

RADAR

Open Digital Platforms for Connected Workers (AR)

SITSI® | Vendor Analysis | PAC INNOVATION RADAR

Positioning of TeamViewer

Lead analyst: Arnold Vogt
July 2024

PAC

TABLE OF CONTENTS

- PAC INNOVATION RADAR Graph 4
- Trends and Status Quo of the Digital Factory – a Use Case Analysis 5
 - Research Topic 5
 - Scope 5
- Trends in Digital Factory Use Cases 5
 - Trend 1: From Industrial Data Visualization and Analytics to Control Towers and Decision Support Systems 5
 - Trend 2: From Individual Solutions for Computer Vision to Standardized Tool Kits for Accelerated Adoption at Scale 5
 - Trend 3: From Predictive Maintenance to AI-Enabled Predictive Quality 6
 - Trend 4: Digital Twin Simulations, 3D Printing, AI, and Vision Technology Help Make Changeovers of Production Systems More Efficient 6
 - Trend 5: From AI-Supported to Digitally Automated Manufacturing Tasks, Processes, and Operations 6
 - Trend 6: From AI-Supported to Autonomous Planning and Scheduling 7
 - Trend 7: From Energy Management to Smart Microgrids 7
 - Trend 8: The First Value-Generating Use Cases around the Industrial Metaverse and GenAI are Emerging 7
 - Summary and Conclusions 8
- Market Situation – Open Digital Platforms for Connected Workers (AR) 8
 - Research Scope 8
 - Trends in the Vendor Landscape 9
 - Important Capabilities of Leading Platforms 9
 - Leading Vendors 9
- PAC INNOVATION RADAR "Open Digital Platforms for Connected Workers (AR) in Europe 2024" 11
- Review of Top-Seeded Provider TeamViewer 12
 - TeamViewer – Best in Class 12
- Appendix 13
 - The PAC INNOVATION RADAR 13
 - Definitions & Segmentation 13
 - Provider Selection and Participation 15
 - Evaluation Method 15
 - Considered Providers by Segment 16
 - Evaluation Criteria 16
- PAC RADAR Report License 17
- About the PAC RADAR 18
- About PAC 18

TABLE OF FIGURES

Fig. 1: PAC INNOVATION RADAR graph.....	4
Fig. 2: Overview of relevant digital factory use case.....	8
Fig. 3: PAC INNOVATION RADAR “Open Digital Platforms for Connected Workers (AR) in Europe 2024”.....	11
Fig. 4: PAC INNOVATION RADAR – segments analyzed.....	14
Fig. 5: PAC INNOVATION RADAR – evaluation method	15

DOCUMENT INFORMATION

Author: Arnold Vogt (a.vogt@pacanalyst.com)
Publication: July 2024
Scope ID: Digital Innovation & IoT | Europe | 2024
Portfolio ID: SITS I Vendor Analysis | PAC INNOVATION RADAR
Related reports: This document is part of a series of six PAC INNOVATION RADAR reports.

PAC INNOVATION RADAR GRAPH

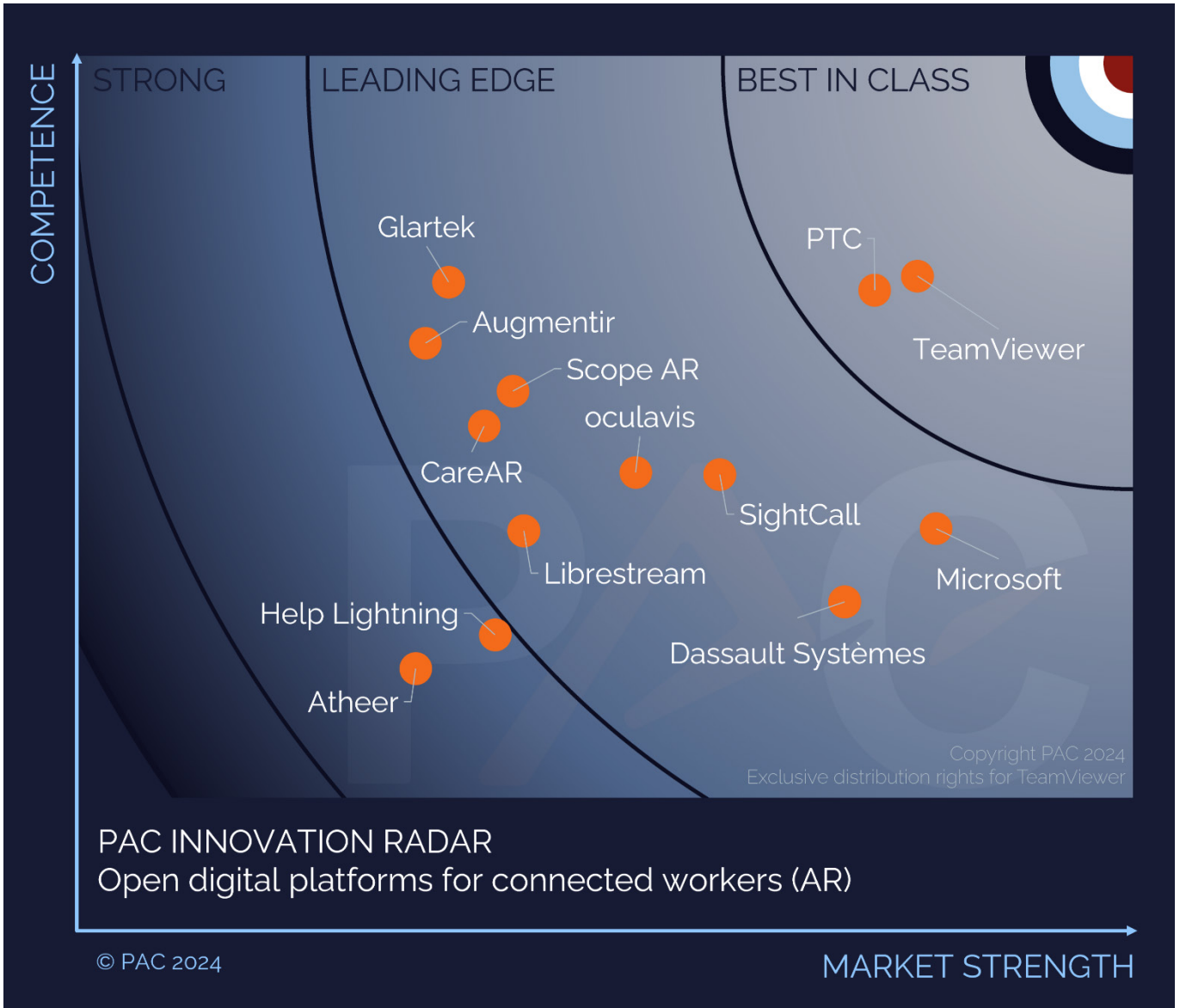


Fig. 1: PAC INNOVATION RADAR graph

Based on the scores in competence and market strength, the overall score is calculated (calculation: competence score plus market strength score, divided by two). From the resulting overall score, each provider receives their characteristic positioning within the PAC RADAR.

Here, the following applies: The closer a company is to the upper right corner, the closer they are to meeting customers' requirements.

TRENDS AND STATUS QUO OF THE DIGITAL FACTORY – A USE CASE ANALYSIS

Research Topic

In December 2023, the World Economic Forum (WEF), in collaboration with McKinsey, published a list of new digital lighthouse factories worldwide. Lighthouses are manufacturing companies that show leadership in applying digital technologies at scale and achieving significant improvements in cost, operational efficiency, and sustainability by transforming factories, value chains, and business models. The initiative started in 2018 by scanning thousands of leading manufacturers, looking for the most advanced factories. This led to the identification of the first 16 lighthouse factories. Today, 153 lighthouse factories are listed; 17 of them are additionally recognized as sustainability lighthouses for the technology-enabled improvements they have made to their environmental footprint.

Scope

PAC reviewed the list of the top 5 use cases of the 21 lighthouse factories (16 factory lighthouses and 5 end-to-end value chain lighthouses) and 4 sustainability lighthouses added in December 2023. The aim was to identify trends around the most value-driving use cases related to the digital factory.

TRENDS IN DIGITAL FACTORY USE CASES

Trend 1: From Industrial Data Visualization and Analytics to Control Towers and Decision Support Systems

The IoT-based visualization and monitoring of process and machine data, in combination with analytics capabilities such as root cause analysis, is not a new topic for lighthouse factories. PAC has identified this topic as a key use case for lighthouse factories in the past (for more details, please see our Expert View from March 2023: "Lighthouse factories report strong efficiency gains by implementing digital use cases").

Today, new lighthouse factories have taken this topic to the next level by achieving holistic transparency of operations and implementing AI-based recommendation engines. Control towers and AI-based decision support systems enable transparency at scale and form the basis for recommendation engines that support operators in

complex industrial environments in making the right decisions. Several of the newly-announced lighthouse factories report significant improvements after implementing these solutions. For example, the Turkish ceramic tile manufacturer Vitra Karo has increased overall equipment effectiveness (OEE) by 19% by implementing an intelligent production control tower in one of its factories. DHL Supply Chain equipped its logistics center in Memphis, Tennessee (US), with a control tower for centralized planning and execution oversight to manage and control end-to-end operations. This has increased throughput by 38% and reduced pick-to-ship cycle time by 71%. Aramco, one of the world's leading fuel suppliers from Saudi Arabia, implemented an AI-powered operation decision system in one of its refineries. This has increased its processing capacity by 20%.

Trend 2: From Individual Solutions for Computer Vision to Standardized Tool Kits for Accelerated Adoption at Scale

Computer vision for quality inspection and safety, i.e., using cameras and AI to inspect production quality within factories, is a well-established use case in lighthouse factories. CATL, for example, uses computer vision for micron-level quality inspection. Some of the recently added lighthouse factories confirm the value of computer vision and report clear efficiency gains from implementing it. Haier is a Chinese home appliances company. In its air conditioner factory in Hefei (China), it uses machine vision technology, in combination with intelligent self-tuning, for welding processes. This has reduced the welding defect rate by 85%. K-water, a public water utility in South Korea, uses video surveillance and AI for safety management. It has reduced incident response times by 75%. ACG Capsules, a pharmaceuticals contract manufacturer in India, uses deep learning-driven safety management and behavior detection. This has enabled the company to reduce the safety incident rate by 53%.

Agilent, a medical equipment manufacturer in Germany, has even gone one step further. It has not only developed a computer vision use case that has reduced the defect rate by 49% but has also assetized it via a tool kit and solution library. It has built an in-house, ready-to-deploy AI solution library for detecting anomalies and responding to process deviations, bundling computer vision tools with plug-in connectors to MES and test software and packaging with standard operating procedures, user documentation, and training guides for operators. This democratization of computer vision technology enables workers to identify, deploy, and test new camera and vision applications end to end. This enabled Agilent to deploy five new applications across 57 work centers and 16 product lines in less than four months.

Trend 3: From Predictive Maintenance to AI-Enabled Predictive Quality

Predictive maintenance was certainly an over-hyped topic in the past. Nevertheless, we recognize that several of the newly added lighthouse factories have reported strong efficiency gains from implementing it. The Chinese car battery supplier CATL implemented a deep learning-powered maintenance system in its factory in Liyang (China), reducing maintenance costs by 41%. The Chinese cement producer CR Building Materials Tech uses an intelligent equipment maintenance and scheduling system in one of its factories, which has reduced unplanned downtime by 56%. The public water utility K-water implemented an ML-based predictive maintenance solution, reducing maintenance costs by 33%. The consumer goods giant Unilever uses a predictive asset maintenance solution in India that has reduced maintenance costs by 56%. Thanks to an AI-based failure prediction system, the India-based renewable energy company ReNew has reduced unplanned maintenance by 83%.

As machine-related maintenance services can have a direct impact on production quality, the topics of predictive maintenance and predictive quality are interconnected. However, while predictive maintenance comes from an asset-centric perspective, predominantly aimed at avoiding machine-caused production stoppages, predictive quality is about using AI to keep overall production quality within a defined corridor and react before a preset threshold is reached. In other words, predictive maintenance only takes care of machine and maintenance-related quality issues, while predictive quality has a broader scope, covering the holistic management of production quality, i.e., across the entire production process and beyond maintenance services. This includes, for example, simple adjustments to machines to maintain production quality. AI-optimized quality management is one of the top use cases for lighthouse factories nowadays. There are many examples of the new lighthouse factories improving their production quality management with AI capabilities. The US-based pharma and consumer goods company Johnson & Johnson has reduced the time to detect variations by 92% by implementing an autonomous, continuous process verification system. The Turkish ceramic tile manufacturer Vitra Karo uses AI-based continuous product specifications for quality consistency and has reduced the scrap rate by 32%. In addition, the company uses AI-based quality inspection and root cause analysis, which has reduced the complaints rate by 66%. The US-based consumer goods giant Mondelez established an AI-enabled, closed-loop defect elimination system in its factory in Beijing (China), reducing consumer complaints by 52%. The Chinese cement producer CR Building Materials Tech uses an AI-enabled, closed-loop quality control system that has reduced its customer reject rate

by 87%. The South Korean cosmetics company AMOREPACIFIC implemented AI-powered fault detection in packaging lines, improving packaging line productivity by 344%. The German medical equipment manufacturer Agilent uses predictive quality testing via cloud-based AI and has improved test station throughput by 13%.

Trend 4: Digital Twin Simulations, 3D Printing, AI, and Vision Technology Help Make Changeovers of Production Systems More Efficient

Digital technologies enable more flexible production. Lighthouse factories leverage digital technologies in this context to reduce changeover times and improve first-pass yield. The Indian pharmaceuticals contract manufacturer ACG Capsules has improved first-pass yield by 35% by adopting an AI-powered, first-time-right optimization solution. The Chinese car battery supplier CATL uses virtual simulation and 3D printing for agile changeovers and has improved output by 25%. The fully automated production line of the Chinese car manufacturer GAC AION supports mixed production of made-to-order and made-to-stock models. Thanks to AI-enabled, flexible automation, the company has improved changeover time by 67%. The Chinese home appliances company Haier uses a digital twin for high-precision changeovers and has improved changeover time by 93%. The Chinese solar module manufacturer Longi uses AI and machine vision-enabled, flexible automation and has improved changeover time by 96%. The Turkish ceramic tile manufacturer Vitra Karo implemented AI-based blending optimization, which has improved first-pass yield by 44%.

Trend 5: From AI-Supported to Digitally Automated Manufacturing Tasks, Processes, and Operations

While one trend is moving towards AI-enabled decision support systems for operators, as described above, we also observe lighthouse factories making clear progress in implementing use cases around autonomous processes and operations. For example, the Chinese car manufacturer GAC AION implemented an AI-based control tower for autonomous material distribution, improving material handling productivity by 67%. The Taiwanese electronics contract manufacturer Foxconn benefits from an AI-powered, automated assembly and testing workshop, improving overall equipment effectiveness (OEE) by 42%. The public water utility K-water from South Korea implemented an intelligent and autonomous AI operating system to control plant operations. This has improved process labor efficiency by 104%. The consumer goods company Mondelez implemented a lights-out autonomous dough workshop in its factory in China, reducing headcount by 91%. The Indian renewable energy company ReNew implemented an AI-

powered, automated wind turbine blade inspection system, reducing the amount of unplanned maintenance services by 78%. The pharma company Johnson & Johnson established an autonomous continuous process verification system that has improved the time to detect variations by 92%.

Trend 6: From AI-Supported to Autonomous Planning and Scheduling

There are multiple good examples of lighthouse factories using predictive analytics capabilities to improve planning and scheduling of production, warehousing, logistics, and maintenance services. The Indian pharmaceuticals contract manufacturer ACG Capsules uses digital twin simulations for production planning and scheduling and has improved on-time delivery by 13%. The Taiwanese electronics contract manufacturer Foxconn uses AI-enabled warehouse and logistics scheduling (line changeover time has improved by 44%) and AI-driven order forecasting and production scheduling (on-time delivery has improved by 8%). DHL Supply Chain equipped its logistics center in Memphis, Tennessee (US), with predictive inventory replenishment, improving availability by 65%.

On top of that, we observe that autonomous planning and scheduling is also gradually becoming a reality for leading factories. The German medical equipment manufacturer Agilent has improved production output by 36% by adopting a supply-chain reliability prediction and control system. Moreover, the company implemented a no-touch shop-floor scheduling system, improving direct labor productivity by 47%. The Chinese home appliances company Haier uses intelligent repair request matching and autonomous dispatching and has improved the speed to repair by 88%.

Trend 7: From Energy Management to Smart Microgrids

Because of rising energy costs and challenging sustainability targets (internal or set by external authorities), energy management remains a highly relevant use case for many lighthouse factories. Digitally-supported energy management enables companies to make significant savings. The car battery supplier CATL implemented an intelligent energy management system in one of its factories in China, reducing energy consumption by 43%. Mondelez implemented an AI-based

heating, ventilation, and air conditioning system that has reduced energy consumption in one of its factories in China by 24%. Thanks to AI and IoT, the Turkish ceramic tile manufacturer Vitra Karo has reduced energy consumption by 17% through the intelligent setting of process parameters. With the help of demand prediction-based energy optimization, the public water utility K-water has reduced energy consumption by 10%.

Most interestingly, the Chinese car manufacturer GAC AION has reduced energy consumption by 48% by adopting a smart microgrid for sustainable manufacturing. Smart microgrids use digital technologies to orchestrate distributed energy resources, electricity storage, and energy consumption. A smart metering system with real-time data management and an intelligent digital control system forms the orchestration layer in this solution.

Trend 8: The First Value-Generating Use Cases around the Industrial Metaverse and GenAI are Emerging

VR-based (virtual reality) training has become a promising industrial metaverse use case. The pharmaceuticals contract manufacturer ACG Capsules uses VR for workforce training, support, and skills management. This has shortened the onboarding time for new workers by 39%. The fuel supplier Aramco uses VR training for safety and process skill enhancement. This has shortened training time by 35%. The public water utility K-water uses a digital twin for training and maintenance purposes and has reduced training time by 33%.

In the case of GenAI, it is still too early to illustrate the value through concrete examples. Lighthouse factories like CATL and ACG Capsules confirm that they are running pilots related to GenAI; however, there are no concrete numbers on the benefits in the factory space available as yet. Still, we observe one indicator in recent lighthouse factory use cases that is cause for optimism about more concrete examples coming up soon: the Chinese home appliances company Haier uses a knowledge graph-enabled expert system for performance inspection. This has reduced the mean time to repair by 67%. PAC considers the combination of knowledge graphs and GenAI (via RAG – retrieval-augmented generation) to be the most promising approach to overcoming hallucinations. In manufacturing, this is especially relevant where the delivery of 100% valid answers is essential.

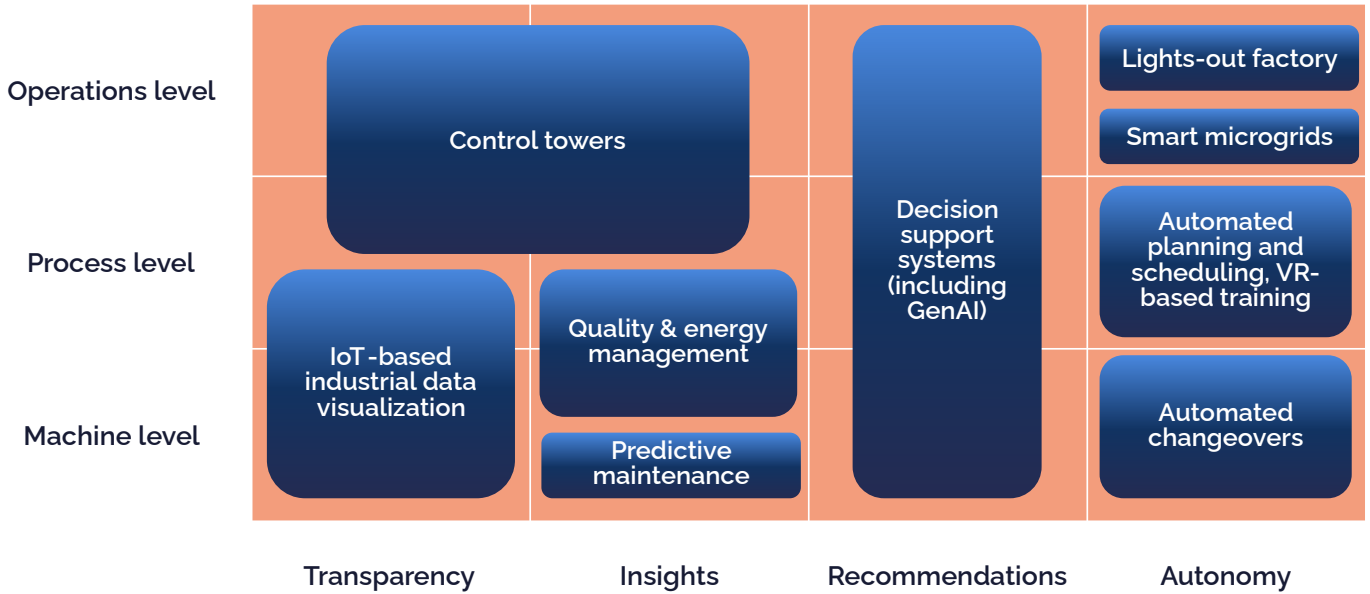


Fig. 2: Overview of relevant digital factory use case

Summary and Conclusions

Summary: As discussed in the previous chapter, multiple trends are emerging that illustrate the status quo of the digital factory from the perspective of leading factories around the world (“lighthouse factories”).

- From industrial data visualization and analytics to control towers and decision support systems
- From predictive maintenance to AI-enabled predictive quality
- Digital twin simulations, 3D printing, AI, and vision technology help make changeovers of production systems more efficient.
- From AI-supported to digitally automated manufacturing tasks, processes, and operations
- From AI-supported to autonomous planning and scheduling
- From energy management to smart microgrids
- VR-based training and expert systems enabled by knowledge graphs are the first value-generating use cases to emerge around the industrial metaverse and GenAI.

Conclusions: Leading factories are gradually but consistently moving in two directions: first, scaling digital use cases from the machine and process levels to the operations level; second, from digital transparency and AI-based insights and recommendations to autonomous systems. Autonomous operations (“lights out”) is the ultimate target, and we observe leading factories making clear progress in this direction.

MARKET SITUATION – OPEN DIGITAL PLATFORMS FOR CONNECTED WORKERS (AR)

Research Scope

To understand the current research scope, it is helpful to understand the evolution of the research scope over the last few years. PAC started to evaluate the connected worker topic in 2019 and has adapted the scope continuously in line with the market evolution. The starting point was pretty simple, by asking the question “What does augmented reality (AR) technology mean to the industrial world?.” The initial vendor landscape was therefore centered around AR-based platforms for industrial purposes. It included companies like PTC, Re’flect (today part of PTC), and Upskill (today part of TeamViewer). However, as we always take a user perspective and not a technology perspective, in our market evaluations we shifted our scope towards the main AR-related use case we recognized in the market at that time, which focused on the visualization of work instructions for mobile workers. Because of this, PAC named the topic “connected worker (AR).” As a result, we also included other vendors, such as Ubimax (today part of TeamViewer), who provided low-code platforms to create mobile work instructions without a dedicated focus on AR (as for picking in logistics). Over time, we have recognized that vendors in our analysis started to expand the scope of their platforms step by step. Besides the work instructions use case, remote expert capabilities have become

increasingly relevant. This was an especially critical capability during the Covid-19 period (2020-22). As a result of this development, we have extended the scope of our research and evaluated connected worker platforms that address the needs of various use cases. This implied that we also have to include more and more the existing, dedicated platform vendors of remote expert services, such as oculavis, Librestream, or SightCall, since they have also extended their scopes beyond pure remote expert services and moved into the work instructions space. This describes the market evolution so far and explains the principal changes in the vendor landscape of this analysis over time. The latest trends we recognized in 2024 are highlighted in the following section.

Trends in the Vendor Landscape

With Career, PAC included only one new vendor in the 2024 analysis. This is a little bit surprising because a long list of potential candidates exists, which we review each year to understand their progress in the market. This means that all these smaller vendors and start-ups were not able to make enough progress to justify a positioning in the current PAC RADAR 2024. The message behind this: The business environment has become more difficult for these players and they have been forced to turn away from growth orientation towards profitability and business consolidation. One example in this context is the Swedish company XMReality, which announced in April 2024 to draw up a balance sheet for liquidation purposes. It is no secret that many vendors in this field are still struggling to reach the break-even point. After a phase of growth during the Covid-19 period (2020-2022) the market of connected worker platforms has been going through a consolidation phase in 2023 and 2024. Today, the market consolidation especially happens around immersive AR use cases, which require binocular smart glasses to interact with 3D models. This is based on the fact that the hype around smart glasses with superior AR capabilities is coming to an end. We see three reasons for this: First, Microsoft HoloLens 2 is not an appropriate solution for industrial workers (not convenient to use in an 8-hour shift). Second, the capabilities of Apple Vision Pro position it as a valid solution for VR-based training, but not for immersive AR-based industrial use cases like visual quality control. Third, another next-generation AR device, such as a Microsoft HoloLens 3 is not on the horizon. In consequence, the worsening market environment pushes vendors of connected worker platforms to become profitable quickly, and the absence of industrial-grade, binocular smart glasses for immersive AR use cases in parallel forces them to focus on feasible use cases to achieve it. As a result, shake-outs and acquisitions will continue in 2024. One interesting acquisition happened in 2023, when Swedish application software vendor IFS acquired Poka. Poka is a Canadian connected worker platform dedicated to manufacturing operations. As the Canadian company

today mainly operates in North America, it has not been included in the PAC RADAR so far. However, through its acquisition by IFS, we expect that Poka will emerge in Europe soon. As a result, Poka is on our watch list of potential candidates for the PAC RADAR 2025.

As mentioned above, CareAR is the only new vendor PAC included in the new RADAR 2024. The vendor is expanding in several dimensions. CareAR comes from the field service space in healthcare and moves into manufacturing and other industries. In parallel, CareAR is moving from the US increasingly into the European market. It is also expanding its portfolio from work instructions to remote expert services and further to visual verification. The company was acquired by Xerox in 2021, acquired Magic Lense in 2022, and received a \$10 million investment from ServiceNow to support its growth. One big client is CareAR's mother company Xerox. More than 8,000 Xerox global contact center agents and field technicians are using the work instruction and remote expert solutions CareAR Assist and CareAR Instruct today.

Another trend in the vendor landscape already emerged last year. It is driven by challengers like Glartek and Augmentir, who embedded capabilities of connected-worker-related use cases into the broader scope of skill and knowledge management for workers. Augmentir focuses on skill management for front-line workers and, for this purpose, offers a platform around training sessions, work instructions and remote expert services. Glartek even goes one step further and, besides skill management for frontline workers, also offers other capabilities like team and task management, and asset and inventory management. This example illustrates that connected worker platforms do not just become embedded in skill and knowledge management solutions, but also overlapping capabilities emerge with other solutions like MES. To reflect this market evolution, we are considering to further expand the scope of our analysis in the coming year.

Important Capabilities of Leading Platforms

What makes a connected worker platform stand out in today's market? The market consolidation that has begun is having a direct impact on this. PAC sees four main aspects: First, focusing on the most relevant connected worker use cases. Second, proof points for new customer projects, especially larger ones. Third, strategic partnerships that support vendors in their go-to-market. Fourth, financial health (revenue, growth, and profitability) to survive the current consolidation phase.

Leading Vendors

In 2024, PAC ranks **TeamViewer** for the first time as the market-leading vendor for connected worker platforms. PAC believes that TeamViewer is well positioned to further

enhance its market position in the current market environment. This is especially based on the following five aspects: First, TeamViewer's portfolio perfectly addresses the most relevant use cases of today, especially manual order picking with monocular smart glasses. Second, thanks to its global market presence, TeamViewer can deliver this around the world and has already established a strong global footprint in this space. Third, TeamViewer established strong partnerships, centered around integrated solutions. Like no other vendor, TeamViewer is able to deliver proof points that their partnerships with leading software vendors for the manufacturing industry, such as Siemens and SAP, are turning into large new deals. The integration in SAP's portfolio is especially relevant for TeamViewer. In April 2023, the company announced the integration of its Frontline platform with the SAP Digital Manufacturing Platform (MES solution). This extends previous integrations to SAP Extended Warehouse Management (SAP EWM), SAP Field Service Management, and SAP Service and Asset Manager. Joint projects, such as the digitalization of warehouse processes at Nadro—the leading wholesaler in Mexico's healthcare industry—underpin the value of TeamViewer's vision picking solution integrated with SAP Extended Warehouse Management. Nadro today uses 400 Vuzix smart glasses powered by TeamViewer Frontline. The vision picking solution will be rolled out step-by-step to all 14 warehouse locations. The partnership with Siemens also led to a large deal in the aviation industry at the end of 2023. One of the world's largest manufacturers of aircraft turbines has chosen the 3D training solution jointly offered by Siemens and TeamViewer to provide training and education for its technicians at hundreds of locations. Fourth, TeamViewer is establishing even more partnerships to further enhance its existing go-to-market. In April 2024, Manhattan Associates announced the integration of its warehouse management solution with TeamViewer's vision picking solution Frontline Pick. In April 2024, TeamViewer and Deloitte announced a joint go-to-market (including consulting and implementation) for the integrated solution of SAP Enterprise Warehouse Management with TeamViewer's vision picking solution. Fifth, PAC believes that the financial health status of TeamViewer's connected worker business (revenue, growth, profitability) is much better than that of other vendors in this space. While others have to consolidate their business to become profitable, TeamViewer is in a much better position and can further expand its business.

PAC recognizes **PTC** as a best-in-class vendor for connected worker platforms in 2024. As the market is currently going through a consolidation phase, PTC adjusted the strategic focus of its Vuforia business in two aspects: First, PTC's connected worker business becomes more integrated with PTC's CAD and PLM business. This enables a more integrated go-to-market approach for customers to maximize the potential of their data harbored

in other business systems through these integration capabilities. Second, to support this, the Vuforia platform will especially focus on immersive AR-based industrial use cases around 3D models in addition to the easy-to-use knowledge capture with AR SaaS solutions. This reinforces PTC's clear focus on the high-end segment of connected worker use cases and mainly addresses more complex use cases like visual quality control and immersive virtual training. From PAC's perspective, PTC Vuforia is the leading connected worker platform for this high-end segment of the market. It provides dedicated capabilities around 3D models at different levels – deep code, low code and no code. Vuforia offers a deep-code platform that allows the development of advanced AR apps with complex computer vision and recognition functionalities. In addition, Vuforia delivers low-code AR platform capabilities that enables content creators to easily learn to build their own AR experiences and source existing product data from CAD and PLM systems. Vuforia also provides no-code capabilities that enables experts to capture knowledge on-the-job and create new step-by-step instructions for hands-on training and task guidance, without the need for pre-existing assets for preparation and training. Most interestingly, the Vuforia Step Check function (released commercially in May 2023 and tested and implemented at various customer locations) provides simple-to-train AI models for visual inspection (based on worker feedback from previous tasks). This allows displaying color-coded graphics for parts/products in real time so that workers can instantly see if parts/products have passed inspection and document it. To further advance into this field, PTC announced the Step Check Auto Proceed function in December 2023, which allows the completion of verification steps automatically and without the need for manual box checking. It illustrates well that PTC is making further progress in offering simple-to-use solutions for complex connected worker use cases.

PAC considers **Glartek**, a start-up from Portugal, as a hidden champion in this market segment. This is based on two facts: First, Glartek has a unique scope compared to other vendors in our analysis. Glartek offers a platform that supports core connected worker use cases such as work instructions and remote expert support. It enhances these elements with an integrated skill management function to track the status and development of frontline worker capabilities. In addition, Glartek offers capabilities around team and task management, and asset and inventory management. This means Glartek covers a scope ranging from connected worker platforms to MES. While Glartek certainly does not address all aspects of an MES solution, the approach is quite unique. Second, Glartek enhanced its offering in several aspects. In March 2024, the company announced the release of Glartek 2.0. The new version provides several updates around different use cases (team management, training, and analytics), the integration of new technology (AI, ML, 3D modeling), and improved

capabilities for real-time collaboration and connectivity. Also in March 2024, Glartek announced support for Apple Vision Pro, which enables customers to train workers in virtual industrial environments. In February 2024, Glartek announced the integration with Microsoft's Azure Enterprise grade 5G multi-access edge compute (MEC)

environment. This supports uninterrupted use cases around digital work instructions, real-time data collection, visual remote assistance, knowledge management, and training. In addition, the company now offers its solution in SaaS mode..

PAC INNOVATION RADAR "OPEN DIGITAL PLATFORMS FOR CONNECTED WORKERS (AR) IN EUROPE 2024"

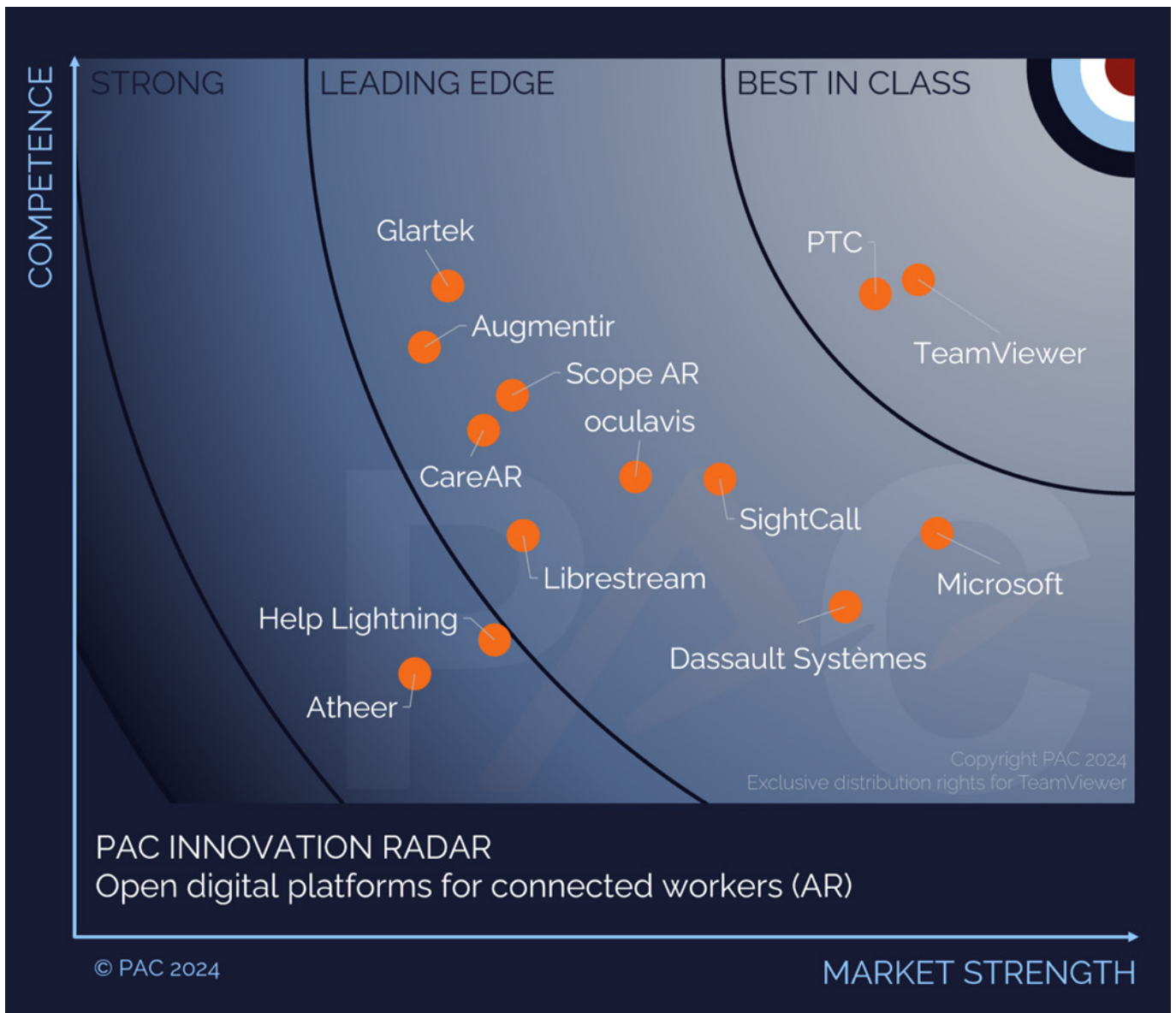


Fig. 3: PAC INNOVATION RADAR "Open Digital Platforms for Connected Workers (AR) in Europe 2024"

Based on the scores in competence and market strength, the overall score is calculated (calculation: competence score plus market strength score, divided by two). From the resulting overall score, each provider receives their characteristic positioning within the PAC RADAR.

Here, the following applies: The closer a company is to the upper right corner, the closer they are to meeting customers' requirements.

REVIEW OF TOP-SEEDED PROVIDER TEAMVIEWER

TeamViewer – Best in Class

COMPETENCE



TeamViewer

STRATEGY

Vision	
Strategic activities in the last 12 months	
Unique selling proposition (USP)	

PORTFOLIO

Addressed industrial use cases	
Portfolio quality based on client references	
Open system approach	

EXPANSION

Expansion of go-to-market and business model	
Expansion to new use cases	
Expansion to new technology	

MARKET STRENGTH

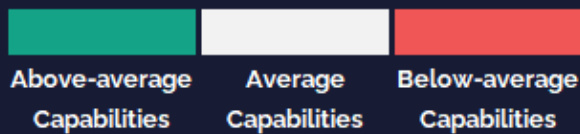


GROWTH

Market perception in Europe	
Momentum	

POSITION

Ecosystem of partners	
Client base and relationships in Europe	



APPENDIX

The PAC INNOVATION RADAR

The PAC RADAR is an effective tool for the holistic evaluation and visual positioning of software and ICT service providers on local markets. Numerous ICT and business decision-makers in user companies of all industries and company sizes rely on the PAC RADAR when selecting their partners and developing their sourcing strategies.

With the help of predefined criteria, PAC evaluates and compares providers' strategies, development, and market position, in addition to their performance and competencies within specific market segments.

Each PAC RADAR focuses on a specific IT market segment. Up to 30 leading providers are evaluated per segment. Participation in the PAC RADAR is free of charge.

All providers are evaluated using PAC's proven methodology, which is based on personal face-to-face interviews and/or a detailed self-disclosure from each provider.

PAC reserves to also evaluate and position relevant providers in the PAC RADAR that do not participate in the self-disclosure process.

After the evaluation of the predefined criteria, each supplier's position is plotted in the PAC RADAR. The criteria are classified by clusters and can all be attributed to the "Competence" and "Market Strength" clusters. The provider evaluation, including a market description, is published as a report.

Concept and methodology of the PAC INNOVATION RADAR are similar to those of the traditional PAC RADAR. While the traditional PAC RADAR focuses on mature market segments, the PAC INNOVATION RADAR, on the other hand, positions providers in new and innovative market segments. Thus, the focus of the evaluation is on the portfolio, vision, strategy, and early client engagements rather than on existing revenue figures and resources.

Definitions & Segmentation

A **digital platform** provides digital services for different use cases (more than one), and constantly strives to expand to new use cases and digital services to serve the holistic demand of its target audience. To achieve this, digital platform providers also integrate their partner ecosystem into the platform. A technical integration layer and a governance framework are helpful tools to ensure interoperability across different digital services on the platform. Based on the current economic conditions,

profitability and the underlying business model are relevant components of a successful digital platform.

An **open digital platform** expands the above concept by numerous different aspects:

- Openness to adding **digital services** (applications) from 3rd-party vendors – this creates an open ecosystem.
- Openness of the **technical integration** layer in order to integrate different types of hardware and/or software (including open-source software) – this is key for IT/OT integration.
- Openness to **sharing data** with independent parties – but within a secure environment.
- Openness of the OT world to leveraging **new concepts from the IT world** (such as containers and app stores).

Specific PAC definitions used in this RADAR

Industrial edge management: These platforms use new concepts from the IT world, such as container technology and app store models, for simplified application lifecycle management at the industrial edge (OT world). These platforms can use the cloud for AI training and as a central app store. Machine builders especially prefer the concept to manage PLCs and IPCs which have been delivered to clients as part of their machines. In an advanced model, users can choose from a range of different IoT apps provided by an open ecosystem of partners, via an app store.

Industrial data fabrics: These platforms build the necessary fundament to handle the complex industrial data landscape (like IIoT data at scale and in real time) holistically and act as an enabler for industrial AI and low-code development. Industrial data fabrics integrate and harmonize data from different sources, systems or cloud platforms, and ensure a consistent view of industrial data (via joint data model). Data fabrics typically provide data catalogs, low-code, analytics and data discovery capabilities. The vision is to create a digitally-integrated manufacturing company without data silos, open data access, deep transparency across the company, user-specific and deep analytics capabilities, agile workflow development, and ever-increasing process automation.

Industrial copilots: These platforms give access to different generative AI-powered assistants (copilots) to enhance human-machine collaboration and to improve industrial productivity. Industrial copilots can for example support automation engineers to faster generate code for programmable logic controllers (PLC) via natural language inputs. Copilots can also explain code and create

automated documentation. In addition, industrial copilots can have access to documentation, guidelines and manuals to assist industrial workers in identifying relevant information faster.

Connected worker (AR): These platforms provide visual guidance and support to industrial workers (like visual step-by-step instructions, visual remote expert support, visually-guided failure recognition and quality checks). Connected worker platforms are open to different HW devices (smart glasses) and provide low-code application development, data visualization and a growing number of vision-based, ready-to-use applications dedicated to industrial workers.

Smart logistics services: These platforms contain a growing number of digital services to manage and optimize all aspects of logistics companies and freight forwarders. This especially includes sensor-based

analytics services around vehicle fleets, trailers, drivers, warehouses and logistics centers. In addition, these platforms act as an integration layer between different digital services and with existing transportation management systems for route planning, optimization, and monitoring.

Industrial metaverse: This topic is strongly centered around the interaction of people with and around digital models of complex industrial operations (simulation of large production lines, logistics processes and entire factories). This RADAR analysis evaluates the current status, vision and approach of vendors from different groups (like factory/plant simulation vendors, start-ups and cloud hyperscalers) to create 3D models of complex industrial operations for optimization purposes. The intention is to create interactive experiences of realistic, real-time simulations.

Segmentation

PAC is going to evaluate the providers of open digital platforms in Europe in six PAC INNOVATION RADAR segments dedicated to specific use cases:



Fig. 4: PAC INNOVATION RADAR – segments analyzed

Provider Selection and Participation

What providers are positioned in the PAC INNOVATION RADAR?

Providers are selected and invited according to the following criteria:

- **Size of revenues** in the segment to be analyzed in the specified region;
- **“Relevance”**: Even providers that do not belong to the top-selling providers in the segment to be analyzed are considered if PAC classifies them as relevant for potential customers, for instance due to an innovative offering, strong growth, or a compelling vision.

There is no differentiation as to whether the providers are customers of PAC – neither in the selection of the providers to be positioned, nor in the actual evaluation.

What do providers have to do in order to be considered in a PAC INNOVATION RADAR analysis?

The decision as to which providers are considered in the PAC INNOVATION RADAR analysis is entirely up to PAC. Providers do not have any direct influence on this decision.

However, in the run-up to a PAC INNOVATION RADAR analysis, providers can make sure in an indirect way that PAC can adequately evaluate their offerings and positioning – and thus their relevance – e.g., by means of regular analyst briefings, etc.

Why should providers accept the invitation to participate actively?

Whether or not a provider participates in the RADAR process does not actually affect their inclusion and positioning in the PAC INNOVATION RADAR, nor their assessment. However, there are a whole host of benefits associated with active participation:

- Participation ensures that PAC has access to the largest possible range of specific and up-to-date data as a basis for the assessment;
- Participating providers can set out their specific competencies, strengths, and weaknesses as well as their strategies and visions;
- The review process guarantees the accuracy of the assessed factors;
- The provider gets a neutral, comprehensive, and detailed view of their strengths and weaknesses as compared to the direct competition – related to a specific service in a local market;
- A positioning in the PAC INNOVATION RADAR gives the provider prominence amongst a broad readership as one of the leading players in the segment under consideration.

Evaluation Method

Evaluation of criteria at cluster and subcluster levels					
Main cluster Cluster	Competence			Market strength	
	Strategy	Portfolio	Expansion	Market growth	Market position

Fig. 5: PAC INNOVATION RADAR – evaluation method

PAC uses predefined criteria to assess and compare the providers within given service segments.

The assessment is based on:

- The provider’s self-disclosure via questionnaire;
- A briefing call about the provider’s organization, resources, approaches, portfolio, customer focus, customer references, investments, partnerships, certifications, etc.;
- If applicable, a poll among customers by PAC;
- The analysis of existing PAC databases;
- Secondary research.

The provider data is verified by PAC and any omissions are rectified based on estimates.

If the provider does not participate, the assessment is performed using the proven PAC methodology, in particular based on:

- Information obtained from face-to-face interviews with the provider’s representatives, analyst briefings, etc.;
- An assessment of company presentations, company reports, etc.;
- An assessment of PAC databases;
- An assessment of earlier PAC (INNOVATION) RADARs in which the provider participated;
- A poll among the provider’s customers (as required) on their experiences and satisfaction.

Based on the scores in competence and market strength, the overall score is calculated. The overall score is calculated by using the weighted criteria assigned to the "Competence" and "Market Strength" clusters. From the resulting overall score, each provider receives their characteristic positioning within the PAC RADAR. Here, the following applies: The closer a company is to the center, the closer they are to meeting customers' requirements.

Reissue of published RADARs

The assessments in the PAC INNOVATION RADAR represent an assessment of the providers within the given peer group in the year in which the respective PAC INNOVATION RADAR was published.

The evaluations may not be directly comparable with those of any previous version due to subsequent content modifications. In particular, they do not depict a development of individual providers over time.

Methodological and/or organizational modifications may be made due to changing market conditions and trends, and may include:

- A different peer group in the focus of the analysis;
- Modification of individual criteria within clusters and sub-clusters;
- Increased or altered expectations by user companies;
- Adjustment of the weighting of individual criteria

Considered Providers by Segment

Open digital platforms for industrial edge management	Open digital platforms for industrial data fabrics	Open digital platforms for industrial copilots (GenAI)	Open digital platforms for connected workers (AR)	Open digital platforms for smart logistics services	Open digital platforms for the industrial metaverse
<ul style="list-style-type: none"> • AVEVA • Bosch Rexroth • FLECS • Hilscher • Kontron • Lenze • Litmus • Phoenix Contact • Portainer • Rockwell Automation • Siemens • TTTech Industrial • Weidmüller 	<ul style="list-style-type: none"> • AVEVA • Cloudera • Cognite • CONWEAVER • Databricks • Element • Google • Microsoft • SAP • Snowflake 	<ul style="list-style-type: none"> • 40Factory • ABB • Beckhoff Automation • Cognite • German Edge Cloud • Microsoft • Rockwell Automation • Schneider Electric • Siemens • SymphonyAI • Tulip • Zerynth 	<ul style="list-style-type: none"> • Atheer • Augmentir • CareAR • Dassault Systèmes • Glartek • Help Lightning • Librestream • Microsoft • oculavis • PTC • Scope AR • SightCall • TeamViewer 	<ul style="list-style-type: none"> • Bosch • Fleetboard • FleetGO • Flottaweb • Geoecept • Geotab • Linqo • Michelin • RIO • Samsara • SPEDION • Trendfire • Verizon Connect • Webfleet • ZF 	<ul style="list-style-type: none"> • AnyLogic • AutoMod • Dassault Systèmes • F.EE • FlexSim • ipolog/SyncTwin • Lanner • Mitsubishi Electric Automation • Rockwell Automation • Siemens • Simio • SIMUL8 • Visual Components

Evaluation Criteria

Connected Workers (AR)

COMPETENCE

STRATEGY	<ul style="list-style-type: none"> Vision Strategic activities in the last 12 months Unique selling proposition (USP) 	PORTFOLIO	<ul style="list-style-type: none"> Addressed industrial use cases Portfolio quality based on client references Open system approach
EXPANSION	<ul style="list-style-type: none"> Expansion of go-to-market and business model Expansion to new use cases Expansion to new technology 		
MARKET STRENGTH		MARKET POSITION	<ul style="list-style-type: none"> Ecosystem of partners Client base and relationships in Europe
MARKET GROWTH	<ul style="list-style-type: none"> Market perception in Europe Momentum 		

PAC RADAR REPORT LICENSE

PAC INNOVATION RADAR “Open Digital Platforms for Connected Workers (AR) in Europe 2024”

Unlimited reprint rights

Within the framework of the license with unlimited reprint rights the customer receives a PAC RADAR short report, a PAC RADAR graphic, and a PAC RADAR badge. Their usage and distribution to external parties is expressly permitted, without any limitations. The customer is entitled to use the contents of this PAC RADAR short report as well as the PAC RADAR graphic and badge, either completely or partially (e.g., individual text sections or graphics), for all marketing and communications purposes.

In any usage and distribution, all contents of the PAC RADAR short report, the PAC RADAR graphic, and the PAC RADAR badge must always be marked with the “PAC” source reference. However, the contents must not be manipulated or deployed in such a way that changes the context.

The usage rights defined within the license with unlimited reprint rights refer to the PAC RADAR short report, the PAC RADAR graphic, and the PAC RADAR badge, however, under no circumstances include the usage of the contents of the full version of the PAC RADAR report.

Moreover, copyright conditions for the PAC RADAR apply (see [About the PAC RADAR](#)).

ABOUT THE PAC RADAR

The PAC RADAR is protected by Pierre Audoin Consultants (PAC) GmbH's copyright.

The PAC RADAR is a graphical representation and written analysis of the positioning of various IT providers within a defined market segment at a specific point in time. The positioning and characterization of selected companies within the PAC RADAR is conducted on the basis of an analytical assessment of criteria which PAC previously defined for this analysis.

The selection, positioning, and characterization of companies within the PAC RADAR is not subject to any vested interests whatsoever. PAC does not support any providers that are represented in the PAC RADAR, and does not give any recommendations to technology users. The PAC RADAR represents a result from market research only and must not be taken as a recommendation for action.

The contents of the PAC RADAR have been created with utmost diligence and care. However, PAC cannot be held responsible for any errors or omissions.

PAC excludes all express or implied claims, also if derived from warranties with respect to the PAC RADAR report, including any implied warranties of merchantability or fitness for a particular purpose.

The PAC RADAR may only be used for a license fee and with the consent of PAC. Moreover, the use and publication of the contents and the results of the PAC RADAR are subject to the "Terms & Conditions for the Usage of Pierre Audoin Consultants' SITSI® License".

Copyright Pierre Audoin Consultants (PAC) GmbH 2024. All rights reserved.

More on www.pac-radar.com.

ABOUT PAC

We are a content-based company with a consulting DNA. PAC is the leading European consulting and analyst firm supporting software & IT service vendors worldwide. Since 1976, we have helped our clients to understand market dynamics, grow their revenue and raise their profile. Our unrivalled understanding of European markets, and deep research coverage help key market players to define their strategy, optimize their go-to-market and increase market share. PAC is an analyst-led consultancy with a team of over 100 experts across Europe. We provide market research and analysis on more than 30 countries worldwide, delivered through our portfolio pillars, Guidance, Insights, and Visibility, and our renowned SITSI® research platform.

More on www.pacanalyst.com.