



Vision Network: Augmented Reality and Virtual Reality for Digital Built Britain

Benefits to designers, contractors, consultants, asset managers, infrastructure owners, operators, authorities

“The work carried out by the Vision Network provides valuable insights about the factors that drive and limit the adoption of AR and VR technologies in construction, and it identifies a clear future R&D agenda to improve adoption.”

- Manuel Davila Delgado, Associate Professor, UWE Bristol

Summary

The Vision Network, a mix of academics and industry experts, conducted a study into the levels of adoption of Augmented Reality (AR) and Virtual Reality (VR) technologies in the UK's Architecture, Engineering, and Construction (AEC) sectors. A mixed research method was used to analyse the collected data, and to identify and prioritise R&D opportunities.

AR and VR have the potential to change all types of visual communications dramatically. AR and VR are of great and broad interest in the UK. Huge benefits can be gained in the manufacturing and construction sectors, but the levels of adoption and commercial solutions are not well developed. The Vision Network conducted granular study to obtain a defined picture of the current adoption landscape and to identify R&D opportunities that will accelerate the adoption of immersive technologies in the AEC sectors.

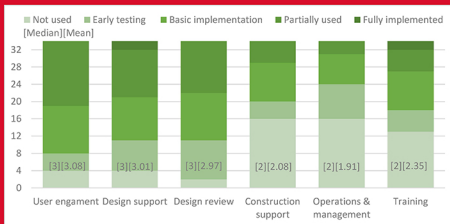


Figure 1. Levels of adoption of Virtual Reality by use case in the AEC sector

Key Findings

- The level of adoption of AR and VR in the UK's AEC sector is low. A level of adoption index was defined to provide a quantitative indication of adoption levels. The adoption index for VR in the UK AEC sector is 2.5 out of 5, and for AR is 1.5 out of 5. Five represents full adoption and 1 not used.
- Most of the companies have tested immersive technologies at some capacity, but they have not integrated the technologies into their regular workflow.
- The level of adoption, research, development, and maturity of VR is higher than AR. Around 90% of the research projects on immersive technologies are focused on VR. AR should be given priority in a future research agenda.
- Six main use-cases were identified for the use of AR and VR in the AEC sector: (1) Client/Public Engagement, (2) Design Support, (3) Design Review, (4) Construction Support/Progress Monitoring, (5) Operations and Management, (6) Training.
- The major perceived benefit for adoption is that immersive technologies will improve communication and reduce ambiguities. They are not perceived as technologies that will greatly improve productivity.

Impact and Value

- Provides a detailed overview of the use and research capabilities of AR and VR in the UK.
- Provides an indication of the levels of adoption of AR and VR in the UK's AEC sectors.
- Explanation of the main factors that limit and drive adoption, which could be used as the basis to develop mitigating actions.
- Defines the capabilities that should be developed to achieve the DBB vision.

Next Steps/Further Work

An R&D roadmap must be developed to drive market adoption of immersive technologies. The R&D activities should focus on developing the identified hardware and software capabilities, the required standards to ensure interoperability, and developing the new skills required for market adoption. In addition, the R&D activities should bridge the gaps between the current state of using immersive technologies in the construction sector and the new vision of the future built environment in short-term and long-term frameworks.

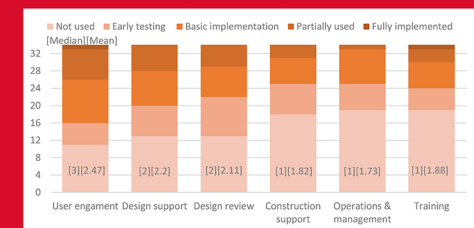


Figure 2. Levels of adoption of Augmented Reality by use case in the AEC sector.

Long-term Vision

The main limitation for adoption is that AR and VR technologies are regarded as expensive and immature technologies. To tackle these issues, R&D efforts should be focused on developing technologies for the specific requirements of the construction industry. R&D should address non-technical issues as well. Detailed cost-benefit studies and real-life demonstrators have the potential to showcase the benefits and improve the reputation of the technologies. Improvements in project delivery and providing new and better services are the main drivers for adoption. R&D efforts should focus on developing approaches that boost and showcase these factors.

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