ism THOUGHT LEADERS IN CUSTOMER STRATEGY

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Pfizer XR/VR/AR Journey Case Study: Pioneers in the Use of XR/Metaverse Technology

Pfizer Inc. is an American multinational pharmaceutical and biotechnology corporation headquartered in New York City. The company was established in 1849 in Brooklyn, New York by two German entrepreneurs, Charles Pfizer, and his cousin Charles F. Erhart.

Pfizer's 2022 revenues were $100 billion, making it the largest pharmaceutical company in the world. In 2022, Pfizer had 83,000 employees.

What propelled Pfizer to hit a record $100 billion in sales last year was the ongoing Covid-19 pandemic. In 2022, Pfizer generated $38 billion in sales for their Covid vaccine and $19 billion in sales for their antiviral pill Paxlovid.

In addition to Covid-19 vaccine and their antiviral pill Paxlovid, Pfizer also manufactures many well-known medicines including Advil, which is the #1 selling branded OTC analgesic in the world, Bextra, Celebrex, Diflucan, Lyrica, Robitussin, and Viagra. Pfizer is also the mastermind behind many popular consumer products including Chapstick and Preparation-H.

Pfizer's XR/VR/AR Journey

In 2018, Pfizer began brainstorming ways to utilize XR technologies. With 39 manufacturing sites worldwide, there was always a need for onboarding and upskilling Pfizer employees. The need for onboarding and upskilling new employees had always been high, but in a company spread across more than 125 countries, finding an effective and efficient training program proved difficult. After much consideration, Pfizer decided virtual reality training was the most logical first step in adopting XR. Pfizer implemented two important phases in their XR/VR/AR journey.

Phase 1: Proof-of-Concept

The first couple of years became Pfizer's proof-of-concept phase, during which time they tested VR headsets and software and experimented with 3D scanning. They also began a large internal communications campaign for Pfizer stakeholders where they shared VR training use cases, VR training benefits, and other VR insights and information. This proof-of-concept phase was all about giving stakeholders a vision of what immersive technology could do – the art of the possible – with the goal to generate interest from different organizations within Pfizer.

Phase 2: Covid-19 Innovation Requirements

In December 2019, a cluster of patients in China's Hubei Province experienced a pneumonia-like illness that did not respond to standard treatments. Within 90 days, health authorities reported more than 118,000 cases of this new virus across 114 countries. Six days after WHO declared Covid-19 a global pandemic, Pfizer and German-based BioNTech announced their intent to co-develop a potential vaccine based on mRNA technology developed at the University of Pennsylvania; as a University of Pennsylvania alumni, I am proud to note the two lead scientists just won the 2023 Nobel Prize in Medicine for their pioneering research.

In early 2020, little was known about the Covid-19 virus. But one thing that was apparent was that billions of people needed a vaccine, which meant Pfizer needed to train thousands of new manufacturing workers quickly within Pfizer manufacturing facilities. The challenge was how could Pfizer get so many new workers trained? The team at Pfizer had already proven VR training was a powerful tool, but now Pfizer had to scale VR training in an unprecedented way. Over the ensuing months, Pfizer hired thousands of manufacturing workers and trained them using VR technology. Whereas a new manufacturing floor worker might take about a year to become fully operational with traditional training methods, the highly contagious Covid-19 virus only magnified the limitations of traditional training methods. Conversely, VR training thrives when things are difficult or dangerous. Pfizer created immersive VR simulations of real-world scenarios without putting people in danger. Pfizer also utilized 3D replicas, virtual group training, and real-time feedback to ensure excellent training outcomes.

The results were astounding! By the time the brilliant Pfizer and BioNTech had developed the vaccine in nine months, Pfizer's manufacturing teams were ready to begin production and so too were the thousands of contracted manufacturing workers that Pfizer had trained using VR technology. More precisely, Pfizer's:

- VR manufacturing training transformed 100+ pages of Standard Operating Procedures into interactive training experiences, which greatly reduced time to train and minimized space required for the training.
- VR behavioral training trained users on proper behavior/movement using speed and haptic tracking capabilities.
- VR training environment removed accessibility issues by taking 3D scans or creating 3D replicas within the training.

Of importance, Pfizer's VR training leads reported a 40% reduction in total training time and a 3X increase in quality.

Over the next year, Pfizer and BioNTech accomplished their goal of manufacturing millions of vaccines. For the first time since the beginning of the pandemic, there was a spark of hope across the globe. The contract manufacturing workers trained in VR were a massive part of that spark. The Covid-19 pandemic put Pfizer's immersive learning program to the ultimate test, and it was hugely successful.

Two Additional VR Applications Pfizer Is Pursuing

While Pfizer's Covid-19 vaccine story is an incredible testimony to the power of VR training, and to Pfizer's leadership in leveraging VR technology, Pfizer innovative use of XR technology does not stop here. Let us briefly look at two additional ways Pfizer is currently leveraging XR technology.

- **Pfizer Leads the Way Leveraging VR To Help Build Its Innovative New Sterile Injectable Plant** Creating an entirely new pharmaceutical factory is both expensive and time-consuming. This has led many companies, including Pfizer, to turn to XR technology to create 'virtual factories.' In Pfizer's case, they are currently creating a $450 million sterile injectables factory, with a 'virtual factory' component that is harnessing 'digital twin' technology to optimize the factory and its supply chain as well as train employees in a more efficient way. Like human twins, a digital twin is an exact replica of a physical object or location, except it is entirely virtual. A virtual factory floor, for example, allows a company to follow the entire supply chain process in order to find ways to optimize it and cut costs. This is all done virtually, which slashes costs significantly. Companies are also using digital twin technology to model new machines or robots, allowing engineers to find weaknesses in the design or movement and fix them before creating the actual end-product. In its leadership role, in addition to using VR since 2018 to train its employees, Pfizer is now leading the way in the deployment of digital twin technology to optimize its production.

Pfizer is building the $450 million Modular Aseptic Processing (MAP) factory on the company's campus in Kalamazoo County, Michigan. At around 420,000 square feet, the giant factory will focus on making sterile injectables. Pfizer predicts that its building will create 450 new jobs, and not all workers will be required to be on-site. Thanks to MAP's digital twin, factory workers can learn how to do their jobs without even stepping inside the factory. Using VR headsets, employees can tour the new factory and learn new tasks even before the MAP factory is built. Trainers can now observe how trainees are executing their tasks in the virtual environment and provide feedback on their performance. Because much of the MAP factory and machines will be designed using 3D models, these models are easy to move into VR software for employee training. Having the employees professionally trained early on is essential to boost Pfizer's efficiency, as producing sterile injectables is a long and complicated process. Pfizer hopes this digital twin technology will give the company the competitive advantage it seeks.

- **Pfizer Embraces VR Simulations to Improve Protocol Compliance**
  In the highly regulated pharmaceutical industry, protocol compliance is critical. Pfizer is bringing VR simulations to investigative sites to improve compliance with clinical trial protocols, including the way 'study' drugs get compounded. This maturing technology, which has only been on the market a few years, can be used both to help prepare an investigational product as well as train clinical trial investigators on complex study protocols. Pfizer intention is to apply this protocol compliance technology across multiple sites since it is a great option for Phase II and Phase III training and compliance purposes.

Closing Comment

Bringing a drug to market can feel like searching for a needle in a haystack. The failure rate is steep, with only one in every 5,000 screened drugs getting approved. Moreover, it is a long, winding road to market, with the drug development process taking an average of 12 years and costing upwards of $2.6 billion. Which make development of the Covid-19 vaccine in 9-months a truly, incredible accomplishment. Even for the drugs that do get approved, manufacturing is not always straightforward. Process deviations, ineffective collaboration, and training result in lost batches, delays, and resource waste.

As discussed in this case study, technology pioneer Pfizer is leveraging existing and new XR technology to shift this reality. Headsets equipped with VR help train employees quickly and cost-effectively. XR technology also facilitates creating 'digital twin' factories to optimize processes and costs, as well as manufacturing effectiveness. XR technology collaboration tools give researchers access to on-the-spot feedback, a better way to achieve process and compliance directives, and an ability troubleshooting issues in real time.

My hat goes off to Pfizer, a 174-year-old company, for their pioneering use of XR technology since 2018 in the healthcare industry.

My Metaverse business partner, Tim Bajarin, and I are keen to assist pharmaceutical companies at each step of the way to ensure their successful entry into the Metaverse. To read about additional pharmaceutical, biotech, and related Metaverse case studies, I strongly encourage you to visit ISM's award-winning Metaverse Resource Center – www.ismguide.com/metaverse-resource-center – where in addition to gaining access to more than 275 Metaverse case studies, more than 275 Metaverse articles, and more than 100 Metaverse videos, you can download ISM's new '8 Steps to Do Business Successfully in the Metaverse' White Paper, download ISM's New 'VR Training Guide for the Enterprise,' learn about and sign-up for ISM's complimentary 2-hour Metaverse Executive Bootcamp, and more.

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