Practical Guidance
for Industrial Augmented Reality

Valuable Insights on Getting Started with AR from Leading Experts with Real-World Experience

"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."

- Tom Mainelli, IDC.

Read "[How AR Drives Real-World Gains in Service, Training, Sales & Marketing, and Manufacturing](#)"

Augmented reality allows us to learn faster, retain more, and to work more efficiently. Many organizations have already implemented augmented reality solutions, and are experiencing the tangible results of this transformative technology.

Others are taking their first steps towards AR digital transformation, and are seeking to understand how to implement AR in a way that will make a lasting business impact. To address that uncertainty, we've asked ten AR industry experts to share their valuable insights, framed around a single question:

"If there was one piece of advice you would offer someone starting out on an AR journey for their business, what would it be?"

These individuals represent a wide array of project roles, from strategy to execution, and their backgrounds include IT, software development, project management, and research analyst firms. Their common thread is a depth of expertise, and a commitment to building AR initiatives that drive real business change.

THE INDUSTRY EXPERT

> *"If your AR projects are well considered, and they help users achieve their tasks more effectively, they'll naturally be embraced."*

AR success depends as much on effective planning and collaboration, as it does the technology. AR projects should be treated as "change programs" with clear steps. Start by involving users and stakeholders throughout the process. Once you've identified tangible problems, you can develop simple but effective AR solutions to address them. At this stage of planning, I also recommend considering safety and security implications. This will help when moving from prototypes to a fully deployed solution. Before you get building, measure your current state; produce metrics *before* the project, so you can build an ROI case. This is often overlooked, but can be crucial to getting future budget assigned.

If your AR projects are well considered, and they help users achieve their tasks more effectively, they'll naturally be embraced. Finally, AR offers easy wins and *easily demonstrated* wins; communicate success with stakeholders, showcase the benefits and tout your ROI.

Mark Sage
Executive Director, AR for Enterprise Alliance (AREA)

Mark is the Executive Director of the Augmented Reality for Enterprise Alliance (AREA). The AREA is the only global non-profit, member-based organization dedicated to widespread adoption of interoperable AR-enabled enterprise systems. With a focus on creating value and ROI for its members, Mark's goal is to develop a robust and active ecosystem for AR within the enterprise.

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THE RESEARCH EXPERT

"

The best AR tools are built with a focus on the end user; these tools emphasize simplified development, and reduce the need for programmers"

Tom Paquin
Research Analyst,
Aberdeen

Tom is Principal Analyst advising business leaders on technology strategy in Field Service, BPM, and SalesOps covering advancements in emerging technologies including AR, IoT, AI, and Predictive Analytics.

To maximize the power of augmented reality, organizations need to bring actual practitioners in at every stage of the implementation process. This starts with the decision to invest in an AR solution, but is just as important for implementation, quality control, process development, and evaluation.

The best AR tools are built with a focus on the end user; these tools emphasize simplified development and reduce the need for programmers. These 'low-code' solutions ensure that the AR experiences are being created by people with the right business knowledge and experience. This is a shift away from tools that are overly dependent on a technical programming background. This new generation of AR allows subject matter experts to use their understanding of workflows and technical processes to author the most valuable and relevant augmented reality tools possible.

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THE
TRAINING AND DEVELOPMENT EXPERT

"
If you tie AR experiences directly to real business challenges, you'll never have to worry about getting buy-in from other teams."

Lance Cummins-Brown
Global Learning and Development Director, AGCO Grain and Protein

Lance is an experienced global learning and development thought leader with a demonstrated history of using cutting-edge technology to develop the skills of students, employees, agribusiness leaders and producers, globally.

My advice for succeeding in your AR journey would be to start simple and grow. Find something simple that will deliver real business value and impact. Start with a basic product that only has a few parts. Add some animations, and make that first AR experience really solid. Resist the natural temptation of AR to make it too cool, or with too much wow factor. Avoid the bells and whistles that could overwhelm the team, or confuse your mission.

Just as important as starting small, commit to solve an actual business problem. Trust your team to identify challenges like "we can't get this installed right because it's hard to train people." Build a simple, no-frills AR solution that effectively solves a real-world challenge. All of a sudden, you'll find product managers will be clamoring for these experiences across all products. If you tie AR experiences directly to real business challenges, you'll never have to worry about getting buy-in from other teams.

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THE MANUFACTURING EXPERT

> *"It doesn't require you to change or reconfigure any of your other technology, and it leverages the models and data you've already created as part of product design."*

Jeremy Mikesell
Engineering Manager, Research, Cannondale

Jeremy is a highly accomplished engineering leader with responsibility for frame design (from conception through to production) for cannondale's road and full suspension mountain bikes – widely regarded as the bike industry's leading innovator with game-changing technologies.

Because AR is so visual and new, we naturally assume it's the result of a huge undertaking. But implementing AR can be much easier than you might think. Good AR applications hook right into your existing library of product models and data, and provide you easy authoring tools to build on top of that foundation. The right tools won't require you to change or reconfigure any of your other technology, and they'll leverage the models and data you've already created as part of product design.

Once you've used AR with your models and data, you will quickly discover potential applications that can help your business. A simple demo to key stakeholders generates a lot of interest, quickly.

AR is not tomorrow's technology. With solutions like Creo Illustrate and Vuforia Studio, the infrastructure is already established; you're literally repurposing digital assets that you already have.

THE SERVICE EXPERT

"Once you're grounded in solving a real challenge—just get started; experiment and don't be afraid to explore what you did wrong and to learn from it."

Innovation relies on a strong understanding of your business and what would help you succeed. You need to balance customer value with staff enablement and process optimization, all at the same time.

Internally, you can develop AR as the "skin" of the digital twins, with the ability to superimpose process and digital twin values in the most visually impactful way: overlaying on the real-world application. Externally, because AR transforms volumes of data and analytics into images or animations that are overlaid on the real world, it can deliver great customer value as a digital twin enabler, as well as an enhanced training and service media.

Either way, start with understanding where and how innovation can deliver value and start small and stay agile, because you want to make sure you're starting in the right direction and that you're involving your team in the change.

Maria Wilson PhD
Global Leader, Data-Driven Advantage,
Howden

Maria leads Howden's Data-Driven Advantage (DDA) product strategy and digital transformation journey, including the digital transformation of customer experience. An innovation advocate, Maria is also an Industry 4.0 and IoT enthusiast with a passion for turning data into valuable insights.

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THE WEARABLES EXPERT

"*Every gain in efficiency and reduction in cost can make an important difference. Devices such as Microsoft HoloLens can help those companies to achieve exactly that.*"

While Mixed Reality (MR) is still at the beginning of a long journey, it is important to start early in order to gain as much experience as possible.

I sometimes get feedback from enterprise customers that it's too early and too expensive to invest in MR. They'd rather wait for devices to become cheaper, smaller, lighter, better, etc... But discussions inevitably end up in identifying areas within their organization where the technology can be used today to produce real benefits over the existing processes.

Companies implementing MR for maintenance, training, production, and design are already seeing ROI and are just now driving additional value. Holographic training guides that overlay 3D work instructions on top of physical machines are introducing efficiency gains of 30-40%.

In a highly competitive landscape, most companies see value in MR. Every gain in efficiency and reduction in cost can make an important difference. Devices such as Microsoft HoloLens can help those companies to achieve exactly that. To get started, I always recommend working with experienced partners in the MR space who can identify the right uses cases and help implement the technology in a fast and convenient way.

Michael Zawrel

Senior Product Manager, Mixed Reality and HoloLens, Microsoft

Michael is the product manager, launch lead and official spokesperson for the HoloLens mixed reality headset in Germany – one of the biggest HoloLens markets in the world. He is a trusted advisor to C-level executives on mixed reality themes and has successfully positioned the device's value to developers, academic and commercial customers.

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THE **TECHNOLOGY EXPERT**

> "*Pragmatically evaluate your AR experience. With AR's huge potential, the challenge can be focusing on the most essential, valuable AR applications.*"

HEAR MIKE'S INSIGHTS ON HOW AR IS DRIVING REAL-WORLD GAINS.

Michael Campbell

EVP, Augmented Reality Products, PTC

Michael is responsible for driving the product and technology strategy of Vuforia; PTC's market-leading solution for the development of augmented reality applications. An expert in IoT and CAD solutions, Michael also serves as an industry advisor to Boston University's Engineering Product Innovation Center (EPIC).

Augmented Reality is fundamentally changing the way that we communicate with one another. When you begin your AR journey, you need to consider what you want to communicate, why you want to communicate it, and how best to communicate it.

To answer these questions, begin with a solid use case where AR uniquely adds real value. Put in the work to identify a use case where value—maybe it's worker speed, efficiency, or safety— can be increased from digital information in the context of their physical world around them.

Embark on AR projects with simplicity in mind, increasing complexity and the resulting value once the fundamentals are mastered. And pragmatically evaluate your AR experience. With AR's huge potential, the challenge can be focusing on the most essential, valuable AR applications. Finally, consider the end-user experience first. Keep it simple; keep it clean; keep it relevant.

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THE AGENCY EXPERT

> *Before your AR wow moment, it's critical to plan how your customers will discover the experience... You should also consider the post-AR moment—that inevitable question, "Cool, but what's next?"*

When designing AR experiences, it's easy zero in on the "wow" factor moments, but it's just as important to consider what comes before and after it. My team loves building the wow moments, but over past few years we've gained appreciation for these seemingly small details that are crucial to success.

Before your AR wow moment, it's critical to plan how your customers will discover the experience. Is it a standalone app or a new feature of an existing app? If there are targets to scan, how do users understand or learn what they should scan? What is the goal of the experience? How would you rank the relative importance of customer education, entertainment, and engagement?

You should also consider the post-AR moment—that inevitable question, "Cool, but what's next?" How will this experience evolve and grow over time? Can your experience refresh content seamlessly, or will users need to update their apps through an app store? How are you planning to keep customers aware, interested, and returning to experience your AR moment over time?

Will Gee
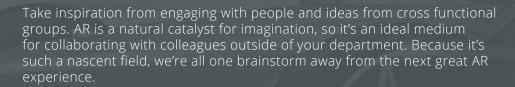Founder & CEO,
Balti Virtual

Will is an expert in video games, real-time rendering and virtual, augmented and mixed reality (VR/AR/XR). He leads an industry-renowned creative studio focused on delivering the highest quality virtual and augmented reality experiences on the latest hardware available.

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THE PRODUCT DESIGN EXPERT

"*Ensure that your AR experience is fun! Make it integral to the use of the product/service so you can interact with AR in a meaningful way.*"

Take inspiration from engaging with people and ideas from cross functional groups. AR is a natural catalyst for imagination, so it's an ideal medium for collaborating with colleagues outside of your department. Because it's such a nascent field, we're all one brainstorm away from the next great AR experience.

Focus on creating connections between platforms and find new ways to benefit the user and enrich their experiences. Most importantly, ensure that your AR experience is fun! Make it integral to the use of the product/service so you can interact with AR in a meaningful way. If you can combine delighting users and empowering them with new features or functions, you'll likely create a natural demand to experience—and reexperience—your AR-enhanced offerings.

Julian Payne
Principal Designer,
Hot Wheels, Mattel Toys

Julian is Principal Designer, Mattel working in the Hot Wheels Advanced Play team. Working on concepting and developing innovation platforms for the 8 year and older child, Julian's toys have won Oppenheim Toy Portfolio gold seal awards for enhancing the lives of children.

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THE DEVELOPMENT EXPERT

> *Mastering usability and better understanding related technologies will do more than just improve experiences; it will help AR developers push this field to its full potential."*

As augmented reality becomes mainstream, AR technology is flooding the market. This growth is driving a need for developers to guide the next era of computing. While out-of-the-box solutions are easing adoption, advanced developers can differentiate themselves from the competition by focusing on details that are often overlooked.

The first differentiator is user experience—AR usability is a new and rapidly evolving field. Today's developers are setting precedence for apps and experiences to come. The second area of differentiation is familiarity of the technology that drives AR. Emerging technology that is complementary to AR, such as computer vision, machine learning, and deep learning, will become increasingly important concepts for developers to understand.

Mastering usability and a deeper understanding related technologies will do more than just improve experiences; it will help AR developers push this field to its full potential.

Vinny Da Silva

Senior Developer Relations, Samsung NEXT

Vinny is passionate about creating AR/VR experiences and has become a globally-respected source of best practices that help the developer community. Prior to his work for leading AR software vendors (including Vuforia and Samsung), Vinny was a consultant working with a diverse set of clients in industries such as medical devices and financial services.

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Conclusion

While these experts are applying their diverse talents and background on a range of different areas in the greater AR eco-system, clear themes emerge from their assessments. These leaders emphasize finding the business case, prioritize substance over style, encourage planning modest pilots, and recommend simple but persuasive trials to gain stakeholder advocates. Successful AR project owners are also engaging expert partners and trusted advisors to support the project and finding hardware and software tools that can match their specific needs.

Ready to begin your AR journey?

Find out more about Vuforia AR by PTC
The Vuforia family of AR products increase efficiency, reduce costs across the value chain, and are closing the skills gap. Discover how Vuforia can digitally transform your organization at www.ptc.com/vuforia.

Try Vuforia Studio
Vuforia Studio enables non-developers to rapidly author and publish their own AR experiences. Start your free, 30-day trial today.

Talk to an AR Expert
Seeking to identify the most practical and impactful applications of AR for your business? Have questions about PTC's market-leading AR technology? Contact a member of the Vuforia team.