Buyer's Guide to Industrial Analytics: How to Conduct a POC

PRESenso.

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INTRODUCTION

Industrial Analytics and Machine Learning for Asset Maintenance are the Crown Jewels of Industry 4.0. The question we will address in this Guide is how to conduct a Proof Of Concept (POC) to find the most suitable solution for your industrial plant.

The promise of Industry 4.0 and the potential revenue gained from increased uptime has created strong interest in Industrial IoT (IIoT) technologies. For instance, industrial manufacturers that have implemented digitalization strategies were interviewed by PwC and expect revenues to grow by an average of 2.9% and to reduce costs by 3.6% per annum for the next five years. As a result, many analysts predict a surge in spending on IIoT-related technology.

Although there is almost universal agreement that Big Data and Machine Learning can unlock substantial value within the industrial sector, the choice of which solution to purchase is often complex. During dialog with senior management at leading manufacturers and energy producers, we've observed the following challenges:

1. There is uncertainty about how to select an infrastructure platform for IIoT. Although there are several large vendors such as SAP, GE and Cisco, there is still confusion in the marketplace. From a functional perspective, there is no single definition of an Industry 4.0 platform. Furthermore, given the dynamic nature of the category, vendors are hesitant about providing meaningful product roadmaps.

2. A significant amount of innovation comes from startups that are not widely known by CTOs and CIOs. Companies are struggling to keep up with all the new market entrants and to understand the differences between various solution offerings.

3. As with every revolution, Industry 4.0 brings disruptive change. In some cases, the position of Chief Digitalization Officer (CDO) has been created. However, other organizations have not created well-defined roles and responsibilities. The result? The process of selecting solution providers can fall through the cracks. Often times, responsibility is given to Information Technology (IT) groups that have less experience with Operational Technology (OT) or vice-versa.

4. Even if the organization views the move towards digitalization as strategic, there is still the practical issue of accessing sensor data. As we've written about previously, most sensor data that is captured in a production plant is not used. Concerns about data hygiene, the lack of qualified data scientists within the industrial sector and inadequate Business Intelligence tools can slow the adoption of IIoT-based analytics.

PRACTITIONER'S GUIDE: PAYMENT FOR POC

One of the most common topics discussed about POCs is the issue of payment. Some software vendors charge to a conduct a POC whereas others provide this as a free service. The logic is simple: if the POC is part of the vendor's sales cycle, then why should the potential customer pay?

At Presenso, we charge for a POC for the simple reason that there are too many industrial plants that are interested in Industry 4.0 at a strategic level, but have back-end constraints that would prevent deployment of a commercial solution. When a client pays money, it indicates their level of commitment.

For almost all vendors, charging for a POC is not to generate immediate revenue, but intended for cost recovery.

THE 4 STEP PROCESS FOR CONDUCTING A POC FOR AN INDUSTRIAL ANALYTICS SOLUTION

Based on our experience on both the client and vendor side, this article provides a framework that can be used for conducting a POC for an Industrial Analytics solution. (Please note that this article is vendor neutral).
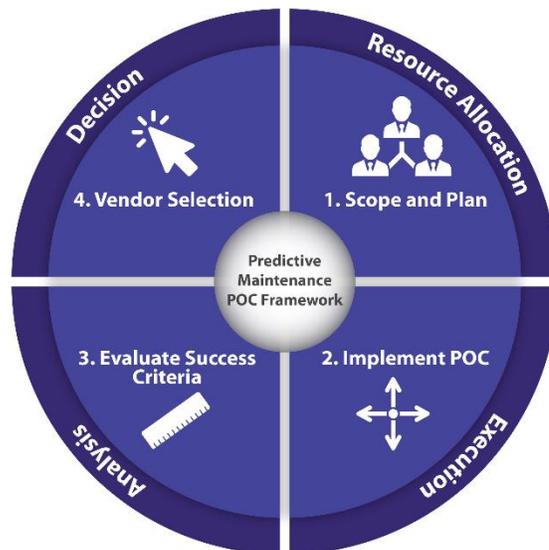
STEP 1: SCOPE AND PLANNING STAGE (1 WEEK)

During this phase, the internal team is assembled, a project plan is formalized and success criteria are defined.

1.1 CREATE A TEAM OF INTERNAL CHAMPIONS

Industrial Analytics software is not a commodity item. In many cases, deciding on an Industrial Analytics solution provider has broader implications. Therefore, the decision-making process should include stakeholders with authority and influence within the organization.

PRACTITIONER'S TIP: STAKEHOLDERS SHOULD REPRESENT BOTH IT AND OT

OT needs to drive the process, but IT needs to be involved from the get go. Organizationally, there are often disconnects between IT and OT organization. The cause for these are well known and include the typical turf-war issues (budget, political etc.) inherent in technology disruptions. Furthermore, IT departments will many times not have the domain expertise in areas such as Machine Learning and Artificial Intelligence.

At the same time, IT departments are often the gatekeeper of sensor data stored in a historian database. IT plays a vital role in Data Governance. There are numerous IT-controlled processes for data cleansing, storage and access required for IIoT to be implemented.

Also, IT groups will need to be responsible for setting standards for network access and security protocols. Standards need to be consistent across the organization and should include IIoT related spheres.

Without access to clean data in real time, the POC may not be successful. If IT plays a constructive role, it can help create the data infrastructure needed to support the project.

Are you interested in learning more about the Convergence of IT and OT? Check out this blog article.

1.2 DEVELOP THE PROJECT PLAN

The purpose of the POC is to reach a decision about vendor selection within a specified time-period. From the outset, all internal stakeholders need to understand the decision criteria that will be used for final selection. This likely requires buy-in from stakeholders with the authority and budget to approve a purchase decision.

This POC represents a significant decision and should be formalized. The project plan does not have to be extensive, but needs to include the following elements:

- List of Requirements / Objectives
- Project Milestones and deliverables
- Resource Allocation
- Communication Plan and point of contact
- Success Criteria (see 1.3 Below)

1.3 USE DATA-DRIVEN SUCCESS CRITERIA

No system is 100% accurate and both false positives and false negatives are to be expected. The POC team needs to define the success criteria prior to engaging with potential vendors.

MUST-HAVE METRICS FOR POC

Your project champions or digitalization team should create specific success criteria based on data performance and of the results as well the functionality of the solution. The following three categories of metrics are recommended:

Accuracy of the results including:
- How many of the findings where meaningful vs. how many were not?

Calculation time including:
- How long does it take to the vendor to provide the results?
- What is the level of vendor's dependency on customer's engineers and understanding of the asset?

Product strengths and weaknesses including:
- User interface
- Ease of integration and installation
- Functionality (e.g., strength of vendors' BI capabilities) and level of support.
- Pricing
- Product roadmap and future features

Keep in mind that a POC gives you the opportunity to work with a vendor and evaluate whether they are responsive to your requirements and can work with your organization on an ongoing basis.

STEP 2: IMPLEMENTATION PHASE (3 WEEKS)

2.1 EXECUTION

Execution is the core process. Working with the solution provider, we recommend including in the POC historical data analysis. To maximize the efficacy of the pilot, we suggest using months or years of historical data for the training and calibration of the Machine Learning algorithms.

2.2 OBSERVATION

Even before you analyze the performance of the data analysis, it is important to observe the overall process. The specific issues to address include the following:
- Was data provided by resources on the schedule that was agreed upon?
- Were there any internal constraints or roadblocks during the execution?
- Was the vendor able to meet all commitments with respect to the delivery of results?

2.3 MODIFICATION

Based on 2.2 Observations above, the original timelines and scope is changed. Any modifications require the approval of project stakeholders. These should be formalized and communicated to the project team and vendors based on the parameters defined in the Communication Plan. (See 1.2 above)

PRACTITIONER'S GUIDE: WHAT CAN GO WRONG?

Based on our experience at Presenso, the following are the most common mistakes made during the POC.

- Failing to secure C-Level support at the onset of the POC
- Excluding IT and procurement from the process
- Misunderstanding the requirements
- Unclear timeframes / weak project plan
- Undefined success criteria

STEP 3: EVALUATE SUCCESS CRITERIA (1 WEEK)

The next step is to compare the insights of machine performance provided by the solution provider with actual performance in the field. Please refer to 1.3 above for the list of success criteria.

There are many approaches to Industrial Analytics including Supervised, Unsupervised and Semi-Supervised Machine Learning. There are pros and cons to each solution as well as cost differentials. We suggest a review of each methodology as part of the overall POC analysis.

Finally, we recommend conducting both Return on Investment (ROI) and Total Cost of Ownership (TCO) analysis. For more information on this topic, please refer to our blog article: Avoiding the Dotcom Bubble: ROI versus TCO in the Era of the Smart Factory.
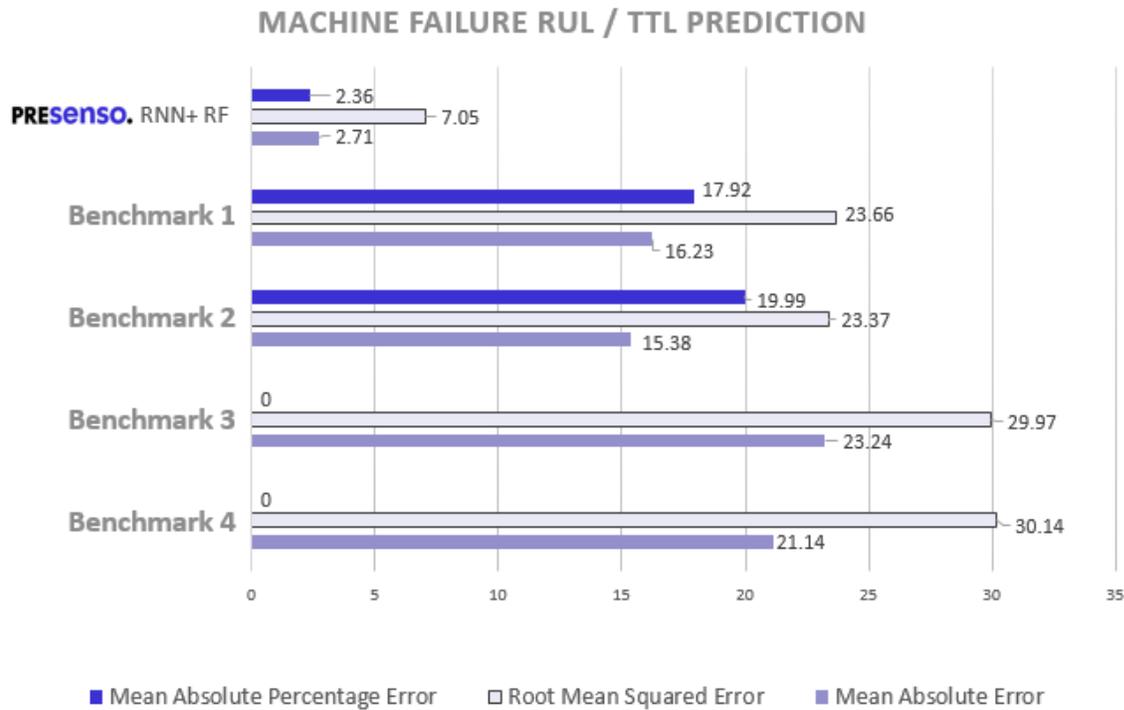
STEP 4: VENDOR SELECTION (1 WEEK)

The goal of the POC is to make a decision about Industrial Analytics software for Asset Maintenance. The POC is not a theoretical exercise or a learning experience. Both the solution provider and internal stakeholders benefit from clearly defined success criteria and a transparent communication plan to inform the vendor of next steps.
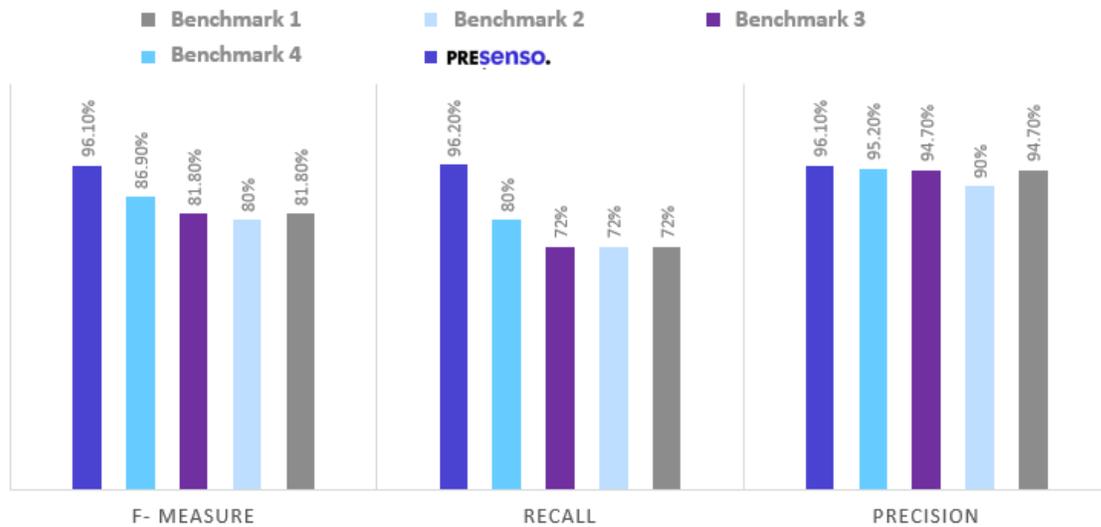The vendor selection process is optimal when the following occurs:
- There is executive buy-in and support from decision makers with the authority to purchase the solution.
- The criteria for vendor selection are established as part of the Project Plan (refer to 1.2 above).
- Vendor notification (go/no-go decision) is based on the mutually agreed upon Communication Plan.

TEMPLATES TO USE FROM INDUSTRIAL ANALYTICS PREDICTIVE MAINTENANCE POC

Due to reasons of confidentiality, we cannot share examples from our customers. Instead, please see templates from tests conducted comparing Presenso and relevant industry benchmarks.

MACHINE FAILURE RUL / TTL PREDICTION

Legend: ■ Mean Absolute Percentage Error □ Root Mean Squared Error ■ Mean Absolute Error

MACHINE WILL FAIL WITHIN CERTAIN TIMEFRAME PREDICTION

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