KEYPOINT INTELLIGENCE

SERVICE AREA

Business Development Strategies

ANALYSIS

BRIDGING THE GAP WITH XR

HOW AUGMENTED & VIRTUAL REALITIES CAN SELL EXPERIENCES AND TRAIN WORKERS

JULY 2021

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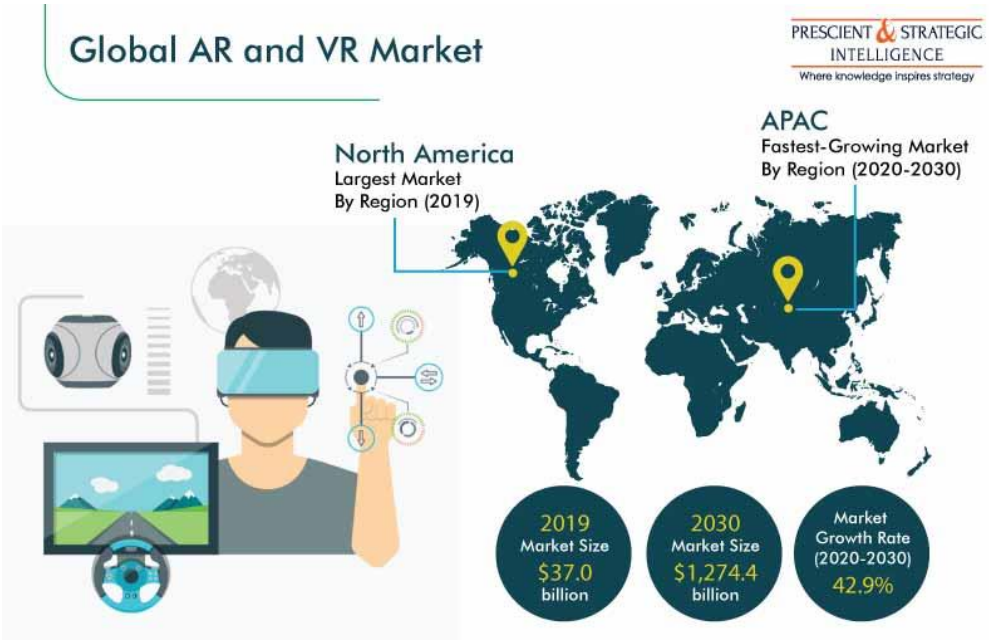
Introduction

Five years ago, terms like augmented reality (AR) and virtual reality (VR) were commonly heard in the digital space and at tradeshows. At that time, some evangelists believed that these new forms of technology would transform the world over the next several years. After several years had passed, AR and VR came under a different narrative—one that dismissed each as a gimmick that was irrelevant to the world and pretty much every market within it. Although neither AR nor VR transformed the world overnight, their perceptions of irrelevance have proven false. Both technologies have been growing at a steady pace over the past five years, finding markets in the enterprise space as consumer models stalled. Each technology also experienced a boost during the COVID-19 pandemic, as practically every organization found itself thrust deeper into digital workflows.

Figure 1: Global AR and VR Market Statistics



Source: Prescient & Strategic Intelligence

This document explores how AR and VR are currently being used in various business environments, and why print service providers (PSPs) should pay attention to these developments. While VR will be discussed, there will be more of a focus on AR applications as these have proven more versatile thus far. For those unfamiliar with VR, AR, mixed reality (MR), extended reality (XR), or related technologies, an Appendix is provided at the end of this document to further explain the terminology.

External Use Cases for XR

In the past five years, much of the media focus regarding XR has been in the external (i.e., B2C) space, particularly when it comes to gaming and other social experiences. That said, XR—and AR in particular—has many uses when it comes to communicating externally, be it toward consumers or toward business partners.

XR in Marketing

As PSPs look to stand apart from their competitors and forge a unique identity to their client base, AR should not be overlooked as a product offering. Print-based AR has become a common experience over the past five years, with users holding up a smartphone or tablet to a static paper image, only to watch that image transform into an animation or even a video. When incorporated into marketing campaigns, these experiences have proven to help drive consumers toward a purchase, even if they originally had no plans to buy. According to a recent USA AR retail study entitled *The Impact of Augmented Reality on Retail*, 72% of shoppers using AR made impromptu purchases simply because of a compelling AR experience.

Figure 2: An Example of Augmented Reality Marketing

Source: NextPage

PSPs have been using color and image resolution to promote their capabilities for quite some time. These two qualities will remain important going forward, but AR will likely provide that extra push. Marketers are constantly seeking ways to prompt consumers to buy at the point of purchase, and AR has a proven track record as a tool that can be quite helpful in this area.

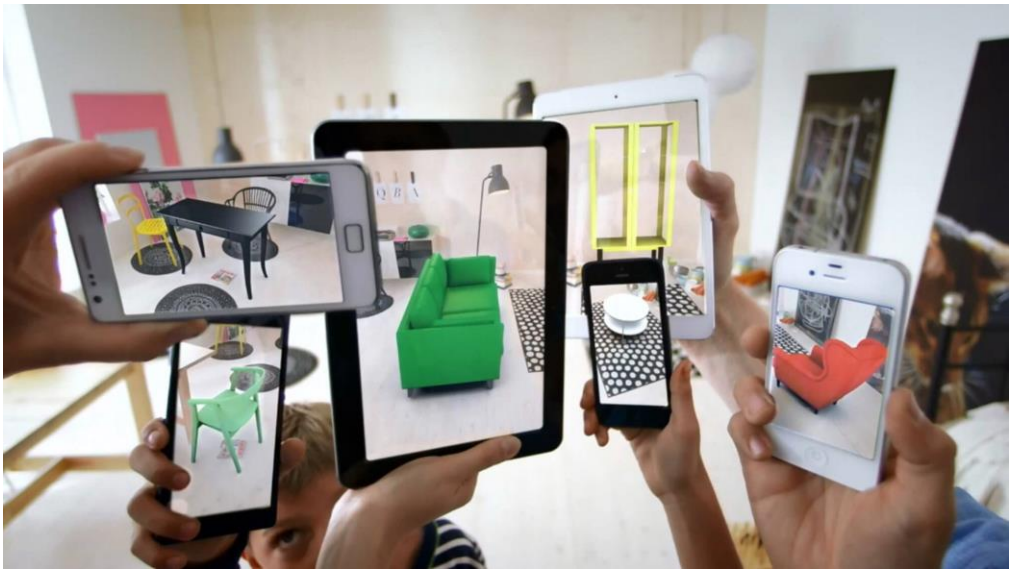
XR for Client Engagement

While AR is a useful marketing tool, PSPs should not assume that any AR experience can magically propel a user toward a desired action. In a recent podcast, Keypoint Intelligence and Konica Minolta discussed the dangers of ineffective AR experiences and how they can actually turn off a consumer rather than engaging them. These so-called "dancing dinosaur" experiences often serve no real purpose and don't prompt engagement. Instead, they simply highlight AR—and very basic form of AR at that—just for the sake of novelty.

It's important to remember that the current consumer space is flooded with companies competing for attention. As a result, most consumers will only engage with organizations that can provide genuine experiences. For example, forcing a consumer to download several apps and hold their phone in place for a few seconds just to see a cartoon elephant waving at them will likely be viewed as a waste of time and energy—and certainly not an experience that is worthy of repeating.

When exploring ways to use AR externally, businesses must consider practicality. One good example of this is AR furniture apps. When consumers think about purchasing furniture, one of the first things they wonder is how a certain piece of furniture will look in their house. With AR, users can easily determine the answer to this question—without purchasing or attempting to move a heavy couch. When incorporating AR experiences, it is paramount for businesses to first understand the issue, then use AR to mitigate the challenge.

Figure 3: A Practical AR Example



Source: WeAR Studio

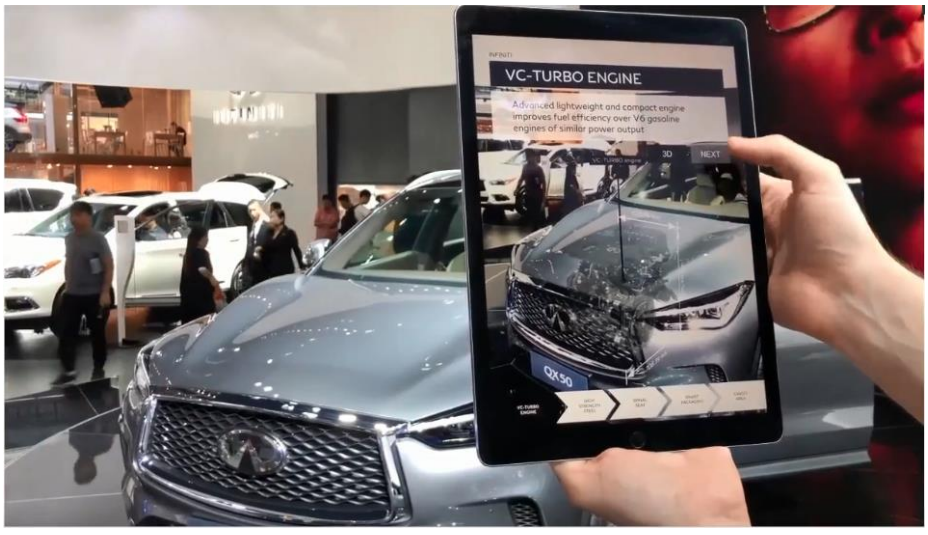
XR as a Sales Channel

When the COVID-19 pandemic hit, it accelerated the pace of e-commerce adoption. To remain competitive, many PSPs were forced to change their sales channels quickly and dramatically. Face-to-face encounters were swapped out for Zoom calls, and online stores were created or updated to facilitate ordering and processing. Even as COVID-19 is becoming better controlled in parts of the world, all indications suggest that this trend will continue.

As PSPs ponder their 21st Century sales strategies, XR is a tool that should not be ignored. At PTC's recent virtual Vuforia Live event, partner panellists discussed how they were using AR and VR as sales tools. To make a long story short, printing hardware is heavy, and it can be expensive and time-consuming to bring a client onsite for a demonstration. AR is fast becoming an effective method to show off hardware features at tradeshows without constantly putting the physical machine through its paces. Likewise, VR was used to show off virtual versions of production floors running at full capacity, giving clients an idea of the space and of its capabilities.

It's easy to see the opportunity for PSPs. VR can be used to provide virtual site tours, complete with full spatial proportions and awareness. AR can be used for product demonstrations, eliminating the need to create and carry samples solely for sales purposes. Neither of these technologies require travel or face-to-face encounters. Even as part of the digital e-commerce experience, AR and VR replicate many of the more personal touches of on-site meetings or demonstrations.

Figure 4: Augmented Reality at a Tradeshow



Internal Use Cases for XR

While XR tools are increasingly used for external communications, the industry has also found considerable success with internal use cases. XR use within the enterprise space has been growing, and much of that growth has occurred in the areas of training, remote collaboration, design, and maintenance.

XR as a Training Method

All forms of XR have found success in the business space as new training methods for employees. Experts from PTC speaking at Vuforia Live 2021 described it as a switch in education, from teaching lessons that may be helpful—and hoping the student remembered them if and when the knowledge was needed—to creating a real-time, growing library of specialized knowledge that can be recalled as needed. VR has been particularly helpful in this regard. Research conducted by FrontCore revealed that VR has a 75% information retention rate—25% higher than lectures and 65% higher than reading.

The advantage lies in the core of what a VR training exercise is: an experience. Employees training with VR experience almost exactly all the sensations they would in real life, but without any of the dangers or pitfalls. No machinery needs to be tied up and no expert needs to be on hand. For PSPs looking to find or replace skilled workers, VR training programs may be a cost-effective investment that can train new workers on a virtual floor rather than tying up physical resources.

Figure 5: Virtual Reality Training Exercise

Source: Data Driven Investor

XR for Remote Collaboration

Training is a strong base, but what happens when the question is too complex or the occurrence is too rare? Even these more challenging situations can be streamlined with XR use—often by employing AR. Rather than flying out an expert or trying to resolve a complex problem via phone, many AR programs are built with remote collaboration in mind. These solutions enable the expert to see exactly what the employee is seeing, and even make visible notes in real-time. This greatly reduces the time required to resolve issues, ensuring that productivity is not disrupted.

Figure 6: Remote Collaboration with Augmented Reality

Source: Next Reality

XR's uses in remote collaboration do not end there. For many larger companies, designing and prototyping new products and solutions is a challenge, often due to the nature of their organizational layouts. Teams develop in siloes, only meeting up and working together when absolutely required—it simply costs too much to operate otherwise. With XR technologies, however, the use case can be much improved. Workers from different countries can design and create together in an easily accessible virtual space.

XR in Maintenance

When looking at the state of factories overall, the International Society of Automation found that 5% to 20% of productivity was lost due to downtime. Human error was a large factor, as was the failure to recognize when a machine needed maintenance. This data sheds light on a problem that impacts the print space. If a print floor loses a printer, the PSP in question will suffer lost revenues and decreases in productivity.

XR provides a solution. By using specialized solutions, PSPs can outfit their hardware with digital twin technology, meaning that a digital copy of the machine exists in the virtual space. As its name implies, this digital twin is an exact replica, not just in appearance but in performance. Information is gathered from sensors and fed into the image, ensuring

complete accuracy. This twin can be easily read in XR via a smartphone or tablet, or through an AR headset.

Figure 7: Maintenance in Augmented Reality

Source: PTC

When employees are equipped with AR displays, they are more likely to know when a machine will need maintenance. This helps minimize downtime and also makes it more likely that the correct repair will be performed since the information is also provided through the AR interface.

opinion

The Bottom Line

Some of us might still be waiting for XR to completely change the world, but there's no question that it's already having a tremendous impact in numerous industries. PSPs that are struggling to differentiate themselves in a crowded marketplace should consider using external XR products and platforms to help make their offerings pop. Businesses that are hoping to run more efficiently should look to internal investments.

The COVID-19 pandemic sped up the path of the digital transformation, and many believe there's no going back to the "normal" that existed in 2019. XR is now firmly entrenched as part of the digital landscape, and it might become a primary user interface (UI) in the future. Now is the time for PSPs to familiarize themselves with the technology and consider how it can be used to their advantage. Far beyond "dancing dinosaur" experiences, XR can enable a richer, more immersive work environment where every employee can serve as a skilled worker.

appendix

Appendix

To better understand this document, Keypoint Intelligence offers these definitions:

- **Augmented Reality (AR)**: An enhanced version of reality created using technology to overlay digital information on an image of something being viewed through a device (such as a head-mounted display or smartphone camera).
- **Virtual Reality (VR)**: An artificial environment that is experienced through sensory stimuli (such as sights and sounds) provided by a computer, and in which a user's actions at least partially determine what happens in the environment. VR is typically experienced while wearing a headset that blocks the user's view of the surrounding environment.
- **Mixed Reality (MR)**: Also known as hybrid reality, MR is the merging of physical and virtual worlds to create new environments where physical and digital objects co-exist and can interact in real time.
- **Extended Reality (XR)**: An umbrella term used to group AR, VR, and MR technologies together. XR deals with any and all virtual and physical world combined environments that have been generated by some kind of processing power, be that a tablet, smartphone, PC, HMD, or headset.
- **All-in-One**: A term used to describe headsets and HMDs that are self-sufficient. These devices need no help from external processing or power sources. They have no wires of any kind, apart from when they may be being charged.
- **Field of View (FOV)**: The observable space, measured in degrees, that a user can see via a head mounted display.
- **Head Mounted Display (HMD):** A type of monitor or display device that is worn on the user's head as part of glasses, a band, or helmet. Designed specifically to create feelings of immersion, an HMD moves with the user's head, guaranteeing that the screen is always in front of their eyes.
- **Occlusion:** When dealing with AR, occlusion refers to the task of hiding a virtual object behind an existing real-world one. In simple AR, the digital floats above the physical. With occlusion, the virtual object is grounded in the real world, and behaves realistically with the surrounding environment (such as disappearing behind a tree or under a desk). Occlusion is very rare in AR today and regarded as a complex feature.
- **Tethered:** Tethered is a term used to describe HMDs that are linked to an external processing or power source via a cord or cords. This term is mainly used to describe certain PC-based VR HMDs, and is still a common form of VR today (as of June 2021). As such, when an HMD is described as "untethered," it means it has no cord or wire connecting it to an external device when in use.
- **User Interface (UI)**: The area where humans and machines interact with one another. The objective of this interaction is to enable effective control of the application, while giving the user appropriate feedback to help guide actions.

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Comments or Questions?