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Immersive Technologies in Financial Services

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ABSTRACT

Immersive technologies are a group of emerging technologies that all share a common aim: to create an experience for users that mediates their perception of their physical environment. Immersive technology is an integration of two main categories with varying levels of immersive experiences (virtual reality (VR) and augmented reality (AR)) that extend reality or creates a new reality by leveraging the 360 space/sphere. Immersive technologies are about to upgrade finance from a heap of spreadsheets to something we interact with and understand intuitively. So rather than conventional brick-and-mortar facilities, traditional and emerging innovative banks can use AR/VR banking and save time and money while giving the same banking experience to customers. Immersive technologies offer exciting opportunities to transform banks and other financial institutions. In this paper, we will examine some of the potential benefits and the challenges of adapting immersive technology in the financial industry.

KEYWORDS: *virtual reality, VR, augmented reality, AR, mixed reality, MR, extended reality, XR, immersive technologies, immersive banking, metaverse, finance, financial industry*

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INTRODUCTION

The financial services industry is adopting the latest tech advances to keep up with customer expectations. For the financial industry, immersive technologies like AR and VR are an ever-evolving landscape driven by technological innovation. Among the most disruptive and exciting technologies on the horizon for this space are immersive technologies which include extended reality (XR), augmented reality (AR), virtual reality (VR), and mixed reality (MR). VR provides an immersive user experience in a virtual 3D environment, whereas AR enables users to overlay digital content onto real-world objects and receive visual, audio, or haptic experiences from wearable technologies. XR includes all the tech tools that combine real and virtual environments, such as augmented reality (AR) and virtual reality (VR). These technologies are poised to transform the way we interact with our finances. Figure 1 shows a representation of immersive technology [1].

For many people, immersive technologies are most associated with gaming and immersive virtual worlds, sometimes referred to as "the metaverse." In this paper, we focus on four types of immersive technologies: augmented reality (AR), mixed reality (MR), virtual reality (VR) and extended reality (XR). These technologies differ in a variety of ways but share broad similarities in how they work and what components they include.

WHAT ARE IMMERSIVE TECHNOLOGIES?

The first step in understanding how to use immersive technologies is to learn the differences between its various forms. In their simplest form, immersive technologies consist in adding virtual objects to the real world. There are four types of digital realities leading to different types of immersive technologies [2,3]:

- *Augmented reality* (AR)- designed to add digital elements over real-world views with limited interaction.
- *Virtual reality* (VR)- immersive experiences helping to isolate users from the real world, usually via a headset device and headphones designed for such activities.
- *Mixed reality* (MR)- combining AR and VR elements so that digital objects can interact with

the real world means businesses can design elements anchored within a real environment.

- *Extended reality* (XR)- covering all types of technologies that enhance our senses, including the three types previously mentioned.

These devices also enable new user interactions including spatially tracked 3D controllers, voice inputs, gaze tracking, and hand gesture controls.

Extended reality (XR) is the overarching term used to describe employing technology to blend real life and the digital world. It includes all the machine-human interfaces beyond the physical realm (reality) such as augmented reality (AR), mixed reality (MR), assisted reality (aR), and virtual reality (VR), as illustrated in Figure 2 [4]. Figure 3 shows the XR spectrum [5]. Immersive technologies reside along a continuous scale ranging between the completely real and the completely virtual world. At one end, the real environment refers to the actual physical space, objects, and people that exist in the tangible world around us. At the other end, the virtual environment represents a completely computer-generated and immersive digital space, distinct from the physical reality. The space in the middle is called mixed reality, which is a blend of the real and virtual environments, where digital and physical elements coexist and interact in real time. A range of devices makes up XR, and these are used by consumers and in many industries for entertainment, safety, training, or productivity purposes.

1. *VIRTUAL REALITY:* Virtual reality (VR) is XR at its most extreme. It completely immerses the user in a digital world, often using a computer-generated environment with scenes and objects that appear to be real. The term "virtual reality" essentially means "near-reality." Virtual reality is the key technology for experiencing sensations of sight, hearing, and touch of the past, present, and future. VR is a fully immersive technology where users wear a head-mounted display and experience a simulated world of imagery and sounds. VR enables active learning. The terms, "virtual reality" and "cyberspace" are often used interchangeably. A cyberspace may be regarded as a networked virtual reality. A person using virtual reality can look around an artificial world, move around it, and interact with virtual features or items. This effect is commonly created by virtual reality headsets. Head-mounted displays immerse the user in a virtual environment. Virtual reality is a simulated experience that can be similar to or different from the real world. It is a computer-generated, 3D environment that completely immerses the senses of sight, sound, and touch. The complete immersion of the senses overwhelms users engrossing them in the action. Virtual reality technology includes multiple components divided into two main groups: hardware and software components [6].

- *Hardware Components:* The hardware components include a computer workstation, sensory displays, a tracking system, wearable devices, and input devices. Sensory displays are used to display the simulated virtual worlds to the user. The most common type is the head-mounted displays (HMDs), which is used in combination with tracking systems. Head-mounted displays are shown in Figure 4 [7]. Users interact with the simulated environment through some wearable devices. VR depends on special responses such as raising hands, turning the head, or swinging the body. A wearable device is important in making these effects realistic. Special input devices are required to interact with the virtual world. These include the 3D mouse, the wired glove, motion controllers, and optical tracking sensors. These devices are used to stimulate our senses together to create the illusion of reality.
- *Software Components:* Besides the hardware, the underlying software plays an important role. It is responsible for the managing of I/O devices and time-critical applications. The software components are 3D modeling software, 2D graphics software, digital sound editing software, and VR simulation software. VR technology has been designed to ensure visual comfort and ergonomic usage.

2. *AUGMENTED REALITY:* Augmented reality (AR) is a technology that combines real-world environments with computer-generated generated information such as images, text, videos, animations, and sound. It can record and analyze the environment in real-time. In augmented reality, the user typically experiences the real world through a device such as a smartphone, tablet, smart glasses, or head-mounted display. For example, AR allows consumers to visualize a product in more detail before they purchase it. This feature enhances consumer interaction and helps them never to repurchase the wrong item. The key objective of AR is to bring computer-generated objects into the real world and allows the user only to see them. In other words, we use AR to track the position and orientation of the user's head to enhance/augment their perception of the world. Augmented reality falls into two categories: 2D information overlays and 3D presentations, like those used with games. AR blends the virtual and real worlds by overlaying

digital objects and information onto the users' view of the physical world.

To obtain a sufficiently accurate representation of reality, AR needs the following five components [8]:

- *Sensors:* AR needs suitable sensors in the environment and possibly on a user, including fine-grained geolocation and image recognition. These are activating elements that trigger the display of virtual information.
- *Image augmentation:* This requires techniques such as image processing and face recognition.
- *Head-mounted Display*: HMDs are used to view the augmented world where the virtual computer-generated information is properly aligned with the real world. Display technologies are of two types: video display and optical see-through display.
- *User Interface:* This includes technologies for input modalities that include gaze tracking, touch, and gesture. AR is a user interface technology in which a camera-recorded view of the real world is augmented with computer-generated content such as graphics, animations, and 2D or 3D models.
- *Information infrastructure:* AR requires significant computing and communications infrastructure undergirding all these technologies. The infrastructure determines what real-world components to augment, with what, and when.

3. *MIXED REALITY:* Mixed reality (MR) is a term used to describe the merging of a real-world environment and a computer-generated one. Physical and virtual objects may co-exist in mixed reality environments and interact in real time. This is an extension of AR that allows real and virtual elements to interact in an environment. MR liberates us from screen-bound experiences by offering instinctual interactions with data in our living spaces and with our friends. Online explorers, in hundreds of millions around the world, have experienced mixed reality through their handheld devices. Mixed reality is a blend of physical and digital worlds, unlocking natural and intuitive 3D human, computer, and environmental interactions, as shown in Figure 5 [9] and Figure 6 [10]. This new reality is based on advancements in computer vision, graphical processing, display technologies, input systems, and cloud computing. Mixed reality has been used in applications across fields including design, education, entertainment, military training, healthcare, product content management, and human-in-the-loop operation of robots [11].
4. *ASSISTED REALITY:* Like mixed reality, assisted reality (aR) is an extension of augmented reality, with a few notable differences to both. One of these differences is that aR is primarily hands-free through the wearing of a headset, whereas AR usually requires the holding of a device such as a mobile phone. While MR is a digital-first, real-world second reality, aR is a real-world first system. It combines software and a head-mounted display. It is best experienced using smart glasses or other wearable technology. The aR market is growing rapidly and promises to be the next great leap to boost workers' productivity. A worker wearing an aR device is shown in Figure 7 [12].
5. *EXTENDED REALITY:* The term "extended reality" (XR) has recently gained favor as an umbrella term that encompasses all of AR, VR, and MR. The primary user inputs for XR devices are described as follows. Voice interfaces are now ubiquitous thanks to mobile devices and standalone smart speakers. Apple's Siri, Amazon's Alexa, Google's Assistant, and Microsoft's Cortana are all voice-driven software interfaces that are continuously gaining new capabilities. Many XR devices enable user control with handheld controllers, which have capabilities beyond button press inputs. Both voice-driven interfaces and human-computer interactions have been developed specifically for XR devices, including gaze and gesture controls [13]. Figure 8 compares conventional computing with extended reality [13].

IMMERSIVE TECHNOLOGIES IN FINANCE

The financial industry plays a prominent role in the global economy. The industry ever-increasingly bustles with activities like lending, investing, managing, and securing financial assets. The traditional way of conducting a financial transaction is for a customer to visit a physical branch and meet the staff. This incurs costs for both banks and their customers. The COVID-19 global pandemic has accelerated the need for financial institutions to explore the provision of services virtually and reduce physical interactions between staff and customers. Imagine a world where financial transactions are not just numbers on a screen but immersive experiences that engage all your senses. Imagine financial institutions offering customer services that use intelligent robots instead of human tellers. There is no physical branch, and customers visit a virtual environment to get the required service at anytime from anywhere. This is the promise of AR/VR in fintech. When using a virtual reality application for virtual shopping, no one wants to be interrupted in the middle of a session to be prompted to make a payment. The payment system should be built into the

service without creating any disruptions to provide a seamless, immersive experience. Banks can provide the interface for making a payment virtually, instead of requiring users to exit from the app [14]. Figure 9 represents immersive technology in finance [15].

EXAMPLES OF IMMERSIVE TECHNOLOGIES IN FINANCE

Banks and credit unions have started exploring XR in their branches now, with personalized advertisements for products that their clients actually need, while still maintaining the privacy of the customer data. Example of implementation of immersive technologies in finance include the following [16,17]:

- *JP Morgan* was the first to open a branch in the metaverse, while BNP Paribas also launched a Virtual Reality app that enables customers to use VR in their banking transactions, including account opening. Named the Onyx lounge, the new virtual creation will be used to offer all sorts of financial services to businesses and institutions interested in entering the metaverse. While it is unlikely that the metaverse will take over all human interactions, it will undoubtedly bring many exciting opportunities for both customers and brands in many different areas.
- *Citi Bank* has adopted AR and VR in financial services by creating holographic workstations that use augmented and virtual reality to visualize complex financial data. This platform lets traders react quickly to market changes. The workstation enables users to manipulate data in a 3D space, providing a more dynamic and engaging way to analyze financial information, making it a standout augmented reality example in banking.
- *Bank of America* in 2021 launched virtual reality (VR) training for its employees, becoming the first financial services firm to do so. The bank's VR-based training programs simulate customer service scenarios, helping staff develop their skills in real-time problem-solving and customer interaction. The employees had a total of 20 different VR simulations at their disposal, which allowed them to practice skills like developing stronger, deeper relationships with clients, listening and responding with empathy, and handling difficult conversations. This augmented reality example in banking helps improve the overall customer experience by ensuring employees are better prepared to handle complex banking issues efficiently.
- *Mastercard* in 2020 announced the launch of a new augmented reality (AR) app that enables cardholders to view, explore, and access their credit card benefits in a 360-degree virtual environment. Once the app is launched, users need to scan their cards with a smartphone, after which they will be presented with a series of interactive portals that represent various credit card benefits offered by Mastercard. After tapping on one of the portals, users are transported into a virtual room, which they can explore by moving their phone around and interact with the items within to discover more information about the benefits available to them.

APPLICATIONS OF IMMERSIVE TECHNOLOGIES IN FINANCE

Figure 10 shows some applications of AR and VR in finance [15]. Augmented and virtual reality offer a number of ways to revolutionize the financial sector. Common applications of immersive technologies in finance include the following [1]:

- *Payments:* Financial services institutions are already tapping into the potential of online payments, allowing their customers to make payments from anywhere, anytime. Virtual reality (VR) payment systems are becoming popular. Traditional payment systems interrupt immersive VR experiences (gaming, virtual shopping) with inconvenient prompts. Integrating payment interfaces directly into VR applications creates seamless experiences. MasterCard has transformed their payment systems to enable customers to make payments from within the virtual reality experience, with zero interruptions.
- *Augmented Virtual Assistants*: These are currently provided as chatbots (Alexa, Google Assistant, Siri, etc.). They will evolve in the metaverse to become your digital butler and will include customizable avatars, skins, behaviors, voice, and tone. These augmented virtual assistants will be able to manage almost everything for you in the metaverse, especially matters related to technology.
- *Data Visualization:* Viewing complex data from multiple sources on traditional screens can be difficult and limited. As the financial industry is more complex and there is more data to analyze, immersive technology makes it easier and faster to visualize and organize complicated and large amounts of data. VR can improve data visualization, which enables financial experts to communicate analytics insights to consumers without overwhelming them. The immersive nature of VR makes it an excellent tool for data storytelling and information visualization.

- *Virtual Trading:* Some financial organizations are making trading a virtual experience by creating VR trading workstations - by incorporating VR with asset management software. It provides users with improving accessibility to trading algorithms, tools, and techniques.
- *Security:* To provide a more secure customer experience, biometric security - merging fingerprint scanners, behavioral biometrics, iris detection, facial gestures, and voice recognition - could be integrated into an AR system - to create safe choices - which could then connect with a VR world.
- *Virtual Banks:* Brick and mortar banks suffer from high costs for property, staff, and expertise, and create inconvenience for customers, such as long travel time, and limited working hours. Banking from anywhere is becoming the new normal, and virtual branch banking comes under this category. Though digital-only banks and mobile banks are already present, someday soon we may also be able to go to a virtual bank, which will hopefully provide the same services but exclusively in a VR environment. This application would be very helpful for those who are not able to visit a physical branch location for whatever reason.
- *Employee Training:* While many immersive technologies are developed for specific uses like gaming or social interaction, organizations in a diversity of sectors have adapted them for uses ranging from healthcare treatment to workplace training. Workforce training is one of the important use cases of AR and VR in banking. AR and VR can be used for virtual simulations, providing realistic training environments for financial services workers. Financial institutions can realistically train their staff on critical banking procedures like risk management, conduct product knowledge transfer sessions, and spread awareness about regulatory changes. Figure 11 shows an example of using immersive technology for staff training [18].

BENEFITS

Immersive technology is the bridge between legacy banking and a financial world that is accessible and engaging. For some consumers, the chance to interact face-to-face with their chosen financial services provider will always be the winning formula. Not only can AR/VR technology be used to provide virtual simulations of bank services with 3D visualization, but it can also help customers increase their financial know-how or learn about stock market trading. Other benefits of immersive technology include the following [19,20]:

- *Convenience:* Convenience is ensured as basic services like account opening, deposits and withdrawals, checking account balances, loan processing, and issuance of debit and credit cards are available in a virtual branch. Cutting-edge visuals of stock trading and investment performance enable users to make the right financial decisions in a controlled environment.
- *Customer Experience:* Customer experience is a critical factor for success in the financial industry. Providing personalized and seamless experiences across channels is key to satisfying customers and fostering long-term relationships. Customer experience in the United States has become increasingly important as customers expect personalized interactions and convenient solutions. VR has the ability to improve consumer experiences, ease remote collaboration, and improve financial training and simulations in the fintech industry. AR allows users to simply point their devices at a product, triggering a secure and efficient payment process.
- *Reduced Costs:* Evaluating AR/VR in finance means weighing costs and benefits. This involves considering initial and ongoing expenses, as well as potential features and maintenance. With infrastructure maintenance costs skyrocketing for brick-and-mortar bank branches, AR/VR in banking and financial services helps reduce operational costs through remote loan processing. This increases borrower satisfaction as resource investments are less.
- *Financial Education:* One of the most compelling applications of VR in fintech is in financial education and training. Traditional methods of learning about finance can often be dry and detached from real-life scenarios. Immersive technologies can bridge the financial literacy gap. In this evolving landscape, 73% of retail consumers navigate through multiple platforms, integrating both online and offline experiences, highlighting the importance of immersive technologies in bridging the gap. Moreover, AR and VR can make financial education more interactive and engaging.
- *Improved Remote Collaboration:* VR allows for the creation of virtual meeting spaces where financial advisors and clients based in different locations can collaborate and make decisions together. This offers greater flexibility and access to financial services regardless of location.

Accessing virtual branches from the comfort of their homes connects them with financial experts from all over the world.

- *Risk Management:* Immersive technologies offer unique possibilities for risk management and employee training in the financial sector. VR simulations can place employees in realistic market scenarios, fostering better risk assessment and decision-making skills.
- *Fraud Detection:* The benefits of AR in banking can also extend to risk management, protecting customers and their assets from scams. AR can assist in document verification, identify suspicious transactions, detect identity theft, and create safeguards against potential security breaches.
- *Data Security:* Data security in AR/VR financial applications requires strong encryption, access controls, and continuous threat monitoring. Aligning with data management best practices and regional regulations ensures customer data integrity while leveraging AR/VR capabilities.

CHALLENGES

Like any other innovation that has taken over the world in the past, immersive technology comes with certain challenges that are preventing its wider adoption. Widespread adoption remains the largest hurdle for immersive technology in the fintech sector. The adoption of XR technology is still lagging due to multiple challenges, such as the high cost and the technical expertise required for implementation and use. The implementation of immersive technology requires a great deal of technical expertise, as well as a lot of time and money. Maintenance and upgrade costs can also be quite high. Other challenges of immersive technology in finance include the following [10,21]:

- *Cost:* XR content creation requires a considerable investment in effort and time. Even after content has been created, refreshing it regularly is also costly from an operational and budgetary perspective. Many projects never make it from proof of concept (POC) to production implementation due to the investments required for outcomes that are difficult to forecast with emerging technologies.
- *Risks:* The risks of immersive technologies may arise in many ways, from the way these technologies function to social factors such as the dynamics among those developing these technologies, where these technologies are adopted and who they interact with. The severity and likelihood of the risks of these technologies will depend on: how they are designed and operated, what purpose they are used for, what contexts they are used in and what kind of people will be affected.
- *Data Protection:* Broadly speaking, immersive technologies all use input devices to collect data, software to process the data and generate content, and output devices to deliver content to users. At a technical level, immersive technologies operate through a process of data creation and processing that often involves specialized hardware products that collect a significantly higher volume of data than devices such as smartphones and laptops, including a diversity of sensitive data. This creates significant privacy and data-protection risks that developers must navigate.
- *Algorithmic Harms:* A typical example is AI-enabled discrimination. Immersive technologies use a range of AI algorithms to process data, which may fall under existing guidance or regulation on AI from sectoral regulators. Depending on their use case and context, some immersive technologies may fall under the remit of the EU AI Act. Examples of these risks include algorithms used within immersive technology products that have been found to perpetuate bias and discrimination.
- *Confusion:* One challenge with defining immersive technologies is that companies and researchers use different terms to describe the same broad grouping of technologies. One problem for the governance of immersive technologies is there is no common vocabulary or understanding of what these technologies are, how they work, what kinds of data they collect, and what kinds of technical components they use. Through a shared understanding of how these technologies operate, policymakers and regulators can better judge how immersive technologies may be used in different sectors and what kinds of issues they may raise. Lack of standardized language can lead to confusion and frustration.

CONCLUSION

By taking a measured and strategic approach, the financial sector can overcome adoption challenges and harness the power of immersive technologies. As technology evolves, immersive technology banking tools are becoming indispensable, offering new ways to elevate customer experiences and improve the efficiency of financial services. Banks and other financial services have recently begun testing the waters by adopting immersive technologies in their daily operations. With physical bank branch closures increasing worldwide, financial service firms can

attract users with services in an immersive environment. This is possible because AR and VR in banking give customers access to remote consultations.

Immersive tech can steadily become more and more vital for both businesses and consumers. Immersive business-to-business commerce can also take off. Business customers should be able to virtually test new machines, new retail settings, new workplace facilities and so on before they make procurement decisions. As immersive technology continues to improve, and as more of it comes from trusted brands, its role in digital commerce will likely grow by leaps and bounds. In the future, AR and VR will even be used in the finance industry for actual bank account management, virtual trading, and even asset security. More information about immersive technologies in the financial industry can be found in the books in [22,23].

REFERENCES

[1] "How immersive technology applications are revolutionizing the financial services industry?" June 2022, https://travancoreanalytics.medium.com/how-immersive-technology-applications-are-revolutionizing-the-financial-services-industry-ea74f4bbd394

[2] M. N. O. Sadiku, C. M. M. Kotteti, and S. M. Musa, "Augmented reality: A primer," *International Journal of Trend in Research and Development,* vol. 7, no. 3, 2020.

[3] "What is augmented reality or AR?" https://dynamics.microsoft.com/en-us/mixed-reality/guides/what-is-augmented-reality-ar/

[4] L. van Heerden, "What is extended reality?" August 2021, https://journeyapps.com/blog/what-is-extended-reality/

[5] A. Xperteye, "What is assisted reality? Here is what you need to know," March 2022, https://blog.amaxperteye.com/what-is-assisted-reality-here-is-what-you-need-to-know

[6] M. O. Onyesolu and F. U. Eze, "Understanding virtual reality technology: Advances and applications," *Advances in Computer Science and Engineering*, March 2011, pp. 53-70.

[7] "VR rundown: What you need to know before buying a VR System for your school," https://vreddo.com.au/vr-rundown-what-you-need-to-know-before-buying-a-vr-system-for-your-school/

[8] M. Singh and M. P. Singh, "Augmented reality interfaces," *IEEE Internet Computing*, November/December 2013, pp. 66-70.

[9] "What is mixed reality?" January 2023, https://learn.microsoft.com/en-us/windows/mixed-reality/discover/mixed-reality

[10] C. Rincon and J. Perez, "What are immersive technologies?" March 2025, https://www.adalovelaceinstitute.org/resource/immersive-technologies-explainer/

[11] "Mixed reality," *Wikipedia*, the free encyclopedia, https://en.wikipedia.org/wiki/Mixed_reality

[12] "What is assisted reality? Here is what you need to know," March 2022, https://blog.amaxperteye.com/what-is-assisted-reality-here-is-what-you-need-to-know

[13] C. Andrews et al., "Extended reality in medical practice," *Current Treat Options Cardiovasc Medicine,* vol. 21, no. 4, March 2019.

[14] "Reimagining financial services using extended reality (XR)," June 2021, https://www.wipro.com/innovation/reimagining-financial-services-using-extended-reality-xr

[15] N. Joshi, "4 ways AR and VR can empower financial services," March 2019, https://www.allerin.com/blog/4-ways-ar-and-vr-can-empower-financial-services

[16] "How augmented reality is transforming the banking industry," https://softwaremind.com/blog/how-augmented-reality-is-transforming-the-banking-industry/

[17] R. van Hooijdonk, "How immersive technology is revolutionising the financial services industry," https://blog.richardvanhooijdonk.com/en/how-immersive-technology-is-revolutionising-the-financial-services-industry/

[18] "How augmented and virtual reality are used in the finance industry," February 2024, https://medium.com/echo3d/how-augmented-and-virtual-reality-are-used-in-the-finance-industry-0ed21c6bbb74

[19] S. F. Shanavaz, "Reimagining the future of banking and financial services with AR and VR," May 2025, https://www.novacimmerz.com/blog/future-of-banking-financial-services-with-ar-vr/

[20] "Immersive technology: Reshaping the future of finance and fintech," https://fishermenlabs.com/blog/immersive-technology-reshaping-the-future-of-finance/#:~:text=Immersive%20technologies%20like%20AR%20and,investment%20marketplace%20teeming%20with%20opportunity.

[21] "Using extended reality (XR) for financial services," https://aequilibrium.com/using-extended-reality-xr-for-financial-services/

[22] V. Kandpal et al., *Digital Finance and Metaverse in Banking: Decoding a Virtual Reality Towards Financial Inclusion and Sustainable Development*. Emerald Publishing Limited, 2025.

[23] J. Dalton, *Reality Check: How Immersive Technologies Can Transform Your Business*. Kogan Page, 2021.

Figure 1 A representation of immersive technology [1].

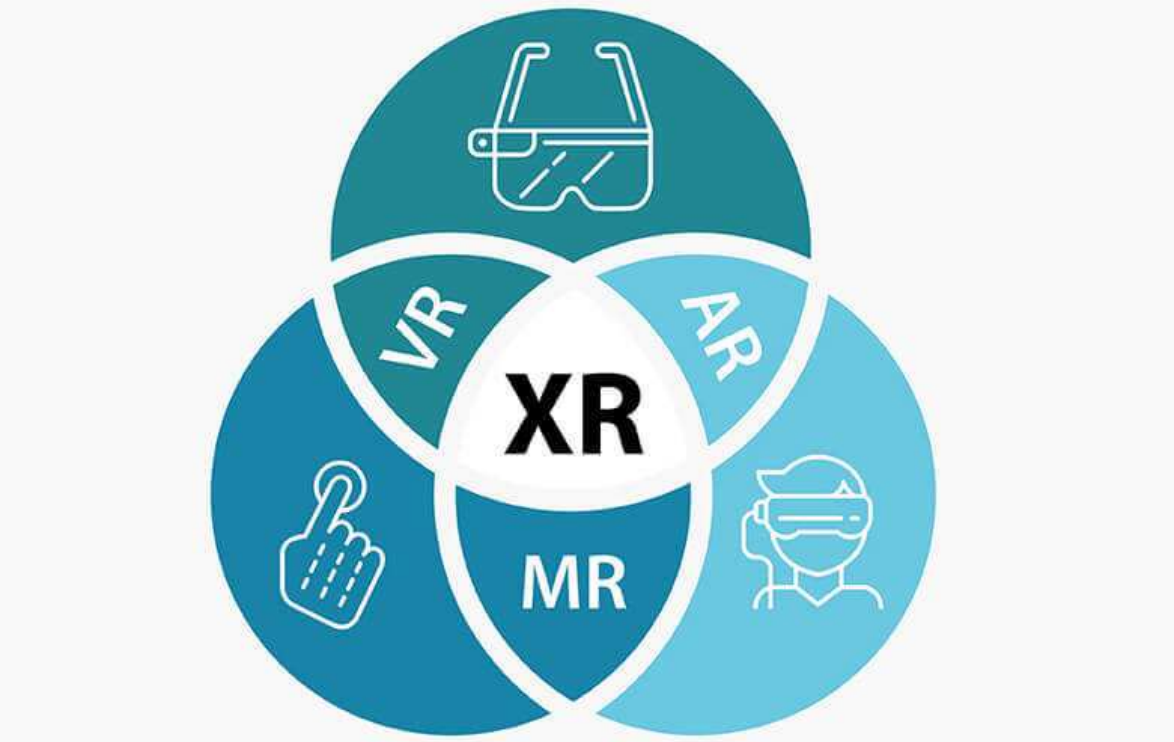

Figure 2 Extended reality (XR) includes AR,MR, and VR [4].

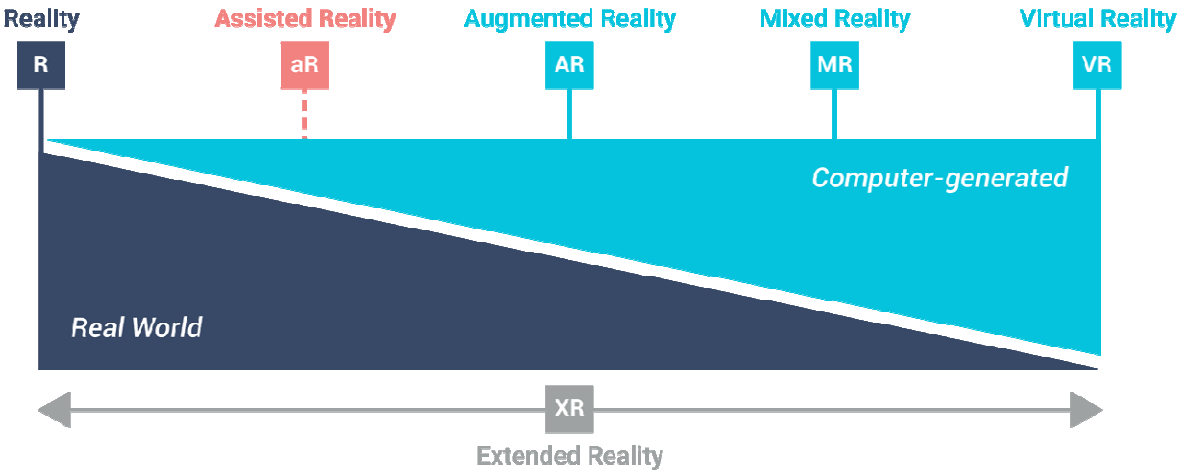

Figure 3 The XR spectrum [5].

Figure 4 Head-mounted displays [7].

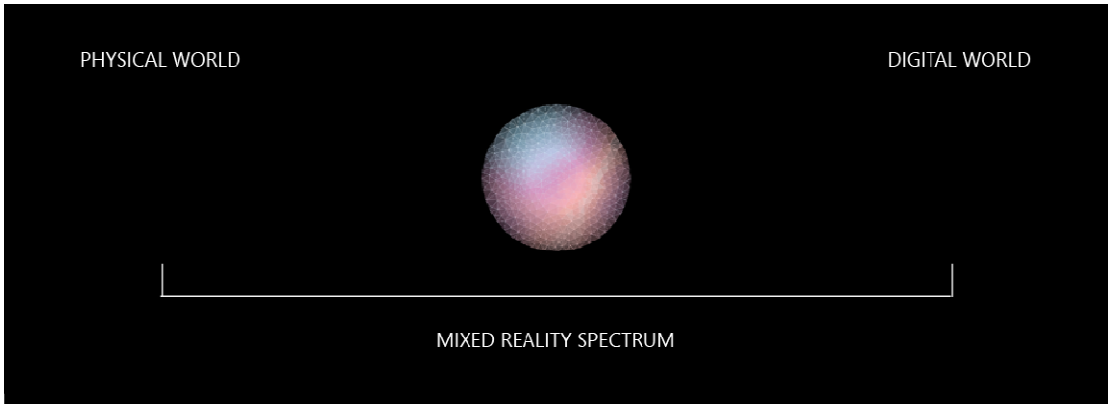

Figure 5 Mixed reality is a blend of physical and digital worlds [9].

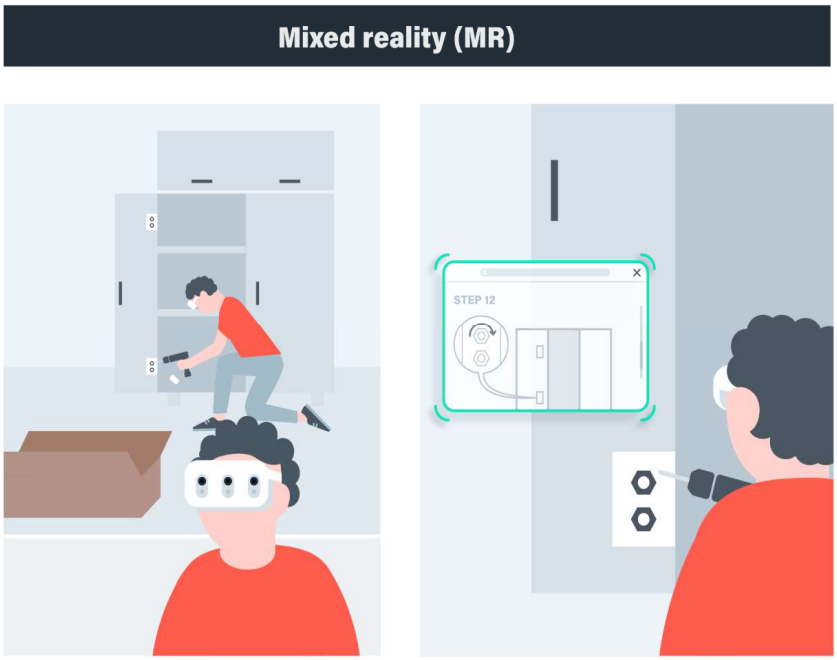

Figure 6 Mixed reality [10].

Figure 7 A worker wearing an assisted reality device [12].

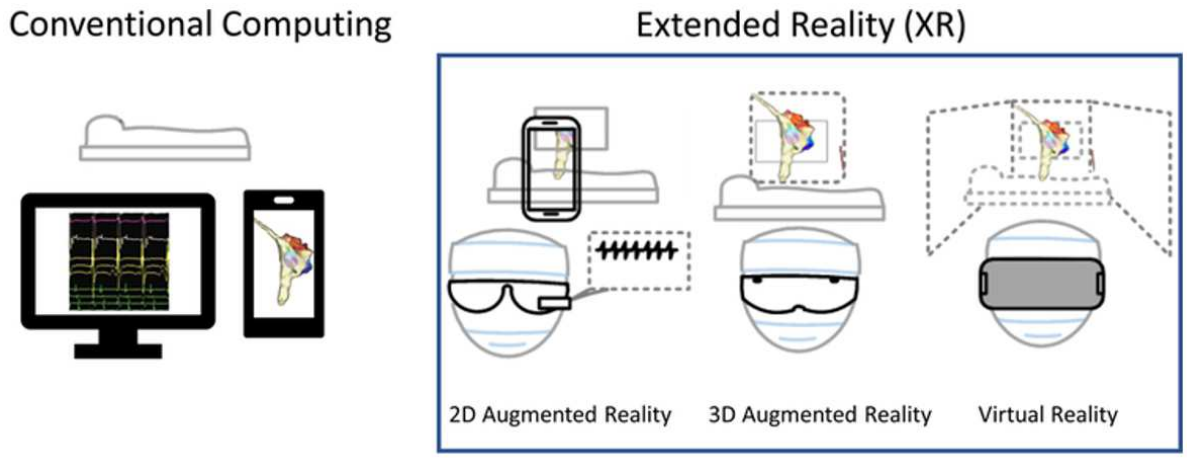

Figure 8 Comparing conventional computing with extended reality [13].

Figure 9 Immersive technology in finance [15].

Figure 10 Some applications of AR and VR in finance [15].

Figure 11 Using immersive technology for staff training [18].