PTC

OVERALL LEADER ABIresearch

TOP INNOVATOR ABIresearch

TOP IMPLEMENTER ABIresearch

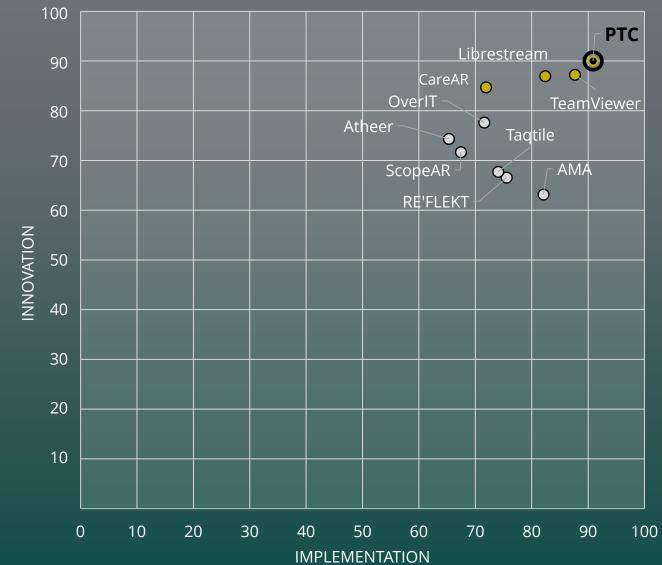**OVERALL: 90.4 | INNOVATION: 90.0 | IMPLEMENTATION: 90.9 | RANK: 1**

PTC
INNOVATION
VERSUS
IMPLEMENTATION
FOCUS

INNOVATION

IMPLEMENTATION

PTC
Librestream
CareAR
OverIT
Atheer
Taqtile
ScopeAR
RE'FLEKT
AMA
TeamViewer

INNOVATION

ptc

TOP INNOVATOR
ABiresearch.

INNOVATION SCORE: 90.0

PTC is a market leader in a few enterprise platform areas and has been recognized as an innovation and implementation leader in these areas in previous competitive assessments, both specific to Augmented Reality and in non-AR portfolio as well. Their strengths in manufacturing—especially as a smart manufacturing platform vendor—are clear. When looking specifically at Augmented Reality platforms, it is important to make a distinction between these existing strengths that are not specific to AR and those that are. That being said, PTC has recognized their incumbent strengths in smart manufacturing and growing strength with Augmented Reality and has been merging the two successfully with their AR product Vuforia growing significantly in capability and footprint.

PTC has been transitioning the company go to market more fully behind Vuforia for a few years. They were earlier than many to identify AR as a growth opportunity and invested accordingly. As a prescient example, PTC bought the Vuforia SDK from Qualcomm in 2015—in November 2021, Qualcomm realized the importance of a powerful AR SDK and acquired Wikitude. PTC's six years of investment in the platform, significant marketing, and whole company alignment around AR puts PTC high on the list for most innovation criteria categories. The time for maturation joined with continued investment in Vuforia lead to full marks in machine vision criteria. Similarly, efforts around SaaS bring full cloud support scores as well. The acquisitions of Onshape and Arena, and their subsequent expansion through the platform, benefit here. Similar to the growth of Vuforia, Onshape is becoming a foundation of more and more PTC portfolio, Vuforia included.

In terms of use case applicability, marks are strongest in guided workflow and verification—dedicated product in Vuforia Expert Capture and Vuforia Instruct show strongly here. Vuforia Chalk as a dedicated remote assistant platform also scores well, although some greater integration between Chalk and other components going forward would strengthen the offering even further.

When it comes to AI and Machine Learning, PTC's capabilities in state detection, alongside it's already mentioned strength with machine vision overall, differentiate. The ability to identify differing points of completion through machine vision, then teaching an ML model to recognize them as verification states, is a great example of growing the Vuforia machine vision capabilities with learning. Some competitors are pushing a step further towards greater prediction and total automation, but PTC's existing product capability are capable here, if not as fully actualized specifically in automation and prediction.

Enabling technologies activity is very strong in robot-related areas, with the company leveraging IoT portfolio along with Vuforia products like Spatial Toolbox for interaction and control. The company has some 5G and edge compute partnerships in place, notably with Ericsson. There is no notable activity in blockchain today outside of some knowledge share and recognition of potential.

IMPLEMENTATION

IMPLEMENTATION SCORE: 90.9

The focus and resources put towards growing Vuforia show up again considerably in implementation criteria. The company receives full points for customers and partnerships. There are over 100 countries showing AR bookings, with a nearly equal split across Americas, Europe, and Asia-Pacific (APAC). There are over 5,000 AR customers spanning verticals—it's difficult to highlight the most impactful or positively representative out of these, but of particular note is increasing traction in medical and pharmaceutical—Merck, Pfizer, JOHNSONN & JOHNSON, GE Healthcare, and Abbott are all active customers. Other notable customers include ABB and Caterpillar in Industrial; BMW and Toyota in Automotive; Lockheed Martin, the U.S. Army and Air Force, and Raytheon in Aerospace and Defense; Ericsson, Samsung, and Huawei in high tech; and PepsiCo, P&G, and Coca Cola in Retail.

Partnerships are equally strong and leading in this assessment; over 700 total partners and over 200 technology partners. A number of notable names in AR are there: Magic Leap, Microsoft, AWS, RealWear, Vodafone, Cisco, Dell, Ericsson, HP Enterprise, Intel, and Nokia. Global Systems Integrators are also represented, with expected names like Accenture, Deloitte, and Capgemini.

Device support is solid as both mobile device sides and computer working environments are supported. For smart glasses, Vuzix, Realwear, HoloLens 2, and Magic Leap 1 are officially supported—Magic Leap 2 will be supported upon release. Dozens of devices are in consideration and evaluation as well. Google Glass is the one notable missing device.

PTC's primary weakness in prior assessments was around pricing, flexibility, and business model layout. This remains the case, however improvements have been made. With the breadth of Vuforia product portfolio—Chalk, Expert Capture, Instruct, Studio, Spatial Toolbox, and Engine—complexity is difficult to avoid. However, all products are on a subscription business model now, which aids in flexibility. All Vuforia product pricing scales based on number of users, except for Engine with scale based on number of apps. SaaS is supported in Chalk, Expert Capture, and Instruct, but not Engine or Studio. Free trials are available for Engine, Studio, and Chalk, but not Expert Capture or Instruct. Pricing is not public.

The efforts in expanding SaaS through the Vuforia product offering, and relatedly a competitive level of third party integration capability, helps to address the flexibility concerns. Choice of first or third party integrations for significant platforms—e.g., Computer-Aided Design (CAD) and IoT—strengthens integration potential and time to value. This leads to full scores in content creation and optimization tools, with low-code/no code options. Integration potential remains incredible within the PTC portfolio and has improved for third party solution integration as well.

Concluding Remarks

While the gap is smaller than in past assessments between PTC and other leading enterprise AR players, the company remains at the top. Vuforia product continues to improve in capability and overall scope, and early and significant ongoing investment in Vuforia makes positions it as a primary element of the company's total go to market. PTC is still best when combined with other PTC products, which is substantial in the manufacturing and industrial space, but the movement towards subscription models and a SaaS foundation help to mitigate some of the inflexibility concerns associated with PTC in the past. The company-wide focus on digital thread, and AR as a critical component of that digital thread, is the right outlook for the space. The footprint and breadth of Vuforia, combined with expected continued investment, will allow PTC to remain an enterprise AR leader.

VENDOR MATRIX

Methodology: After individual scores are established for innovation and implementation, an overall company score is established using the Root Mean Square (RMS) method:

$$Score = \sqrt{\frac{innovation^2 + implementation^2}{2}}$$

The resulting overall scores are then ranked and used for percentile comparisons.

The RMS method, in comparison with a straight summation or average of individual innovation and implementation values, rewards companies for standout performances.

For example, using this method, a company with an innovation score of nine and an implementation score of one would score considerably higher than a company with a score of five in both areas, despite the mean score being the same. ABI Research believes that this is appropriate as the goal of these matrices is to highlight those companies that stand out from the others.

RANKING CRITERIA

Leader: A company that receives a score of **75 or above** for their overall ranking

Mainstream: A company that receives scores **between 60 and 75** for their overall ranking

Follower: A company that receives a score of **60 or below** for their overall ranking

Innovation Leader: A company that receives a score of **75 or above** for their innovation ranking.

Implementation Leader: A company that receives a score of **75 or above** for their implementation ranking.

INNOVATION CRITERIA

Use Case Applicability: Where and how the platform can be used when considering inherent strengths and weaknesses. Specific portfolio products enable use cases where applicable. This includes use case opportunities in current and future markets, as well as vertical applicability across enterprise and consumer markets. Scores in these use cases are not binary, meaning partial points are given based on assessed capability of product, including:
- Remote Assistance
- Training
- Guided Workflow and verification

AI/ML: Integration and usage of artificial intelligence and machine learning tools in the platform, whether first party or through partners. Analytics and dashboard support is very common today, however automation and prediction vary in maturity. Full points in automation and prediction includes complete automation of use cases where possible— e.g., removing the need for a remote expert, complete hands-off data capture/metadata tagging/content delivery—and full preemptive prediction of AR content and data delivery from connected systems.
- Analytics and Dashboards: Types of data, dashboards, integration with data capture, and automation capabilities.

- Automation and Prediction: Just-in-time content delivery, location-based content, chatbots, and non-AR prediction (e.g., machine maintenance).

Cloud: Connectivity both within the platform itself and without.
- Cloud and local storage and processing
- Cloud sync between devices and platform
- XaaS (Anything/Everything as a Service) portfolio elements (specifically web-based)
- SSO (Single Sign-On)
- Security
- Cloud platform support

INNOVATION CRITERIA

Machine Vision: Enabling mixed reality, but can also be leveraged for assisted reality, with semantic labeling, object tracking, etc. For these elements, some points are given through support of a mixed reality smart glasses product, such as HoloLens—which natively supports gesture control and Simultaneous Localization and Mapping (SLAM). Additional points are given for dedicated product on top of hardware-level support, such as a licensable SLAM software development kit (SDK) or additional gesture control capabilities.

- SLAM and spatial tracking
- Semantic labeling
- Gesture control
- Optical character recognition
- Pattern/object recognition

Enabling Technologies Support: Support for forward-looking enabling technologies that integrate with the AR platform. While support for these technologies is not a requirement today, some customers will demand them while others will hope to scale into them in the future. Partial points are given for partnerships and conversations occurring in these areas, while greater points are awarded for active product and portfolio support.

- Robot management/programming/control
- Edge compute
- Blockchain
- 5G

IMPLEMENTATION CRITERIA

Customers and Footprint: Measure of traction through verticals, scale of current distribution, notable customers, and capabilities for expansion. Strong footprint and proof of capability customers help demonstrate maturity in what can be an uncertain market.
- Number of active users/devices
- Sales channels
- Proof of capability customers

Partnership Ecosystem: Value of the partnership ecosystem to a potential customer and/or partner. Often, a partnership ecosystem can be the primary differentiator between similar platforms. Greater exposure and cooperation with impactful companies can ensure cooperability and capability. Note that partnerships are different than simply support of a platform (e.g., using Amazon Web Services (AWS) is different than being an Amazon partner).
- Overall scale (number of partners)
- Notable names
  - Hardware: Microsoft, Realwear, Vuzix, Google (mobile and glasses), Apple (mobile).
  - Cloud: Amazon AWS, Microsoft Azure, Google.
  - Services: SAP, Salesforce, ServiceNow, Dynamics.

Pricing and Business Models: Outright cost of usage, along with flexibility of business model, and actual portfolio. A clear portfolio layout and associated pricing helps attract initial customers, while scaling capability helps retain customers. Increasing interest in cloud, especially cloud native and cloud first, portfolio offerings factors into business models and structure of portfolio, with greater cloud and as-a-Service exposure a positive.
- Overall cost.
- Transparency of portfolio and pricing.
- Scaling options (how well these business models scale with customers, from pilot phase to large scale).
- SaaS, subscription *versus* non-subscription offerings. Pervasiveness of SaaS throughout portfolio.
- Options for free trial/free tier.

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IMPLEMENTATION CRITERIA

Device Support: Breadth and depth of support for multiple form factors (monocular smart glasses, binocular smart glasses, mobile, etc.), Operating Systems (OSs) (e.g., Android, iOS, Windows, *etc*.), and input/interaction options. Support for both mobile devices and smart glasses is a boon as the market expands both segments.
- Smart glasses types: Assisted reality vs mixed reality.
- Mobile device requirements.
- Input options (hands free and handheld): Voice, gesture, gaze, trackpad, controller.

Integration Potential: Capability and flexibility to integrate into existing systems for customers across different needs. This lessens barriers both to entry and to scale.
- Content capture: Audio/images/video, synergy between use cases (e.g., captured content feeding training, remote assist, etc.).
- Content development team (if applicable).
- Offline usage capability.
- Non AR platform support (examples):
  - Internet of Things (IoT)
  - Product Lifecycle Management (PLM)
  - Product Data Management (PDM)
  - Enterprise Resource Planning (ERP)
  - Customer Relationship Management (CRM)

Time to Value: How long it takes to get up and running and start seeing value. High capital expenditure (CAPEX) and operation expenditure (OPEX) often associated with Augmented Reality can inhibit investment and growth, but quick time to value can encourage investment. All of the criteria in this assessment could be seen as contributing to time to value, but elements specifically included in this criteria examine initialization time primarily.
- Content creation and optimization tools.
- Low code/no code options.
- Professional services availability.

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