NEW REALITIES: HOW VR WILL TRANSFORM THE WORLD OF WORK

CONTENTS

5 VR IN RETAIL

7 VR IN TRAINING

8 VR IN MEDIA AND ENTERTAINMENT

9 VR IN PRODUCT DEVELOPMENT

10 VR IN THE FUTURE WORKSPACE

11 CASE STUDY: MCLAREN

New Realities

How Virtual Reality will transform the world of work

By harnessing the power of virtual reality technologies, organizations are revolutionizing their customer and employee experience while supercharging productivity and innovation.

The world of work and business has undergone seismic changes in the past decade – and these shifts show no signs of abating. Alongside factors such as globalization and mobility, technological innovation is a driving force in this evolution—with virtual reality (VR) playing an increasingly starring role. Unlike many other hyped technologies, the promise of VR and associated immersive technologies is already being realized by leading-edge enterprises to deliver a commercial advantage and a boost in productivity. Rapid advancements in VR technology have opened new use cases around transforming customer experiences, improving training and simulation, and fast-tracking product development—it's nothing less than a sea change in how we work.

After two decades of talk, hype around potential enterprise applications of VR is finally converting into investment. Researcher IDC says global spending on VR and augmented reality (AR), is expected to hit $160 billion in 2023, up significantly from the $16.8 billion forecast for 2019. The researcher predicts the five-year compound annual growth rate (CAGR) for AR/VR spending will be 78.3%, and that a significant portion of this growth in spending will come from the commercial and public sectors. “A growing number of companies are turning to virtual reality as a way to drive training, collaboration, design, sales, and numerous other use cases,” says Tom Mainelli, Group Vice President, Device and Consumer Research at IDC.[1]

There are subtle and important differences between VR, AR and mixed reality (MR) technologies. VR harnesses the power of computer-powered simulation and gives designers the opportunity to experience their creations in almost-real virtual environments. In AR, virtual objects are overlaid on a real-world view, allowing the user to experience digital content combined with a real-life context. MR, on the other hand, offers a different level of reality, allowing interactivity with not-really-there objects. In MR, virtual objects are integrated with—and can respond to—the real world.

MR is the least mature of the technologies, with the fewest present-day applications in design and engineering. And while AR is increasingly being adopted by businesses in sectors such as manufacturing, facilities management and aerospace, it is VR that is creating the most immediate use cases for business leaders in Retail, Training, Media and Entertainment (M&E), Architecture, Engineering and Construction (AEC) and Product Development.

VR technology is increasingly being regarded as a tool that has enormous potential to drive productivity and innovation. It is creating new opportunities for businesses to develop new training experiences, visualize new products and services, and test and optimize new processes at reduced cost. The technology enables teams to overcome physical real world limitations such as space, geographic divides, cost of prototyping, and the communication of complex concepts.

Businesses can now turn 3D CAD models into incredible immersive VR experiences that can be interacted with and then iterated in real time by multiple users from different locations using performance analytics. Businesses are amassing use cases across Retail, Education, M&E, AEC and Product Design—but the one thing they all have in common is that they are unlocking new efficient workflows.

> “A growing number of companies are turning to virtual reality as a way to drive training, collaboration, design, sales, and numerous other use cases.”
>
> Tom Mainelli, Group Vice President, Device and Consumer Research at IDC

VR in retail

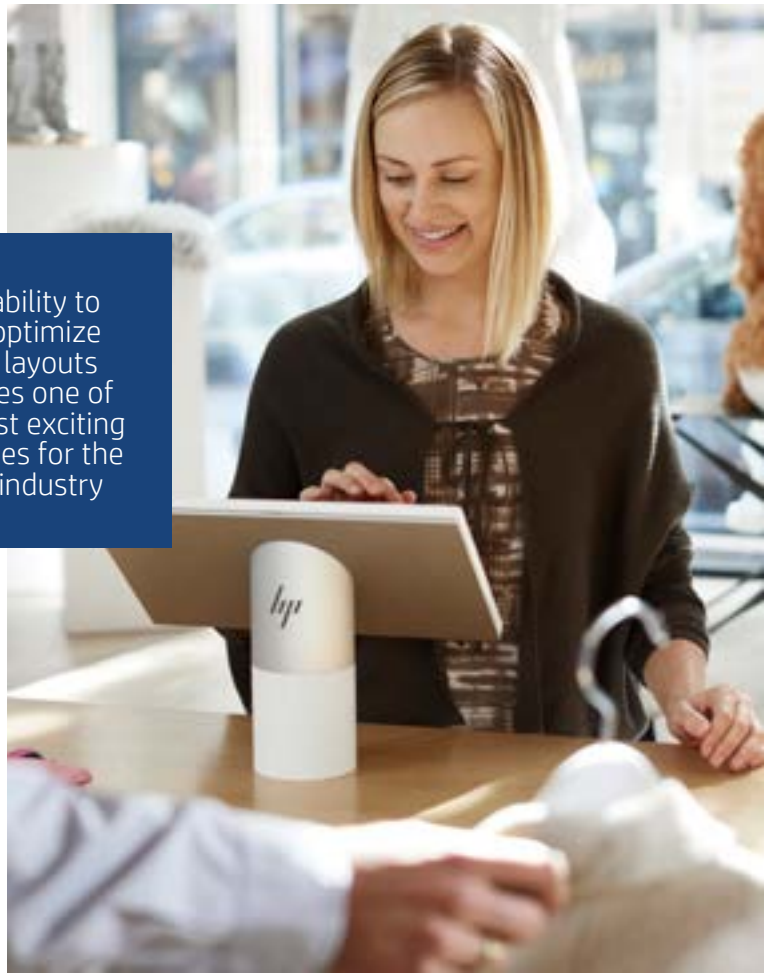
For years, headlines have screamed about the demise of brick-and-mortar retail stores at the hands of e-commerce. But VR and other technologies present an opportunity for retailers to harness technology to both complement and improve the in-store experience. Simply by having innovative, cutting-edge technology in-store, retailers can drive footfall by creating excitement around a new shopping experience.

The British cosmetics brand Charlotte Tilbury, for instance, has enhanced their customers' experience by installing virtual mirrors in their stores in London. These 'magic mirrors'[2] allow their shoppers to virtually experience different looks, 'trying on' products quickly and conveniently. The mirrors take a scan of the user's face and use it to create an AR version, meaning they can see how ten of the brand's iconic products look on them in under a minute.

VR's ability to help optimize store layouts provides one of the most exciting use cases for the retail industry

What's more, VR can even recreate traditional shopping experiences in the home—recently retail giant Walmart[3] launched a 3D Virtual Shopping Tour allowing customers to browse virtual stores and buy products from the comfort of their armchairs.

However, it's VR's ability to help optimize store layouts that provides one of the most exciting use cases for the retail industry. Moving goods from one aisle to the next, switching products from the top shelf to the bottom shelf, testing new signage or even completely revamping the in-store layout are far simpler and more cost-effective in the virtual world than the real world. And this provides retailers with greater agility during the ongoing drive to optimize how their outlets look and feel in order to boost performance and improve margins.



VR in Architecture, Engineering, and Construction

This is an approach that can be applied beyond the retail environment and to organizations of all shapes and sizes. Whether exploring new designs for the security gates at an airport, trying out a new layout for a call center or understanding the impact of 100 new employees in the marketing department of a large enterprise, VR can help businesses try out new things quickly and cost-effectively.

In the AEC sector, VR helps businesses better explain design concepts. Instead of showing CGIs of planned developments, architects are now able to get their clients to experience what the building will be like.

These VR experiences are a powerful means of communicating design features to clients who may have less experience in interpreting how a design would otherwise look and feel as a spatially finished project. They are also accurate, visualizing at 1:1 scale, and incorporate real world surrounding environments. This means architects can, for example, demonstrate in a few minutes what they would otherwise have needed a meeting and lots of drawings to explain.

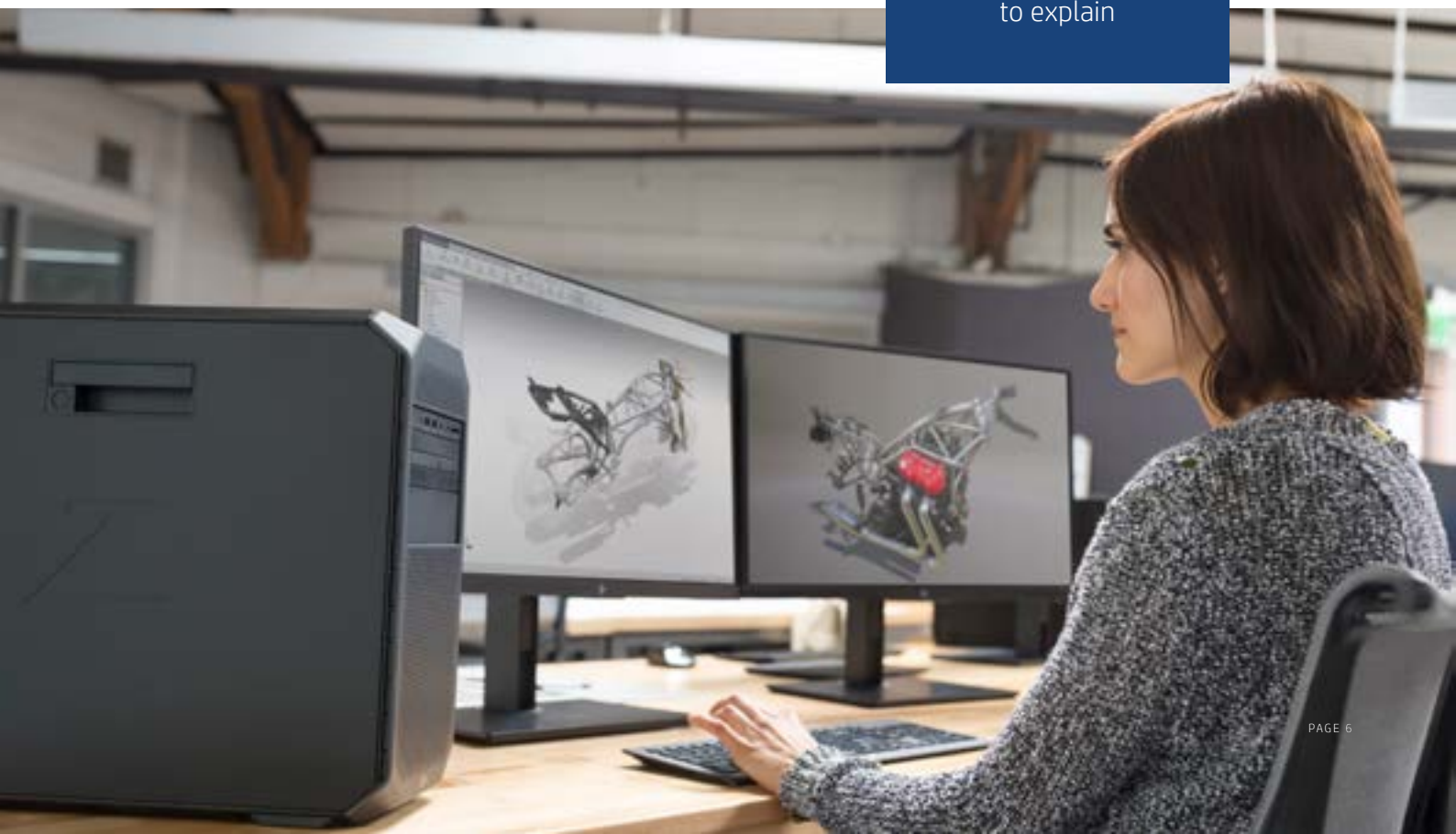
Software developments are making the process of visualizing 3D CAD designs in VR far easier. One example is software firm Autodesk's Stingray game engine and real-time rendering software, which helps AEC businesses create VR experiences that enable them to make changes throughout the design stage.[4] The firm's Revit Live cloud service creates an immersive experience that allows architects to understand, explore and share designs. This approach changes how AEC professionals collaborate with colleagues and clients because any stakeholder can experience life-size designs in virtual reality from anywhere in the world.

AEC companies are already doing this. Engineering and architecture company Arup is using VR technology and gaming engines in many of its projects, as well as using VR in its portable m|Lab space to create engaging immersive experiences of the built environment. The company says VR is allowing informed decision making to happen from the earliest design phases of a project.[5]

Construction companies are also taking up VR solutions to streamline the building process. Rather than having to rely on static drawings and blueprints, engineers can demonstrate how modifications can impact design and cost, even in real time. Operatives are already able to walk onto a virtual site and see upcoming challenges before they are played out in the physical environment. Construction teams can resolve issues collaboratively, and make better decisions that save resources and reduce errors.

Such immersive experiences were previously only available to businesses that invested in costly projection-based systems, including CAVES and powerwalls. But these systems are now being usurped by more cost-effective interactive headset systems where project stakeholders can see first-hand how potential design options might play out.

> Architects can demonstrate in a few minutes what they would otherwise have needed a meeting and lots of drawings to explain



VR in Training

One of the challenges in education—whether at university, college or in the business world—is repeating and scaling training. The training program remains the same, but the commitment in time and resources is huge when you need to train dozens, hundreds or thousands of people over a period of many years. And this is where VR comes in.

> "Every company involved in training and design work should get familiar with VR technology."
>
> Paul Melin, Head of Digital Media, Nokia Technologies[6]

On the one hand, VR can reduce the number of hours a human teacher needs to repeat the same instruction. But it also has the power to increase retention and repeatability, to democratize access to content across the globe and also to optimize training to specific users.

Not only can it cut out distractions, if a user wearing a VR headset is mistakenly looking at the wrong thing, the technology can notify them. Similarly, if someone loses concentration and their eyes wander off the task at hand, it can politely bring them back on track.

It also has huge potential for training programs that, in the real world, involve using large equipment. Industries such as aviation and construction are already using it. With VR, mechanics can safely make mistakes when learning how to repair large complex mechanisms such as engines or turbines.

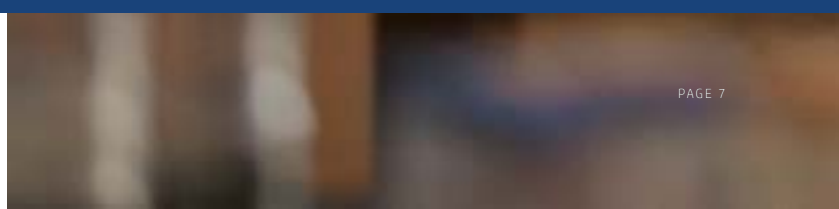
And there is a drive to make VR training more readily accessible to businesses. An alliance between VR software developer Pixo and HP, announced late 2018, has paved the way for businesses to move from understanding the potential of VR for training to actually implementing it. The two companies have launched an out-of-the-box solution that combines Pixo's fully immersive, 3D, active learning experiences with HP's Windows Mixed Reality Headset and VR Backpack.[7]

Levels of VR immersion

VR experiences vary massively in their level of immersion and interactivity. As such, they also vary in accessibility and cost.

At the less immersive and more affordable end of the spectrum are 360-degree simulations of a static space. These do not allow interaction or navigation. A step up is exporting 3D designs or content to gaming engine software that, when combined with a VR headset and controller (such as HTC Vive or Oculus Rift) allows users to navigate their way through the virtual environment.

At the most immersive and expensive end of the spectrum are VR experiences in which users can walk around and interact with the environment. This allows designers and engineers to use VR interaction tools to make design changes. More than this, multiple users can interact together and collaborate from different locations in real time.



M&E businesses are increasingly designing and animating with the VR user experience in mind at the outset

"AR/VR changes the role of the engineer into engineer plus experienced designer. This is not just lines of code. It's changing the poetry of business. I love this quote from Norbert Wiener in 1950: 'Either the engineers must become poets, or the poets must become engineers.'"

Chris Ezekiel, Founder & CEO, Creative Virtual

VR in Media and Entertainment

For M&E businesses, VR is creating opportunities for companies to engage audiences in new ways. This is driving content creation across gaming, movies, television and publishing. The resulting content is being consumed in the home, in theme parks and in arcades and installations.

An example of a company doing this is Disney, which, in partnership with Lucasfilm's ILMxLAB and VR company, The Void, invites theme-park guests to become active participants in VR experiences, including Ralph Breaks VR, based on the Wreck-It Ralph films, and 'Star Wars: Secrets of the Empire', where guests interact with each other and popular Star Wars characters.

The immersive VR experience follows the development of Star Wars-branded VR games. As a result of this trend, M&E businesses are increasingly designing and animating with the VR user experience in mind at the outset. But VR has many other benefits for M&E companies. Businesses designing entertainment experiences such as movies, rides and attractions can use VR to showcase and market these experiences in a more exciting way.

VR also presents opportunities for businesses to learn how people interact with their experiences. Using biometric analyses ranging from muscle responses through to EEG (electroencephalogram) scans, companies can track and then optimize VR content. If the content is a simulation of a physical experience in development, they can also gain insights about how it will be received by consumers. This can inform the design process.

Automotive and aerospace companies are among those pioneering VR to interact with designs in a virtual environment and to shorten product iteration cycles.

VR in Product Development

Companies operating in product development are using VR to speed up design cycles and visualize work more accurately and efficiently. VR gives designers and engineers the opportunity to work at life-scale and to interact with their creations in an almost-real digital environment. Professionals are using this new level of interactivity to collaborate with colleagues and partners, and to review potential options in real time. The result is informed design and engineering decisions that create better results.

Automotive and aerospace companies are among those pioneering VR to interact with designs in a virtual environment and to shorten product iteration cycles. Companies such as McLaren are using VR to add new value to 3D CAD data.

Instead of building several costly physical prototypes, businesses such as BMW are using 3D design software to create life-scale immersive virtual models in VR and reviewing them interactively. This enables digital collaboration from teams around the world to enable early validation and better decisions.

Ford, for example, uses a dedicated virtual reality lab, located at its product development center in Michigan, to immerse its engineers in the car development process, meaning they can quickly and easily improve the quality of early stage concepts. This helps engineers to quickly review options and make better informed decisions before taking prototypes to the manufacturing stage.[9]

Engineers in the automotive sector are also finding that VR is enabling highly effective ergonomic testing by allowing engineers to evaluate how people interact with virtual products. Data from such tests can accurately demonstrate physical interactions that can be fed back into the design process. Similarly, photo-realistic product stylings, so that vehicle designs can be checked for gap and flush, means designers can identify problems early in the process. More than this, they can test variations of colors and design options at the touch of a button. The ability to do this is presenting customer-facing opportunities too.

Audi quickly saw the potential of VR in this arena, first introducing compelling customer VR experiences into its showrooms back in 2016.[10] Three years on and the company now has around 1,000 VR showrooms around the world,[11] empowering dealers to attract more customers and upsell them higher-end configurations.[12]

The key benefit for automotive sales is that VR allows dealers to demonstrate millions of potential options on demand across a range of vehicles all within the confines of a showroom. In this way, VR helps businesses overcome the limitations of costly space. A static version of the experience in a booth enables customers to wear a Head Mounted Display (HMD) and take a virtual seat behind the wheel of their individually configured dream car. In the interactive version of the same experience, customers can wear an HTC Vive headset and walk around the virtual vehicle.

Over time, businesses using VR experiences to sell products will be able to use analysis of HMD data collected from customer interactions alongside data about purchase decisions to inform the design and engineering process.

VR in the future workspace

According to statistics database, Statista, 68 million VR headsets will be sold in 2020, up from just 5 million in 2016. Jitesh Ubrani, Senior Research Analyst for IDC Mobile Device Trackers, explains this growth in VR uptake: "On the consumer front, the combination of lower prices and increased content is beginning to resonate with users. Meanwhile, commercial adoption is also on the rise for a wide range of use cases, including training, design and showcasing."[13]

And VR technology is advancing rapidly. In a short space of time, HMD products like Oculus Rift and HTC Vive have catalyzed huge change in the VR industry. They have already made inroads to eliminating previous barriers to wider adoption such as prohibitive cost and motion sickness due to latency. This momentum will only drive further improvements as new players bring new HMDs to the market.

Future hardware is likely to focus on greater interactivity with virtual environments and better collaboration. An example of this is the HP Z VR Backpack, a wearable workstation which enables five engineers to interact in VR environments without tethering cables. But VR is also extending beyond visual and audio experiences to include other senses like temperature, smell, and touch. For instance, developments around haptic technology will enable deeper levels of immersion for users, which will create more realistic experiences.

An in-depth report by investment bank Goldman Sachs predicts that by 2025 as many as 3.2 million engineers will be using virtual technology and engineering firms could be spending as much as $4.7 billion a year on specialist VR software.[14]

To realize the full disruptive productivity benefits of VR for the design and engineering process, VR will need to be combined with other emerging technologies such as 3D printing, Internet of Things (IoT) and Artificial Intelligence.

For instance, VR will enable engineers to visualize real-time data insights from IoT devices and carry out repairs and maintenance work. In the case of additive manufacturing there is a clear benefit of being able to create rapid physical prototypes of 3D virtual models to drive quicker, more effective iteration.

To date, much of the debate around the future of VR has centered on the extent to which it will be adopted in the home by consumers. While the jury is still out on the extent to which the consumer market will boom, in the enterprise space the hype about the technology's transformational potential to drive productivity and innovation is already being delivered on. New use cases and innovative applications are constantly emerging, and leading-edge businesses are using VR solutions to gain competitive advantage over their rivals.

The question for IT decision makers, then, is whether to join the leading early adopters in transforming design and engineering workflows today, or risk playing catch-up later.

McLaren is using high-performance VR to create a competitive advantage in the ultra-competitive world of sports car design

CASE STUDY: How McLaren is using VR to fast track its design decisions

From the race track to the public road, McLaren is famed for making some of the fastest and most advanced sports cars in the world. VR already plays a key role in the UK automaker's design decisions, helping the firm bring sports cars to market even faster.

The company uses sophisticated Unreal Engine VR technology to visualize its cars at near-photorealistic quality via a powerwall or a fully immersive VR headset. "We want to be able to believe in what we see and then we can confidently make the right design decision," says Mark Roberts, Design Operations Manager.

McLaren now wants to expand its VR journey further, allowing its manufacturers to explore prototype parts, giving specialist training to dealerships and providing customers with the opportunity to visualize their dream cars. From prototyping through to production and on to customer experience, McLaren is using high performance VR to create a competitive advantage in the ultra-competitive world of sports car design.

Sources

1 https://www.idc.com/getdoc.jsp?containerId=prUS45123819
2 https://www.charlottetilbury.com/uk/blog/2018/05/charlotte-tilbury-magic-mirror/
3 https://www.businessinsider.com/walmart-launches-virtual-reality-shopping-2018-6?r=US&IR=T
4 https://area.autodesk.com/blogs/journey-to-vr/autodesk-and-unity-expand-collaboration-/
5 https://www.aecmag.com/59-features/1166-virtual-reality-for-architecture-a-beginner-s-guide
6 https://www.arup.com/projects/m-lab
7 http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA7-4083ENW.pdf
8 https://www.vrfocus.com/2018/08/pixo-vr-and-hp-collaborate-on-vr-training-solutions-for-enterprise/
9 https://disneyworld.disney.go.com/en_GB/attractions/disney-springs/void-step-beyond-reality/
10 https://www.mesalliance.org/2017/06/07/pwc-forecast-ai-vr-hold-promise-companies/
11 https://www.designboom.com/technology/ford-virtual-reality-lab-vehicle-design-01-15-2017/
12 https://www.roadtovr.com/audi-has-deployed-1000-vr-showrooms-in-dealerships-worldwide/
13 https://www.audi-mediacenter.com/en/press-releases/audi-launches-virtual-reality-technology-in-dealerships-9270
14 https://www.idc.com/getdoc.jsp?containerId=prUS44509518
15 https://www.goldmansachs.com/insights/pages/technology-driving-innovation-folder/virtual-and-augmented-reality/report.pdf
16 https://www.solidsmack.com/design/see-mclaren-vr-car-body-design/