



CAREAR



Enterprise AR: Benefits & Barriers

An Industry Briefing from CareAR

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Executive Summary

One of augmented reality's (AR) proposed beneficiaries is the enterprise. That can take many forms including data visualization in corporate, industrial or service-based contexts.

The idea is that AR's line-of-sight visualization can guide field workers, service technicians and onsite customers – thus upskilling them by augmenting their intelligence. Compared to the “mental mapping” they otherwise do with 2D instructions or instructive voice calls, line-of-sight support makes them more productive and provides instant access to expertise.

This plays out in a few ways including deflecting dispatches of onsite visits, reduced resolution times, speed, effectiveness, error reduction and safety. These micro efficiencies can add up to worthwhile bottom-line impact in large-scale operations.

Macro benefits meanwhile include boosting customer satisfaction, margins, skills gap resolution and knowledge transfer; while lowering employee strain and turnover. Altogether, the result is improved outcomes and optimizing institutional knowledge.

All of these benefits are present in “normal” times but take on new meaning in the Covid-era. Given social distancing requirements and best-practices, AR's remote-support capabilities are compelled further. This will not only boost the technology's near-term traction

but its long-term growth as adoption sustains into a post-Covid world.

In other words, enterprises compelled to adopt AR out of necessity may find that they like it... and may never return to previous non-AR methods and workflows.

But despite all of these enterprise AR benefits, challenges still await. Practical and logistical barriers include organizational inertia, politics, change management and fear of new technology among key stakeholders.

The biggest symptom of these stumbling blocks is the dreaded “pilot purgatory.” As its name suggests, this is when AR is adopted at the pilot stage but then doesn't proceed to full implementation.

What can be done to alleviate these challenges and give AR a chance to succeed in enterprise adoption? We explore some of these tactics in this report. This entails everything from product integration to internal communications. The name of the game is to set up enterprise AR to succeed.

Visualizing ROI

Augmented reality (AR) continues to be touted as the next big computing platform that will impact our lives and work. And there are many applications and use cases it applies to – everything from gaming to commerce to enterprise productivity.

The latter is where AR will show the most tangible benefits and solve real pain points. The biggest beneficiaries will be enterprises

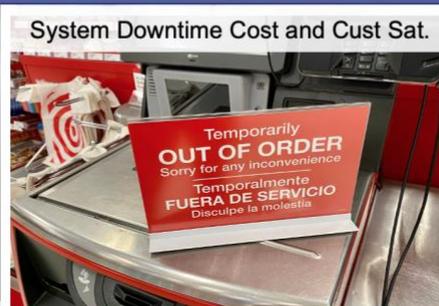
that need to build, support, and fix things within and outside their facilities. That’s everything from remote visual support for troubleshooting, to hands-free expert guidance to interactive instructions.

More than that high-level logic, AR is proving out through quantifiable performance metrics in these and other enterprise contexts. Let’s dive in deeper to explore how...

SERVICE MANAGEMENT CHALLENGES



Failure of First Time Fixes



System Downtime Cost and Cust Sat.



Skills Gap and Knowledge Transfer



Ability to Work and Support Remotely



Audit Trail and Integration

Part I: Benefits

Many enterprise AR benefits have been validated through real enterprise deployments. But before diving into deeper strategic analysis of all these moving parts, let's level set on

some of the fundamentals of AR in enterprise settings. What are the formats being deployed today? And what are the benefits they're demonstrating?

Enterprise AR Flavors

Enterprise AR takes several forms. There are current and nearer-term deployments that include desktop, mobile, and smart glasses such as Google Glass Enterprise Edition. Headworn AR, is where visualization software is installed such as Microsoft's HoloLens.

Beyond AR's vessels, there are also varied functions. For example remote assistance (a.k.a. "see what I see") lets subject matter experts remotely view (via camera) and guide field workers. The latter can occur through visual and voice instructions and/or spatially-accurate line-of-site annotation.

Conversely, pre-authored AR involves programmed animation of self-guided sequences that can overlay equipment or parts with line-of-sight instructions for maintenance or assembly. These sequences are usually activated through user inputs and visual markers – the latter also helps to spatially anchor the animations.

Lying between these two methods is the growing practice of recording content from AR

service sessions, including images, video and audio. This helps to ensure compliance as well as capture best practices. The latter addresses the skills gap and "brain drain."

The way these processes work is to capture and optimally deploy a given company's institutional knowledge for the purposes of training users and informing future scenarios. This is particularly valuable at a time when job turnover is high and baby boomers retire at a rapid pace (more on this principle in a bit).



Enterprise AR Benefits

With the above enterprise AR definitions established, the next question is what are specific benefits?

Advantages for the above AR formats are varied, meaning broad applicability to functions

such as troubleshooting, maintenance, repair, and assembly. Advantages map to micro-benefits such as unit economics of production; as well as macro-benefits, such as organizational evolution and knowledge retention, as noted. Here are a few examples.



Micro-Benefits

Time to Task Completion: Remote expert guidance and line-of-sight overlays can speed up productivity up to 90 percent by reducing the skills gap and replacing the process of “mental mapping.”

Deflecting Dispatches: Converting on-site visits to virtual visits can reduce cost, downtime, and improve customer satisfaction. On average, the potential exists to reduce site visits (a.k.a. truck rolls) by 50 percent.

Error Reduction: Just as line-of-site AR instructions speed up productivity, they can lessen costly mistakes. By reducing human error from mental mapping, AR can have real bottom-line impact.



Macro-Benefits

Customer Satisfaction: AR’s ability to resolve the skills gap can reduce resolution times, which leads to lower down time and greater satisfaction. Reduced errors can also improve workplace safety, performance and outcomes.

Longevity: The most experienced workers often do the most strenuous work (think: field maintenance). Remote assistance positions them as remote experts, thus increasing their longevity.

Institutional Knowledge: By increasing longevity, organizations collectively retain knowledge. Recorded AR sessions can meanwhile capture that knowledge to train new workers.

Drilling Down: Institutional Knowledge

To go a bit deeper on just one of the above benefits, how can AR help companies boost and retain institutional knowledge? It can accomplish this on a few levels including delaying retirement for valued experts, as well as knowledge transfer to novice workers.

As mentioned above, the timing for this is ripe as macro factors create greater levels of turnover and institutional knowledge loss than ever before. Combine these factors and you get a growing challenge to retain knowledge or transfer it to younger workers who cycle in. It becomes an expensive problem.

AR can combat this challenge in a few ways. First, it can turn seasoned employees into remote AR experts. Rather than retiring with decades of knowledge, they can transition into more comfortable roles such as call center positions to centrally monitor or advise customers or less-experienced workers.

Meanwhile, as introduced above, recorded sessions can aid this process of institutional knowledge transfer. By providing AR enabled mobile or smart glass devices to top-performing workers (or doing so during the above remote-assist sessions), sequences can be recorded to capture and reinforce best practices.

This is knowledge transfer in action: Less experienced field technicians work closely with season experienced personnel. Meanwhile, real-time training and guidance are provided. Content is also captured via recording, which can be used for future training or process enhancements.

AR also enables microlearning. The idea is that instead of the traditional method of educating someone for months or years on a given topic or skill (most of which they won't use), deliver the right knowledge at the exact moment they need it. It's a more efficient form of learning.



Part II: Barriers

Enterprise AR is experiencing a rapid climb, This mostly results from its enormous potential and business case. The enterprise AR ROI story is maturing and can show-next level operational efficiencies.

But despite those advantages, there is still organizational resistance. Just as with any new technology, there is fear of the unknown and potential job losses that could result from embracing automation. This resistance can often come from front-line workers within a given organization. So the trick is to explain that it's helpful to them, not harmful.

Adoption challenges are multi-dimensional but share this common trait of organizational resistance. That can happen on a system-wide basis or through inter-departmental friction as C-level change agents champion AR while

ground-level stakeholders (or sometimes the IT department) resist.

This all leads to enterprise AR's biggest stumbling block: "pilot purgatory." As its name suggests, this is when AR is adopted at the pilot stage, but never progresses to full deployment. It happens when AR fails to gain traction due to suboptimal planning, ROI realization, and communication.

Fortunately, these challenges can be studied in a structured way. They map to three key organizational areas that ARtillery Intelligence has identified: *People, Product, and Process*. They're the root of AR's problems and the source of its solutions.

Let's examine them one by one, including their challenges and solutions...



Optimizing People

When devising ways to get beyond organizational hurdles, it's important to customize value propositions to specific needs. And with that thinking, it's important to remember that organizations are made up of people. Their technology adoption likewise happens through people – albeit several people.

For example, metrics about AR's operational efficiencies are not only misaligned with field workers' goals but can be counterproductive. If a new tool can do a job 2x faster, does that mean a worker has a 50 percent chance of keeping his or her job? This is the message that front-line workers can infer.

The takeaway is that messaging should be addressed to individuals in order to boost AR

adoption. But who are the organizational personas that AR touches? Identifying them and their AR adaptiveness is the first step to successful deployment.



For example:

Business leaders always look for operational efficiencies and bottom-line impact so AR's ROI metrics naturally resonate.

Stakeholders within enterprise innovation hubs are tasked with bringing in new technology to improve operations, so AR likewise resonates with them.

Business unit managers oversee front-line or field workers. They are open to AR if it improves their departmental productivity and output.

IT professionals are risk-averse, as their job mandates. They don't want to be responsible for data breaches and aren't motivated to bring in new technology.

Field and Front-Line Workers are AR's end-users and biggest resisters, stemming from fear of technology, job security and other factors. If positioned properly, they can also be the biggest beneficiaries.

Agents and experts are the main users of remote AR solutions. They realize the potential and immediate benefits of utilizing AR to provide better assistance and guidance to customers and field workers. They can become your best advocates.

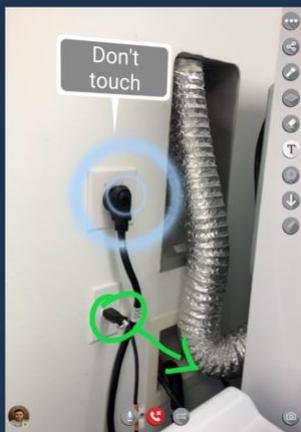
Optimizing Product

Beyond the people that represent barriers to AR success, there's also the product itself. Its success hinges on a few main factors that should be considered when in development and strategic planning. They include product/market fit as well as a deliberate and targeted user experience.

Enterprise technology adoption is a microcosm of open market dynamics. So just as "product/market fit" is a key success factor in consumer technology, it can make or break successful enterprise integrations. And the name of the game is deploying AR where it has impact.

This thinking is grounded in the fact that AR is not a "silver bullet": it excels in some areas more than others. For example, AR's visualization advantages can be most effective in jobs that require guidance for complex and non-repetitive tasks such as large-equipment maintenance.

Conversely, it's less effective in jobs that involve repetitive simple tasks such as assembly line work. With this type of work, front-line workers are already well-equipped by "muscle memory." Therefore, AR products deployed in these settings will fail to add any value or gain traction.



UX is Key

There are often sliding scales of simplicity versus complexity in user interfaces for any product. Not customizing the right "sweet spot" for the application and its intended users will cause any enterprise AR product to fail. For example, industrial front-line workers often have a need for simplicity.

"Enterprise workers – the people who are the main users of AR – require solutions to be intuitive and automated with very little patience for instruction manuals," said **Sam Waicberg, CEO of CareAR**. "Clean, easy-to-use tools with workflows for driving adoption can automate tasks and remove many steps in the process. This will drive adoption at scale, and increase buy-in from field workers".

Speaking of simplicity, successful AR deployments can happen in stages. Given front-line workers' tech fears or lack of comfort, slow rollouts can be more prudent. This lesson can apply to the user interface or – more broadly speaking – the type of AR that is chosen and deployed.

For example, among the AR formats outlined earlier, "remote assistance" is less tech-involved because it still incorporates a live human guide. This can sometimes acclimate front-line workers before graduating to more technology-centric forms of AR such as pre-authored instructions.

Optimizing Process

Flowing directly from product success factors are procedural ones. Like the previous section we'll highlight the biggest factors that can impact AR adoption. They include product planning & prototyping.

In order to achieve the above “product/market fit,” true department-level pain points must be understood. That doesn't happen when AR champions or solutions developers within an organization fail to get the direct input and perspectives of front-line workers and business unit managers.

Innovation and product planning often happen in a top-down manner from innovation leaders that work with AR vendors. But without the direct involvement of departmental entities, they're “flying blind,” in their quest to solve real problems. The result is a mismatch in product fit.

Conversely, bottom-up product planning breeds success by involving front-line workers. That not only pinpoints the right product features that will solve real operational issues, but it gives front-line workers a sense of ownership and investment in the technology. This can vastly boost their interest.



Device Continuum

Another tactic to lessen resistance is to start with proven hardware when possible. If the use case aligns, consider deploying AR through smartphones and tablets before headsets. There can be less resistance from risk-averse IT and comfort-driven workers when trusted hardware is the vessel.

And to reiterate a related point made earlier, simpler integrations can exist at different points of the AR software spectrum. Remote assistance involves less automation and data transfer which can alleviate data security concerns from IT, as well as technology fears from front-line workers. These will be keys to enterprise AR success.



The Covid Era

In closing, it's important to note that all of the concepts in this report are amplified by the current state of the world. Successfully deploying AR in enterprise settings has even higher stakes considering the benefits it can bring during the Covid era... and a post-Covid world

AR's remote-support capabilities examined in this report are well aligned with social-distancing requirements and best-practices. This means its value is accelerated in the current environment. More importantly, near-

term Covid-era traction will transition to long-term post-Covid adoption.

In other words, enterprises compelled to adopt AR out of necessity during the Covid era may develop new habits that are positive and permanent. By being forced to discover AR's advantages, many of these enterprises may never return to previous non-AR methods and workflows.

The lesson is to be ahead of that curve and start gaining competency and competitive edge in enterprise AR today.



Key Takeaways

- AR's benefits are being demonstrated throughout enterprises, especially industrial enterprises.
- AR line-of-sight visualization breeds operational efficiency in areas like assembly and maintenance.
- Primary formats are remote AR assistance and automated pre-authored sequences.
- Recorded AR sessions are evolving to better capture and distribute institutional knowledge.
- Advantages and ROI gains result from micro and macro factors.
- Micro-benefits include production output and deflected dispatch (e.g., speed, accuracy and safety).
- Example: tasks can be completed up to 99% faster, and reduce truck rolls 50% on average.
- Macro-benefits include profitability gains, job strain reduction and institutional knowledge retention.
- Example: AR helps to bridge the skills gap, while recorded sequences distribute knowledge optimally.
- But it's not all good news: several organizational hurdles stand in the way of the above benefits.
- "Pilot purgatory" has emerged as industrial AR's biggest pain point, diminishing real deployment.
- Failure to reach deployment squanders opportunity and investment in AR implementation.
- Causes are mostly organizational and cultural, such as natural resistance to change.
- Pitfalls originate within three main areas that ARtillery has identified as people, product & process.
- These are where enterprise AR stumbling blocks happen and where solutions should focus.
- Optimizing people involves customizing AR's value proposition to individual stakeholders
- Organizations are made up of people who adopt products and processes based on selfish needs.
- AR's benefits to front-line workers shouldn't be communicated based on things like unit-economics.
- Marketing best practices should be used to target messaging internally, using consistent language.
- Optimizing product involves the classic principles of product/market fit
- Features should address real pain points such as reducing friction or worker strain.
- UX is critical in terms of pinpointing the right balance of features, functionality, and complexity.
- Example: Industrial front-line workers require simple and singular-purpose interfaces.
- Optimizing process involves smart deployment and communications in organizational rollouts.
- Product design is often top-down but should be bottom-up, including department-level input.
- Front-line worker input breeds comfort and ownership in the technology, and better product fit.
- The importance of following all these tactics is to set AR investments up to succeed.
- AR investments can be protected rather than lost, if deployed intelligently.
- AR's alignment with social distancing also makes it a natural fit for Covid-era enterprise needs.
- Enterprises that adopt AR during this period will discover its advantages and be permanent converts.
- Now is the time to gain competency and competitive edge with this emerging technology.

About CareAR



CareAR is the augmented reality support platform for the modern service management-enabled enterprise. The company makes expertise accessible instantly for customers, employees, and field workers through live visual AR interactions, instructions, and insights as part of a seamless service management digital workflow. CareAR uniquely helps bridge the skills gap and accelerate knowledge transfer through augmenting intelligence, while providing greater efficiencies, customer outcomes, and safety.

Learn more [here](#).

About AR Insider *Edge*



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A graphic of three overlapping colored rectangles (yellow, blue, pink) is positioned above the word "CAREAR".

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