



SENSEYE PREDICTIVE MAINTENANCE

Maximising your ROI with scalable, predictive maintenance

A guide on optimizing your ROI potential by scaling predictive maintenance, utilizing data effectively, and tapping into the capabilities of the Senseye Predictive Maintenance ROI Calculator.

Find out more: [siemens.com/senseye-predictive-maintenance](https://www.siemens.com/senseye-predictive-maintenance)

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Introduction

The industrial sector currently faces multiple challenges, ranging from sustainability concerns, efficiency pressures and the battle for profitability due to post-pandemic inflation and the rising cost of living.

What was thought to be a short-term issue for manufacturers during the pandemic has lingered for an unprecedented period. Inflation has now spanned between seven and nine per cent -the highest in 40 years- from 2022 and is set to rise throughout the remainder of 2023¹, continuing to push businesses to their fiscal limit.

Elevated energy and commodity prices persistently challenge the industrial manufacturing and automotive sectors, which are major consumers of both energy and raw materials. Coupled with widespread wage inflation across various business tiers, a deficiency of skilled labour, shifts in global government policies, rising interest rates, emerging sustainability objectives, and the shadow of an impending recession, companies are recalibrating their priorities for the coming year.

To survive and thrive, industries must not only minimize costs but also maximize efficiency. One way that companies are adjusting their operations is by evaluating their maintenance strategies to unlock potential ROI that may be restricted by traditional approaches.

Traditional maintenance strategies, such as reactive and preventive maintenance, are no longer sufficient for organizations aiming to gain a competitive edge. The era of predictive maintenance heralds a fundamental shift in how we approach asset management, operational efficiency, and return on investment (ROI).

Why Predictive Maintenance at Scale?

Traditional maintenance strategies often involve scheduled inspections and part replacements, irrespective of the actual condition of the equipment.

These methods are not only costly but also inefficient, as they fail to consider the real-time status of machinery and can lead to unnecessary downtime. On the other hand, predictive maintenance at scale, uses data analytics, machine learning, and other advanced technologies to monitor the condition of equipment and predict failures before they happen across thousands of machines in plants globally.

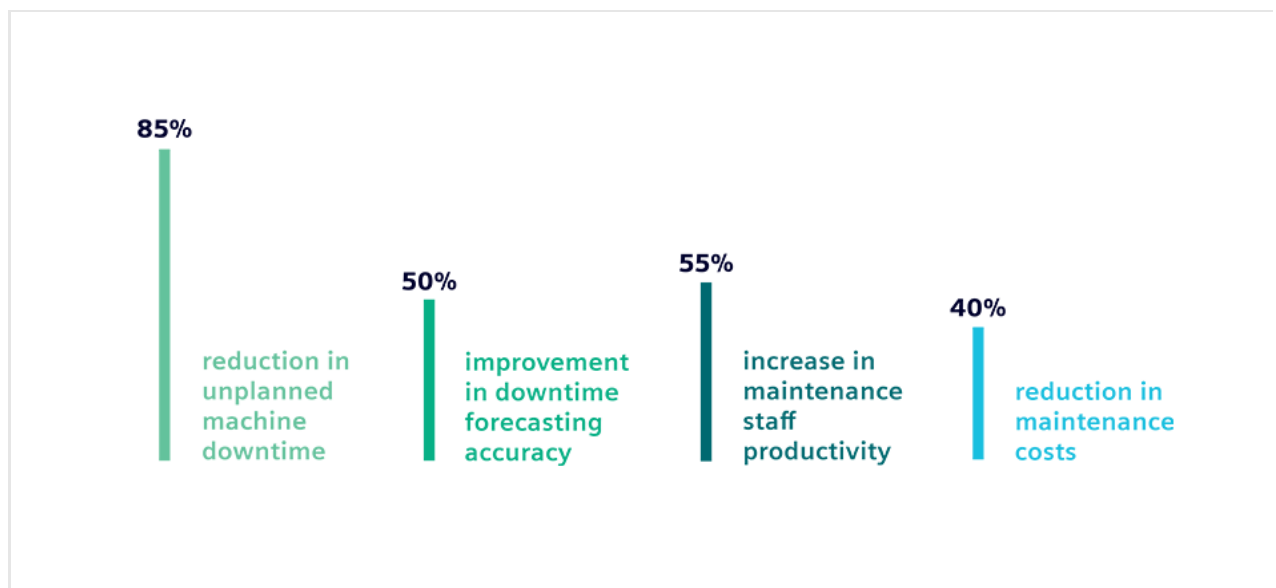


The ROI Potential

The financial benefits of implementing predictive maintenance at scale are substantial.

According to estimates, industries can reduce maintenance costs by up to 30%, improve asset utilization by 20%, and extend the life of machinery by years, thus unlocking hidden ROI potential. Predictive maintenance is not just a solution to a problem; it's a strategy for industrial transformation.

The potential ROI of scalable, predictive maintenance (PdM) projects can be substantial. By bringing in PdM, Siemens Readiness for Predictive Maintenance at Scale report 2023 showed that customers have achieved the following:²



Data gathered from Siemens [Readiness for Predictive Maintenance at Scale report 2023](#)

This whitepaper explores how organizations can leverage scalable predictive maintenance to unveil untapped ROI opportunities while simultaneously achieving sustainability objectives and boosting operational efficiencies and how to calculate your own ROI and assess your organization's readiness for predictive maintenance at scale.

Executive Summary

- The industrial sector is contending with post-pandemic challenges, including soaring inflation and operational costs.
- Traditional maintenance strategies are outdated; predictive maintenance, leveraging data analytics and machine learning, offers proactive equipment health monitoring.
- Implementing predictive maintenance at scale can significantly boost ROI, with reductions in maintenance costs, increased asset utilization, and extended machinery lifespan.
- Importance of Condition Monitoring: Condition monitoring, underpinned by real-time analytics, is pivotal for the optimization of machinery and operational assets. Insights from Siemens highlight the necessity of an effective condition monitoring system to significantly increase ROI.
- For successful deployments, commitment from management and operational teams is critical. However, only 50% of manufacturers are ready for Predictive Maintenance without extensive support, largely due to challenges in organizational culture. Only 19% of manufacturers have reached peak cultural maturity, whereas 57% excel in data proficiency.
- There is a strong link between cultural maturity and key maintenance KPIs, including unplanned downtime and associated costs.
- For a clear ROI, organizations must weigh the implementation costs (technology, training, and overheads) against benefits such as reduced downtime and extended asset lifespan.
- Predictive maintenance at scale reduces unplanned downtime, resulting in operational efficiency and cost savings.
- Predictive maintenance can significantly boost ROI, with studies showing an average ROI of 250%, but its success depends heavily on quality data and its correct utilization.
- Mature organizations leveraging real-time data are evolving their maintenance strategies, leading to informed decision-making and optimized ROI.
- The true value of predictive maintenance at scale lies in avoiding unnecessary costs, with high data maturity and a strategic approach pivotal for effective implementation and maximized returns.
- For organizations to fully optimize their ROI, tools like the Siemens' predictive maintenance at scale ROI Calculator are recommended, providing detailed insights based on various operational factors.

Enhancing ROI Through Strategic Predictive Maintenance

Optimizing the health and performance of machinery and operational assets has never been more crucial. Condition monitoring, a data-driven approach rooted in real-time analytics, offers a robust framework for achieving these optimizations. This chapter drawing insights from industry experts at Siemens, delves into the fundamental strategies to build an impactful and scalable predictive maintenance program that significantly boosts Return on Investment (ROI).

The Cornerstones of Effective Predictive Maintenance

Establishing Clear Objectives

Manufacturers must lay down well-defined objectives for any scalable predictive maintenance deployment to succeed. Whether these objectives revolve around regulatory compliance, cost reduction, or quality enhancement, having a clear purpose is vital for steering the program effectively.

Identifying Key Performance Indicators

To gauge the efficacy of a predictive maintenance project, selecting the appropriate Key Performance Indicators (KPIs) is vital. Potential KPIs could range from reducing production costs and minimizing equipment downtime to extending the useful life of assets. These measurable metrics serve as a precise yardstick, enabling organizations to monitor performance and quantify ROI with greater accuracy.

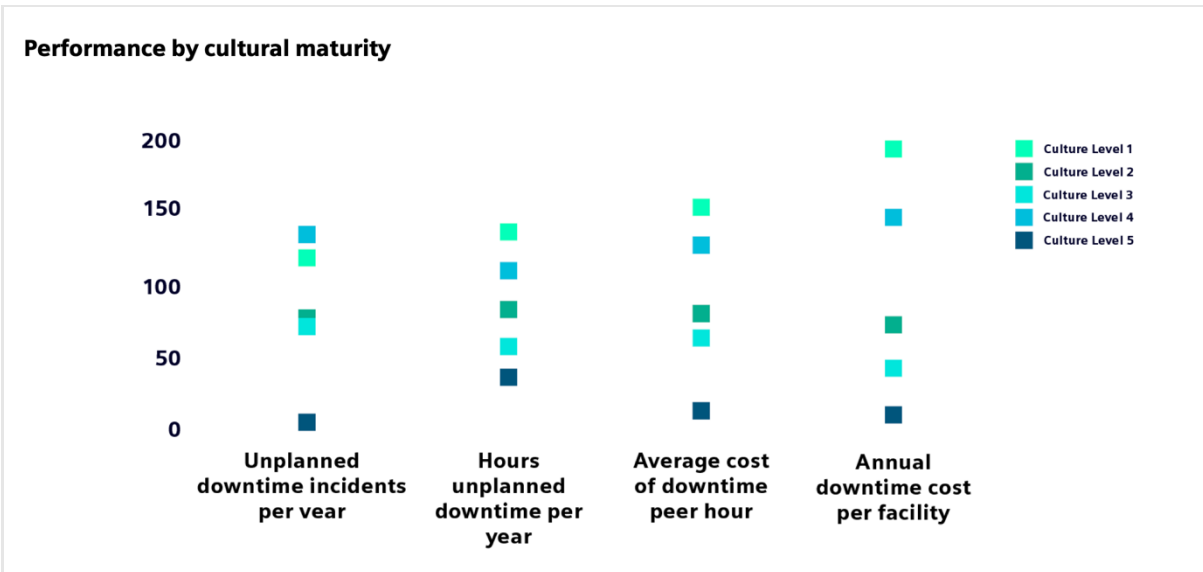
Assessing Organizational Preparedness

The human element is often the make-or-break factor in the success of predictive maintenance initiatives. The level of commitment from senior management, operations, and engineering teams is crucial for the program's long-term viability and effectiveness.

The Readiness for Predictive Maintenance at Scale report 2023 projects that about 50% of major manufacturers are mature enough in their data practices and organizational culture to

effectively implement Predictive Maintenance (PdM) without intensive customer success management (CSM) support. ³ The remaining 50% either necessitate enhanced CSM intervention or are at risk of failing without foundational preparation.

The primary hurdle is organizational culture. Merely 19% of manufacturers rank at the pinnacle in terms of cultural maturity, while an impressive 57% have achieved the highest tiers of data proficiency. Evidently, most firms possess the requisite data.⁴



This table suggests a clear correlation between high levels of cultural maturity and all the following maintenance KPIs:

- Number of unplanned downtime incidents
- Hours of unplanned downtime every year
- The average cost of an hour of downtime
- Total annual downtime costs per facility

Therefore, it is proven that enhancing cultural maturity within your business is a key cornerstone to optimize your ROI potential.

How to enhance cultural maturity within your organization

Organizations that achieve higher cultural maturity in Predictive Maintenance (PdM) share distinct enabling factors. Firstly, they are objective-driven, setting clear and quantifiable goals.

Firms that are guided by metrics that capture aspects like maintenance effectiveness and energy consumption, ensuring clarity in their PdM objectives from the onset. Secondly, comprehensive buy-in is pivotal.

This means commitment from senior leadership who champion the PdM transition, maintenance teams who need proper training and engagement, IT departments that facilitate system integrations and data-sharing, and operations teams that provide on-ground insights and feedback. Additionally, early engagement with these stakeholders fosters a collaborative approach, allowing for smoother adoption of PdM practices.

Lastly, seeking expert support is a common trait among these organizations. They understand that PdM isn't a one-size-fits-all product but a customizable methodology. By viewing PdM as an organization-wide project and a philosophy change, they lay a robust foundation for achieving substantial benefits and maturing their operational culture.

Read our [“Readiness for Predictive Maintenance at Scale Report 2023”](#) for information about how to do this.

Conducting a Comprehensive Cost-Benefit Analysis

Justifying the ROI involves a rigorous analysis of both costs and benefits. Organizations need to account for all costs associated with the implementation, which include technology acquisition, employee training, skill development, and other related overheads. These expenses should then be compared against potential benefits like avoiding downtime and extending asset longevity to determine the program's ROI.

ROI Enhancement Facilitated by Scalable Predictive Maintenance Strategies

Minimizing Downtime and Mitigating Risks

Predictive maintenance at scale facilitated by strategies such as condition monitoring can drastically cut down unplanned downtime, leading to significant operational efficiencies and cost savings.

Prolonging Asset Longevity

By shifting from reactive to proactive maintenance strategies, condition monitoring enables organizations to extend the operational lifespan of their assets. This deferral of capital expenditure contributes positively to ROI.

Optimizing Maintenance Costs

Predictive Maintenance at scale not only lowers maintenance costs but also refines the process. It replaces broad preventive measures, often managed by expensive third-party services, with targeted, in-house maintenance activities.

This focused approach reduces labor hours, associated costs, and average repair times. The capability to identify failing components also minimizes wasteful trial-and-error repairs and reduces inventory holding costs for spare parts.

Enhancing Product Quality

Keeping machinery at its peak performance through predictive maintenance and condition monitoring helps achieve consistently high product or service quality, thereby potentially increasing revenue, and customer satisfaction.

The system elevates crucial operational metrics, such as equipment uptime, component durability, and overall efficiency. Remote monitoring capabilities also provide expert support without necessitating costly on-site visits, an invaluable feature for businesses operating in remote or geographically challenging locations.

In summary, predictive maintenance at scale serves as more than just a maintenance tool—it's a strategic asset for any organization. When well implemented, it can substantially amplify ROI by minimizing costs and maximizing operational efficiency.

Maximizing Return on Investment through Data-driven and Scalable Predictive Maintenance

One of the most promising avenues for ROI optimization is the strategic application of scalable predictive maintenance with recent studies showing that it can be a significantly cost-effective investment. For example, one study by the American Society of Mechanical Engineers found that the average ROI for Predictive Maintenance projects is 250%⁵.

However, the productiveness of scalable predictive maintenance is heavily contingent upon the quality and judicious use of data fed into the tool. This chapter elucidates the critical role of existing data in enhancing predictive maintenance strategies and consequently, augmenting ROI.

The Certitude of Control: A Benchmark in Maintenance Optimization

Among more mature organizations, the concept of control over maintenance processes is transcending from execution to comprehensive awareness. Such organizations not only ensure that their systems are well-maintained but are also confident that their preventative measures are effective.

This reassurance enables an efficient allocation of resources, specifically in maintenance activities. Instead of adhering to potentially outdated practices—such as periodic grease sampling or prophylactic bearing replacements based on manufacturer guidelines—these organizations can rely on real-time, high-quality data to make informed decisions. By eliminating unnecessary maintenance procedures, organizations can enhance Return on Investment (ROI).

The Concept of Bankable Value in Scalable Predictive Maintenance

According to domain experts, the most significant value derived from predictive maintenance is not merely the prevention of equipment failure. Rather, it is the averted costs associated with unnecessary maintenance and spare parts inventory.

Employing a data-driven approach allows organizations to shift from crisis management to proactive, value-generating activities. Every so often, these strategies yield significant "wins," such as the timely detection of an impending failure, reaffirming the value of predictive maintenance initiatives. ¶ However, the consistent, incremental gains achieved by avoiding unnecessary maintenance activities often constitute substantial contribution to ROI.

Operationalizing Data for Effective Decision Support

The epitome of predictive maintenance lies in its capacity to serve as a decision-support tool. The application is designed to provide actionable insights, which, if heeded, could either prompt timely interventions or validate the status quo, thus preventing wasteful activities.

For example, before halting an entire production line for scheduled maintenance, organizations can consult their data analytics tools. If the data indicates that the machinery is functioning optimally, the scheduled downtime can be postponed, saving both time and resources and thereby enhancing ROI.

Data Maturity to Maximise ROI

For effective and scalable Predictive Maintenance (PdM), the right metrics that anticipate machine issues are vital. While retrofitting sensors is commonly believed to be a necessity, in many cases, existing data from systems like Programmable Logic Controllers (PLCs) is adequate. Monitoring changes in metrics such as current or torque can pre-emptively identify failures, enabling interventions that prevent costly breakdowns.

A significant number of manufacturers looking into PdM have the required data, making the transition smoother and more economical than retrofitting sensors. Higher data maturity not only ensures a smoother PdM implementation but can also maximize ROI by optimizing maintenance schedules, reducing downtimes, and extending equipment lifespan.

The Readiness for Predictive Maintenance at Scale report suggests that there is a high level of data maturity among companies already considering Predictive Maintenance, but the broader

industry might still need significant support. As manufacturers shift towards cloud storage, data accessibility and readiness for PdM are further enhanced. However, it's essential for businesses to accurately gauge their data maturity to fully leverage its potential for maximum ROI in PdM initiatives.

Do's and Don'ts in Data-Driven Predictive Maintenance

In summary, the following guidelines are recommended for organizations aspiring to maximize ROI through predictive maintenance at scale:



The strategic utilization of existing data in predictive maintenance initiatives offers a potent avenue for ROI maximization.

By enabling organizations to make data-informed decisions, predictive maintenance tools not only reduce operational risks but also optimize resource allocation, thereby significantly enhancing ROI. The road to maximizing ROI is paved with quality data and insightful decision-making; organizations that understand this are better positioned for success in a competitive marketplace.

How Different Industries are Using Predictive Maintenance at Scale to Unlock Earning Potential

Predictive Maintenance is a ground-breaking solution for large corporations managing an extensive portfolio of plants and machinery. This innovation not only offers real-time insights into the health of equipment but also fosters proactive maintenance strategies, leading to significant reductions in both downtime and operational costs.

By leveraging sensor technology to continuously monitor equipment performance, maintenance teams can pre-emptively identify and rectify minor issues before they escalate into major problems.

This approach effectively minimizes unplanned downtime and reduces maintenance expenses, while simultaneously enhancing productivity, decreasing waste, and elevating profits.

Case Studies: The Real-World Impact of Predictive Maintenance

1. Transforming Aluminum Production: Achieving a 20% Reduction in Unplanned Downtime

This pioneering global leader in bauxite, alumina, and aluminium products has a history that spans over 130 years. Facing narrow margins in the global aluminium market and increasing operational targets, the company seeks to upgrade its maintenance methodologies.

They required a specialized Predictive Maintenance solution that can seamlessly integrate with existing data feeds without the need for numerous new sensors. The solution also needed to be user-friendly and capable of rapid global deployment, all while delivering a quick return on investment.

After adopting Predictive Maintenance in their East Icelandic facility, the company achieved:

- A 20% reduction in unplanned downtime.

- Streamlined operating efficiencies and curtailed maintenance costs.
- ROI goals achieved within just 4 to 6 months.
- Extension of the solution to additional global sites.

Currently, more than 10,000 diverse machines, ranging from robots to conveyors, are remotely monitored using Senseye Predictive Maintenance's proprietary machine-learning algorithms.

2. Increasing operational efficiency for leading steel producer

BlueScope, a lead producer of steel faced significant challenges managing diverse machinery across its global operations and aimed to boost efficiency through predictive maintenance to reduce downtime and maintenance costs. Given the competitiveness in their industry, any downtime was critical, especially when their plants operated at near capacity.

Integrating the predictive maintenance platform became a game-changer. This platform provided comprehensive daily reports and crucial KPIs, particularly 'downtime avoided,' proving essential their management. Innovatively, they combined this platform with IoT devices for machine vibration monitoring, enabling early detection of potential equipment issues, translating to significant resource savings.

The platform's adaptability allowed customization to the client's distinct needs, facilitating their digital transformation journey and ushering in a proactive maintenance culture, ensuring a cost-effective future.

3. Rapid ROI for European Automotive Manufacturers

A major global automotive manufacturer, operating in 20 countries, possesses abundant sensor data but lacks the skilled resources for manual analysis. They decided to embark on a Predictive Maintenance program aimed at reducing production downtime by up to 50%.

With ongoing support from Siemens industry experts, the manufacturer extends its predictive maintenance capabilities across its global production facilities. Over time, they achieve complete autonomy in the scaling of their Predictive Maintenance initiatives. Key results include tens of millions in downtime savings and a rapid ROI of less than three months.

Optimise your Return on Investment with the Senseye Predictive Maintenance ROI Calculator

Take next Steps on your Scalable, Predictive Maintenance Journey and discover your potential Return on Investment.

Enhancing your return on investment (ROI) begins with a thorough assessment of your current situation.

By taking this critical step, you can unearth potential streams of untapped revenue and forecast the prospective enhancements to your ROI.

A practical way to do this is with our ROI Calculator. This allows you to assess your current levels of data and cultural readiness for PdM at scale and learn about your potential cost savings by successfully implementing Senseye Predictive Maintenance.

**Calculate your
potential ROI**

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