VISION

Trends in XR Training & Spatial Computing

2024 Industry Whitepaper

20 industry experts share why emerging metaverse will be transformative for the XR industry

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Executive Summary

LORNE FADE
COO & Co-Founder
VR Vision

This whitepaper explores the evolving landscape of Extended Reality (XR) Training and Spatial Computing, analyzing key trends shaping the industry in 2024. XR technologies, including Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), have witnessed significant advancements, transforming traditional training methodologies across various sectors. We're going to dive headfirst into what an assortment of industry veterans think about "Spatial Computing" and what the future holds for merging both physical and digital worlds seamlessly.

Integration of Artificial Intelligence (AI) and Machine Learning (ML):

XR training platforms are increasingly leveraging AI and ML algorithms to personalize learning experiences, enhance content creation, and provide adaptive feedback. These technologies enable the development of intelligent simulations that can dynamically adjust based on user behavior and performance, maximizing training efficacy.

Real-time Collaboration and Remote Training:

With the rise of remote work and distributed teams, XR training solutions are incorporating real-time collaboration features, allowing geographically dispersed users to participate in immersive training sessions simultaneously. This trend facilitates cost-effective and scalable training programs while fostering collaboration and knowledge sharing among remote employees.

Emphasis on Accessibility and Inclusivity:

As XR technologies become more prevalent in training scenarios, there's a growing emphasis on ensuring accessibility and inclusivity for all users, including those with disabilities. Innovations such as gesture recognition, voice commands, and haptic feedback are making XR training experiences more intuitive and accommodating diverse learning needs.

Gamification and Interactive Learning:

Gamification elements are being integrated into XR training modules to enhance engagement, motivation, and knowledge retention among learners. By incorporating game-like mechanics such as rewards, challenges, and leaderboards, organizations can transform mundane training tasks into immersive and enjoyable experiences, driving better learning outcomes.

Hybrid Training Environments:

The convergence of XR technologies with IoT (Internet of Things) devices is giving rise to hybrid training environments that blend virtual and physical elements. These environments enable hands-on experiential learning by simulating real-world scenarios while providing users with actionable insights and feedback, bridging the gap between theory and practice.

Conclusion

The evolution of XR training and spatial computing presents unprecedented opportunities for organizations to revolutionize their training initiatives, driving efficiency, effectiveness, and engagement. By embracing emerging trends like AI integration, remote collaboration, accessibility enhancements, gamification, and hybrid environments, businesses can unlock the full potential of XR technologies to cultivate skilled and adaptive workforces in the dynamic landscape of 2024 and beyond.

Enterprise XR Hardware

SAID BAKADIR

Senior Director, Product Management
Qualcomm Technologies, Inc.

Enabling the Future of XR Training & Spatial Computing

2024 has already been an exciting year in the XR industry with new announcements and experiences. Qualcomm Technologies, Inc. enables the XR ecosystem with purpose-built Snapdragon XR Platforms to deliver the full spectrum of realities: AI smart glasses, AR, VR to MR. We believe XR devices will revolutionize the way we perceive and interact with the world across work and play, transforming the world as we know it.

> "We believe XR devices will revolutionize the way we perceive and interact with the world across work and play, transforming the world as we know it."

To help the XR industry continue to grow, Qualcomm Technologies develops the platforms, AI perception technologies and developer tools required to address the unique requirements of XR devices. For consumers and enterprise to widely adopt XR, devices need to support rich visuals, interactions and functionality all while being lightweight and more comfortable to wear. This is when Qualcomm Technologies steps in to enable the future of spatial computing and XR training.

Critical XR Technologies Made Possible by Qualcomm

As the XR industry is evolving to support blended Mixed Reality, Video Pass-Through (VST) is a critical technology to enable immersive experiences that blend the real and virtual worlds. Qualcomm Technologies is making VST better and bringing it to mainstream devices with our latest Snapdragon XR2 Gen 2 and Snapdragon XR2+ Gen 2 platforms. Through the optimization of our silicon, support for additional cameras and sensors, and the hardening of our perception algorithms we bring low latency, full color video see through to devices with up to 4K per eye resolution

in devices designed for both consumer and industrial applications. VST is critical technology to enable advanced use cases such as remote assistance, immersive training in real-world environments and more.

Spectrum of Augmented Reality Glasses

As processing technology continues to improve as well as advancements in micro projectors, waveguides and optics, another key category for immersive training is AR glasses. Qualcomm Technologies views this segment as a range from AI smart glasses that features cameras, audio and/or smaller display, to fully featured AR glasses that have advanced displays to blend immersive content into your environment. These glasses will transform the enterprise with use cases like infinite desktop, collaboration, and remote assistance. AR glasses provide a seamless interface for users to interact with their environment hands-free and are ideal for logistics, training, delivery, and pick and pack fulfillment workers. Positioned close to the eyes and ears, AI smart glasses enable Gen AI to perceive the world as humans do - providing contextual understanding and real-time streaming capabilities such as transcription and translation.

VISHAL SHAH

GM of XR and Metaverse
Lenovo

In just a few years we've gone from VR, AR, and then XR to MR, Metaverse, and now Spatial Computing. This market has been an exhilarating ride filled with highs and lows, and 2024 will be more of the same. That's an easy prediction. But the important thing is overall **the trajectory is very positive for XR OEMs and developers.** This is because technology trends for hardware and software, as well as demographics, strongly support the adoption of immersive experiences in the enterprise, and then eventually into the consumer market.

First, let's talk people. Ten thousand Baby Boomers are retiring daily, at the same time the generations replacing those workers are tech-savvy Gen X managers and digital native Millennials.

A huge transference of skills and knowledge needs to occur just to maintain equilibrium in companies, much less achieve growth.

This is one of the biggest reasons XR training is increasing in popularity, enterprises need cost-effective, safe, and effective learning opportunities for their people. And nothing delivers that like XR. Whether it's training doctors and nurses on healthcare procedures, or a manufacturing team on mechanical processes, immersive learning has shown great efficacy, as well as a vast reduction in using expendable resources.

" Enterprises need cost-effective, safe, & effective learning opportunities for their people. And nothing delivers that like XR."

The other major demographic shift is not who is working, but where. Since the pandemic, hybrid work scenarios have become the new norm. There is a lot of opportunity for remote and smart collaboration solutions like AR glasses to assist workers on a task or using VR to work in 3D models and digital twins by teams distributed globally. Because of XR and other tech, geography simply isn't the challenge to workers the way it used to be.

"XR hardware can achieve a lot more now at lower cost then what was possible just a few years ago. Software, too, is beginning to exponentially advance with the aid of Generative AI. "

Now let's look at XR tech, it's getting much better more quickly. XR hardware can achieve a lot more now at lower cost than what was possible just a few years ago. This trend continues to accelerate. This means the industry is started to hit capabilities and price points more acceptable for enterprises planning mass deployments. At the same time, software is beginning to advance exponentially with the aid of Generative AI. What used to take developers weeks and months is starting to take only hours and days. This trend will help dramatically solve a major bottleneck in the industry — **speed to solution.**

Also on the hardware side, we are just starting to see Mixed Reality (MR) devices get used in enterprise scenarios. This is technology only in its early stages. It will be very exciting to see the lessons OEMs and developers draw from real-world applications and usages.

All of this will have a major impact on enterprises, but the tech use cases and gained efficiencies will trickle down to consumers too. For those of you who can remember when PCs and mobile phones were new, do you recall where you first saw them? They were at the office before they made it to living rooms and coffee shops. Similarly, more workers are having their first XR experiences now and are seeing the magic of immersive and mixed digital settings. Eventually, they'll want to bring this tech into their homes.

So, that's it. My prediction is XR will continue to advance and break new barriers this year more so than it did last year because of the introduction of GenAI and other new or maturing technologies. Next year we'll see even more advances and I'm confident I'll make a similar prediction then about the industry's trajectory. Because **the future is bright.**

MALCOLM FINKELSTEIN

Business Development
PICO

We are watching the latest in XR and spatial computing boost educational and workforce training applications to new levels. Step into any job from anywhere, with less reliance on special equipment or prior knowledge of the trade. In the classroom, the latest chip and design improvements should drive even more engaging, story-driven simulations that focus on problem-solving, where it's more than just memorizing a formula to solve an algebraic equation - a student's immersive scene is the math problem today.

Individualized learning continues to improve. Everyone can participate at their own pace while remaining collaborative and under educator control, thanks to new spatial mapping and enterprise-ready device management tools (more user-friendly and intuitive than ever). Added accessibility features have made these XR-powered scenarios more inclusive for all learners. A.I.'s further integration with XR platforms lets a new wave of empowered designers quickly create tailored content that remains fresh and aligned with market demands.

We're excited about the direction the industry is heading, especially with big names like Apple entering the market and putting a spotlight on our efforts.

Thanks to our partners' deep expertise and user feedback from past deployments, we're able to build better bridges between education and career opportunities, where XR as a tool can open doors to rewarding jobs. We're honoured to support these immersive initiatives today as we also look ahead to new possibilities with the latest upgrades.

ALVIN WANG GRAYLIN

Author, "Our Next Reality"
Global VP, HTC

Get Ready for XR Take-Off

I've seen numerous cycles of boom & gloom over three decades in the space but this year I'm more confident than ever it's going to finally happen. Here are the key reasons:

- ✓ **All the biggest companies in tech are working on or have released devices in the space** and coming out soon with cheaper, smaller and higher fidelity hardware in the coming year! The lingering cloud of doubt that has always hovered over the market is clearing away.

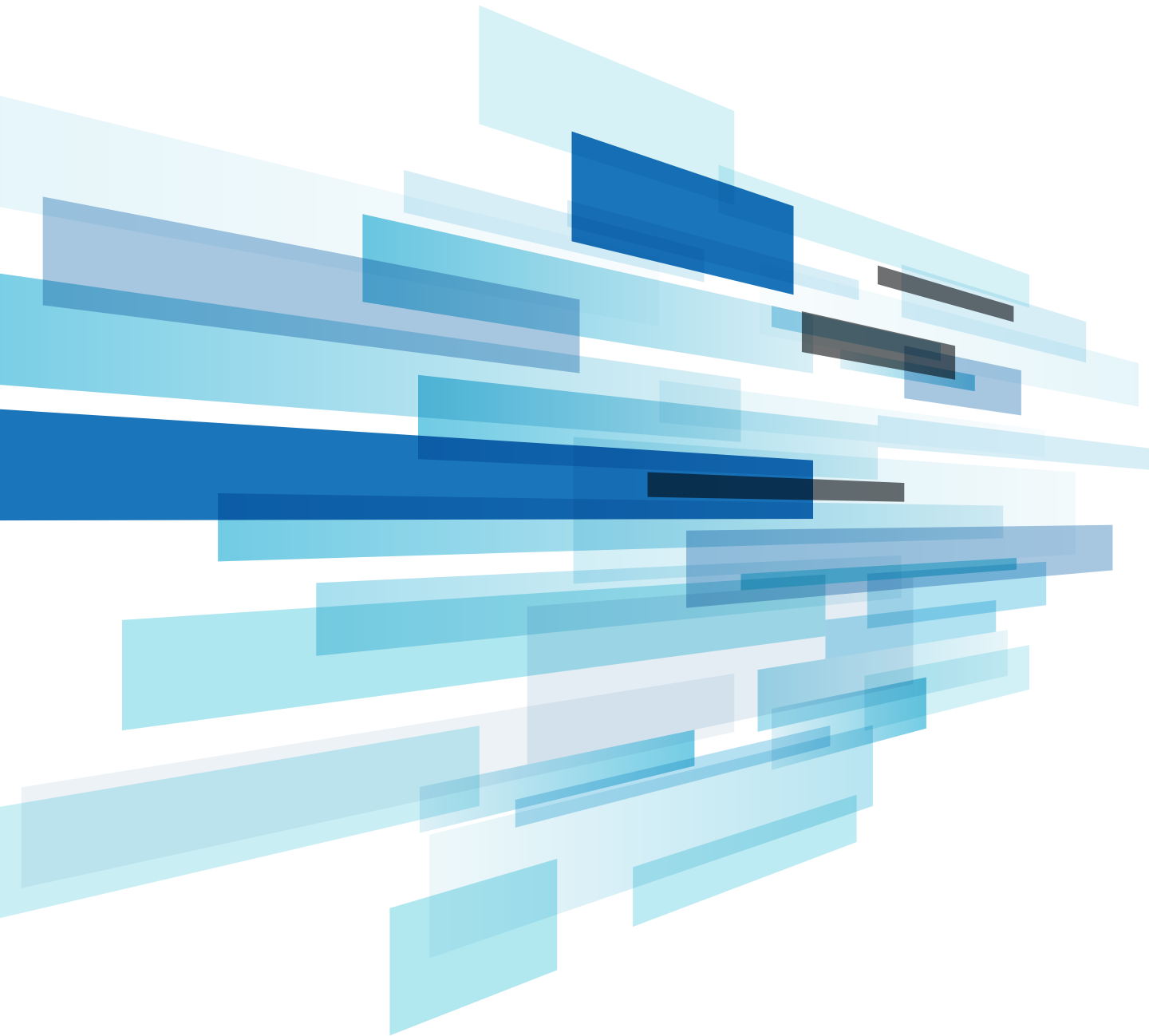
- ✓ **AI is going to bring the cost of content creation down and speed development cycles up dramatically.** The biggest roadblock for greater adoption is NOT hardware but lack of quality content for both consumer and enterprise use cases. That's about to change in a big way. Soon, building 3D virtual worlds populated with smart AI NPCs with prompts will be possible and we never have to fear the ghost town effect anymore. The number of 3D content creators will go up exponentially.

- ✓ **The "metaverse" will be making a comeback, even if it doesn't end up being called that.** The 3D internet will happen, and new tools and standards will accelerate it. People are social animals and we've evolved to be optimized for interacting in a 3D world, all the pieces are coming into place.

- ✓ **Smart glasses will soon turn into smart XR glasses.** It may take a couple of years, but current audio-focused smart glasses will evolve into full XR-capable AI glasses soon and be affordable to consumers. When they come, a flood of users and apps will come to market and these new devices

will not only entertain us, but increase productivity and make us all smarter. We will feel naked with them, more so than when we don't have our phones today.

Brighter days are ahead. It won't all happen in 2024, but this will be the year of inflection for the adoption curve. Keep the faith and keep pushing forward.



CASIE MILLHOUSE

Founder, Managing Director

Enabling Tomorrow's Market

We are here but kind of not already there, yet. While many focus only on the content, software or user interaction, there's so much more to the AR/VR Hardware ecosystem that are all coming together to drive optics, photonics, sensors, processing, connectivity and materials. Moreover, these advancements are not just transforming the landscape for privileged regions but are also opening doors for underserved communities, fostering economic growth, and bringing support to areas that previously lacked access.

Reimagining the Future with AI and XR

Struggling to envision what lies ahead? AI and XR are here to help us navigate the possibilities. By simulating scenarios and forecasting outcomes, we're shaping a future that's not only innovative but also sustainable. Currently, we have R&D teams around the globe that are working on understanding AR hardware safety protocols, like being able to measure latency within an AR/MR/VR headset and trying to understand, "How do we measure color uniformity in a microLED space and build all the pieces to lower to end cost for consumers?" It's about more than just technology; it's about ethics, policy, safety and ecology too.

Integrating Data for Predictive Analysis

Data is the new gold, but it's scattered like sand. That's where integrated platforms come in. By consolidating diverse data sources, we streamline analysis and predict trends like never before. It's all about understanding markets deeply and driving innovation forward.

Fostering Collaboration and Innovation

Collaboration is key to progress. That's why partnerships, ecosystem development with policymakers, telecoms and every step in the supply chain is factored in. These events not only forge new connections but also spark innovation and accelerate progress. It's a win-win for research, commercialization, and securing funding.

Perspective on Markets and Maturity

In established markets like the US and UK, we're witnessing a massive influx of demand from consumers and enterprises alike. This is fueled by hardware companies targeting these regions with their latest offerings to enterprises and consumers, while other countries, particularly in Asia, lag behind. For instance, most Asian countries still don't have access to devices like the Quest 3, let alone the highly anticipated Apple Vision Pro. While this presents a downside, it also offers opportunities for talent in these regions to thrive and for companies to expand their businesses into untapped markets.

We can foster technology integration by taking a platform approach with our competitors. This accelerates time-to-market, enables interoperability, delivers a robust supply chain and facilitates a lower cost.

Embracing the Future: AI, XR, and Society

The future is upon us, and it's exciting! By embracing AI and XR, we're not just staying ahead of the curve; we're rewriting the rules of the game. Innovation is boosted, societal norms are challenged, and we're paving the way for a brighter, more inclusive future.

XR Product Companies

RONI CERGA

CEO

VR Vision

Now, there's this buzzword floating around: "spatial computing." It's got people talking, especially with cool products like the Vision Pro hitting the market. But some of these solutions, like Apple's fancy closed-off approach, are just too pricey for most people. They get us all hyped up, but then the challenge is to get user adoption you need for users to be able to afford the technology in the first place.

As for AI, it's not quite the game-changer in the XR world yet. “Yet” being the key word here, the reason for this is that making complex 3D environments and models is something that AI's still figuring out. Maybe in a couple more years, it'll catch up, but for now, it's more of a sideline player.

Meanwhile, companies that jumped on the VR bandwagon early are reaping the rewards. They're scaling up their programs, seeing the ROI, and snagging top talent left and right. But for the ones dragging their feet, they're starting to realize they're falling behind. They're missing out on attracting the best new hires and holding onto all that valuable knowledge from their veteran employees. The pressure's on, and soon enough, VR training will be the norm rather than the exception in the large enterprise world.

“It's a tough game out there, and only the strongest will survive.”

Additionally, we're likely to see some shake-ups in the industry.

1

Companies that couldn't quite find their niche or secure enough funding might end up being acquired or shutting down altogether.

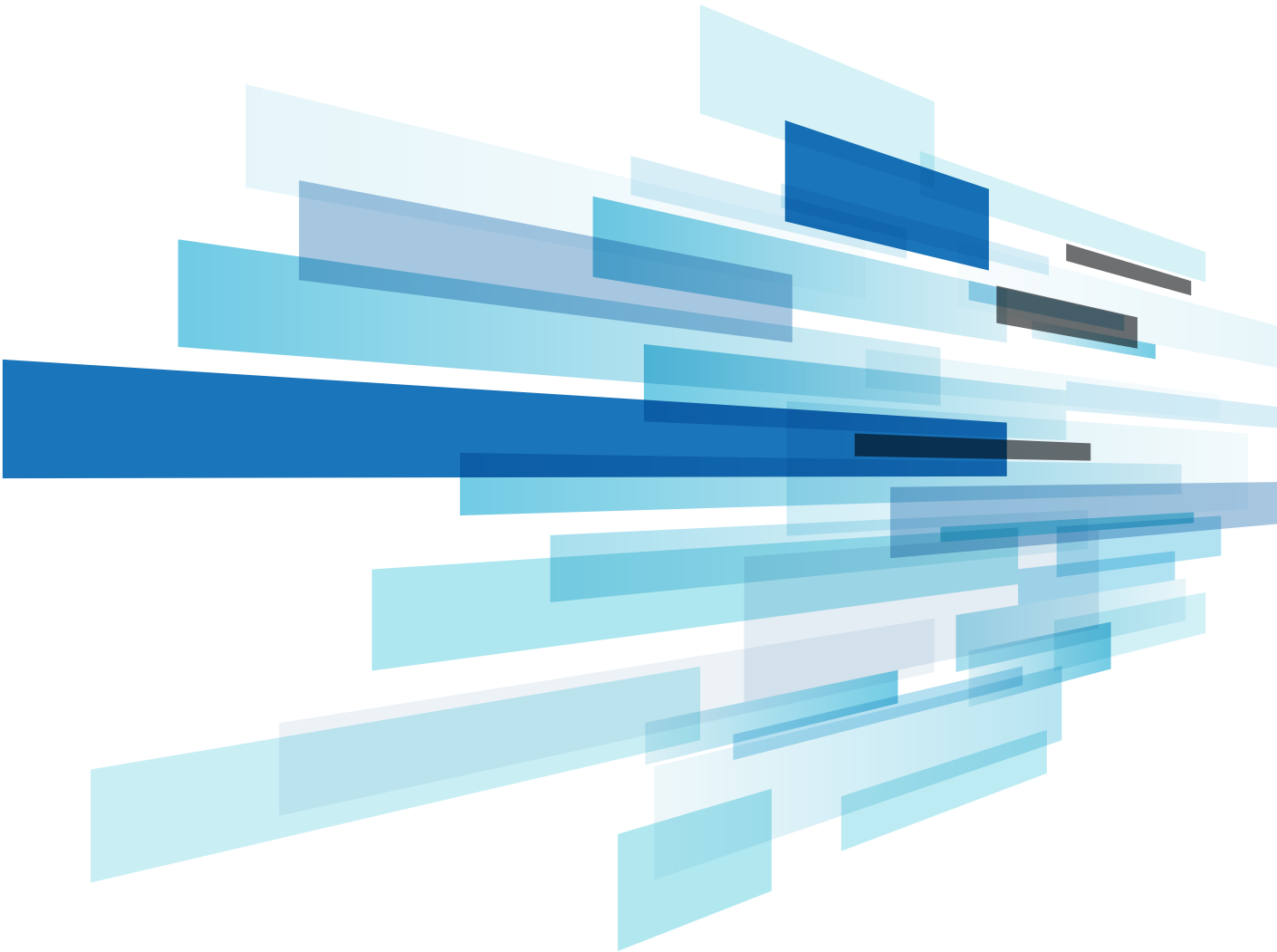
2

On the flip side, new players are entering the market, but they're facing **tougher competition.**

3

The funding landscape has shifted, with fewer big rounds available for startups. This means newcomers have to bring something unique to the table to compete with the established players who not only have a solid customer base but also a treasure trove of internal tech tools for XR that are hard to replicate.

It's a tough game out there, and only the strongest will survive.



ANEESH KULKARNA

CTO

Strivr

The Future of XR is Now

In 2024, the dynamic intersection of immersive tech with AI will redefine workforce engagement and development by bringing unprecedented levels of collaboration, personalization, and productivity to the enterprise.

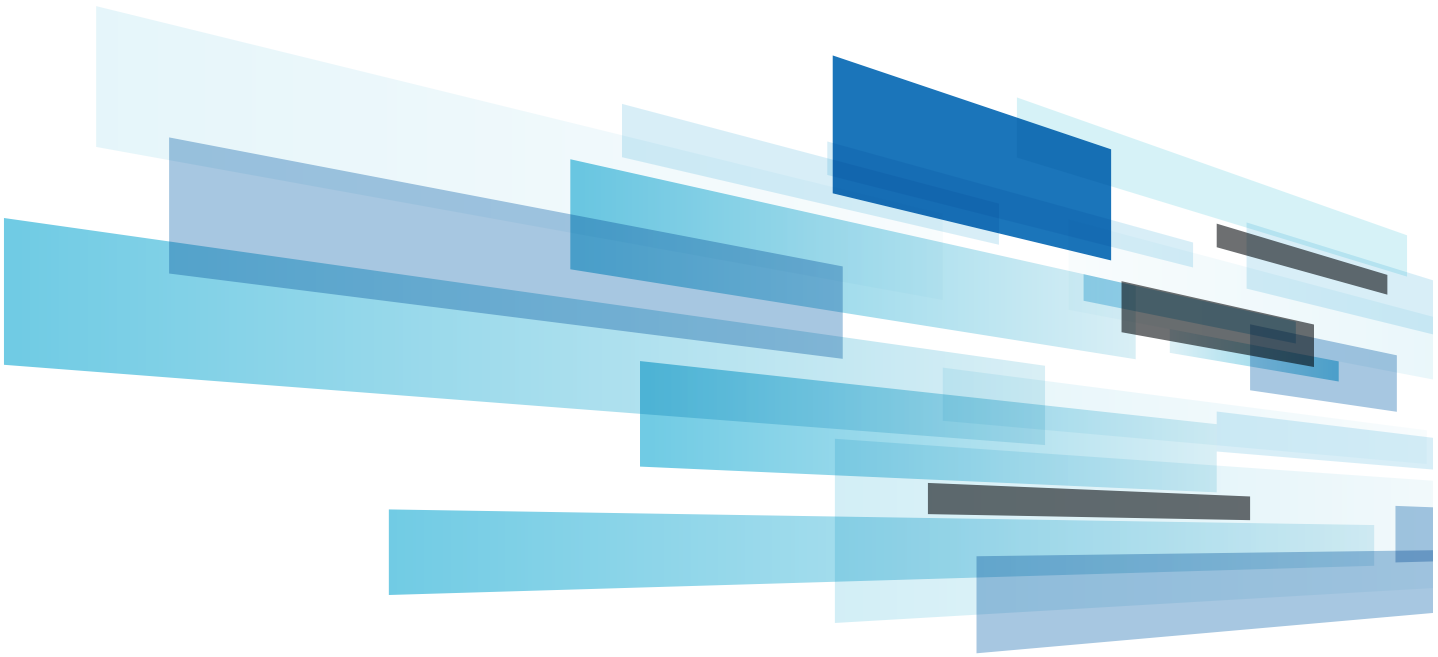
With breakout innovations from companies including Apple and Meta, XR tech has taken a quantum leap forward in the past year. The Meta Quest 3 features breakthrough mixed reality, and when combined with Presence Platform, enables a spectrum of immersive experiences with capabilities including passthrough, scene and spatial anchors, and interactions. More recently, the release of Apple Vision Pro introduced the world to a new era of spatial computing. With the highest fidelity and lowest latency video passthrough that we've experienced to date, the device provides a real-time sense of the physical environment. The naturalistic and human-oriented hands-free user interface will drive new use cases, increase usage, and likely usher in a whole new category of users.

"The naturalistic and human-oriented hands-free user interface will drive new use cases, increase usage, and likely usher in a whole new category of users."

As we have seen with VR, first-mover industries will drive adoption based on the value it delivers to the business. From airlines to retail stores, VR has proven its efficacy in elevating skills from safety preparedness to customer empathy with higher learner engagement, higher knowledge retention, and significantly less time to proficiency. With XR, we anticipate a broader range of industries will influence the adoption curve by showcasing practical applications that combine VR and AR, emphasizing more collaborative, hands-on learning experiences. Consider fields like industrial and product design, where virtual platforms enable real-time collaboration, development, and testing – significantly reducing time and cost constraints.

As 2024 unfolds, XR is poised to accelerate engagement, productivity, and performance across the workforce with advancements in employee training and collaboration. The combination of XR and AI will bring learning into the flow of work, deliver training in both virtual and physical environments, and generate more compelling, intuitive, adaptive, and personalized experiences.

The ultimate winners will be the users, and the ecosystem of content creators, who can rest assured that key hardware and software companies in the industry are continuously investing to elevate the technology and experience in concert with rapidly growing adoption in the enterprise.



RYAN CHAPMAN

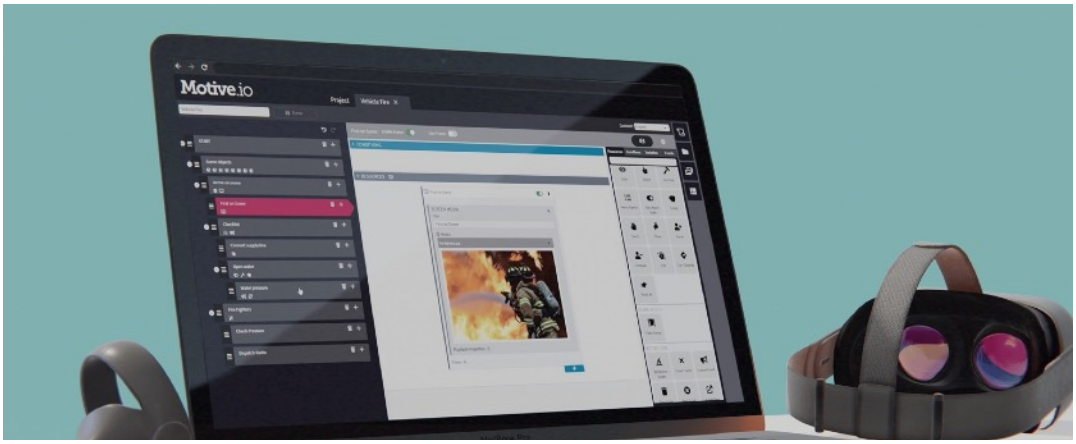
CEO

Motive.io

XR Technology, in 2024, is going mainstream in Enterprise. One can say that it's going to get boring, which is an extremely exciting development!

Let me explain. We use "boring" technologies every day to solve business problems. They don't seem new or novel because they've become an indispensable part of our workday. We take for granted that they boost productivity, save money, and make the lives of the people using them better.

This is where we find XR in enterprise today. Although there is plenty of excitement (hello Apple Vision Pro!), **the most compelling trend for me is the increased adoption of XR into mainstream business use cases like training.** The results speak for themselves, and large organizations are starting to scale out training programs that take advantage of the substantial cost savings and dramatically improved training outcomes that XR can deliver.



I'll give you an example from personal experience. We're developing a training program for a major retailer to teach new employees how to pick products in a massive warehouse. When I read through the complex procedure my head was spinning. But when I tried the scenario in VR, everything fell into place. I was learning by doing, in a perfect replica of the warehouse, without leaving my desk. I didn't need to visit the site or take valuable time from a manager to learn the procedure. This program will deliver the holy grail of cost savings and increased productivity all at once.

These results are exciting! But to adopt XR at scale, you need a system that solves a lot of "boring" problems like security compliance, interoperability with other vendors, and integration with existing infrastructure. Our platform, Motive XMS, was built from the ground up to address these challenges. And of course, we've sprinkled in a few exciting features too–like no-code authoring and AI agents that let you interact in virtual worlds using natural language.

XR is getting boring–which is the most exciting trend in XR today!

KYLE JACKSON

CEO

Talespin by Cornerstone

Just like other modalities before XR, the real value of those mediums was not unlocked until standards emerged, content became transferable between platforms, and enterprises could bring together a cohesive user experience across a wide range of vendors, content formats, and service providers. While the value of spatial learning is undeniable, and most enterprises are already convinced of its transformative potential, XR has been plagued with silo after silo of immersive content, hardware and enterprise IT frictions, and a lack of market leadership from the large incumbent learning platforms.

Unblocking these frictions is where the industry needs help.

While the amazing innovations coming from Apple, Meta, Lenovo, Qualcomm, generative AI, and many other technologies are extremely exciting, it is time to focus on creating cohesion at scale for the enterprise needs. Collectively amongst hundreds of promising startups and technologists the vision for the intersection of spatial learning and AI has been laid out.

We now sit on the technology to conjure interactive worlds, build engaging simulations, & drive personal and professional development at a previously unattainable magnitude.

The work to scale the collective vision of the spatial learning community should be the primary focus for our community and a substantial portion of our product roadmaps this year.

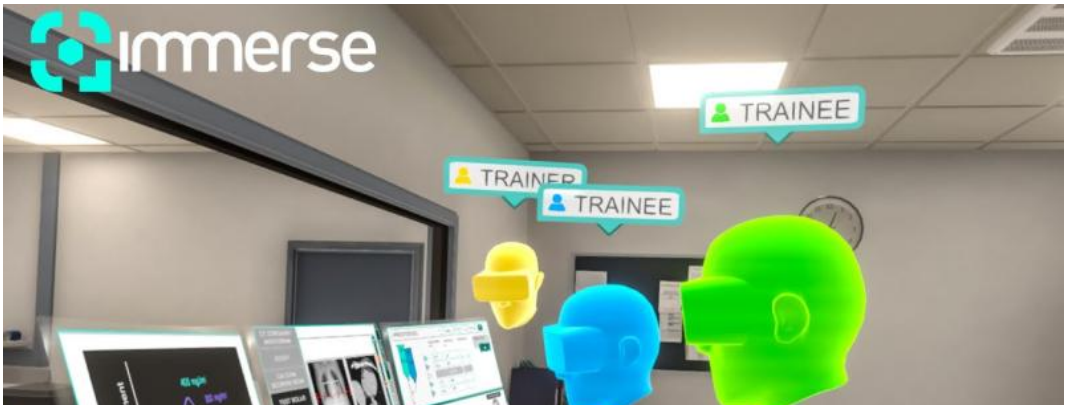
JUSTIN PARRY

COO and Co-Founder
Immerse

Embracing XR in 2024: the unavoidable future of enterprise innovation

XR opens a window to the future, yet it's crucial for technology providers to concentrate on the present and actively seize the opportunities available today. The industry is still contending with some fundamental complexities related to scale. One of the key challenges is to help enterprise organisations develop a strategic approach to XR implementation, as opposed to rather narrow POCs that often get caught in limbo. Other major obstacles include complex and expensive content creation, fragmentation of content and suppliers within an organisation, and the safeguarding of user privacy and data security.

The good news is that the major players in the space are now fully focused on these challenges, where previously there may have been an over-emphasis on the wow-factor of the hardware. This requires innovative, joined-up solutions that not only bridge the gap between potential and actuality but also cultivate an expanding digital ecosystem. We see this shift in mentality as a major trend in 2024.



Identifying & addressing key challenges

Comprehensive end-to-end solutions

Fragmentation within the VR sector calls for end-to-end solutions that harmonize hardware, software, and content platforms. This integration is vital for businesses aiming to foster widespread adoption and harness the full potential of immersive learning on a grand scale. By providing a unified solution, companies can mitigate the intricacies of the current VR landscape, paving the way for enhanced user experiences and operational efficiency.

Strategic data utilization and AI Integration

The intelligent exploitation of data emerges as a foundational aspect in validating the effectiveness and ROI of XR training initiatives. Directly confronting privacy issues and implementing stringent data management protocols allows for the ethical use of data to tailor experiences, rendering them more engaging and pertinent to users. The incorporation of Artificial Intelligence (AI) into virtual realms enables the creation of dynamic, responsive, and intuitive environments. AI-driven avatars and natural language processing technologies can significantly amplify immersion and interactivity, and predictive analytics drive substantial organizational benefits.

Streamlining content creation and consolidation

Key to democratizing XR training is the expansion of content diversity and its affordability. The industry's focus on lowering content creation and distribution barriers facilitates a wider range of experiences, catering to diverse user needs and preferences. Innovations in content creation tools, alongside scalable distribution models, are essential in making VR more accessible to a broader audience. Enterprise content consolidation further enhances this accessibility by simplifying the management and deployment of resources, ensuring seamless integration and utilization across different platforms and departments.

Conclusion

Forging the path to a digital future

As the XR landscape continues to evolve, the strategic integration of these technologies within enterprise environments signifies a profound transformation in how industries operate, learn, and interact. The concerted efforts of key industry players to address current challenges, coupled with the adoption of comprehensive, end-to-end solutions, set the stage for a future where XR technologies are integral to business strategies, enhancing operational efficiencies and creating immersive, impactful learning experiences. Embracing XR today is not merely about leveraging new technologies but about preparing for a future where digital and physical realities converge, driving unprecedented innovation and growth.

LUKE WILSON

CEO & Founder
ManageXR

2024 will be an exciting year for XR!

The most notable development is of course the release of the Apple Vision Pro. This long-awaited device is a huge signal to the world that this technology is ready for prime time. While the Apple Vision Pro will create a lot of buzz and excitement around XR, it won't be the device of choice for large-scale use of XR in the training space. This is mainly due to its high cost and specific sizing requirements, which make it more suitable for consumers and enthusiasts rather than for extensive deployments using devices that are shared by many users. But keep an eye on Apple, this is just the beginning!

As more hardware enters the space, we'll see more content developers become device-agnostic. Every hardware has its unique pros and cons, and every enterprise has its unique hardware requirements. Developers will be certain to maximize their business opportunities by supporting as many hardware types as possible.

Our advice to enterprises and XR training developers will continue to be focused on choosing a hardware, software, and management solution that is built to scale.

Finally, Education and Training will continue to make up the lion's share of where people are finding value in XR. Whether it's students learning new skills in vocational schools or employees learning new workflows at company training centers, training in XR will continue to prove its ROI. It is clear that there is no better way to learn than by doing.

SUZANNE BORDERS

CEO

BadVR

2024 XR Outlook

2024 will bring the convergence of AR, VR, and AI. Each component of this technology triad has finally gained its own independent momentum and the next generation of Deconstructed, the metaverse moniker is just as appropriate in describing this fusion of real and virtual. Whatever the words, everyone can agree that innovation is accelerating toward the same apex user experience.

For training, the integration of AR and VR with AI is enabling the creation of highly interactive and realistic environments that can adapt to the learner's performance and needs. Automated algorithms will analyze user interactions and personalize the difficulty or challenges to optimize the learning curve. This approach enhances engagement and significantly improves quantitative retention of information and skills, at a much smaller content creation cost than ever before.

XR allows for more nuanced and interactive representations of real-world spaces, facilitating remote teams to work and learn together in virtual environments that mimic physical counterparts. In sectors like healthcare, aerospace, and manufacturing, where precision and accuracy are paramount, high-fidelity simulation means trainees can practice intricate procedures and operations in a risk-free environment. This not only reduces the logistical burden compared to traditional methods but also provides a dramatic ROI proposition as evidenced by the recent uptick in demand for immersive solutions.

AI's role in this confluence cannot be overstated. Beyond content generation or personalization, AI is creating intelligent virtual assistants and mentors that can guide users through training sessions, provide instant feedback, and even predict and preempt common mistakes. This level of support is invaluable in creating a more effective workforce. As all these computing components become more accessible, their impact on the sector is set to grow exponentially, reshaping how knowledge is transferred and skills are acquired in the digital age.

This year will see both the consumer & commercial markets become aware of the potential already being realized by heavy industry. The form factor of modern headsets will shrink down to a weight and size comfortable enough for the youngest generation to become immersive natives, and mainstream devices will become capable of both AR and VR modalities. Most importantly, we'll see acceptance of this technology's nascent forms into our everyday lives and businesses, especially in the professional education sector where investments are quickly justified. **2024 will be the year that XR transformed from a toy into a tool.**

"This year will see both the consumer & commercial markets become aware of the potential already being realized by heavy industry."

OLGA KRYVCHENKO

Owner/CEO

Qualium Systems

So, 2024's shaping up to be a steady year for the XR scene. Don't expect a sudden explosion of popularity; it's more like a slow and steady climb. Sure, gadgets like the Apple Vision Pro and Meta Quest Pro are making waves, but they're just paving the way for other cool headsets to join the party. Personal devices might not take over the professional realm just yet. Instead, it seems like those headsets with flexible usage rules are gonna be the real winners, especially in training gigs.

But here's where it gets interesting - mixing XR with AI could unlock a whole bunch of possibilities, especially for training purposes. And guess what? Big players and investors are starting to take notice.

As more companies gradually hop on the XR train for their processes, you can bet your bottom dollar that attention's gonna shift towards beefing up security, making sure things stay safe, and dealing with all the red tape.

Overall, the hype around XR is gonna settle down into a solid recognition of its value in training employees. But here's the thing: XR firms need to keep spreading the word about the perks and pitfalls of using this tech in the workplace.

It's all about educating folks and getting them on board with the XR revolution.

Thoughts Leaders and Influencers

BOBBY CARLTON

XR and Spatial Computing Specialist and
Head of Business Development and Sales
FS Studio

Synthetic Data, GenAi and Spatial Computing's Impact on Training

The future of enterprise training is rapidly evolving with the convergence of synthetic data, generative artificial intelligence (genAI), and spatial computing. These cutting-edge technologies offer unprecedented opportunities to revolutionize training methodologies, enhance workforce capabilities, and drive innovation across industries.

Synthetic data, accurately replicating real-world conditions, serves as a cornerstone for immersive training environments in spatial computing. It enables the creation of diverse and customizable training scenarios, empowering enterprises to tailor training programs to their specific needs. Complemented by genAI, which autonomously generates realistic content, synthetic data further enhances training effectiveness by providing AI-generated content that adapts to individual learning styles.

Across industries, the integration of synthetic data, genAI, and spatial computing is reshaping the training landscape.

In healthcare, medical professionals can undergo immersive simulations of complex procedures, while in manufacturing, employees receive training on equipment operation through interactive simulations. These technologies democratize access to training resources, eliminating constraints associated with data scarcity and privacy concerns.

The automotive sector benefits from realistic training scenarios, improving the safety of automated vehicles. By leveraging genAI and synthetic data, organizations can access custom datasets tailored to their training needs, driving productivity and innovation. As these technologies become more accessible, immersive experiences in spatial computing ecosystems are expected to proliferate.

The impact of synthetic data, genAI, and spatial computing on enterprise training is transformative, offering unparalleled opportunities for workforce development and innovation.

As we embrace these technologies, the future of training holds boundless potential for growth and advancement across industries.

ANTONY "SKARREDGHOST" VITILLO

Owner

The Ghost Howls

The Year When XR Bounces Back

2024 is going to be a positive year for immersive realities: after the disillusionment about the "metaverse", the industry is getting a new infusion of trust thanks to the release of a new generation of devices from key players like Apple, Google (with Samsung), LG (with Meta), Bytedance, Huawei.

We are entering into a new cycle of XR, which this time does not immediately focus on consumers but on prosumers, and that is not mainly dedicated to games, but to general computing (hence the "spatial computing" trend).

It is going to be interesting to follow the evolution of the space. The Apple Vision Pro has triggered a new cycle of XR that will be beneficial for the whole ecosystem.

This new attention towards prosumer headsets is very positive for the enterprise sector, which will have more tools to implement solutions like immersive training or XR prototyping. There are already a few companies employing the Apple Vision Pro for training (which is and still will be the main use case of XR in the enterprise world) and we are waiting for their first feedback to evaluate its usability in the field.

On the consumer side, it is important to have a look at what Meta is doing, in particular to the rumored Quest 3 Lite. If, according to the rumors, Meta is going to release a lightweight version of the Quest 3 priced only at $199, this is going to increase the adoption of VR even more than now.

Meta is also one of the leaders in the smartglasses sector, and its Ray-Ban Meta is getting good reception because they are both stylish and effective in taking photos and videos. Ray-Ban Meta highlight also one of the big trends to keep an eye on this year: the integration between XR devices and artificial intelligence. AI is one of the greatest revolutions of our time and it is demonstrated that it is very useful when it can give us suggestions that depend on the context we are in. Ray-Ban Smartglasses can see what you are seeing, and so can answer your queries by being aware of the context you are in. If you say "What is this?" the system can get your camera input, see what you have in front of you, and answer your question.

It's important that our glasses can understand the environment around us to help us better, it is the future we want, but on the other side, we must make sure that this is made in a way that preserves our privacy and safety.

DINESH PUNNI

Founder & CEO
Immersive Insiders

Realistic Expectations in XR Development

In the fast-paced world of XR and spatial computing, adjusting our expectations is essential. We need to aim for realistic advancements rather than the dream of high-tech gear as light as sunglasses. Concerns about device weight, resolution, and comfort should take into account the real challenges of fitting advanced technology into small devices. This field is still emerging and requires both patience and a practical approach as it develops.

XR's Value in the Enterprise Sector

The enterprise sector is making significant progress with XR, finding real value in its application across various industries. This contrasts with the idea of 'metaverse dystopias' that suggest a total virtual takeover of our lives. Instead, XR's real advantage lies in improving specific tasks, particularly in training and education. Taking a use-case-first approach not only taps into XR's potential but also makes its benefits directly relevant and valuable to businesses.

The Introduction of High-Profile Devices

The introduction of devices such as the Apple Vision Pro adds more awareness to our industry, potentially softening some of the skepticism surrounding the idea of 'metaversifying' everything. This increased attention could lead to a more informed discussion about XR's practical applications, moving us away from inflated expectations.

XR as a Complementary Tool

Ultimately, immersive technologies should act as a complement to our lives, enhancing our experiences without taking over the real world. It allows us to dive into virtual worlds when beneficial and then invites us back to the richness of real reality (RR). Viewing XR in this way promotes a balanced and meaningful integration into our daily routines, ensuring that these technologies enrich rather than replace our real-world interactions.

SCOTT BURKEY

Co-host

XR at Work

In 2024, VR and XR training are taking off, especially for those tricky training challenges that traditional methods struggle with. But the big hurdle we're still facing is getting this tech into more people's hands. Sure, it's super effective, but not everyone has the gear they need to dive into it.

The Questions Have Changed

2024 is the year that the questions changed. The objections that have been raised for the past decade are being replaced with conversations focusing on the proven value of deploying extended reality technologies into the frontline environments of **manufacturing, oil and gas, automotive and so many other industrial settings.** In years past, many of us XR Practitioners have heard questions about whether XR will really work, why they should change their old training methods and why 3-ring binders won't suffice for today's younger workers. Today we spend more time having conversations with business stakeholders, plant managers and deskless workers about the viability and quantifiable value of immersive technologies in rugged environments.

When I talk to my peers across various industries, we all agree that the conversations have shifted.

XR has proven its value and proven its stability with today's impatient and self-reliant workforce, Generation Z. Questions about real value like reducing the repair time of machinery are being asked:

How can we keep machines running longer between unscheduled outages?

Just how much faster can we see new hires be proficient?

How can XR help us hit our goal of keeping teammates 100% safe?

These are the questions we're fielding today and it's refreshing because we have good news! I see machines recover from outages faster through the use of spatial-guided workflows. Regularly I see new hires become proficient in their job functions much faster than their predecessors who were trained one-on-one with another worker. Pretty much every week I hear from a frontline maintenance technician in a factory that tells me about how assisted reality helped them get the machine they operate back online faster. These discussions are a far cry from 2019 when I was told that VR was just for video games. **In 2024 it is evident to those of us who work in the industrial metaverse that this technology is now accepted and embraced like never before, which is refreshing.**

Two years ago my friend Dane and I started a community dedicated to educating, encouraging and supporting professionals like us that put immersive technologies into the enterprise on a daily basis. Pro's that put XR on the shop floor, in the warehouses, on the assembly lines, in the hangars and in the oil fields where work gets done. Through XR at Work we have met and become friends with hundreds of other XR Practitioners and through constant contact we see that 2024 will be the year the questions changed from nervous hesitation to a focus on the real value of XR. It's a great time to be in spatial computing and I'm proud to be a part of it.

"2024 will be the year the questions changed from nervous hesitation to a focus on the real value of XR."

NICK ROSETH

Chief Explorer

Explore Design

The year is 2024

XR and AI have collided into the "Era of Spatial Computing" as Tim Cook presents the Apple Vision Pro to the world. The AVP specs bring immersive experience to a whole new level with ultra high definition, near zero latency, and unreal eye tracking capabilities. The entrance of Apple into the market reveals what the market has been anticipating and sets the bar for competition among rivals vying for customers attention.

"AI is increasingly being built into content applications like Adobe that continue to push us into the "assistive era."

AI evolves at breakneck speed. Large Lanaguage Models like ChatGPT, Claude, and more continue to evolve while generative video is released with Sora by OpenAi. Generative images from MidJourney are indiscernible from real photographs. Generative 3D continues to evolve with text-to-3D asset applications proliferate across startups and major enterprise companies. AI is increasingly being built into content applications like Adobe that continue to push us into the "assistive era". These AI driven tools continue to reduce the cost of creating content, one of the major roadblocks in the path to scalable XR. LLMS like ChatGPT are also increasingly being built into immersive experiences, glasses, and head mounted displays as communication tool.

ALAN SMITHSON

Co-founder

Metavrse

2024 has begun with a massive BANG!

I cannot look at my phone without seeing someone wearing or talking about the Apple Vision Pro. We rapidly went from VR-to-AR-to-XR-to-Metaverse and now Spatial Computing, all without most people realizing that mass consumer adoption of these technologies is still 3-5 years away and consumers won't care what it's called, as long as it delivers something special or something of value. The entry of Apple into the space has reinvigorated an entire industry that has been working in the XR field for a decade.

My sincere hope is that an entirely new generation of developers and creators will realize the transformative power of 3D on whatever device they use. **3D is the backbone of spatial content,** and for years companies like NVIDIA, Qualcomm, Meta, Walmart, Siemens and others have been using 3D to design new products faster, to train new employees better and onboard new customers more effectively. 3D can be experienced on any device and most of us are familiar with 3D video games, so anticipate more gamified learning, work and entertainment.

I have shared my 'Top 24 Technology Predictions for 2024', but more specifically to the XR/Spatial Computing space, I would expect startups that have valuable technology will get acquired or investment and the race to the spatial web will begin. Education will get a massive upgrade using the combination of AI and XR. Video games contribute $185 billion to the global economy annually.

$185B

Contribution of video games to the global economy, annually.

With the rise of game engines such as Unity, Unreal, and METAVRSE, coupled with the versatile capabilities of AI for text-to-everything, it won't be long before we witness a rapid surge in the immersive gamification of numerous websites, business operations, and marketing tools, accessible to all. We are already seeing brands set up shop in Roblox and enterprises are using 3D to accelerate design, building, training, marketing and selling using virtual worlds like Microsoft Mesh and Meetopia.

Let's build a future where we use the superpowers that AI and Spatial Computing (XR) give us to unleash the unlimited potential of humanity.

RANDY NUNEZ

Technology Analyst

Artificial Intelligence

It's hard to imagine an industry that won't be impacted by AI, and XR is no exception. One area is in the content creation process. AI gives you the ability to generate initial content for things like guided instructions and 3D graphics with tremendous speed and quality. Another area is AI-guided experiences. Many products will include the use of virtual assistants and virtual trainers that work with you within immersive training applications, providing not only instructions but a level of rich interactivity

Apple Vision Pro

Apple's long-awaited foray into the XR world, or rather the 'spatial computing' world, the Apple Vision Pro is finally launched. Boasting some superior specifications and a significant ecosystem, there is much hope that Apple will bring the consumer into the XR world. However, the launch seemed to show little on the 'real' 3D type of content that would be compelling for training. It seemed to be more focused on multiple 2D screens and watching movies. I do see some training use cases for soft skills and medical/therapy, but not as much in the hard skills space.

Will it be adopted by the masses? Probably not. It's high price point and first-generation technology are not in its favor. Also, I'm not sure that spatial computing is the right terminology (I'm partial to 3D Internet). On the other hand, it's hard to count Apple out given its significant marketing capabilities and financial resources.

Is 2024 the year of the tipping point in XR?

Unfortunately, no. While AI will help accelerate the use of XR, it is also taking much of the energy from it. The tech layoffs of the last few years have caused companies to tighten up their spending, which means less money for emerging technologies, with spending for AI prioritized. Also, the hardware still isn't there yet: issues with weight, heat, battery life, and UI/UX that do not meet user expectations.

I think XR training has a tremendous use case to attract and retain millennial talent that the 100+ year industries like manufacturing, construction, and petrochemical desperately need. These companies are coming around, but it is a slow process. XR training will continue to grow, but it will be steadily growing, not explosive. Regrettably, there is still too much friction with onboarding users and maintaining the technology at this stage. I predict XR will be mainstream for training in 5 years, and I will keep making that prediction until I am right.

"While AI will help accelerate the use of XR, it is also taking much of the energy from it."

"XR training will continue to grow, but it will be steadily growing, not explosive."

Thank you for taking the time to delve into the "Trends in XR Training & Spatial Computing 2024" whitepaper. We hope it has provided valuable insights and sparked ideas for future innovations in your own endeavours. The journey into XR and spatial computing is an exciting one, and we look forward to the possibility of exploring collaborative opportunities and engaging in meaningful discussions inspired by this whitepaper.

For any questions, further discussions, or to explore potential collaborations, please feel free to reach out to us:

hello@vrvisiongroup.com

Together, let's push the boundaries of what's possible with XR.