White Paper

How Augmented Reality Drives Real-World Gains in Services, Training, Sales and Marketing, and Manufacturing

Sponsored by: PTC

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IDC OPINION

Augmented reality (AR) technology is here now, and companies of all shapes and sizes are utilizing it to change the way work gets done and to drive better outcomes for themselves and their clients. IDC believes that service-based organizations should be among the first to embrace this new technology or they could face near-term disruption of their business. Beyond the service elements within a wide range of enterprises, we also see strong interest in AR inside of companies that have specific needs around knowledge transfer and training, sales and marketing, and manufacturing. When you sum these major groups together, the result is that a huge number of companies are already using AR.

According to IDC's Worldwide Augmented and Virtual Reality Spending Guide, in 2017, companies spent more than $3.6 billion worldwide on AR hardware, software, and services, and that number is set to grow to more than $8 billion in 2018. IDC recently completed a custom project for PTC in the United States where we surveyed a mix of IT decision makers, enterprise executives, and line-of-business managers and found that 77% of companies were already experimenting with AR. While most companies were still in the early stages of testing, a surprisingly large number of them were already moving from proof of concept into pilots, from pilots into the early stage of deployment, or from early stage deployments into late-stage deployments. Another 6% said they expected to begin testing AR in the next 6–12 months. Less than one-fifth of respondents said their company had no immediate plans around AR. This is not the company you want your organization to keep.

AR technology is exciting because it brings real-world benefits to organizations left out of the digital transformation wave. Why? Because in many cases, the job to be done, the process to be revised, or the knowledge to be transferred requires at least one foot in the physical world and one foot in the digital world. AR helps bridge this gap by bringing digital assets into the real world — content viewable on mobile devices such as smartphones as well as using headsets that let workers engage with the content hands free. The result is that in the space of a few years, companies stuck with using paper-based processes, that are dealing with aging expert populations, or that have been looking for ways to iterate more rapidly in manufacturing have found the tools they need to move into the 21st century.

Today is an exciting time for such firms, but it also means companies in these industries that are slow to adopt these new technologies, that take a "wait and see" approach, may find themselves quickly falling behind. This IDC white paper will dive deep into some of the primary use cases of AR related to service-based industries, knowledge transfer and training, sales and marketing, and manufacturing. It also includes insights from individuals at companies who have already started their AR journey.

Note: All numbers in this document may not be exact due to rounding.

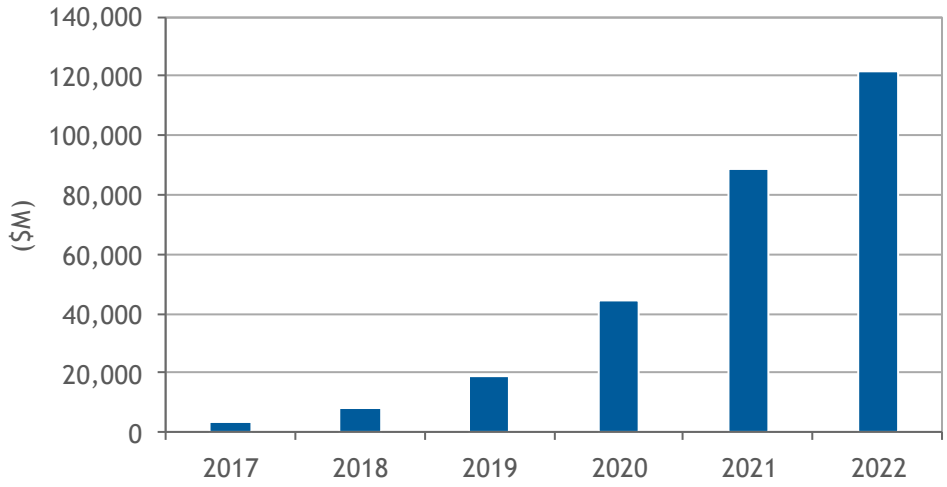
SITUATION OVERVIEW

Often when a new technology arrives, it can take years for the true "killer app" to appear that transforms a technology from something interesting to something truly game changing. Augmented reality is not one of those technologies, as it became immediately obvious that AR would have a profound impact on any organization that employs people focused on service-related tasks, knowledge transfer, sales and marketing, and manufacturing.

In the span of just a few years, forward-thinking companies began working with AR software and hardware pioneers to begin mapping out ways to apply this new technology within their organizations. By 2017, this nascent industry was already driving enterprise spend of more than $3.6 billion on AR software, hardware, and services, according to IDC's April 2018 Worldwide Augmented and Virtual Reality Spending Guide. That number will grow to more than $8 billion in 2018 and will more than double to $19.2 billion in 2019 (see Figure 1).

FIGURE 1

Worldwide Enterprise Augmented Reality Software, Services, and Hardware Spending, 2017–2022



Note: Data excludes consumer spending.

Source: IDC, May 2018

Big numbers to be sure, but how does this relate to an average enterprise that's more focused on serving its customers and fighting off its competition than on IT industry spending? Here's a more down-to-earth number: In a recent U.S. survey of IT and business executives, a whopping 77% of respondents said their company was already testing AR. About 36% said they were in the early stages of testing, 15% were in the pilot stage, 17% were moving from pilots to early deployments, and about 9% were in late-stage deployments. In other words, if your company operates within an industry that has key competitive metrics that rely on services, knowledge transfer and training, sales and marketing, or manufacturing, and you're not looking closely at AR, you're already falling behind.

One of the primary reasons AR has taken off in so many organizations is because many organizations already have some of the key hardware and software components on hand. Many of the first enterprise-focused AR experiences have utilized existing hardware such as smartphones and tablets. Similarly, many companies have found it possible to leverage existing stores of 3D content to drive their early AR experiences. Assets such as CAD-based product drawings and digital instruction manuals pulled into enterprise-grade AR software have made it possible for organizations to stand up AR experiences that are driving positive real-world outcomes.

So what are the primary ways companies are looking at AR to make them more competitive? We asked respondents to rank the top 3 reasons their company is interested in AR in 2018, and then we asked them to list what they expect those reasons to be a year from now. The results were quite interesting, with increased efficiency, increased safety, and improved knowledge transfer among employees as the top 3 responses for 2018. Top 3 responses that showed an increase in interest from 2018 to 2019 included enabling hands-free work, improving client-facing interactions, and driving better remote access processes (see Figure 2).

FIGURE 2

Top 3 Reasons for Interest in AR: Today Versus Next Year

n = 300

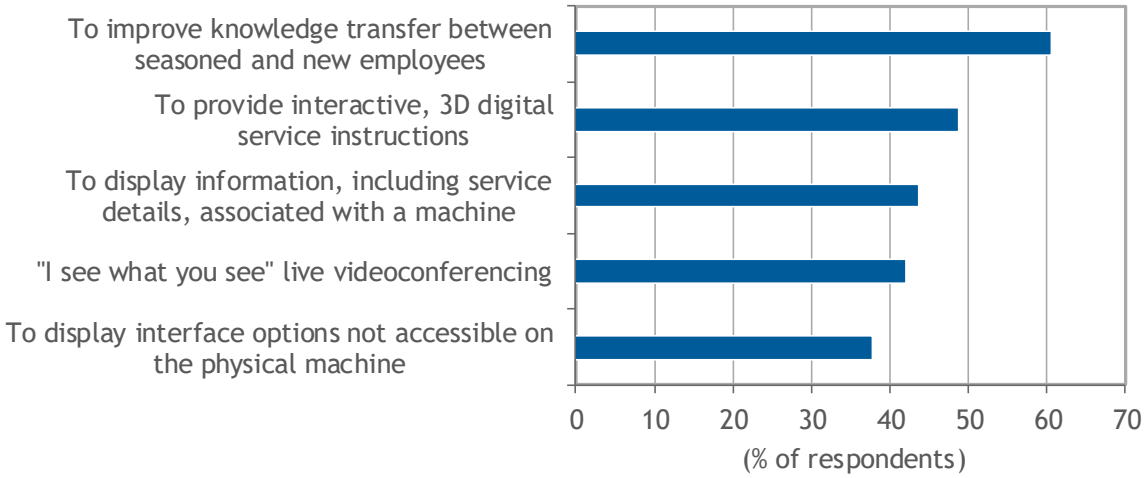
Source: PTC's *AR Use Case Survey,* 2018

Services Use Case

IDC has identified service industries as well as industries with service components as among the first to embrace AR. In other words, if your company provides services to other companies or part of your business model includes servicing machines you sell to customers, then you should be paying close attention to this industrywide evolution. When IDC asked respondents what the top service-based AR use cases were today, the top selections included knowledge transfer between seasoned and new employees, 3D digital service instructions, and the display of digital information – including service details – associated with a machine (see Figure 3).

FIGURE 3

Key Service-Based AR Use Cases Today



n = 119

Source: PTC's *AR Use Case Survey,* 2018

Real-world service-based AR use cases are growing exponentially, and IDC interviewed executives at several companies utilizing the technology for this use case. One IT professional, tasked with keeping machines running in the difficult environment of a paper mill, described how his company is using the technology to help personnel service machines by overlaying a digital view onto the real-world machine they are looking to service. He said, "If they have to replace a motor or a pulley or belts or a motor controller, they can augment the machine. They can look at the actual sequencing instructions of powering down the machine, removing the bolts, taking off the equipment, replacing the parts with new ones, and powering it up." Best of all, because the company already had detailed CAD data on most of its machines, transforming that 3D information into something useable for AR was a straightforward process. He added, "We turned that 3D CAD data into a digital twin, which matches the real-world product exactly."

Often, when an organization introduces new technology to an existing workforce, there can be some friction as most people don't like change. But rolling AR out to service personnel has gone remarkably well, according to survey respondents. An amazing 78% of respondents said that service personnel responded positively to the introduction of AR technologies. Equally important, respondents said that customers receiving service from personnel using AR have also expressed a high level of satisfaction.

In addition to the real-world benefits of AR for service use cases, there is also the simple wow factor that is often the result of a well-executed AR experience.

Smart people are drawn to this technology, and in services industries that are struggling to bring new talent into the workforce as many experts head toward retirement age, we can't overlook the importance of this technology. People are more interested in working for companies that have an eye on future technologies, and AR can be a key recruiting tool for this reason.

Of course, strongly positive results are great, but are these new service-based AR experiences driving measurable return on investment (ROI)? An impressive 62% of respondents say it is. What are the primary ways it's doing so? About 65% said it's through better knowledge transfer among employees, about 60% said it's because employees are more efficient once onsite, 50% said it is due to improved first-time fix rates, and 24% pointed to fewer total truck rolls.

And once AR takes hold inside a company, smart people quickly begin to figure out that it has many applications. Returning to our paper mill IT executive: "So the service stuff is kind of obvious in terms of what you can do, and I think many will try it out, and there will be some return or some sort of value in that for them. But the real trick is to get them to think about how they can improve their whole production," he said. "To reduce their waste or improve their runtime or improve their product quality. Any one of these things gives them a sort of a cash return with the technology, and if they can get that, I think that's a real success."

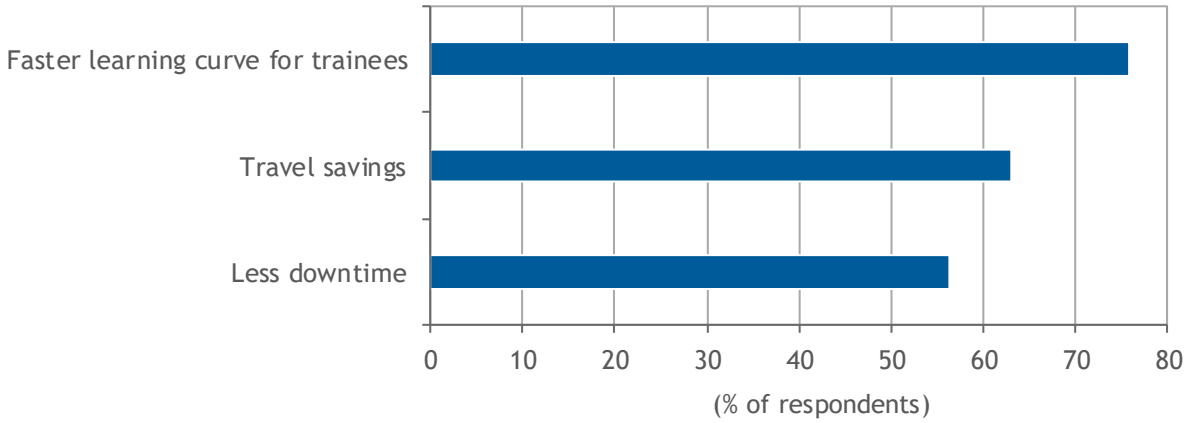
Training and Knowledge Transfer Use Case

From training new workers in a classroom setting to managing knowledge transfer from seasoned experts to young professionals in on-the-job settings, AR has a clear role to play. The beauty of using AR for training is that it offers trainees an opportunity to move beyond paper manuals and watching videos to interacting with the tools and machines they'll use on the job. The value of placing employees in a work setting where they can learn the nuances of a job versus just understanding the task at hand in broad strokes is hard to overstate. Among the many training use cases companies are utilizing today, training classes without travel was the top reason for using AR (66%), followed by video capture for later training playback (52%), and access to service manuals and instructions (50%), and videoconferencing (50%).

When we asked respondents about whether employees had embraced AR for training, nearly half said that was the case inside their business. Meanwhile, another 38% had mixed reaction, with more employees embracing than resisting, and the percentage of outright resistors was quite low at 11%. Equally important, 51% of respondents said that their company had already seen a measurable return on their investment when it came to using AR for employee training and knowledge transfer. While training without travel was the key use case among respondents, the key cost saving came from the fact that this technology drives faster learning curves for trainees (see Figure 4).

FIGURE 4

Key Areas of Savings Derived from AR Training



n = 149

Source: PTC's *AR Use Case Survey,* 2018

Sales and Marketing Use Case

When most people think about using AR in their company, they tend to think about the technology for internal use cases, but there are customer-facing opportunities to use it as well. One of the key use cases is in sales and marketing. Smart companies are realizing that they can use AR experiences to both train their own employees and enable easier sales of high-dollar equipment that is too big or too costly for sales to take with them on a sales call.

An IT executive within a manufacturing company that IDC interviewed noted that his company is using AR to help drive sales by moving from paper catalogs to 3D assets served up in AR via a tablet such as the Apple iPad: "In the old days, you might have a picture of your product, but with AR you can really visualize the product. You can travel light and still have access to different 3D models of your products. It's great at trade shows because it can help to showcase some big items that you can't bring physically or that are too big to show in an exhibition hall."

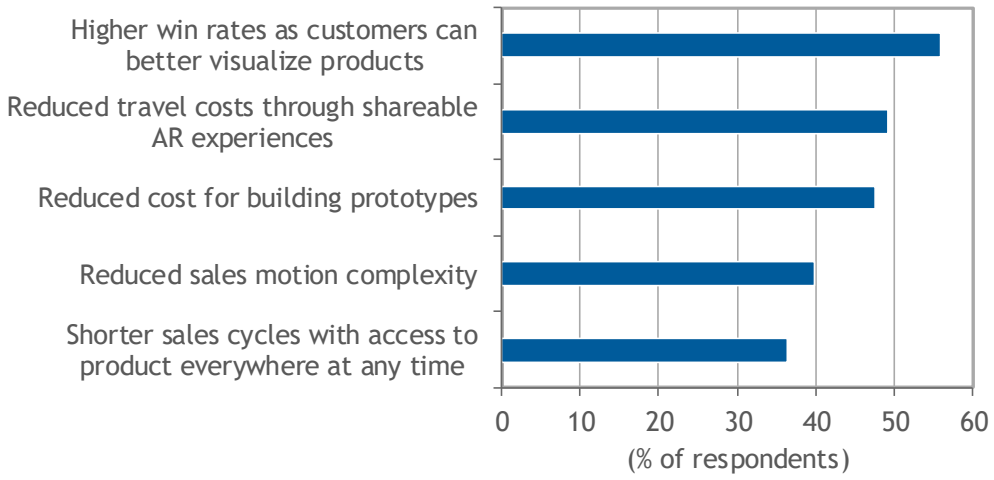
When we asked survey respondents about the primary ways they are using AR for sales, about 68% said they were using AR for sales personnel training, another 60% said it was for customer-facing AR experiences, and nearly 52% said they were using it for videoconferencing. When we asked them to drill down on the key ways sales is using AR for customer-facing experiences, about 62% of respondents said it was for product demonstrations without transporting the product. The second most popular use case was the ability to place a digital version of the product into the customer's environment (59%). Other key use cases included virtual customization of the product and product instruction manuals.

Our IT executive notes, "It can really help to stimulate sales … if you go to an exhibition, it's always important to have an eye-catcher. With AR, people are interested, and they stop to look when you showcase something using the latest technology. It's more stimulating than just having a pile of printouts lying on your desk."

As with other use cases, the instance of employee acceptance around the use of AR for sales training was high with well over half of respondents outright embracing it, and another quarter had mixed reaction, with a higher percentage embracing versus resisting. This is logical when you consider the fact that good salespeople will gravitate to the best tools that help them sell, and AR is shaping up to be one of these tools. Just as important is an amazing 65% of respondents said that they'd seen a clear return on investment when it comes to AR for sales. When we asked respondents what areas were driving these savings, more than half said it was due to higher win rates as customers can better visualize products. The second area was reduced travel cost, followed by reduced prototyping costs (see Figure 5).

FIGURE 5

Primary Cost Savings Using AR for Sales and Marketing



n = 118

Source: PTC's *AR Use Case Survey,* 2018

Manufacturing Use Case

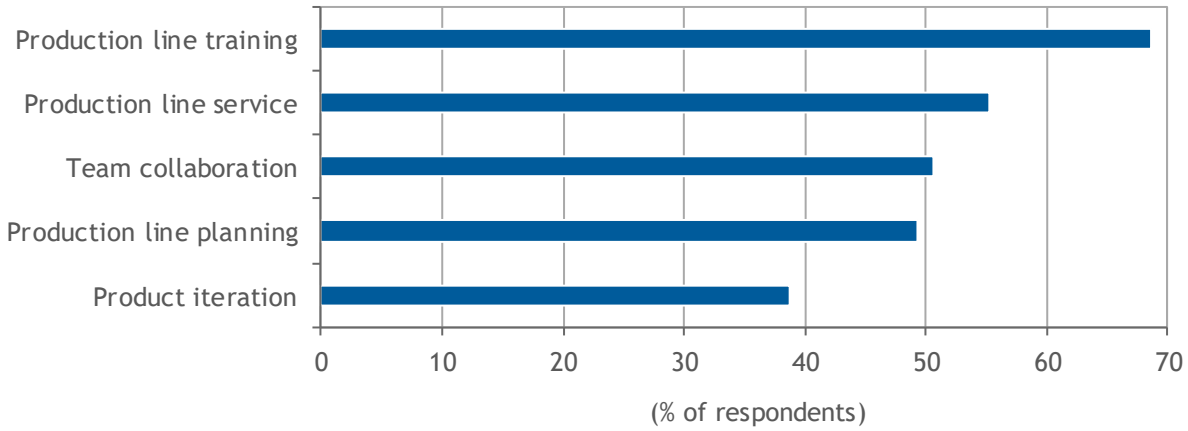
The final area where we see a strong use case for AR is in manufacturing, a vertical that was among the first to embrace this new technology. And it's easy to see why: In many cases, this is an industry that is still driven by processes managed on paper. The opportunities here are immense, and forward-thinking companies aren't waiting for AR technology to be perfect, they're moving to adopt it now. As with other verticals, the key use cases for AR in manufacturing start with training and service, but AR also plays a role in team collaboration, product line planning, and product iteration (see Figure 6).

It's also worth noting that in our survey, the response to AR in manufacturing garnered the highest positive response of all, with a rather amazing 82% of respondents noting a positive response, zero negative responses, and just 11% calling it a mixed response, leaning toward positive. That's reflective of a technology that's making a real difference in people's work lives.

Equally notable was the strong response to our question about a return on investment. More than 76% of respondents said their company was already measuring real ROI for this use case. What's driving AR? At the top of the list was increased manufacturing efficiency (70%), followed by the ability to speed the time between training and operations (60%). Other key metrics included avoiding manufacturing mistakes (42%) and decreased downtime (39%). As you can see, AR in manufacturing isn't a future technology, its one that's here right now.

FIGURE 6

Primary Use Cases for AR in Manufacturing



n = 67

Source: PTC's *AR Use Case Survey,* 2018

PTC's Augmented Reality Solutions

IDC's survey combined with interviews with executives at companies using AR technologies paints a compelling picture for a wide range of use cases in a large number of enterprise companies. But the fact is that most companies are just getting started with AR, and most have few experts on staff. That's where partnering with experts is key, and one of the pioneering experts in the field is PTC. Well known for its CAD and Internet of Things (IoT) solutions, PTC has forged a strong position in AR, thanks to its Vuforia Engine SDK, Vuforia Studio application, and new Vuforia Chalk remote assistance app. Each solution plays a critical role in enabling the previously outlined use cases:

- **Vuforia Engine SDK** is a leading AR development platform geared toward enabling the creation of apps that utilize computer vision to drive an AR experience. PTC made it possible for iOS and Android developers to bring AR to mobile phones and tablets long before Apple introduced ARKit or Google rolled out ARCore, and today, the Vuforia Engine leverages these new technologies to drive even better experiences. And the platform is not limited to mobile devices; it also works on next-generation hardware such as Microsoft HoloLens.
- **Vuforia Studio** enables the creation of enterprise-focused AR experiences through a simple drag-and-drop interface. Companies can leverage their existing 3D assets to create scalable service applications, training-focused experiences, virtual sales and marketing demonstrations, and even manufacturing workflow sequences using Vuforia Studio. And because this is PTC, you can easily link these experiences to your IoT and business systems data.

- **Vuforia Chalk** is PTC's innovative remote assistance app that provides a simple, straightforward way of bringing "see what I see" videoconferencing capabilities to employees equipped with smartphones and tablets. Using Vuforia Chalk, both experts and technicians can accurately mark up live views to indicate details or guide multistep solutions. Annotations remain anchored to the objects or surfaces where they are drawn.

CHALLENGES/OPPORTUNITIES

We've painted a very positive picture of AR and its implantation across a wide range of enterprise use cases. Of course, new technologies always bring with them a series of challenges, and AR is no different. One of the key challenges here is that AR represents some new ideas about the basic ways many companies will operate going forward. New ideas and new technology are often met with strong opposition within an organization, especially by people with a vested interest in keeping things the way they are. It is also important to realize that AR must represent a long-term investment for a company. It's not expensive to get an AR initiative started; however, to make AR work well and to drive long-term return on investment, a company must consider not just the initial apps and hardware but how AR experiences will drive fundamental digital transformation within an organization. Linking AR to the IoT will be a critical piece of the puzzle.

A well-conceived plan around AR leads to a wide range of stellar opportunities. As previously noted, the early opportunities lie within the services, training, sales and marketing, and manufacturing areas of your business. But AR can enable a wide-ranging evolution of business processes, will drive productivity across the enterprise, and will – over time – drive substantial cost savings. The trick on that last piece can often be figuring out how to measure those savings when legacy tools no longer do the trick. Of course, within these opportunities lie some risks as the companies that get there first will undoubtedly suffer some setbacks along the way. But the fact is that within many industries, being a fast follower in AR won't be good enough – to win, you will have to lead.

CONCLUSION

Augmented reality isn't some pie-in-the-sky technology that's coming someday soon. It's here now, and it's driving real-world use cases that will have industry-shaking ramifications in the very near future. A large percentage of companies have already recognized this technology and are moving fast to embrace this revolutionary technology. If your company has a focus in any of the previously noted key areas – from services to training to sales and marketing to manufacturing – it is time to get started. Otherwise, you will soon find yourself running fast to catch up with your competition.

About IDC

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