

# All systems GO: augmented reality in the enterprise

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Pokémon GO may have brought augmented reality to the masses, but the technology has been around for years – and now enterprises are ready to take it on



'AR is now viewed as a potential game changer because it can produce experiences that can actually reduce hardware and people dependencies'

Augmented reality (AR) has been around for a long time now, but challenges in the technology's development have restricted widespread deployment.

Now, however, a little push into mass adoption via Pokémon GO, along with more manageable costs, is gearing the technology up to be a transformative tool for companies across the enterprise spectrum.

Numerous business use cases of AR to date have focused on the technology's ability to engage customers, but its capabilities and potential spread much wider than as just a marketing tool.

AR superimposes a computer-generated image onto a user's real-life view of the world – through cameras on smartphones, tablets, laptops and dedicated AR devices – to augment what they are seeing.

What's important to note is that there is a big difference between AR and mixed reality (MR). While AR superimposes images onto streamed video, MR is when the images that are superimposed onto the video are to some extent 'aware' of the environment upon which they are superimposed.

What that means is that the stream of video that is projected on screen has to be analysed and mapped so that the program that's running understands each object and the physics associated with it. Other layers can be added to this, such as real-time data feeds (maps), social interactivity and artificial intelligence.

'The sky's the limit, and it'll definitely get more complex over time,' says Marcos Sanchez, head of corporate communications at Unity. 'MR will be huge but still requires research, so most of what we see today is AR. Over time, AR and MR will merge, with every application being contextually aware, much like what we've seen coming from Magic Leap.'

While AR is at a more advanced stage than MR, it is still largely in the experimental stage. DHL is testing AR for warehouse staff, while Coca-Cola is using tablet-based AR to place beverage coolers in retailers.

'It is still very nascent as a business tool,' says Gartner research director Augie Ray, 'but that will change. While some early AR head-mounted displays have been available in recent years, 2016 has been the year when more capable and viable AR headsets have reached the market.'

Many of these, such as the Microsoft HoloLens and Meta 2, are still offering developer versions rather than commercial versions, so significant business adoption is still years away.

Still, with Apple acquiring AR start-up Metaio, Google investing in AR start-up Magic Leap, which has now raised over \$1.3 billion, and Mark Zuckerberg predicting the convergence of AR and virtual reality, it's clear that the next few years will bring a great deal of change.

'AR has been around for decades but was seen more as "cool to have" rather than anything truly useful,' says Chris Lawrence, head of media consulting, UK and Ireland at Cognizant. 'However, AR is now viewed as a potential game changer because it can produce experiences that can actually reduce hardware and people dependencies by delivering real-time information to inform user movements.'

### **Fail fast**

Although somewhat in its infancy, businesses must turn their attention to AR now or risk losing out on a key learning period in an increasingly digital, diverse and competitive world.

Rather than rushing to adopt it, enterprises should be testing what can be enhanced with AR by starting small, failing fast and scaling quickly.

AECOM and Trimble are collaborating on the world's first use of Microsoft HoloLens for engineering and construction, launching a pilot programme to apply the technology to projects on three continents.

Through a lightweight headset, HoloLens adds holograms of 3D objects into a user's view, allowing interaction with these virtual objects as if they were present. Trimble's AR solutions

allow AECOM to feed 3D engineering models into the HoloLens world, including models of large or complex projects.

AECOM is deploying HoloLens devices and Trimble technologies to real-world projects, including the Serpentine Galleries' annual architecture programme in London.

'AR is helping architects and contractors to visualise projects and communicate with clients in a simpler and clearer way by bringing building information modelling (BIM) models to life in the context of their surroundings,' says Dominic Thasarathar, construction industry strategist at Autodesk. 'Architects can now use AR on their iPads while walking around sites and demonstrate building interiors to customers even on a project basis, which is vital for smaller firms.'

One of Autodesk's customers, BNBuilders, used AR to create the prototype of a profile for a staircase handrail. The deployment enabled the company not only to significantly reduce costs and production time, but also to keep the client informed and involved in the process from start to finish, increasing customer satisfaction.

Beyond construction and engineering, AR technology could have a role in every major sector in the world. For any company that works globally or across any distance, AR will be a game changer – allowing for quicker, better and more efficient communication.

From property developers and publishers to health professionals, the possibilities that these maturing and evolving technologies hold are huge.

In manufacturing, AR allows instructional information to be overlaid onto a screen to highlight safety or hazard warnings. It can also be used in quality control to ensure that all the correct components are in place and the finished product exactly matches the design.

### **Learning curve**

Interactive learning is also made more engaging through the application of AR. Carlton Books, a London-based publishing house, has injected AR into its children's books. This allows dinosaurs or ancient Egyptians to come alive and 'walk' across the table as a book is read.

'As AR technology becomes more accessible, we expect to see many more industries realising the creative possibilities of applying this modern technology to their business models,' says Sam Davies, lead technologist for creative programmes at Digital Catapult.

Retail stores could use AR to show users the way to the nearest outlet or show updated prices on advertising hoardings when users view them through their phones.

The military have been using AR heads-up displays in their fighter jets for years, and the technology is spreading to cars.

The technology can also help industrial designers experience a product's design and operation before completion. Volkswagen uses AR for comparing calculated and actual crash test imagery.

AR can be used to visualise a car body structure and engine layout, and to compare digital mock-ups with physical mock-ups for finding discrepancies between them.

In travel and hospitality, AR will have to allow access to information in a consumable way. Hyperloop Travel Technologies has already put out a concept for AR screens on their trains that display real-time information to travellers on their journey.

'AR will enable the delivery of the right information to the right person at the right time,' says Dmitry Bagrov, MD UK of global technology consulting firm DataArt.

### **Gotta catch 'em all**

But even with Pokémon Go's ravenous success, AR still has a long way to go before it can reach its full potential. Effective AR solutions need data sources, as well as hardware and bandwidth, to drive them.

Software apps and user interfaces must be reliable enough to augment everyday objects repeatedly and accurately.

Hardware has to be powerful enough to process inputs and produce outputs in near real-time while still being small enough to either fit in a user's hands or sit in a user's line of sight.

'Technology companies have been working hard to address these problems,' says Vishwa Ranjan, head of AR and VR at Infosys. 'Software developers are building out tools to create AR applications. Smartphone manufacturers are continually boosting processor power and battery life, making AR viable for mainstream as well as specialist applications.'

To build a strong business case for augmented reality, IT professionals need to speak the business's language.

Using AR has been shown to lead not only to increased sales and higher staff productivity, but to an even higher customer conversion rate per marketing dollar, and ultimately a more satisfied customer.

'Despite the significant initial investment required, AR can have a profound effect on cost reduction over time by, for example, reducing the need for printing and distributing millions of user manuals, or transporting experts to a site for a particular job,' says Jeremy Dalton, emerging technologies consultant at PwC.

### **Copious costs**

Perhaps the most significant challenge to AR adoption in the enterprise will be the cost to create and maintain the applications.

As with any new wave of technology innovation, it will take time for the development software and skills to improve and permit the cost-effective creation of AR applications.

‘We expect to see AR utilised earlier where the stakes are higher,’ says Ray at Gartner, ‘such as doctors viewing what paramedics are seeing at accident scenes and offering instructions in real time, or in industrial settings where a mistake or accident can cost lives and millions of dollars.’

Gartner anticipates many valuable use cases for AR within business. Even something as simple as giving workers AR headsets rather than monitors promises to increase productivity by providing employees with many virtual desktops that they can manage and view rather than the one or two monitors that most have today.

For workers who are mobile, including factory, warehousing, maintenance, emergency response and medical staff, AR can deliver context-specific information for real-time decisions.

‘We anticipate that AR offers the opportunity not simply to enhance traditional sorts of session-based training but also to improve on-the-job training,’ says Ray.

### [The history of augmented reality](#)

#### **1901**

The Wonderful Wizard of Oz author L. Frank Baum envisions electronic spectacles that overlay data onto real life, the first recorded idea for augmented technology

#### **1968**

Ivan Sutherland invents the first piece of technology resembling augmented reality: a head-mounted display positioned as a window to a virtual world

#### **1975**

Myron Krueger creates an artificial reality laboratory called Videoplace, allowing users to interact with virtual objects for the first time

#### **1990**

The first attributed use of the term ‘augmented reality’ by Thomas P. Caudell, a former Boeing researcher

#### **1992**

The first major paper on an AR system prototype, KARMA, is presented

**2000**

Bruce H. Thomas develops the first outdoor mobile AR game, ARQuake

**2009**

ARToolKit is ported to Adobe Flash (FLARToolKit), bringing AR to the web browser

**2013**

Google announces the open test beta of Google Glass

**2015**

Hololens and Windows Holographic revealed by Microsoft, and Project Tango by Google.

Snapchat buys Looksery, enabling users to overlay graphics onto people's faces

**2016**

Nintendo and Niantic release Pokémon Go, bringing mass adoption of augmented reality

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