Emerging Technology Analysis: Augmented and Mixed Reality Opportunity for 3D Design Software and Vertical ISVs

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Initiatives:Emerging Technology and Trends Impact on Products and Services **and 1 more**

Commercialization of AR and MR solutions presents new opportunities to drive innovation, expand capabilities and grow revenue. To successfully capitalize on new opportunities, software product managers must build, acquire or partner to deliver AR/MR solutions as part of their product strategy.

Overview

Key Findings

- Software providers are building their own augmented reality (AR)/mixed reality (MR) platforms instead of leveraging existing ones, which takes time and resources that are not well used.
- Leaders of digital transformation initiatives are approaching AR/MR solutions tactically and are seeking solution packaging that is purpose-built to address a specific need.
- The AR/MR market lacks turnkey solutions that best meet organizations' needs with built-in functionality for specific use cases to reduce time to value.

Recommendations

For product managers to capitalize on the emerging trend of AR/MR experiences:

- Leverage existing AR/MR platforms via partnerships with specialists rather than building your own, unless such platforms are core to your business and represent real competitive advantage.
- Work closely with AR/MR platform partners to create a strategic roadmap of target market segments to prioritize integration (connectors, APIs for legacy systems) capabilities for the most pertinent incumbent systems to your market segment.
- Establish a partner ecosystem that offers both utility and flexibility to minimize the impact on your customers' internal resources, brings the necessary expertise to simplify implementation, and allows you to deploy more quickly while optimizing business processes.

Analysis

Technology Description

AR and MR are two types of experiences on the immersive spectrum.

Augmented reality (AR) is a digital interface/experience that uses real-time information in the form of text, graphics, audio and other virtual enhancements integrated with real-world objects and presented using head-mounted-type displays or projected graphics overlays.

Mixed reality (MR) is a digital interface/experience that merges real and virtual elements, where physical and graphical objects appear to interact and integrate naturally.

AR and MR, in concept, are single and separate technologies. However, both include an underlying group of technologies encompassing the spectrum of immersive displays and interactive systems that produce either an augmented or mixed reality experience.

Software providers offer tools to interact with and manipulate 3D graphics and/or task- and industry-specific programs, such as productivity, architecture, engineering, construction, field services and manufacturing applications, which (ideally) integrate with existing systems to facilitate employee productivity.

In 3D graphics, this means using and creating 3D content in a 2D interface (workstations, PCs and tablets). This force-fitting causes a visualization challenge for users. AR/MR experiences take native 3D graphics and display them within a physical 3D space, mitigating this challenge.

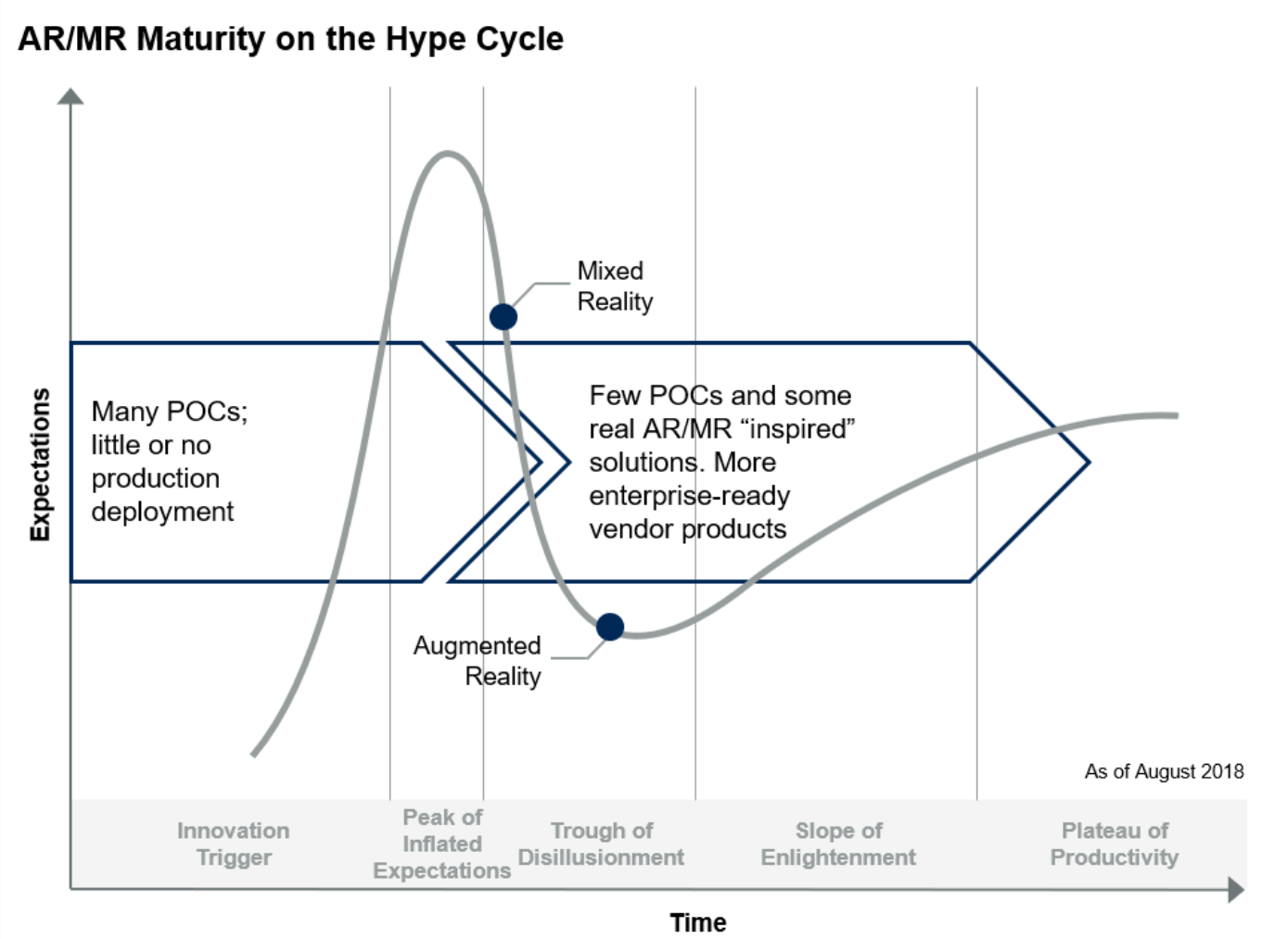
Segment- and industry-specific software providers cover a much broader set of functionality. For example, field service management (FSM) software helps workers deployed off-site across a broad range of industries to facilitate FSM tasks (such as scheduling, ticketing, documentation, invoicing and inventory management). AR/MR experiences extend this functionality with an interface designed for the task.

For example, instead of force-fitting complex documentation better suited for desk-bound work, documents can be turned into checklists for procedural tasks. Moreover, if a head-mounted display (HMD) is used, the information can be accessed hands-free. Another example is productivity software, which typically focused on desk-bound workers. AR/MR solutions extend suite functionality to frontline and deskless workers as well.

3D design software and vertical independent software vendors (ISVs) can gain competitive value from these solutions by developing their own platforms to create AR/MR experiences. 3D design software and vertical ISVs create value by integrating with AR/MR tool providers to develop solutions the tool provider could not or would not develop on its own. These vendors can also gain competitive value by providing semi-turnkey solutions (their own offering bundled with offerings from AR/MR tool providers, HMD vendors and professional services companies) to collectively deliver greater innovation and choice. Customers benefit from these partnerships by more quickly and easily finding integrated solutions that meet their needs.

Over the past 12 months, the market has moved into a transitional phase. It is no longer just bleeding-edge enterprises adopting AR/MR to gain competitive advantage. The market is three to six years from seeing AR/MR experiences being adopting by the early majority (see Figure 1).

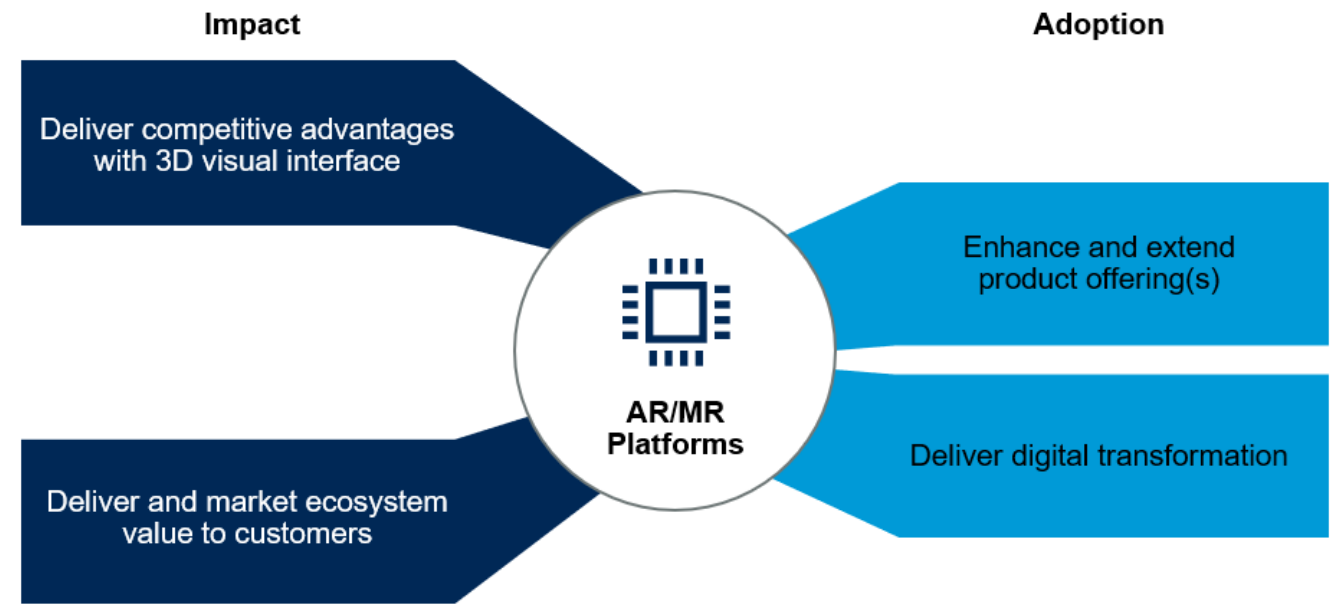
Figure 1. AR/MR Maturity



POC = proof of concept
Source: Gartner (August 2019)
ID: 407906

Critical considerations for product managers pursuing AR/MR experiences include providing an easy-to-use, 3D visual interface and positioning this offering within an ecosystem of software, hardware and services (see Figure 2).

Figure 2. Significant Product Management Considerations for Augmented and Mixed Reality Platforms



Source: Gartner
ID: 407906

Many organizations will try to create their own platform instead of leveraging someone else's, as they believe that only by controlling the interaction between themselves and their partners can they profit as a digital business. However, developing a platform may require more investment than they expect and delay their entry into the market.

Product managers must decide whether the benefits to building your own platform are core to your business, represent real competitive advantage and can be used to improve your competitive position. Developing your own solution requires monetary investment, takes time, and demands specific skills and experienced specialists.

Meanwhile, integrating with something off-the-shelf is potentially much quicker. More importantly, AR/MR is a new (3D) interface type. Creating a new UI may seem simple, but it is not easy, and you may not have the in-house skills to address optimal AR/MR visual design and user experience. By the time your competitors design, create and bring a solution to market, the market may have moved on — leaving them behind again.

Critical considerations for product managers pursuing an AR/MR platform include:

- Designing a 3D interface for use across pertinent hardware, which might extend from handheld devices to HMDs
- Delivering capabilities relevant to the target market(s)

- Establishing connectors to seamlessly interface with customers' systems of record
- Delivering the ecosystem as the centerpiece of the product strategy
- Securing the necessary investment
- Selling ecosystem value to customers
- Campaigning to attract and retain high-value partners

Technology Adoption

AR/MR Is a Compelling Digital Interface That Enhances Your Product Offering(s)

AR/MR is a good fit for software customers that are selectively aggressive regarding which technology they adopt early. AR and MR also serve as portfolio differentiators by offering thought-leading solutions that complement your current offerings. In turn, this can drive incremental revenue as well as potentially increase customer loyalty through bundling.

Visualization solutions/interfaces are a natural choice to leverage 3D assets. Vertical- and segment-specific ISVs benefit by adding a workflow solution that provides relevant, interesting and actionable (and potentially hands-free) information to frontline workers. This is especially applicable to procedural tasks (such as a pick-pack list) and those that benefit from situational video (such as remote-expert assistance). This functionality is extended in situations where digital items show value from interacting with the physical environment. For example, does a particular piece of equipment fit into the designated space and promote a safe and effective workflow?

Because AR/MR is in its early days of technological maturity, the industry lacks turnkey solutions, forcing customers to spend time and energy researching a-la-carte offerings from an inadequately defined value chain. Offering a more complete solution can extend current customer relationships and loyalty.

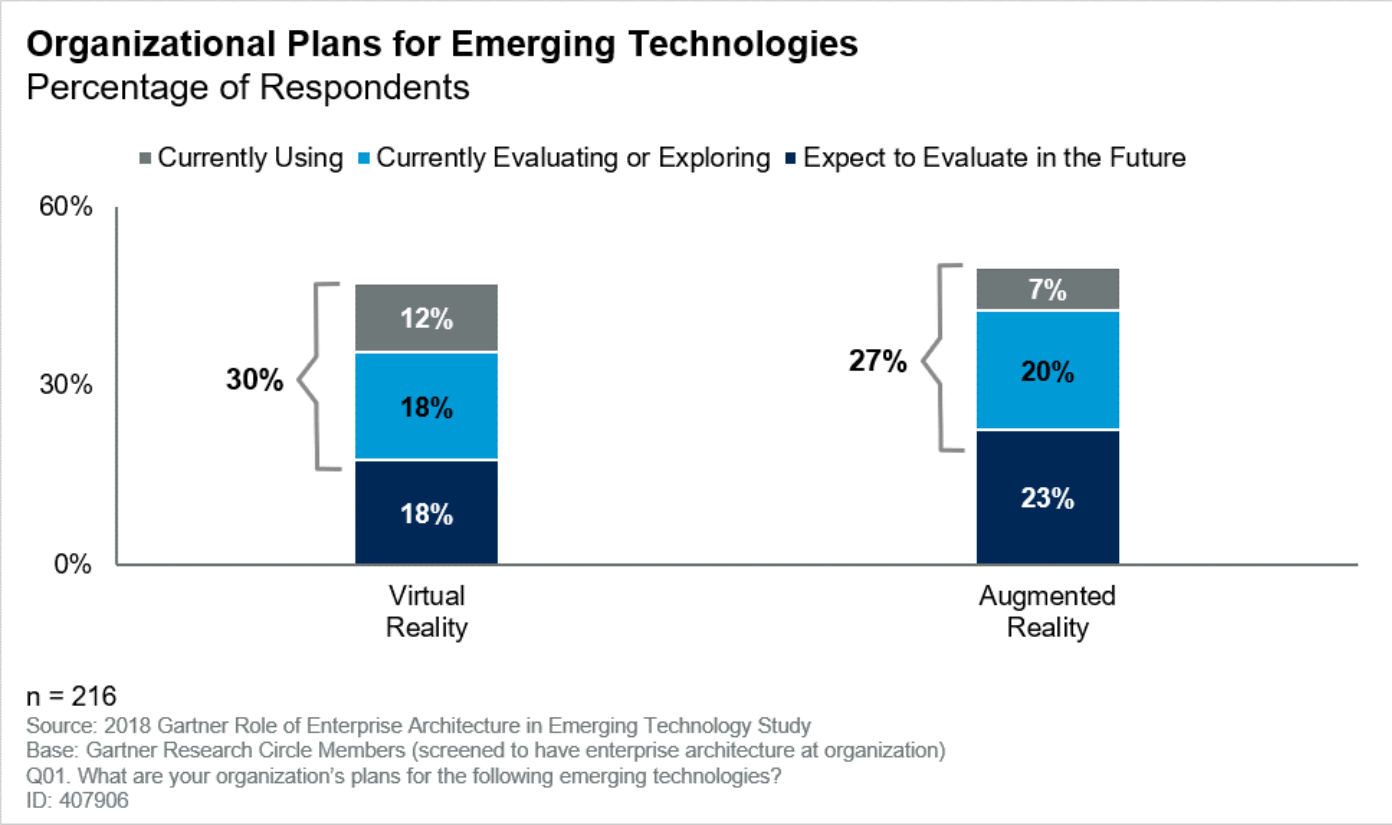
Recommended Actions:

- Avoid building your own AR enterprise tools unless such platforms are core to your business, represent real competitive advantage and can be used to improve your competitive position. If you opt for platform acquisitions in the next three years, it should be treated as an independent entity. This will help optimize development of 3D experiences while mitigating negative influences from 2D and other legacy design paradigms.
- Use third-party platforms. Establish nonexclusive partnerships with software tool and hardware providers whose solutions are aligned with your value proposition.

Use AR/MR to Deliver Digital Transformation

According to a Gartner Research Circle study, 27% and 17% of respondents were either using or evaluating AR and MR technologies, respectively (see Figure 2). The majority (55%) of respondents are looking to emerging technology to achieve digital transformation. Forty-four percent cited competitive advantage and 35% cited improving customer service as top drivers for emerging tech adoption.

Figure 3. Organizational Plans for AR and MR



Vendors have an opportunity to address the needs of IT professionals and CIOs. These buyers are faced with a multitude of technologies and trends to gain or sustain competitive advantage. AR/MR benefits from other technologies by repurposing the technology into an AR/MR experience.

For example, Internet of Things (IoT) data can be leveraged by individual users to have up-to-date service, maintenance and performance information on machinery. This information can be presented to workers via an AR/MR overlay — delivering on-demand information about the machinery they're using or servicing. When the maintenance is completed, the systems can be updated so the next user gets the most recent information.

On top of "inside out" information, computer vision can be leveraged in situations where IoT data is not available. For example, computer vision can be used to visually identify (via a marker or the object itself) the correct machine to perform maintenance on, initiate a service request or seek knowledge base artifacts. Similar to the IoT example, an AR/MR experience provides an overlay that annotates the physical world with contextually relevant information (in this case, visual context), bridging the physical and digital world.

While AR/MR solutions can involve new hardware and technologies, much of the value can be derived from existing assets. For example, AR/MR experiences can be used on different endpoint devices. For example, these experiences can be used on current smartphone and tablet deployments if a hands-free (HMD) scenario is not warranted. Content can be created to enhance AR/MR experiences, but can (and should) leverage existing digital information (such as service records and inventory).

Therefore, AR/MR systems can be developed and deployed alongside enterprise digitization efforts. These same efforts can also be used to empower the workforce by making their tasks more effective, efficient and/or safer using hands-free AR/MR solutions.

Recommended Action:

- Use AR/MR solution partnerships as a complement to your efforts in IoT, digitization and workforce empowerment offerings. For internally developed AR/MR solutions, this can be used as an extension of your current digital transformation offerings.

Technology Impact

Deliver Competitive Advantages With AR/MR Experiences

AR/MR experiences will exist on a spectrum of available tools and technologies. In other words, this interface may substitute other tools such as paper-based instruction, but won't necessarily replace smartphones (for example, in situations where a hands-free workflow has limited or no value). AR/MR will change how users interact with the world around them. This will change the software landscape by creating new, competitive opportunities in numerous areas including:

- **Integration** — To ensure these experiences and technologies are not siloed, immersive software tools and platforms will need to be broadly integrated into existing systems of record. Systems of record can include FSM, enterprise asset management (EAM), manufacturing execution systems (MES), ERP, CRM, product life cycle management (PLM), and warehouse management systems (WMS). Work with platform partners to make sure they have the key connectors required by your clients or understand the roadmap and timing of necessary integration capabilities.

- **Interfaces** — The development of computing interfaces has largely been focused on flat (2D) screens (PCs, phones and tablets). As computing moves into the physical spaces, interfaces will need to be designed and optimized for physical workspaces, 3D content and/or HMDs. Given the current maturity of AR/MR, these interfaces will require workflows designed for these specific tasks, rather than forcing workers to adapt to new or generic workflows.

- **Content** — This involves repurposing existing content and optimizing for 3D interfaces (where applicable). It also includes creating new digital content for visualizing in physical space.

AR/MR is a new type of user experience. Therefore, it will extend how users interact with digital content. On one hand, for traditional software vendors, this means incremental disruption as their existing core business will expand to include this experience type. On the other, disruption for startups in this space is also potentially large. These new vendors are not only defining new pieces of the value chain, but also how and where to bring value to this expanded ecosystem.

Recommended Actions:

- Work closely with AR/MR platform partners to create a strategic roadmap of target market segments. Use this roadmap to prioritize integration (connectors, APIs for legacy systems) capabilities. Ensure broad interoperability by identifying and ensuring support for all pertinent incumbent systems.
- Build UIs optimized for task-specific workflows. These will align with current hardware offerings.

Deliver and Market Ecosystem Value to Customers

True turnkey solutions do not exist yet. However, early successes for product managers at AR/MR software startups (such as Atheer, Librestream, Upskill, Ubimax, Scope AR) have come to providers that offer solutions backed by a network of hardware, service and developer partners.

Due to the relative immaturity of the AR/MR value chain, customers have been forced to research and work with providers a la carte. This presents a number of hurdles, including research time, costs, compatibility and integration issues.

Providers that don't have an extensive partnership ecosystem are at a disadvantage to those that do. This requires providers to compete for and add partners to differentiate their own offerings.

Adoption of these solutions have been most useful and successful in heavy industries such as aerospace, automotive, logistics, manufacturing, energy and utilities, oil and gas, and field services. The common thread across these segments is they have deskless workforces with hands-busy tasks that benefit from relevant, actionable information.

End-user customers are concerned that they are betting on the right vendor. Customers must feel like the product will keep up with changing technology and buyer behaviors, or better yet, lead the way. To address these concerns, AR/MR offerings within an ecosystem offer customers the following advantages:

- **Completeness** — Partner solutions can fill gaps that the ecosystem provider either cannot or will not fill.
- **Innovation** — Partners identify and meet customers' needs on different vectors. Partners may act as two-way stepping stones in developing new technologies, which in turn will drive AR/MR software providers to enable such technologies.

- **Choice** — Partners in a thriving ecosystem will provide competing solutions, offering greater choice and value to customers.
- **Validation** — Partners' investment in the ecosystem validates the provider and the provider's solution.

Software vendor product managers will benefit by promoting turnkey or near-turnkey solutions created through partnership or internal development by emphasizing the speed of deployment and rapid ROI. Partnerships should also prioritize tighter bundling that includes first-line support and testing, so your customer can single-source.

Recommended Actions:

- Identify hardware, software and developer partners that have knowledge and experience within your customers' domain (for example, logistics, manufacturing, automotive).
- Establish a partner ecosystem that offers both utility and flexibility to minimize the impact on your customers' internal resources, brings the necessary expertise to simplify implementation, and deploys more quickly while optimizing business processes.
- Deliver a superior customer experience through tighter bundling, allowing customers to single-source.

References

"Forecast Wearable Electronic Devices, Worldwide, 2018"

"Hype Cycle for Display and Vision, 2019"

"Hype Cycle for Frontline Worker Technologies, 2019"

Evidence

Gartner's Role of Enterprise Architecture in Emerging Technology Study was conducted through an online survey from 30 August through 11 September 2018, with 216 Gartner Research Circle Members — a Gartner-managed panel comprising IT and IT-business professionals. The survey explored the role of enterprise architects (EAs) in evaluation, selection, recommendation and implementation of emerging technologies such as immersive technologies (AR and VR), blockchain, artificial intelligence and machine learning.

Participants were screened to be involved with enterprise architecture at their organizations. A majority of survey respondents (52%) have full decision-making responsibility for the investment, strategy and implementation of enterprise architecture in their organizations.

This survey was developed collaboratively by a team of Gartner analysts, and it was reviewed, tested and administered by Gartner's Research Data and Analytics team.

Recommended by the Author

Competitive Landscape: Head-Mounted Displays for Augmented Reality and Virtual Reality

3D Design and Device Convenience Hinder AR and VR Adoption

Top 10 Strategic Technology Trends for 2019: Immersive Experience

Research Roundup: Augmented Reality and Virtual Reality

Market Insight: Mixed-Reality Immersive Solutions Are the Ultimate User Experience for Everyone

Competitive Landscape: Augmented Reality Tools for Enterprise, 2018

Disruption Profile: Immersive AR and VR Technologies Transform Computing Experiences

Cool Vendors in Display and Vision for Augmented Reality, 2018

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