Analyst, Gartner

1. https://www.pwc.com/us/en/industries/industrial-products/library/augmented-virtual-reality-manufacturing.html Fusing self-reported and sensor data from mixed-reality training."
2. https://www.gartner.com/smarterwithgartner/3-reasons-why-vr-and-ar-are-slow-to-take-off/
3. http://usblogs.pwc.com/emerging-technology/2017-diq-emerging-tech-insights/

The low rate of adoption is due primarily to backlash from manufacturers in four key areas:

01

NON-HANDS-FREE BACKLASH

Though ruggedized tablets typically use platforms familiar to workers and can be easy to use, the reality is that the majority of manufacturing employees work with their hands. Whether they're working on a production line, fixing a piece of equipment or inspecting product, the ability to work with their hands is integral to their job. To use ruggedized tablets in industrial environments, workers must take their hands and attention away from whatever they're doing. This

a) decreases worker productivity, because they have to pause an activity to look at the device (with lower productivity affecting the bottom line) and

b) decreases situational awareness, which is critical to being able to identify and respond to life-threatening safety hazards (which can also affect the bottom line).

Many immersive solutions that cover the face reduce peripheral vision and add to the digital distraction that workers, who already carry smartphones, have on the job. These solutions are simply better suited to the needs of architects and designers, who don't have the same rugged, hands-free needs as factory workers.

02

FRAGILITY BACKLASH

Many of the devices that have launched over the past several years weren't originally conceived and designed for a harsh industrial environment, where they may be banged up, dropped, exposed to dust, extreme temperatures, or used in other harsh conditions. They're consumer devices that have been marketed to manufacturing, but they weren't built from the ground up for use on a factory floor. Just look at the iPad: Though the consumer version was launched in 2010, ruggedized iPads and other tablets weren't adopted at scale by more than 1,000 workers in a single manufacturing business until 2014. Consequently, enterprise and worker frustration alike has grown with the cost and ineffectiveness of device replacement and frequent repair.

03

APP & CONTENT INVESTMENT BACKLASH

Most companies don't have the large quantities of immersive and interactive content needed to deliver Internet of Things (IoT) data visualization, maintenance instructions, training and reference materials on these devices. Creating libraries of this content or developing apps for thousands of pieces of equipment represents a large investment, and certain types of content, such as 3D, isn't really needed to enable remote coaching, knowledge transfer and viewing of documents and checklists. According to Gartner, "the biggest barrier to wide adoption of immersive technologies is the lack of good user experience design. 3D interface design is difficult and expensive, and there are few people with the necessary design skills to overcome these issues."[4]

Content is also not standardized between different devices – what works on one device typically doesn't work on another due to aspect ratio, frame rate, image quality and other factors, so unique content must be created for each device. That means manufacturers have had to go all-in on a particular device, and with new, unproven technology, that investment can be hard to justify.

04

PROTECTIVE EQUIPMENT BACKLASH

Immersive solutions such as helmets or headsets that partially cover the face aren't compatible with safety glasses and other safety gear, and ruggedized tablets are hard to use or cannot be used with safety gloves. This makes the devices difficult or impossible to roll out to all workers.

4. https://www.gartner.com/smarterwithgartner/3-reasons-why-vr-and-ar-are-slow-to-take-off/

A New Approach is Needed

Digital transformation and its myriad benefits are still the goal for manufacturers, but because the backlash is hindering progress, we expect that it will take five to ten years to fully achieve.

Though the potential benefits of these technologies are real, their real-world ability to make immediate change has been overhyped. The result: Manufacturers are unable to realize the benefits of enterprise-wide digital transformation, and deskless manufacturing employees on factory floors are disillusioned and resistant to implementation due to failed connected worker programs.

What's needed is a pragmatic approach to connected worker programs that's tailored to manufacturing and can deliver the digital transformation results the industry needs, instead of a futurist, technology-trying-to-find-a-problem approach. A technological stepping stone can help manufacturers achieve their digital transformation goals and realize massive ROI, productivity, safety and knowledge transfer benefits from their connected worker devices.

What will happen in the next 5 to 10 years

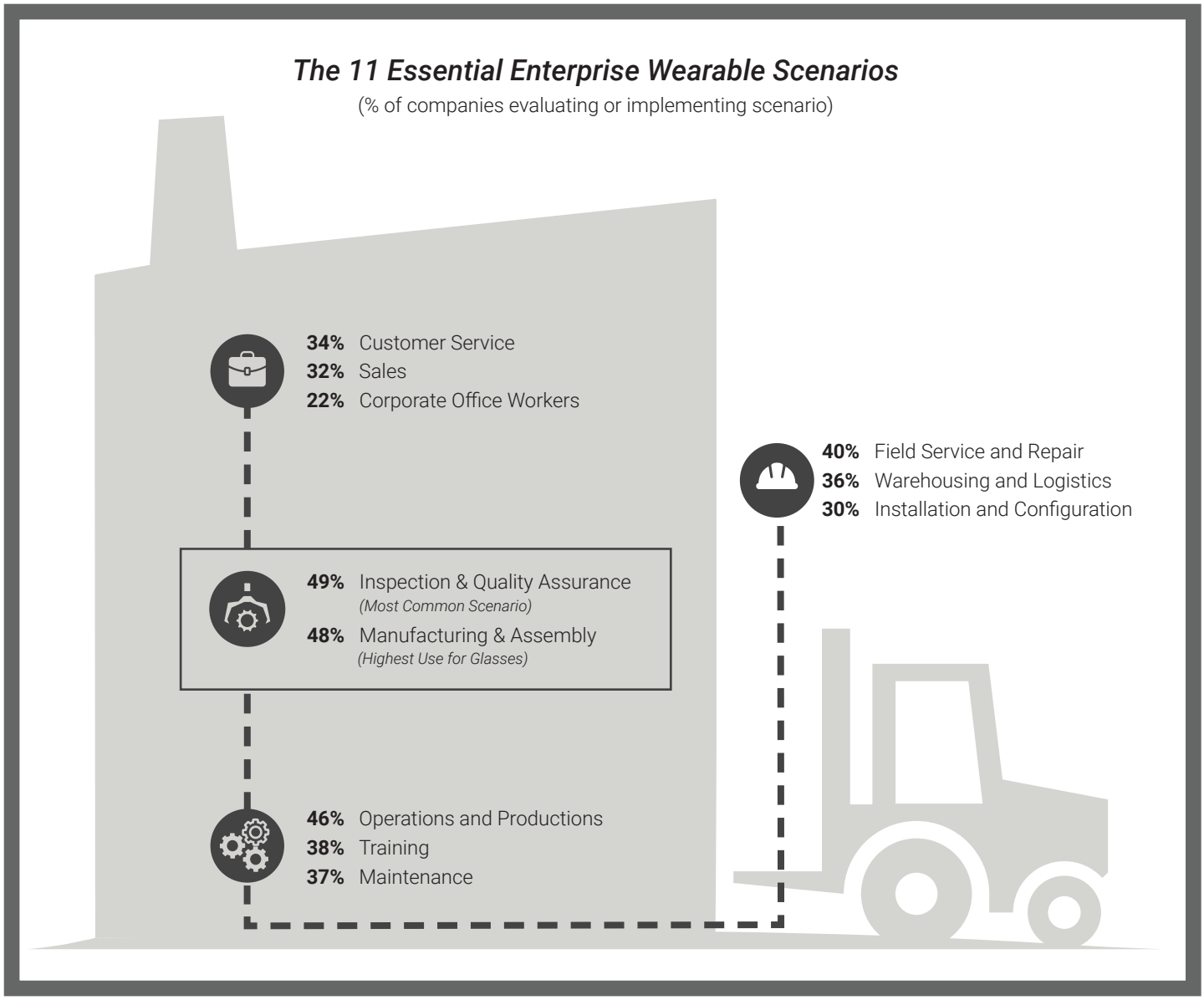
Their head-mounted, boom-arm displays use high resolution micro-displays and an Android tablet to bring digital transformation to unconnected manufacturing workers. Wearable computers can be operated entirely through voice controls, allowing deskless employees to work hands-free, keep their eyes on their job and better respond to safety issues and production errors. These devices can be designed for long battery life to last a whole shift and for drop- and dust-resistance, which is critical for tough manufacturing environments. The technology can be used with safety glasses, gloves and other equipment.

Wearable computers can also help manufacturers overcome the challenge of producing a large amount and variety of content for digital transformation. These devices can repurpose existing content for training and safety, such as vendor or OEM instructional

videos, safety checklists, PDFs, technical drawings and manuals. Some machines with touch panels or APIs can be swiftly turned into apps for use on wearable computers, allowing workers to control their production equipment and access IoT data while walking around the factory floor with just the use of their voice.

Wearable computers can have a front-facing camera that enables workers to quickly capture walk-through videos or instructional content that can be shared with other staff. The front-facing camera can also show a worker's field of vision to a remote expert, enabling swifter problem solving and training at the same time.

Among the 200+ companies surveyed by UpSkill and Zogby Analytics in 2015, scenarios for using wearables in manufacturing assembly, inspection and quality assurance, operations and production, training and maintenance had the highest rates of evaluation for implementation.



This technology presents a middle ground that can help manufacturers bridge the gap between their digital transformation goals and the realities of the factory floor. With solutions such as this in place, we predict that the factory of the future – and the technology used in it -- will look very different than it does today. Factories and corporate offices, multiple factories within a supply chain, and factories and their original equipment manufacturers (OEMs) will connect and create a network of data and content that generates a multiplier effect for ROI.

THIS WILL PLAY OUT IN THE FACTORY ENTERPRISE IN A HANDFUL OF WAYS:

INNOVATION WILL STABILIZE, AND A HANDFUL OF WEARABLE TECHNOLOGY PROVIDERS WILL EMERGE AS LEADERS, allowing manufacturers that are currently investing in reusable content to pull ahead as their large, existing content library sets them up for success on any platform.

LEASING OR WEARABLE-COMPUTERS-AS-A-SERVICE MODELS WILL EMERGE that enable manufacturers to overcome the rapid pace of technology change, lower the cost of wearable programs, maintain IT security and consistently innovate how they use technology on the factory floor.

SECURITY WILL BECOME SEAMLESS as IT grows its experience in deployment of connected worker programs and wearable computers become an everyday technology for IT.

FACTORIES WILL SHARE BEST PRACTICES BETWEEN FACILITIES, enabling manufacturers to leverage expertise from around the world and creating untold efficiencies as one factory site can train another in its processes.

$80 Billion

the size that Goldman Sachs predicts the virtual and augmented reality market will be by 2025.[5]

22 Million

the number of augmented reality glasses expected to ship by 2022 across consumer and industrial uses.[6]

FACTORIES WILL TROUBLESHOOT EQUIPMENT as their entry point for wearable computers and then grow into other applications.

IOT POINT OF INTEREST VISUALIZATION will become common for key pieces of equipment, allowing workers to instantaneously view data on key machinery while sharing information with factory supervisors, technicians and OEMs – resulting in reduced equipment downtime.

AR-LED GUIDED AND PREVENTATIVE MAINTENANCE WILL BE THE PREFERRED WAY TO COMPLETE TASKS, allowing newer workers to take on more advanced tasks and reducing human error across the factory enterprise.

FACTORY LEADERS WILL PROVIDE REMOTE FACTORY FLOOR TOURS to key stakeholders, such as insurance underwriters, the FDA or federal regulators, saving costs and facility time.

PAPER ASSETS WILL BE DIGITIZED, enabling all types of factory floor workers to be trained faster and work with greater productivity and safety. Digital lab books and data capture will replace paper capture.

5. https://www.goldmansachs.com/insights/pages/virtual-and-augmented-reality.html
6. https://arpost.co/2018/05/23/key-statistics-virtual-and-augmented-reality-industry-2018/

Overcoming Internal Resistance

Your manufacturing organization can achieve digital transformation and adopt connected worker programs with wearable computers. It's likely, however, that you will experience some internal resistance due to failed programs of the past. Here's how you can overcome organizational skepticism or individual resistance and realize the potential of a connected worker program:

01

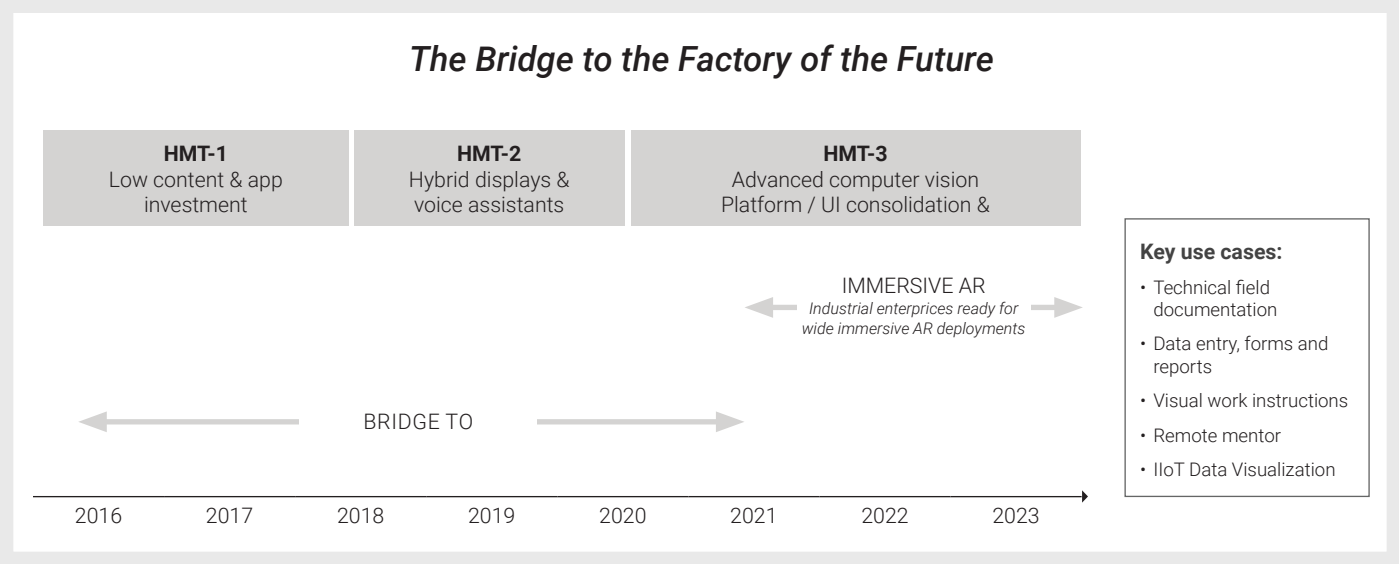
IDENTIFY A REAL-WORLD PROBLEM THAT CAN BE SOLVED.

In the past, organizations often rolled out new technology without making a clear case for how the technology would change existing ways of working for the better, resulting in low adoption rates. Instead, start with a small group of frontline employees and work with them to identify a business problem or pain point that can be solved with wearable computers. Then, implement a well-designed pilot program aimed at solving that problem to uncover the challenges and results of the device use before broader rollout. This enables you to fine-tune the program. Because the program and its content will be customized to the specific needs of your workers, it will also drive a greater ROI and higher rates of adoption. Targeting a specific business case also makes it much easier to judge the ROI of the program.

02

BREAK DOWN BARRIERS EARLY.

Bring IT and environmental health and safety (EHS) partners onboard as early as possible in your connected worker program. They can help you understand organization-wide needs and how critical factors such as connectivity, device management, training, safety and usability will play a role in your deployment. Security reviews are often one of the biggest causes of delays of pilot programs, and by making IT a partner, you can address concerns early and turn IT into an advocate.



03

KEEP IT SHORT.

Your pilot program should last no longer than three months to avoid "pilot purgatory." Longer programs without demonstrated ROI tend to lose the attention of top management and workers alike. With the help of your IT and EHS partners, set specific success criteria and metrics around the business problem that your pilot is focused on. Once your pilot is complete, measure results and gather feedback to make your case for the connected worker program and identify any opportunities or improvement needed.

04

SET REALISTIC EXPECTATIONS.

Your pilot should be focused around a solving a single use case. Make sure that your pilot metrics are based on solving that one use case and align all partners and employees around the goals of the pilot. If the business problem you're trying to solve is too complex or employees don't understand which problem they are targeting, your partners may have unrealistically high expectations for the pilot's impact. Only once your initial pilot is complete should you add additional use cases.

05

SHIFT YOUR CULTURE BY SHOWING THE DEVICES IN ACTION.

Lead by example and enable broad cultural change by showing your workers that the program has buy-in from top executives. The best way to do this is to use the devices themselves to communicate about the program with workers. HR and internal communications partners can help you successfully implement the devices for this use.

International manufacturer enables greater productivity and safety with voice-controlled welders

Building large-diameter pipes, such as for offshore oil pipelines or infrastructure projects, requires precise welding work. These sizable products must be rotated while welding, requiring production staff to be aware of what is going on around them while controlling the movement of the welder. Recently, a major international manufacturer implemented hands-free wearable computers to make this process much safer. With a voice-controlled wearable computer, the company's welders can control the rotations of the pipe while standing farther away, allowing them to have a better view of the machine and potential safety hazards while ensuring more accurate welding.

Skin care products manufacturer saves time, travel costs with wearable computers

In certain types of manufacturing, there's no substitute for an expert's confirmation that a product has been produced correctly. For an international manufacturer of skin care and beauty products, a number of qualities can only be confirmed visually such as texture, consistency, viscosity and look. Every batch of product must be inspected for consistency. However, its factories are located a six-hour train ride away from its office. Every time a batch must be inspected, the company's engineers spend two days traveling back and forth. With a head-mounted, hands-free, voice-controlled wearable computer, onsite staff can use a front-facing camera to show the engineers the product and complete the entire process remotely – saving time and

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