ARTICLE

Predictive analytics: How to move beyond the pilot phase

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Whatever an organization's vision for the future, it should include predictive and prescriptive maintenance strategies to grow. Successful predictive maintenance strategies prioritize integrated solutions that unlock value from industrial data silos, maximize labor productivity, and drive continuous operational improvement.

As workforces evolve, the systems that enterprises use to make critical decisions should include new technologies that democratize data, enabling teams to collaborate better and giving them the confidence to make faster, more accurate decisions.

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Getting the most out of your data

Organizations use the vast majority of their available data ineffectively. Enterprises should create a unified information platform that connects all available data sources to get the most out of their information.

When businesses can access a single source of truth that delivers real-time data across the enterprise, they can connect workers, secure collective knowledge to maintain operational reliability, and identify new insights to optimize business operations.

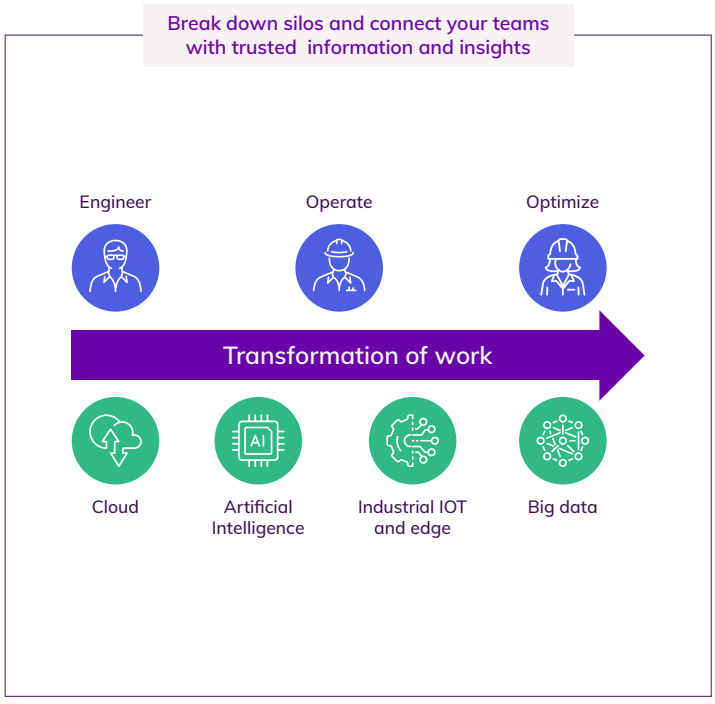
When all data sources are unified, it creates a digital thread that empowers engineering and operations teams to:

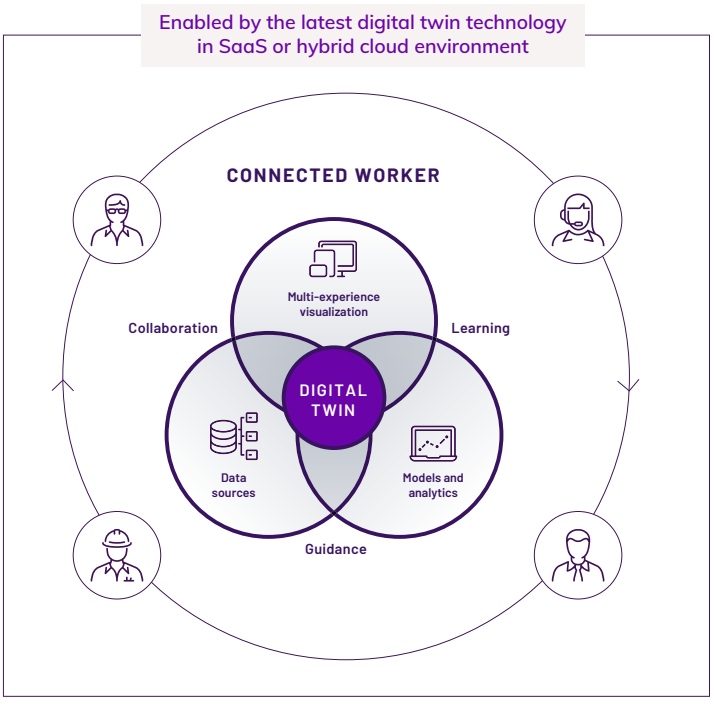
- Collect, aggregate, and contextualize massive amounts of data
- Connect engineering data with operations data and eliminate silos
- Derive new insights that span the entire asset life cycle, including engineering, operations, maintenance, and decommissioning
- Infuse the data with artificial intelligence (AI) and machine learning (ML) for predictive and prescriptive analytics
- Visualize information seamlessly throughout the enterprise in a single pane of glass

A digital twin is created when this digital thread is infused with predictive models, AI-powered analytics, and multi-experience visualization. A digital twin is a digital representation of a real-world physical product, system, or process. It can create insights that span the entire asset life cycle, from capital projects and engineering to operations and asset performance optimization.

A digital twin can help businesses scale their predictive analytics efforts much faster, as data, predictive models, analytics, and visualization are already standardized and ready for use.

For example, when **SCG Chemicals**, Thailand's largest petrochemical company, built a digital thread, it increased its plant reliability. With a single platform that provided integrated, real-time visibility into its operations, SCG Chemicals then used AI-powered analytics to drive decision support, achieving a 9x return on investment (ROI) within six months of deployment.





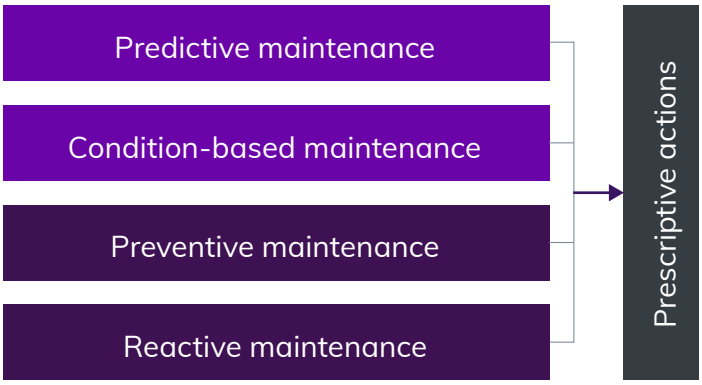
Analytics software delivers fast results

Often constrained by limited resources, decision-makers look to undertake projects that deliver a fast impact and ROI.

AI and ML technologies reduce unplanned downtime and maintenance costs, ensure workforce safety, and build sustainable operations. Enterprises using these technologies often achieve a reduction in OpEx costs of up to 20%.

Many organizations start their predictive maintenance journey with condition-based monitoring. While condition-based monitoring focuses on real-time conditions and sensor measurements, AI and ML focus on the early detection of problems using precise models based on historical information and real-time asset health.

A sustainable maintenance strategy would likely combine reactive, preventive, and predictive maintenance approaches tailored to a specific asset's risk profile and criticality. For some assets, a run-to-failure approach might make sense depending on the criticality of the asset to the business. Other assets may require more advanced maintenance depending on their importance, the availability of parts, and other factors.



Southern Power, a leading wholesale energy provider based in the U.S., achieved a fast ROI by first creating a digital thread that served as a foundation for its predictive analytics program. In just a year, it recorded an estimated find valuation of US$10M with 350 observations and 43 significant finds. With a robust digital foundation for its predictive analytics process, Southern Power was able to scale its program quickly and achieve impressive results in improving the operation, performance, and reliability of its assets.

Moving beyond the pilot phase

Many enterprises have initiated pilot projects to begin implementing predictive analytics technology, but some of these companies are unable to move beyond them. Conversely, early adopters of predictive analytics solutions have achieved impressive results and surpassed their competitors, as they continue to benefit from compounding insights.

Several key factors determine the effectiveness of a predictive analytics program. The deployability, usability, maintainability, and scalability of the predictive analytics efforts are of the utmost importance. To efficiently move from the pilot phase to a profitable company-wide rollout, enterprises look for:

1. Open, standards-based connectivity

A successful AI program requires a holistic and comprehensive approach to integrating data and analytics. Simply adapting a set of point solutions with proprietary connectivity options is not enough. An open, agnostic data infrastructure allows all data sources to be connected and included in analytics, providing a complete view without undercutting prior technology investments.

2. The ability to aggregate, contextualize, and visualize data

Turn these large amounts of data into meaningful insights. Workers must be able to understand the information they collect and how it can be applied to improve operational reliability. A digital thread delivers role-specific contextualized information and provides complete visibility into real-time asset health, operations, and asset life cycles with one single pane of glass.

3. A prioritized maintenance strategy

A holistic maintenance strategy should include a combination of reactive, preventive, condition-based, and AI and machine learning techniques aligned to the assets' risk profiles. To understand where to invest predictive efforts, enterprises should understand the criticality of their assets toward business success. Once businesses have insight into the criticality of their assets, they can determine how and where to deploy the different building blocks for a predictive maintenance strategy that drives the greatest impact.

4. Deployability, usability, and maintainability

When the time comes to scale analytics results, teams may find it difficult to deal with the vast amount of data, the maintenance it requires, and how to deploy predictive models across their production lines. The usability, maintainability, and deployability of predictive analytics software are critical for maintaining and optimizing a sustainable analytics program.

Businesses must assess how to deploy different maintenance strategies at scale. What is the best way to manage different strategies in the system? How will different stakeholders use the insights derived from various analytics? How easy is it for stakeholders to act on the predictive alerts? How does the system deal with changes?

5. Scalability

Moving beyond the pilot phase requires a scalable approach. At scale, implementing predictive analytics tied to the digital twin reduces time to value and fosters a programmatic approach to deployment, use, and maintenance.

For example, PETRONAS, Malaysia's fully integrated, multinational oil and gas company, took advantage of the scalability of AVEVA's solutions. Its pilot program was a resounding success: In its first year of deployment, the program caught 51 major early warnings and delivered savings of $17 million and 14x ROI. Since then, the solution's ease of scalability has ensured continued improvements. Following the successful pilot program at four plants, PETRONAS deployed AVEVA™ Predictive Analytics at an additional 10 plants using asset templates. PETRONAS replicated the learnings achieved during the pilot phase, encapsulated them in a digital twin, and deployed them throughout the other plants.

What to look for in a predictive analytics solution?

Organizations can overcome integration hurdles by choosing a trusted, reliable software partner. To help with the decision-making process, businesses should consider:

- How deployable, usable, maintainable, and scalable is the solution? Does the organization have the necessary skill sets to deploy this?
- Does the solution deliver the ability to collect, organize, and analyze data?
- Can the solution integrate engineering, operations, and financial impact analysis data, and data from third-party applications?
- How does the solution handle malfunctioning sensors and anomalous data that might obscure analyses?
- Does the solution include deep fault diagnostics, including time-to-failure forecasting?
- Does the solution have prescriptive analytics to help solve problems efficiently?
- How does the solution handle case management? Does it incorporate a continuous loop of improvement to deal with knowledge retention when workers retire, enabling the new generation of workers?

Each business is different. Enterprises should ensure the solutions they choose address these concerns and fit their specific needs.

Conclusion

When deployed well, predictive analytics solutions always deliver a high return on investment. It is no longer a choice of whether to embark on a predictive maintenance journey, but how. In today's dynamic market, organizations need to build agility and efficiency, and unplanned downtime remains a significant hurdle for operations and maintenance managers to overcome. To get the most out of a predictive maintenance program, organizations must think big and plan for the future with a partner that can help bring their predictive analytics program through the pilot phase and beyond.

Why AVEVA?

AVEVA's digital twin spans the entire asset life cycle from capital projects and engineering to operations and asset performance optimization. Industrial users have one digital customer experience and access to contextualized information to make better, more informed decisions. This technology enables them to increase reliability, reduce unplanned downtime, and lower maintenance costs.

AVEVA's digital twin is typically built incrementally as various capabilities are deployed. For example, enterprises might begin building a digital twin by creating predictive analytics models for quick time-to-value, then add engineering information, simulation, process optimization, and other functionalities in later stages. Modular flexibility allows enterprises to take any combination of paths and scale with a seamless handover to future initiatives.

Because of the open and agnostic architecture, data can be incorporated from AVEVA applications, customer projects, and partner offerings. The ability to work in concert with multiple technology providers is critical for customers to maximize value from their technology investments.

AVEVA Predictive Analytics requires no coding and includes purpose-built AI and self-service analytics. It delivers in-depth analyses, including time-to-failure forecasting to help operations and maintenance teams determine whether to operate an asset until the next planned maintenance outage or initiate an urgent shutdown.

Prescriptive guidance allows users to take action to address a failure, reducing the chance of uncertainty or error on the part of the operator. With sensor preprocessing, users can detect and eliminate malfunctioning sensors from the analytics, ensuring the accuracy of the insights.

Native integration with AVEVA™ PI System™ and the asset framework of AVEVA™ PI Server reduces manual errors and provides consistency, which drastically improves maintainability.

When combined with AVEVA™ PI Vision, users can visualize information and design information in 2D and 3D. They can collaborate across process areas and geographical boundaries.

Users can operationalize AI at scale in minutes instead of weeks or months. Automated model-building enables users to leverage a predictive model template to create models for all assets of the same type in a single action. This saves time, reduces errors, and ensures consistency, enabling faster results and ROI.

The predictive results are fed back into AVEVA PI System and displayed in context with other asset-related information to provide a more complete integrated picture of assets' health and performance.

About the author

Petra Nieuwenhuizen Senior Product Marketing Manager, Asset Performance Management at AVEVA. Petra has over 20 years of experience in IT and 10 years in asset performance management. She is a subject matter expert in asset strategies as well as AI and machine learning. Petra connects data, people, processes and technology to help companies quickly increase ROI and become more reliable, safe and sustainable.

Learn more about our solutions for Chemicals from AVEVA