Trends in the Process Industries

Digital Transformation Can Unleash Untapped Potential and Enable Sustainable Growth

With the process industries facing numerous challenges today, there is a growing expectation that technology innovation can chart a path through stormy waters. A look at the latest approaches, from machine learning to cloud and predictive analytics, highlights where digital transformation can unleash untapped potential and enable sustainable growth.

Less than optimal demand, threats from alternative energy sources and lower prices have all driven executives across the process industry into focusing on making significant cost reductions. Digital initiatives promise not only innovation and growth, but are also seen as means of offsetting expense escalation and ensuring cost efficiency. Oil and gas organizations, in particular, are under ever-increasing pressure to digitize their operations faster.

However, as the focus of plant operators and other businesses across the sector shifts toward creating value rather than volume, the questions of “how” and “where” remain. So, what exactly are the digital trends the process industry can profit from?

The Science of Maintenance

Machine learning and analytics are central to digital transformation. This is certainly the case in asset maintenance: an operational area that is still widely seen as unpredictable and unmanageable; a necessary evil that can’t be accurately planned for or avoided. This will change – and is changing.

Conditions are now right, thanks to the wide adoption of sensors and advances in data science and machine learning via the cloud, to evolve asset maintenance. And the technologies available are becoming more mature and reliable. Companies have now the ability to transform asset maintenance from a “cost center” to a “value creator”.
Here, proactive maintenance, in conjunction with predictive analytics, will move to front and center stage. The new approach promises to give engineers and maintenance professionals the opportunity to accurately and proactively identify asset vulnerabilities and to act well ahead of any potential impact on individual assets or larger systems. Based on historical and real-time operational data and leveraging machine learning functionalities, algorithms can model the precursors to failure across all assets and systems.

The output is a refined set of recommendation that enables engineers and maintenance professionals to act well ahead of any potential impact on individual assets or larger systems.

Imagine never having to experience losing a year’s worth of hard-fought optimization value in just two to three days due to a maintenance emergency. Imagine arming staff with the intelligence that pinpoints exactly the specific part in an asset or system that, if they worked on it today, would enable them to avoid unnecessary failures during a spike in demand. All this is possible through the science of maintenance.

**Data Analytics and Industry 4.0**

With data and analytics capabilities certain to advance considerably over the next few years, businesses will have a huge, and ever-growing volume of data available to them to help drive the decision-making process. Organizations are already becoming increasingly comfortable with these technologies and the engineers who will drive this new area of optimization. Analytics, as a representation of the data itself, is telling chemical producers what to measure and what is important to take the business to the next level. The value to an organization is being able to connect the data threads and leverage, as well as monetize, the newly-gained insights. Only by doing so will organizations be able to create significant value and differentiate themselves.

The intersection of modelling, data and analytics solutions is now reaching the market as part of Industry 4.0, whereby complex data from many sources is made understandable so manufacturers can use it in their decision-making to optimize operations, maintenance and even supply chain business processes. The groundwork is done. Now, process and other complex, capital-intensive industries can actually draw new value from their data.

**Data Collection Software**
The new knowledge capture capability in software is going to be increasingly crucial in the area of data analytics. Model-based estimating will become a competitive advantage due to the waves of experienced senior estimators retiring, for example, and engineering, procurement and construction (EPC) firms will come under a great deal of pressure to produce accurate and precise capital equipment estimates and related bids. Organizations need to implement an advanced model-based estimating system to achieve the efficiency, agility, speed and accuracy required to successfully capture a company’s unique proprietary costing basis and project cost history to ensure a competitive advantage.

**Real-time Data for APC**

Advanced process control (APC) optimizes production by using models based on actual plant process data. Unavoidably, as process changes occur, the actual plant behavior deviates from the modelled representation resulting in lost benefits over time. In order to update APC models to match current plant performance the plant must be retested – in real time, accurately and without shutdowns. APC technology provides the tools to update models in the background while simultaneously optimizing the plant. This enables much more frequent updates and accurate models, resulting in sustainable APC benefits over the entire lifecycle of the controller.

**Process Simulation Software Instead of LP Solutions**

Linear planning (LP) tools are traditionally used by plant designers to evaluate options and decision variables and find the optimal solution. However, these models are only valid within a specific operating range of the refinery. Additionally, these tools do not have the ability to auto update, making them outdated and ineffective. As a result, many refineries are turning to rigorous process simulation software that can accurately simulate key refinery equipment such as reactors and distillation units. With the use of the analytical capabilities in these advanced software solutions, refineries can also simulate scenarios around the operating point of the refinery, which allows them to provide the data required to update the planning models used by LP tools.

**Moving SCM to the Cloud**

There are two key supply chain management (SCM) trends we see happening today. First, cloud services for oil, gas and petrochemical companies are hitting the mainstream. As major concerns related to security and uptime/accessibility are being alleviated by advances in technology, the interest from companies in moving
towards hosting supply chain solutions in the cloud has increased. The second significant trend is customers moving away from enterprise resource planning (ERP)-based supply chain planning and scheduling systems due to the limitations of these tools. Many companies are re-engaging with best-of-breed supply chain planning and scheduling vendors to find better solutions to either replace or complement existing planning and scheduling technology.

Automated Business Processes

Automation continues to be a permanent topic for the process industry. Most executives in the EPC industry believe that the current downturn in capital projects workload is a good time to drive automated business processes. But in reality, it is not really happening. A survey by AspenTech which polled 161 organizations, showed that 50% of capital planning and estimating groups are dissatisfied with current practices – including the use of Excel – even for very large and complex projects and a startlingly high percentage use manual data handover between departments.

That’s why improving organizational performance in the areas of bidding and front-end project execution will certainly be a strategic topic in many oil and gas, chemical and engineering contractor boardrooms over the next few years. Implementing better estimating software technology, combined with more collaborative business processes, will provide a huge opportunity for improvement in capital projects, such as driving down capital costs on projects by up to 25%.

Overall, the wave of innovation and new technologies provides mega oil and gas producers, refiners and petrochemical producers with the chance to make a major business change – the opportunity of doing more with less and of adopting technology to navigate steady, sustainable growth. The potential is huge. According to AspenTech, about over $1 trillion of process industry value is left on the table due to the inability of traditional maintenance procedures to address plant reliability issues. Here, analytics and machine learning will break through a significant part of this barrier.

Autor(en)

Norbert Meierhöfer, AspenTech

Kontaktieren