THE NEXT FRONTIER: EXTENDED REALITY IN BUSINESS

Taras Kovalchuk

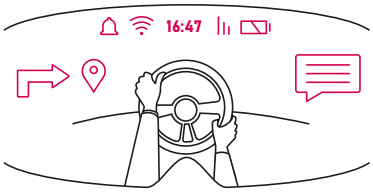
softserve

Imagine a world in which online meetings are so real that you see another person as if they were standing right in front of you. Imagine glancing at a restaurant provided you with information about the facilities, menus, prices, and reviews. Imagine a world where education exists in a completely controlled and measured virtual environment, with the highest engagement levels and personalization. Imagine a manufacturing plant where employees can access necessary information on the spot, getting on-the-spot support, hands-free, and without breaking the usual workflow.

Imagine the world of extended reality.

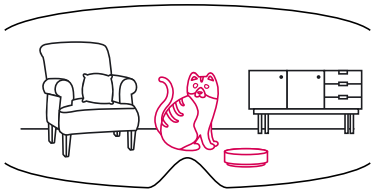
Extended reality (XR) combines a number of tech directions that change the ways of interacting with the physical world through digital information. Common segments are:

AUGMENTED REALITY (AR)



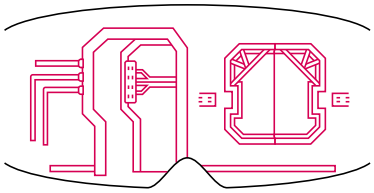
Content overlaid over the physical world

MIXED REALITY (MR)



The result of blending the physical world with the virtual world

VIRTUAL REALITY (VR)



Completely virtual world experience

According to a recent market forecast by Artillry Intelligence, global XR product revenues are projected to grow from $4.2 billion USD in 2017 to $61.2 billion USD in 2022. That's a 71% compound annual growth rate.

How can your business get in on the action? Let's take a look at common examples today.

4 TYPES OF USER EXPERIENCE

Since the release of Google Cardboard in 2014 and the mass adoption of AR/VR that followed, a number of ways to experience extended reality have emerged:

360-degree Video

The simplest use case of VR is the ability to view 360-degree photos and videos. Interaction in such experiences is usually very limited, as all content is predefined. It is highly accessible and can usually be viewed on mobile-based VR with accessories like Google Cardboard and Samsung Gear VR. The latest sales figures state 15 million devices sold.

Though filming a 360-degree video requires special equipment (making production the most expensive aspect of this experience), its accessibility provides a notable ROI. Despite the fact that it is based on mobile phone viewing, 360-degree video provides exceptional visual quality. The most popular content is nature and wild animal experiences.

Mobile AR

Mobile AR is another highly accessible experience, with apps that allow the user to view digital content overlays in a camera view using computer vision techniques. The success of Pokémon Go, popular Snapchat and Instagram filters, as well as recent tech developments from Apple (ARKit), Google (ARCore), and Facebook (CameraEffects), are driving the wider adoption of the mobile AR experience.

The simplest experiences are based on real-world markers (QR codes, special pictures) that provide anchors for digital content. Emerging advanced capabilities from products like ARKit and ARCore do not require markers to recognize and track horizontal or vertical surfaces. This drives these experiences towards mixed reality.

Interactive VR

In contrast to 360-degree content, interactive VR experiences render content in real time. This opens doors to all kinds of interactions, from gaze and head movements to sophisticated 6DoF ("six degrees of freedom") controllers. Required hardware ranges from standalone 3DoF/6DoF headsets to more complex PC-based systems equipped with 6DoF controllers, haptic gloves, trackers, and other accessories that provide enhanced interaction with digital content. For home users, PC-based systems usually require a powerful graphic card to eliminate latency, rendering at a minimum of 90 fps.

AR/MR Glasses

Google is planning to relaunch Glass for the enterprise market and there are currently dozens of different devices for numerous applications. Most notable are Vuzix and ODG devices, that are affordable and have a decent field of vision, as well as other capabilities well suited for enterprise tasks such as: guided instructions and manuals, barcode scanning, GPS navigation, camera recordings, and more.

More complex devices, like Microsoft HoloLens and Magic Leap, support the analysis of surroundings (walls, surfaces, etc.) and allow digital content to interact with physical objects. Currently, this is the closest experience to true extended reality, though continued technological advancement will make it available to the consumer market.

XR IN ACTION: BUSINESS USE CASES

Extended reality might require more time for universal adoption, but there are real possibilities for enterprise applications today.

Training and Simulation

The immersive quality and flexibility of VR opens the door to next-level training and education. ABI research forecasts the growth of this segment alone to be $6.3 billion by

2022. There is huge potential for training in sports and several companies are exploring its benefits for the NFL and NBA. Retail is discovering its benefits as well: Walmart created a VR training solution for employees to handle Black Friday and is planning to roll it out in its training centers.

In healthcare, surgery training from Osso VR, as well as various rehabilitation experiences is providing a safe environment for surgeons to practice. In logistics, UPS conducts VR training for drivers prior to official dispatch. It can also be widely used in HR for soft skill training, helping employees to overcome fear of public speaking (and other phobias) or to enhance presentation and training effectiveness. Depending on the need, training can also support a real-time multi-user environment, even via remote online connection.

Another way of training is an on-site MR headset that overlays all information for the user, guiding interactions with specific equipment. Adding real-time remote supervision from a learned professional provides increased process effectiveness. Businesses can even leverage veteran workers by recording their operations and later using them as training materials for newcomers.

In summary, there are many benefits to training via XR.

- **Cost-effective**. Conducting training in VR doesn't require standard equipment and specialized facilities. Also, it's much easier to maintain and update.

- **Risk-free environment**. Mistakes are unavoidable during a training process, and in dangerous situations the risk could be very high. Immersive experiences in VR provide close-to-life situations, without any risk to trainee health.

- **Emergency situations**. It is important to provide training for employees in situations that are impossible to fully recreate in real life. For example, it is vital to make the right decisions quickly in emergency situations, such as natural disasters, fire training, emergency surgery, etc.

- **Advanced behavior measurement**. Since training is performed in a controlled virtual environment with connected controllers and trackers, the facilitator receives metrics that provide valuable insights on the process. In sports especially, coaches are able to precisely monitor players' field of vision, heart rates, and reaction speeds, relying on data rather than subjective decisions.

- **Scalability and remote performance**. In the case of training for a large workforce it is much easier to conduct training remotely in VR, rather than several days of expensive on-site training and associated travel expenses. Such an approach will guarantee consistent training across the company, as well as the ability to conduct A/B testing of various approaches for optimal results.

Product showcase and marketing

An XR experience to showcase products before purchase, or "try before you buy," provides closer brand interaction in an immersive environment. It also demonstrates the company's intent to move towards innovation, attracting more customers and helping with recruitment efforts.

In the real estate industry—especially in the luxury segment—property tours can be given remotely with more realistic experiences than ever. And VR is already being used effectively in retail:

- Zara allows customers to explore new fashion looks in mobile AR
- ModiFace helps customers try different makeup products
- Ikea, Wayfair, Amazon and others allow digital furniture placement within customers' homes
- "Magic mirrors" allow shoppers to try on dozens of looks and styles in minutes

Extended reality not only supports products, but the way in which they are marketed as well.

Pokémon Go spurred the increased use of AR for marketing promotions. Audi allows users to see their cars in action on the road. Lego added additional content to make stories around its toys "come alive." Both Universal and Disney promoted recent movies through Snapchat Lens and interactive magazine covers.

Hands-free data access

With the growing complexity of industrial equipment, XR guides and instructions will become important tools for successful operation. In this case, AR glasses can provide hands-free, on-location access to any information, both stored and in real-time parameters. For warehouse picking and maintenance, this decreases the level of human error, increases efficiency and safety, and helps with indoor navigation—like DHL partnering with Ricoh to implement vision picking at their facilities.

Also, utilizing mixed reality headsets provides more opportunities in automatic quality control via image recognition, on-the-spot visualization of real-time data, work schedules, etc. This provides another level of collaboration by supporting a multi-user environment with shared contributed input.

Remote assistance and collaboration

Holographic meetings have yet to arrive, but there are still a number of ways that XR provides better collaboration tools, especially in cases of digital content production. For

example, in the automotive industry, designers can collaborate in VR when they design with the ability to interact with 3D models on the go. Doing so can greatly increase efficiency for distributed teams and enable a solid platform for providing feedback. BMW recently announced that it will use HTC Vive and mixed reality headsets in its production instead of laboriously constructed draft models, as it provides greater flexibility, faster iterations, and lower costs.

Speaking of remote assistance, Microsoft HoloLens recently added out-of-box support, as it has high potential in engineering. Now highly qualified engineers can assist junior staff across the globe to resolve complex production issues. This approach provides substantial cost savings for traveling and improves the availability of skilled resources. Additionally, mixed reality headsets enable easier sharing and collaboration on 2D and 3D content, as well as the improved view of personalized data streams and analytics.

It's important to mention that headsets also meet important environmental and safety standards and can be used actively in engineering. HoloLens has been tested and found to conform to the basic impact protection requirements of ANSI Z87.1, CSA Z94.3, and EN 166. Another example of rugged enterprise glasses is Kopin Golden-i Infinity, which are IP-67 and MIL-STD. 810G certified.

Premium service and experience

Extended reality is on the verge of becoming a more premium option for customer service. For example, in the airline industry, Air France rolled out a test run of in-flight VR entertainment for business class passengers. AlloSky is working on a headset specially designed for this purpose, making it lighter and more comfortable for long flights. Universal, Disney, and Six Flags also partnered with Snapchat to provide geo-restricted lenses that enable a deeper connection between visitors and their characters.

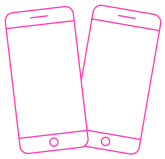
In financial services, BNP Paribas and Bank of Kuwait explored options for virtual branches and VR personal assistants. XR can also provide enhanced support in the healthcare industry where there is high demand for personalization and guidance.

Another option for VR is the live streaming of events. Next VR recently raised over $115 million in funding to create a platform for VR-streaming events and on-demand experiences. This will allow users to access live events as if they're in the audience, from the comfort of their homes.

TIME TO BUILD

The massive potential for XR application is clear, what now?

Through the evolution of the technology and expansion of usage, the device market is fragmented into a number of sectors.



MOBILE PHONE-BASED AR/VR

Low price

Mobility

Easy to demo

Limited interaction (3DoF controller)

Accessible (a lot of mobile phones)

AR/MR HEADSET

Mobility

Gesture interaction

Awareness of surroundings

Quite easy to demo

Higher price point

Standalone headset

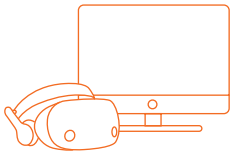
STANDALONE VR

Moderate price

Better visuals, compared to mobile

Easy to demo, mobility

Some headsets have 6DoF tracking + 3DoF controller



PC-BASED VR

Highest quality visuals and immersion

Additional accessories possible (gloves, motion tracking)

Complex setup (base stations)

Possibility to have untethered experience

Precise 6DoF headset and controller

Need of PC (+$1000)

Besides headsets alone, there are accessory developments that should make experiences closer to what we can see in futuristic movies like Ready Player One. These include:

- **Gloves**. Usually with haptic feedback; they contribute to the ability to interact with digital objects as if with the user's own hands, creating immersion on a higher level.

- **Trackers**. These are placed on physical objects (like tools) to place an exact copy into the virtual world. This means an almost unlimited number of objects that people can interact with. Also, placing trackers on a human body can enable acceptable tracking of the full body in VR.

- **Full body suits**. Like the TeslaSuit, full body suits provide more precise full body movement tracking, as well as haptic feedback and climate control. The suits broaden the range of virtual interaction, though primary use cases are focused on the entertainment industry currently.

- **Gesture tracking systems**. Based on camera and computer vision, these provide the possibility of tracking hands without using additional equipment that could break immersion. Leap Motion is a veteran on this field and is still improving. Systems like Kinect allow the tracking not only gestures, but also full body movement.

- **Treadmills**. Especially omnidirectional ones are good for simulating continuous movement in VR, with a number of successful applications in fitness and certain types of training.

- **Motion tracking systems**. Allows the precise tracking of full body movement in large areas (more than 15x15 meters). In addition, certain configurations can be tracked separately, such as tracking facial expressions. It requires a complex setup, but can be used to generate intricate custom animations and be a part of simulation system. The most notable providers are OptiTrack and Vicon.

BEST PRACTICES

The development of XR experiences involves several steps, including:

Workshop

- Demonstrate and explain capabilities of different XR devices and various types of experiences
- Discover customer business needs. It is important to identify scenarios in client's business that will work best for XR and provide highest value
- Provide necessary initial training for customer's employees that will allow them to provide feedback and experience solution remotely

Advantages

- Rapid iterations for solution, allowing flexibility in final product design
- Multidisciplinary teams that consist of developers, experience designers, content artists, and QA
- Collaboration with in-house ML, big data, IoT, and CV (computer vision) that enables the ability to deliver the most complex experiences
- Full-cycle/turn-key solution including special hardware assembly and setup, employee training, and ongoing technical support

Interested in getting your business started with XR? Contact SoftServe today.

ABOUT US

SoftServe is a digital authority that advises and provides at the cutting-edge of technology. We reveal, transform, accelerate, and optimize the way enterprises and software companies do business. With expertise across healthcare, retail, media, financial services, software, and more, we implement end-to-end solutions to deliver the innovation, quality, and speed that our clients' users expect.

SoftServe delivers open innovation—from generating compelling new ideas, to developing and implementing transformational products and services.

Our work and client experience is built on a foundation of empathetic, human-focused experience design that ensures continuity from concept to release.

We empower enterprises and software companies to (re)identify differentiation, accelerate solution development, and vigorously compete in today's digital economy. No matter where you are in your journey.

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USA HQ
201 W 5th Street, Suite 1550
Austin, TX 75703
+1 866 687 3588

EUROPEAN HQ
One Canada Square
Canary Wharf
London E14 5AB
+44 (0) 800 302 9436

info@softserveinc.com
www.softserveinc.com

softserve