

The background features a dark green, textured surface resembling a digital landscape or data flow, with numerous glowing green particles and light trails. Three white-outlined icons are scattered across the upper half: a mountain range, a bar chart with an upward arrow, and a document with a bar chart. A solid red diagonal bar is positioned at the bottom of the page.

Web-based AR/VR Experiences: Revolutionising Digital Business Models

Dr. Bertalan Forstner
Emerging Technologies Strategist
bertalan.forstner@zenitech.co.uk

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Introduction

The technological revolution knows no boundaries, and web-based augmented and virtual reality experiences are reshaping the way digital communication and interaction take place. In recent years, more companies, research institutes, and software development firms have discovered the benefits of delivering immersive experiences directly through web browsers without the need for dedicated apps or specialised hardware. This trend is not just an innovation, but a strategic lever capable of enhancing consumer experience and streamlining internal processes.





The evolution and relevance of web-based AR/VR technologies

Traditionally, AR and VR technologies have been bound to specialised devices and standalone applications. The shift to web-based solutions has broken those constraints by enabling immersive experiences to be accessed directly via a browser on a wide range of devices—from smartphones to desktop PCs. This approach appeals not only to consumers expecting instant, interactive content but also to decision-makers who value scalability, cost efficiency, and rapid deployment. Technologies such as WebXR, A-Frame, and Three.js provide developers with a platform-agnostic foundation to build sophisticated AR/VR applications that work seamlessly across multiple devices.

This evolution is a breakthrough that extends beyond enhancing user experience. It transforms various industries by providing a cost-effective, easily updatable solution that bypasses the need for regular software downloads or hardware upgrades. In sectors ranging from retail to education and healthcare, web-based AR/VR is paving the way for next-generation digital interactions and operational efficiencies.

Business benefits and market impact

For the business world, web-based AR/VR technologies unlock new avenues for consumer engagement and operational innovation. In e-commerce, virtual product visualisations allow customers to view items within their own environment without needing to install an app, thereby personalising the shopping journey. Educational institutions are using browser-based virtual classrooms to offer students immersive learning experiences remotely, while healthcare providers use virtual simulations for surgical training and patient education. In manufacturing and urban planning, real-time design simulations and digital twins help optimise processes and reduce the margin for error.

The market dynamics are equally compelling. According to a [Statista study](#), "The global AR and VR market revenue is projected to reach approximately \$209.2 billion by 2025, growing at a compound annual growth rate (CAGR) of 48% from 2020 to 2025." This robust growth underlines the strategic importance of adopting web-based AR/VR solutions to stay ahead of the competition. Decision-makers can leverage these insights to justify investments in emerging technologies that promise not only to enhance consumer experience, but to drive operational efficiency and innovation.





Challenges and solutions in developing web-based AR/VR

Despite its vast potential, the development of web-based AR/VR experiences comes with a unique set of challenges. A critical technical issue is performance optimisation; even minor delays can cause discomfort or even motion sickness in users. Ensuring smooth, low-latency performance across varied devices is essential. Developers must also navigate interoperability challenges—integrating frameworks like WebXR, A-Frame, and Three.js across different browsers and devices requires robust, unified solutions.

Security is another significant concern. With the increased handling of biometric and usage data in immersive experiences, safeguarding sensitive information through advanced encryption and access controls is non-negotiable.

Beyond technical challenges, environmental and regulatory issues also demand attention. High compute requirements lead to increased energy

consumption, prompting the need for greener data centers and sustainable practices. Rapid hardware turnover contributes to growing e-waste, further emphasising the necessity for eco-friendly design and production. Additionally, as data privacy laws tighten and intellectual property rights evolve, companies must align their AR/VR applications with global standards and enforce robust safety protocols to mitigate physical risks during immersive interactions.

Market and ethical challenges also loom large. Fragmented platforms and high R&D expenses often create barriers to entry, while building consumer trust requires developing secure, user-friendly experiences that respect cultural and accessibility norms. Investment challenges—ranging from attracting venture capital to adapting to shifting market demands—further complicate the landscape, as does the imperative to shield systems against increasingly sophisticated cyber threats.



Zenitech's competitive edge and market dynamics

In a crowded global software development landscape, companies that recognise the strategic importance of web-based AR/VR technologies gain a significant competitive edge. Zenitech stands out in this space by combining robust research and development capabilities with close collaboration with leading technical universities. This synergy accelerates the integration of the latest research findings into practical solutions, ensuring that Zenitech not only meets current technological challenges—such as performance optimisation, cross-device interoperability, and data security—but also, sets new standards for sustainable and responsible innovation.

While many competitors focus primarily on the technical aspects, Zenitech's approach integrates business strategy with technology development. By addressing both the operational challenges and the ethical, environmental, and regulatory dimensions of immersive technology, Zenitech offers solutions that are not only technologically advanced but also aligned with modern business and societal expectations. This balanced approach positions the company as a long-term partner for organisations looking to transform their digital strategies while maintaining a commitment to sustainability and trust.



What to watch for in future developments

As immersive technologies continue to evolve, staying ahead of trends is crucial for businesses aiming to capitalise on web-based AR/VR. Decision-makers must recognise that these technologies are not transient fads but fundamental tools for driving digital transformation. The future will likely see further advancements in performance optimisation, increased integration with artificial intelligence for personalised user experiences, and enhanced security protocols that address emerging cyber threats.

Organisations need to invest in flexible, scalable platforms that can adapt to rapid technological changes while maintaining high standards of user experience and data integrity. Moreover, embracing a forward-thinking mindset—one that anticipates market shifts, aligns with global regulatory trends, and prioritises sustainability—will be essential for companies to thrive in an increasingly competitive landscape. It is the combination of cutting-edge technology with strategic business foresight that will determine success in the new digital era.

Concrete application areas and detailed examples

The transformative potential of web-based AR/VR is evident across various industries. In the realm of e-commerce and retail, virtual showrooms offer customers the ability to explore products in their own environment, creating a highly personalised and engaging shopping experience. Imagine a scenario where a customer can virtually place furniture in their living room or try on accessories without stepping into a physical store—the convenience and enhanced decision-making power that result from such interactivity cannot be overstated.

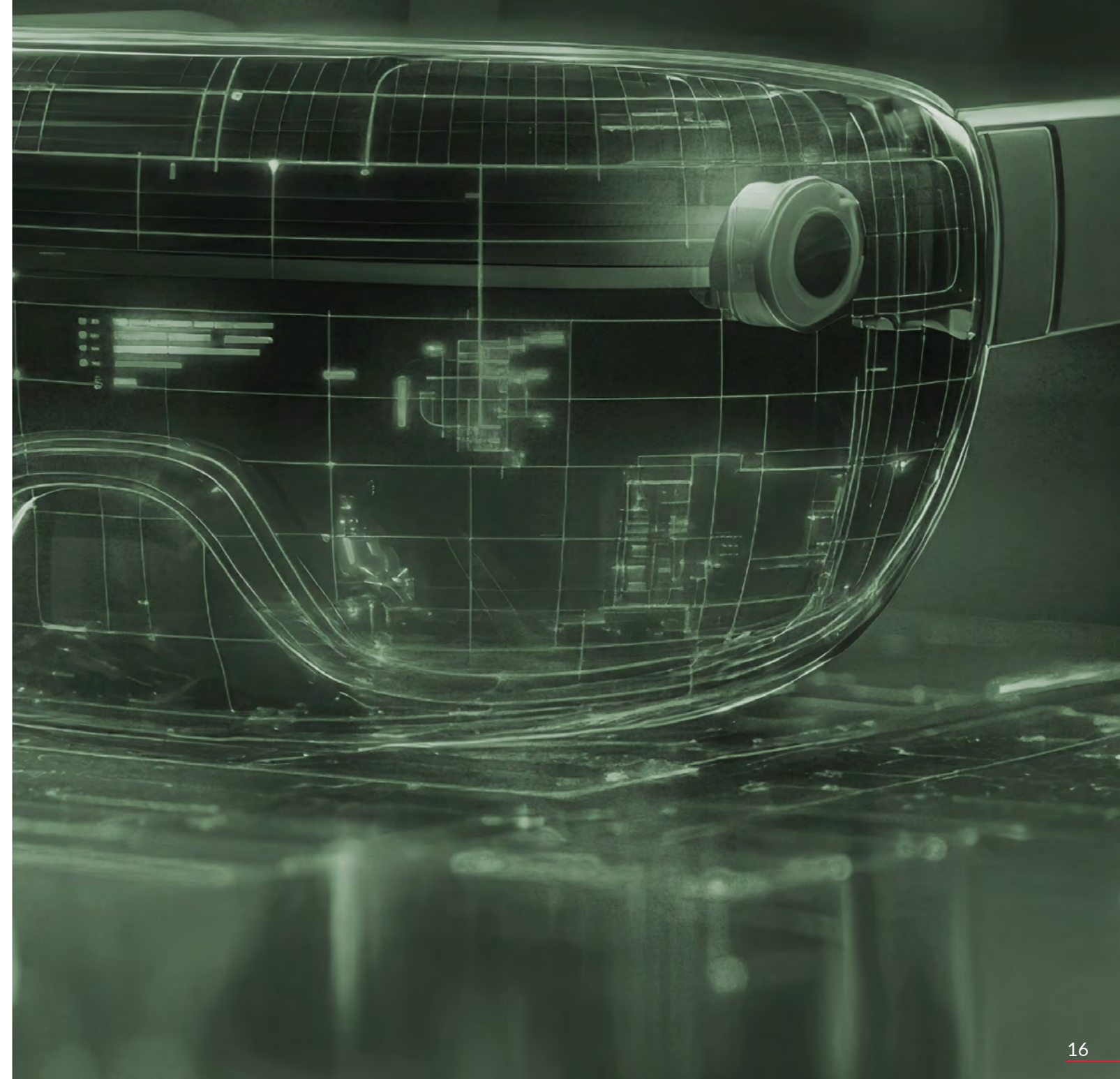
In the education and training sector, virtual classrooms enable students to access immersive, interactive learning environments from anywhere. By using real-time simulations and interactive modules, educational institutions are breaking down geographical barriers and providing students with practical experiences that traditional classrooms cannot offer. These immersive learning tools not only boost engagement but also help cultivate the practical skills needed in a technology-driven world.

Healthcare and therapeutic applications present another compelling use case. Virtual reality simulations for surgical training allow medical professionals to practice procedures in a risk-free environment, significantly reducing the margin

for error during actual surgeries. Additionally, immersive therapy sessions offer innovative approaches to mental health treatment and rehabilitation. Patients can experience controlled, interactive environments that support their recovery process, while remote diagnostics and consultation services further extend the reach of quality healthcare.

In manufacturing and urban planning, digital twins and real-time design simulations are revolutionising how projects are conceptualised and executed. Engineers and architects can use virtual prototypes to simulate and refine designs before physical construction begins, thereby minimising costly errors and delays. This capability allows for a more dynamic, informed decision-making process, ultimately leading to more efficient project management and resource allocation.

Finally, the entertainment, gaming, and arts sectors are leveraging web-based AR/VR to create truly immersive experiences. Virtual concerts, interactive exhibitions, and digital art installations are changing the way audiences consume cultural content. These experiences allow users to engage with art and entertainment in a highly personalised manner, breaking away from conventional media consumption patterns and fostering deeper emotional connections.



Final thoughts

The shift to web-based AR/VR is a fundamental change in how businesses interact with consumers and optimise internal operations. By focusing on performance, interoperability, security, and sustainability, companies can harness the full potential of immersive technologies to drive both innovation and operational excellence. Leaders must prioritise integrating these emerging trends into their strategic planning, ensuring that investments in AR/VR not only meet immediate technical requirements but also support long-term business goals.

Zenitech's approach exemplifies this balanced strategy. Through extensive R&D efforts, strategic partnerships with leading academic institutions, and a deep commitment to sustainable and ethical practices, Zenitech offers solutions that address the complete spectrum of challenges facing today's digital businesses. Their competitive edge lies not only in technological prowess but also in the ability to translate complex technical solutions into tangible business benefits.


Reach out to our team to discuss how web-based VR/AR could help to transform your business strategy.





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 www.zenitech.co.uk

 info@zenitech.co.uk

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