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# AUGMENTED REALITY IN MANUFACTURING:

## How far can we go?

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# AUGMENTED REALITY IN MANUFACTURING:

## HOW FAR CAN WE GO?

Emerging tech trends press for fundamental transformation on the way we perceive manufacturing evolution. Promising areas of research and development continuously provide us with state-of-the- art solutions for the current manufacturing challenges. Augmented Reality (AR), so far, has proven its potential for substantial contribution to these challenges with innovative applications in training new and existing personnel, providing instructions and guides to new processes as well as evaluating alternative production scenarios with extremely low cost. Driven by the need to keep pace with continuous performance and productivity improvement many organizations have already adopted the AR tech trend[1].

Augmented reality glasses are forecast to reach around 1.9 million by 2021, and when combined with VR devices, they could hit 59.2 million units with their corresponding shipments reaching the levels presented in Figure 1. Additionally, using the integrated strength of 3D and IoT, Augmented Reality experiences help to enhance efficiency by enabling a more productive environment for workers and customers. These glasses have been successfully tested by global manufacturing companies like Coca-Cola, Boeing, and General Electric.

AR is set to become a vitally significant component of secure, effective and creative items, playing a pivotal role in the design, growth and manufacturing stages, from the formation of risk-free virtual constructions, all the way through to the final testing on a complex machine under repair[2].

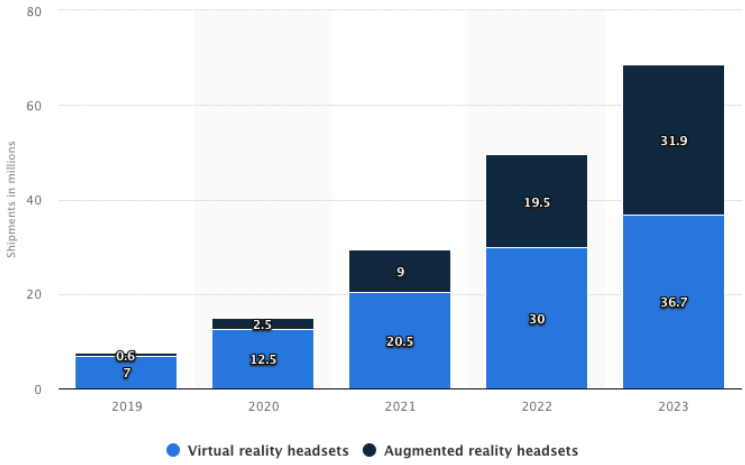


***Fig 1.*** *Forecast unit shipments of augmented (AR) and virtual reality (VR) headsets from 2019 to 2023 (in millions). Statista. (2019). Augmented and virtual reality (AR/VR) headset shipments worldwide from 2020 to 2025.*

In a more focused pursuit of what AR could provide in the modern manufacturing organizations, we could point out the following pillars of digital transformation:

## EFFICIENT WORKFORCE TRAINING

The workforce training of manufacturing employees is usually based on traditional techniques, which are more often than not a combination of printed manuals, computer training, roles and shades. These techniques are time-and cost-consuming and, despite important costs, yield blended outcomes. Printed handbooks can be hard to interpret; video is not interactive and can't be tailored to employee requirements; and roles can be hard to plan, impeding manufacturing and reducing productivity. These kinds of training materials are also time consuming to build and retain, and all information acquired from them still requires to be tested in practice[2].

An AR headset would allow a single worker to monitor a substantial part of an automated production device, but it would also generate fresh possibilities and employment positions with the technology in question.

Data connectivity, analytics, and automation play all the more a significant role, as production activities become more complicated. However, operations and maintenance individuals also need to be digitally linked in order to enable the similarly critical human assets. AR technology plays an important part since it is able to provide the factory worker with that link. The importance of AR apps, which tap into the rich world of linked resources and information, is expected to be magnified especially once combined with the Industrial IoT[3].

## COMPLEX ASSEMBLY

Modern production includes the quickest feasible assembly of hundreds or even thousands of components in complicated structures. Whether you produce the latest smartphone or the world's biggest airliners, installation directions must be followed. To achieve greater productivity and greater performance along with better ergonomics, a company could save precious time by utilizing voice commands and bar code readers in assembly processes[3].

## PRODUCT DESIGN

AR can eliminate some of the tedium of this process by augmenting and enhancing the task at hand, and streamlining collaboration and communication between parties.

## SYSTEMS MAINTENANCE

With AR tools, a maintenance team would eliminate the conjecture, enabling quicker repairs, faster reaction and retrieval times, and easier operation throughout.

## INNOVATION IN LOGISTICS

AR could contribute to the enhancement of worker's productivity through interactive connected systems which provide real-time information about the location of products and raw materials. An even better specification would be the scanning of information in order to propagate the orders autonomously, without needing further employee engagement except for the delivery of the product to the correct party.

AR can also bridge the division of abilities by connecting distant professionals to production equipment. Remote specialists may use an AR tool that shares the same data, environment, and discussions with someone who carries an AR unit in the plant. Remote experts can also use their hands to draw and mark in the digital matrix to help their colleagues communicate ideas and instructions in the physical world.

Early adopters in manufacturing have demonstrated that the technology delivers value by bridging the skills gap and transforms the way a broad range of engineers are trained and evaluated. Additional potential is recognized with respect to safety and the productivity of workforce with certain cases being referred[4].

It is widely accepted that Augmented Reality will see growth over the next couple of years. Not just in manufacturing, but all across the world and in every industry. With swift adoption and widespread penetration in multiple verticals, you can expect the cost of entry to significantly fall as well. SMEs will also be able to carry out maintenance, inspections, and assembly with greater speed, accuracy, and profitability than ever. In market terms, AR can be divided into hardware- and software-based. Furthermore, the hardware section can be split into intelligent glass and HMDs. It is possible that AR creation and AR content management systems are to be further classified in the software section. The product design, installation of an item, preparation and growth, checks and quality control (QC) can be divided into products with respect to implementation. In addition, assembling, installation preparation, and installation simulation may be classified as part of the item installation as well.

For the time being, the simplification of complex production duties and the all the more extensive use of AR are the most pronounced drivers in the manufacturing sector for digital transformation. The AR technology explores increasingly advanced functions for the immense transformation of production procedures. Based on these, any notable increase in the effectiveness, referring to company processes in today's complex financial circumstances, can contribute to an important market benefit.

## REFERENCES


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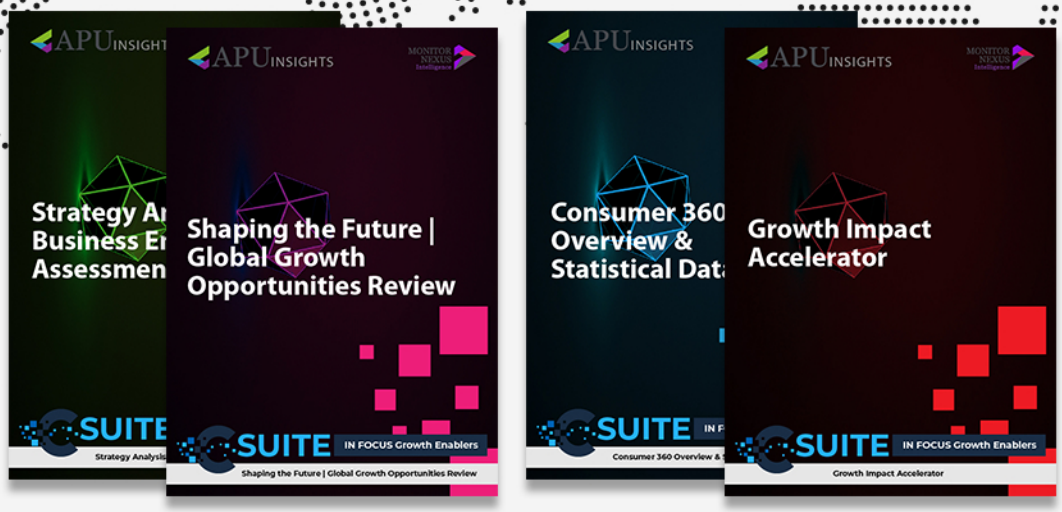
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