Virtual Scotland

Metaverse and Augmented Reality Strategies for Scottish Digital Tourism

Exploring the Potential for Augmented and Metaverse Virtual Reality Adoption in Scottish Tourism

Scotland's tourism industry, valued at around £11 billion annually, thrives on its rich heritage, stunning landscapes, and iconic landmarks like Edinburgh Castle, Loch Ness, and the Highlands.

In this modern digital era technologies such as Augmented Reality (AR), Virtual Reality (VR), and the emerging Metaverse offer new avenues to enhance visitor experiences, expand reach, and drive economic growth.

AR overlays digital information onto the real world, while VR immerses users in fully simulated environments.

The Metaverse combines these with blockchain and social elements to create persistent virtual worlds. This market research article examines the global trends, current adoption, benefits, challenges, and future potential for these technologies in Scottish tourism, drawing on recent data and examples.

Global Market Overview

The integration of AR, VR, and Metaverse technologies into tourism is accelerating, fueled by post-COVID demand for contactless and virtual experiences. The global Metaverse market was estimated at USD 105.40 billion in 2024 and is projected to reach USD 936.57 billion by 2030, growing at a CAGR of 46.4%. Within this, tourism and hospitality sectors are leveraging virtual tours and immersive previews to boost engagement. For instance, platforms like Eventcombo allow users to explore landmarks such as Dubai's Burj Khalifa virtually.

Exploring the Potential for Augmented and Metaverse Virtual Reality Adoption in Scottish Tourism

The broader AR and VR market generated USD 59.76 billion in 2024, expected to hit USD 200.87 billion by 2030 at a CAGR of 22%. AR is poised for faster growth at 26% CAGR, driven by applications in gaming, education, and tourism. Virtual tourism alone was valued at USD 10.34 billion in 2024 and is forecasted to reach USD 111.16 billion by 2033, with a CAGR of 30.2%. Key drivers include immersive technologies for cultural preservation, education, and inclusive travel, with Asia-Pacific showing strong regional growth.

In the Metaverse context, tourism adoption is rising, with virtual replicas of destinations enabling "test-drive" visits. Projections for the global Metaverse tourism market suggest explosive growth, potentially exceeding USD 155 billion between 2023-2028 at a 27% CAGR, positioning early adopters like Scotland for significant gains.

Current Adoption in Tourism and Scotland's Landscape

Globally, AR and VR are transforming tourism by offering interactive experiences. Museums use VR for virtual exhibits, while AR apps enhance on-site visits with historical overlays. In Scotland, adoption is gaining momentum, blending digital innovation with its unique cultural assets.

One early example is the VisitScotland VR app, launched in 2017, which uses 360° imagery to let users explore a virtual glen complete with Highland cows and interactive elements. More recently, the National Trust for Scotland partnered with Reydar for an AR campaign at Brodie Castle, where visitors animate a 3D rabbit character via their devices, encouraging social media sharing and family engagement.

Exploring the Potential for Augmented and Metaverse Virtual Reality Adoption in Scottish Tourism

Stirling became the world's first fully AR-enabled city in 2022 through a collaboration with BT and Historic Environment Scotland, allowing visitors to access digital overlays of historical sites via an app. At Urquhart Castle, the "Historiscope" – AR binoculars developed by SENSEcity – lets users view medieval reconstructions of the site, merging archaeology with immersive storytelling. A 360° VR tour of Urquhart Castle further immerses users in its history along Loch Ness.

Metaverse initiatives are emerging too. The "Museums in the Metaverse" project, a £5.6 million UK-funded effort led by the University of Glasgow with partners like Historic Environment Scotland and National Museums Scotland, digitizes thousands of artifacts for virtual access. Launched in 2023, it aims to boost education, tourism, and creative economies by creating XR platforms. In 2023, the Great Tapestry of Scotland was replicated in the Metaverse by New Frontier, offering interactive NFTs for themes like battles and traditions, serving as a toolkit for tourism and education. The "Metinburgh" concept envisions a photorealistic digital twin of Edinburgh, starting with Castlehill, to redefine tourism through VR/AR and blockchain.

Recent discussions on X highlight enthusiasm, with concepts like AI-powered AR tours in Ghent inspiring similar ideas for Scottish cities, and calls for "Virtual Scotland" to attract global visitors.

Exploring the Potential for Augmented and Metaverse Virtual Reality Adoption in Scottish Tourism

Benefits for Scottish Tourism

Adopting AR and Metaverse VR could revolutionize Scottish tourism by:

- **Enhancing Accessibility and Inclusivity**: Virtual tours make remote or inaccessible sites like the Highlands available to global audiences, including those with mobility issues. This aligns with rising demand for inclusive experiences.
- **Boosting Engagement and Revenue**: Immersive previews can convert virtual visitors into physical ones, increasing bookings. AR gamification, like animated characters at castles, encourages repeat visits and social sharing.
- **Cultural Preservation and Education**: Technologies preserve heritage digitally, as seen in the Great Tapestry Metaverse, while educating users interactively.
- **Economic Impact**: With tourism contributing £11 billion yearly, virtual elements could tap into the Metaverse's projected $486 billion market by 2030, creating new income streams like NFTs and virtual events.

Exploring the Potential for Augmented and Metaverse Virtual Reality Adoption in Scottish Tourism

Challenges and Barriers

Despite potential, challenges include:

- **Technological and Infrastructure Hurdles**: High costs for development and hardware (e.g., VR headsets) may limit adoption. Network limitations in rural Scotland could hinder seamless experiences.
- **User Adoption**: Financial and psychological barriers, such as effort to engage with Metaverse platforms, may deter users, especially older demographics.
- **Content Quality and Authenticity**: Ensuring digital replicas maintain cultural integrity is crucial to avoid diluting real-world visits.
- **Competition and ROI**: While global growth is strong, Scotland must compete with tech-savvy destinations like Dubai.

Future Outlook and Recommendations

By 2030, AR/VR adoption in tourism could see Scotland capturing a share of the $200+ billion market through expanded virtual offerings. Concepts like "Virtual Scotland" – integrating AR along routes like the North Coast 500 – could attract millions of "test-drive" visitors. Recommendations include government funding for pilots, partnerships with tech firms like Meta, and training for tourism operators. Prioritizing user-friendly apps and hybrid experiences (virtual previews leading to physical visits) will maximize impact.

The potential for AR and Metaverse VR in Scottish tourism is immense, offering ways to innovate while preserving heritage. With growing markets and successful pilots, Scotland can position itself as a digital tourism leader, blending its timeless appeal with cutting-edge technology to attract a global audience.

Stirling to become world's first fully Augmented Reality city

As they report Stirling Council has launched a ground-breaking Augmented Reality tourism app.

It's another example of Scottish tourism harnessing the latest 'Metaverse' innovations for providing exciting, immersive experiences for visitors.

The cutting edge software will transform the visitor experience to Stirling allowing people to explore the city in a unique and exciting way through their smartphone screen.

Virtual signs will respond to users' needs, Stirling's rich history and heritage will be brought to life and interactive games will unlock rewards and incentives.

To access the new AR environment, people simply need to download the free Stirling XP app and then hold up their phones as they navigate the city.

Stirling Council has invested £200,000 in the project via funding from the Scottish Government's Place Based Investment Programme.

Exciting world-first

Stirling Council Leader, Councillor Chris Kane said: "Offering this complete AR environment across Stirling is an exciting world-first and will revolutionise the visitor experience in our amazing city.

"Stirling's historic city centre and world-class attractions will be overlaid with interactive information, graphics, 3D models and much more, creating a fully immersive and dynamic experience that no other city currently offers.

"Stirling is already a must-visit destination and this pioneering product will raise the city's profile and attract more people to come here, boosting the wider tourism economy.

Stirling to become world's first fully Augmented Reality city

"The new free app will also open up a plethora of fantastic opportunities for local businesses and will make Stirling a more inclusive and accessible place that's setting the world standard for next generation tourism."

Stirling's substantial investment in fibre broadband and BT's rollout of 4G and 5G in the area has delivered the cutting-edge connectivity to lead other world cities on this innovative technology.

A first of its kind experience

Alan Lees, Director for BT's Enterprise business in Scotland, said: "At BT, we don't just build the connectivity, we help to build the solutions which will be powered by it to change communities.

"Tourism is vital to the Scottish economy and working with Stirling Council and Seymour Powell we're excited to be part of this brilliant app, helping to deliver a first of its kind experience which visitors will love."

Seymour Powell, a tech innovation company with a base at Codebase Stirling, developed the cutting edge software in partnership with Stirling Council and BT.

Brings the city to life

Chris Doughty, Head of Immersive Experiences at Seymour Powell said: "The Stirling XP project demonstrates what is possible when cutting-edge infrastructure providers, optimistic and forward-looking public bodies and award-winning designers work together.

"Using Google's new Geospatial platform, we were able to design a truly immersive experience that brings the city to life by revealing an exciting digital layer, gamifying local history and providing tourists with local challenges that encourage them to go out and explore the city.

"We are delighted to have been able to deliver a project which firmly positions Stirling as a world-class digital destination and paves the way for continued, industry-leading, development."

Stirling to become world's first fully Augmented Reality city

Experience Stirling from the palm of their hands

Neil Christison, VisitScotland Regional Director, said: "It is incredibly exciting to see such an innovation showcase Stirling like this.

"AR enables people from anywhere in the world to experience Stirling from the palm of their hands and learn more about this historic and vibrant city in an interactive way.

"It is also great to have a new platform that local businesses can take advantage of and a tool that visitors can use to plan their trips to Scotland.

"We know that tourism is a force for good with an impact that spreads far beyond the industry itself – it benefits our economy, our community and our wellbeing."

Stirling is a step ahead of other destinations

Go Forth Stirling BID Project Director Danielle McRorie-Smith welcomed news of the project and the opportunities it will give the city's business owners.

She said: "This is an exciting initiative which really taps into the expectations of visitors – especially those of the younger generation who grew up with technology – who are looking for a much more experiential and immersive experience when they come to a city.

"It's great to see that Stirling is a step ahead of other destinations when it comes to enhancing the visitor experience and we're excited by the power of augmented reality to tell stories and showcase our amazing city by providing more options for locals and visitors to explore its hidden gems.

Stirling to become world's first fully Augmented Reality city

"The many independent and national businesses represented by the BID will benefit from a new way of promoting the experiences, goods and services they have to offer – whether that's through the use of interactive posters and artwork or giving visitors the chance to explore inside buildings without ever leaving the footpath.

"We look forward to the chance to show people in Stirling and around the world exactly what makes our city extra special."

Additional info

The Stirling XP project supports the objectives and aspirations of a number of Stirling Council plans and strategies including the Tourism and Events Plan 2018-23, the Making Stirling a Dementia Friendly City – A Citizen Led Places and Spaces Project and the City Centre Strategy and Action Plan 2022-2030.

The aim of the Scottish Government's Place Based Investment Programme is to ensure that all place-based investments are shaped by the needs and aspirations of local communities and accelerate our ambitions for place, 20-minute neighbourhoods, town centre action, community led regeneration and community wealth building.

Metinburgh! A Vision for Metaverse Digital Tourism in Scotland

There are many technologies that the tourism industry can harness to grow the sector, with Augmented and Virtual Reality an especially potent innovation to harness.

The Metaverse—a dynamic blend of virtual reality (VR), augmented reality (AR), and blockchain—ushers in an immersive digital layer where tourism experiences can be explored in revolutionary ways.

These can be applied in a practical way to boost success for Scottish businesses. Tourism is a great example. Enhancing the experience with these types of exciting innovations will draw in even greater visitor numbers and continue the massive economic success of this industry.

Immersive Tourism

This Conversation article comments on the details of this economic success and the critical role immersive experiences can play in facilitating this boost.

Simple examples include AR tourism guides, such as this one for Inverness Castle, and for Loch Lomond they inserted 'Zapcodes' into the local guide magazine, to trigger AR links that enhance the printed word with a virtual experience.

You can discover Fife and discover the Highlands via AR.

Another great example is described in this news, about Blair Castle adopting the Smartify app. Via easy-to-use interfaces and well designed technology available as a native and web app, the Smartify guide allows visitors to follow their own interests and curated tours, with additional features such as e-commerce, targeted push notifications and donations.

Metaverse Worlds

'Metinburgh' is a concept for how a full Metaverse experience could be developed for tourism, for Edinburgh in this case. It aims to redefine global tourism by creating immersive digital replicas of real-world locations, starting with Edinburgh, specifically Castlehill at the foot of Edinburgh Castle.

Metinburgh blends VR and augmented reality (AR) to offer authentic exploration experiences, allowing users to visit iconic sites, engage in gamified activities, and collect blockchain-based digital items like NFTs.

These items are interoperable across SITEnetwork's virtual worlds, such as Metahattan and Mayaverse, and are supported by partners like MRKD and New York Culture Club using NFC technology. The project enhances cultural exploration, education, and e-commerce, with potential to boost physical tourism. Metinburgh is preparing for a closed-alpha phase, setting a new standard for virtual tourism.

Featured Vendor: BizzTech

BizzTech is a vendor who can be used for this type of scenario. They offer immersive, AI-powered metaverse platforms that reshape how people interact with cities, industries, and education.

From urban planning and industrial efficiency to education and civic engagement, we are redefining how cities, industries, and communities interact with technology. Using AI, digital twins, and the photorealistic metaverse, we bring history to life, optimize infrastructure, and create immersive experiences that empower governments, businesses, and individuals alike.