

The AI Playbook for Process Industries



Start Small Strategy

Making operational decisions is becoming more complex than ever before for the process industries. In response to increasing market volatility, higher growth demands and compliance with tightening sustainability targets, some companies are undergoing a fundamental change in how they reach smarter decisions to optimize their processes, troubleshoot operational issues, or make their capital-intensive assets more reliable.

Industrial AI has the potential to revolutionize process industries manufacturing through the automation of decision steps in a number of areas including design, operations, maintenance and supply chain. For decades the industry has been digitizing plants by capturing and storing operating data, data logs and through various control systems. The data exists, however, as AI solutions have unlocked value in various sectors, the continuous process industries have been slower to adopt AI.

In the article, [“Winning with AI”](#) by Sam Ransbotham et. al, the authors reported that 60% to 80% of AI programs failed to achieve significant business gains. This was despite the promise of AI to improve production capacity, mechanical availability, efficiency and reliability, and to reduce GHG emissions. So, what has caused the process industries to fall behind and how can the sector close the gap?

Technology doesn't create value, people create value.

The problem with AI is that for the moment it feels like a step just out of reach, but the thought of reaching it both exhilarates us and terrifies us at the same time.

“Capturing value through AI requires a three-part solution: collecting the right data, making that data available and accessible, and revamping the company culture to embrace new ways of working. These technologies are now time-tested and constantly improving. Companies can either capitalize on them or cede the advantages of AI to the competition.”

Reported BCG in their article titled [“How Process Industries Can Catch Up in AI”](#)

As with all adventures that feel daunting in the beginning, the path to an AI-driven future starts with a single step that will eventually turn into many, each one paving the way for the next.

Before embarking on the journey, organizations need to start by asking: “what are the problems worth solving in the given time?” These would be key problems that require immediate redress, while also contributing to the overarching business objectives. From a more practical perspective, the answer is to simply start small and allow yourself and your organization to grow into the change.

Managing the disruptive change that AI produces is fundamental to success,

particularly because an AI deployment alone does not guarantee the desired business results. This fact is evidenced by numerous studies that show most AI programs do not achieve their performance improvement targets.

The reason these AI programs fail is because they fail to consider, and plan for, the organizational impact of AI. In fact, a successful AI implementation requires enabling and preparing the organization for the changes in work practices that would result.

How the Start Small approach achieves faster and sustainable outcomes.

The Start Small Approach:

The concept of “start small, think big” refers to the cycle implemented by innovators to break up a project into small pieces, test, learn fast, iterate, and work towards the final goal based on actionable data.

The journey to an AI-driven future won't be reached in a single step but a multitude

of them, with each one opening the door to the next. By starting with small and important problems that realize immediate value for your production teams, you will create trust and confidence with the workforce, who in turn will adopt better data and decision practices, which make new integrated solutions possible. This cycle quickly leads to improvements in how data is captured and used to drive even better decisions by the production teams and leading to transformational value for the organization.

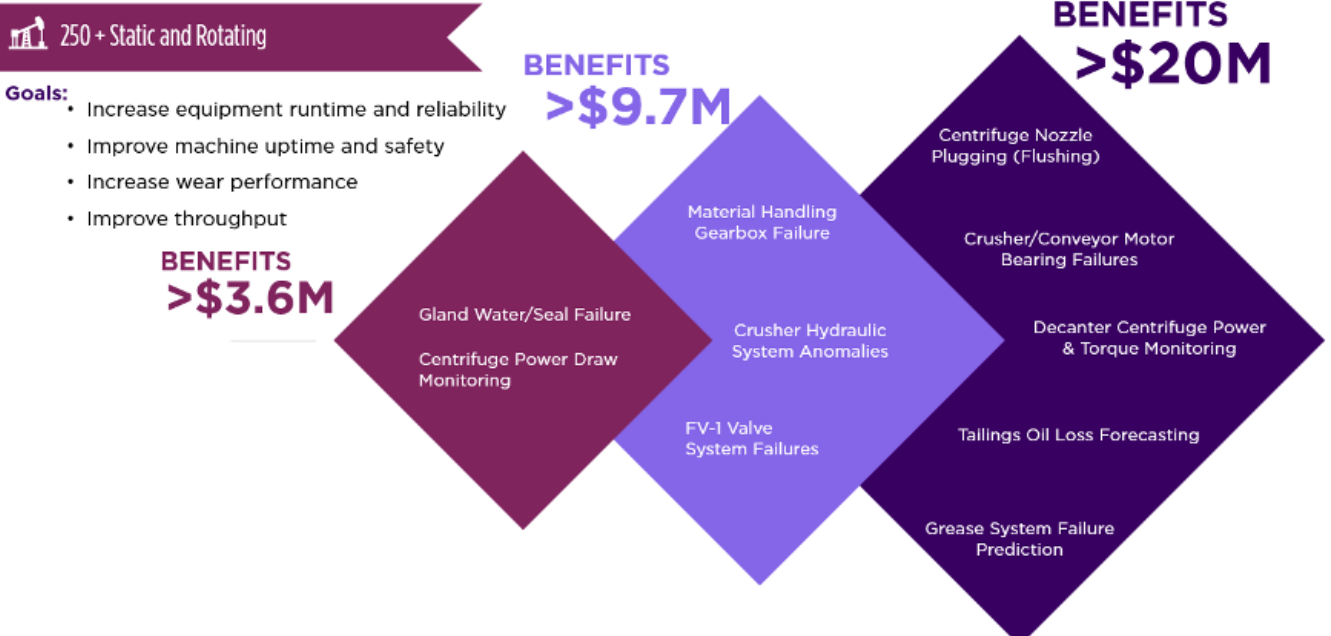
To illustrate this, let's look at an example of how Canvass AI delivered over \$20M in benefits to a leading Oil & Gas company in North America, by improving asset reliability and uptime for a number of their assets. It started with citing a specific problem – a centrifuge separator – with a predictive maintenance solution. Within days, value was delivered. The workforce then quickly gained confidence and expanded the solution to monitor for many more failure modes and for additional assets. What started with one asset, now covers over 20 assets today, and is being expanded to more than 80 assets.

The Value Cycle



It's important to note that the pace of deployment is determined by the readiness of the workforce to adopt the solutions and not by a limitation of the technology.

The Journey did not Start with a \$20M Problem...



Evaluating focus areas for faster time-to-value:

The key in this activity is to identify areas for focus, that deliver immediate benefits while more importantly, setting the stage for broader, more advanced AI applications in the future.

A few good examples of bite-sized problems that address the short-term vs long term balance include:

Focus Areas	Short-Term
Heat Exchanger Fouling Forecasting and Cleaning Prescription	<p>Fouling undermines heat exchanger efficiency and pressure drop issues. Operators are often looking to understand the impact of exchanger fouling and determine the right timing and methods for energy recovery and exchanger cleaning.</p> <p>Industrial AI solutions learns from larger operating and process boundaries, across multiple sensors data, to predict fouling factors more accurately, saving thousands of dollars in energy costs, reducing CO2e emissions and creating a more efficient maintenance schedule.</p>

Focus Areas	Short-Term
<p>Closed loop Co-generation unit Energy Optimization</p>	<p>Boilers and turbines often supply the required energy and power to the various units within the production plant. These units are typically operated by experienced operators who use their knowledge and intuition to handle the changing conditions in the facility and fluctuations in demand.</p> <p>Industrial AI solutions can quickly analyze the entire process and ambient conditions, narrowing down to the most relevant variables or units to reduce energy consumption and GHG emissions. AI driven insights can present new offline operating models that can drive improved and consistent operating decisions and further improve performance. With time, as operators gain confidence, AI can input set points to the controller directly, with operators only intervening in outlier conditions.</p> <p>For example, the Canvass AI Live setpoint closed-loop solution was implemented by a chemical manufacturer to reduce emissions and energy by 4%.</p>
<p>Reduce Flare Events and Minimize Flaring</p>	<p>Flare systems are a highly complex network of connections that protect the plant from over-pressure transients that result from uncommon events. Root causes for flaring are difficult to detect early and the result is disruption in production, energy losses and increased emissions.</p> <p>Multivariate analysis of operating and process simulation data can narrow down to the subsets of relevant variables and create synthetic data where data is unavailable or sparse. Using operating, design, simulation and ambient data sources, AI models are developed that watch for precursors in real-time to predict flare events early. In the next stage, industrial AI are trained to recommend possible actions to reduce flaring.</p>

The above are a few examples of the application of AI for process industries. Each of these is also a gateway to realize the full potential of AI, both in how it solves important problems to create immediate value and for its potential to be integrated into more holistic sustainability solutions.

Whether you pursue any of these, all of these, or something entirely different, the key to the future lies with getting started, getting your organization used to working with and trusting AI, and then mapping out more ambitious plans to capture fuller value from the complex analytics and predictive capabilities of the technology.

Capturing institutional knowledge to future proof your operations

As previously noted, the real process of AI integration is multilayered and goes beyond the implementation of technology. The journey must be equal parts employee capability development, organizational change to address the desired shift in work practices and the AI solution implementation itself.

To drive sustainable change better operational practices must be standardized across the plant. To do this and gain informed operating decision-making, it is critical to package the institutional knowledge of experienced operators along with the AI insight- driven operating models.

The process for AI solution deployment involves a number of discussions with subject matter experts to interpret and contextualize data. While some of the institutional knowledge naturally gets embedded in the AI models, a purposeful approach will ensure standard best practices are preserved in the digital job

aids and decision support tools for the broader workforce and future generations of production teams.

In addition to capturing institutional knowledge, all AI adoption programs should also have a focused capability development practice that provides targeted training to help the workforce adapt to the new work practices that leverage AI insights. By integrating a well-thought-out change management program from the outset, early engagements with targeted work groups and supporting subject matter experts, both internal and external to the organization, can ensure successful adoption of AI to unlock new value and achieve its full potential.

About Canvass AI

[Canvass AI](#) is a leading industrial AI software provider that puts industrial companies in control of their data, to make timely decisions, and achieve faster and sustainable outcomes. Some of the largest companies in the world use Canvass AI to empower their production teams for high performance

decision making, to future-proof operations and drive net-zero targets. Backed by Alphabet and Yamaha Motor Ventures, the Company has been recognized by CB Insights as one of the top 50 companies in the world making a difference in advanced manufacturing. Follow us on [Twitter](#) or [LinkedIn](#).

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