

INDUSTRY SOLUTION

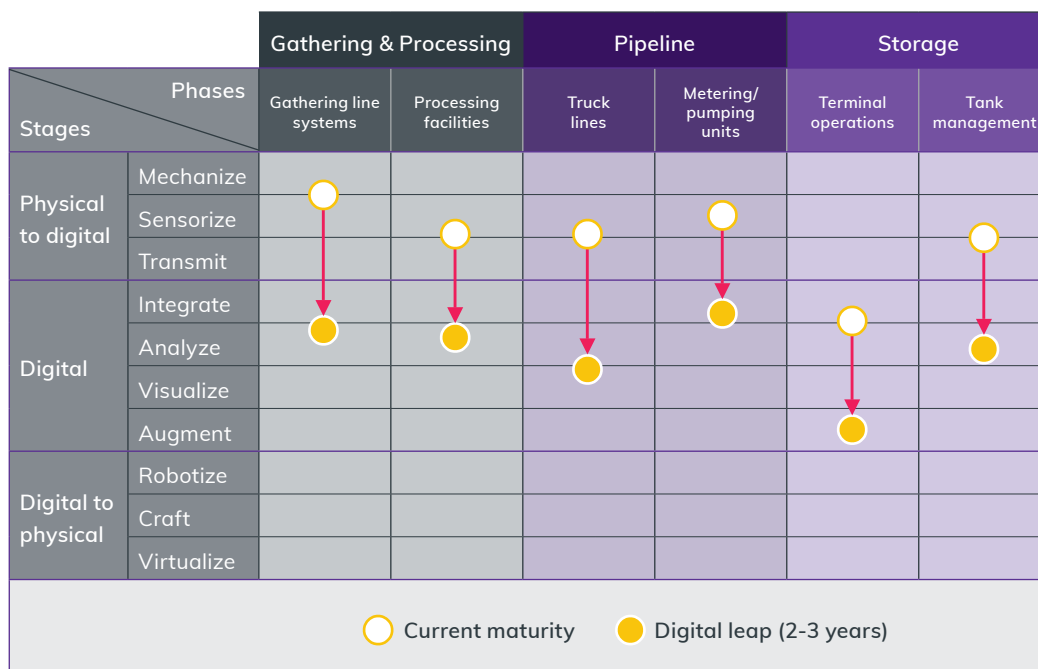
Digital Acceleration in the LNG Industry

While leading corporations in the Liquefied Natural Gas (LNG) industry try to seek market and shareholder differentiation in sustained growth and efficiency, this is extremely difficult to accomplish. The years since the oil price crash of 2014 have not been easy ones for the sponsors of LNG liquefaction projects. Confidence has since been returning and, as we have seen in the previous article, in 2019 numerous liquefaction projects are hoping to get the green light. It is however a crowded field and projects face a number of structural challenges. These go well beyond the cash flow crisis that resulted from the oil price collapse. Growth by itself isn't enough – it must be combined with improved asset utilization and agile Value Chain Management.

Digital Transformation is one of the core innovations being used by leading LNG corporations to increase asset utilization through improved recovery, accelerated production, higher efficiency, and reduced downtime, capex, and regulatory events. For larger LNG corporations, a key challenge is accelerating the value; finding and using methods to transform operations faster than the competition.

Digital Transformation Trends

The digital wave is beginning to significantly impact the LNG industry. Looking across the midstream sector of the oil and gas industry, it is evident at top level that storage operations seem digitally ahead of other midstream operations; with terminal operations being the most mature. Deloitte attributes this digital maturity to its focus on safety and efficiency; whereas the other operations may be restricted by a legacy asset base and upstream volatility, thus preventing them from reaping the full benefits of digital technologies.



Value Drivers for Digital Acceleration

There are several key value drivers for accelerating digital transformation across the LNG industry. The LNG industry has quadrupled over the last two decades and is expected to double again over the next two. While production grew by almost 50 percent over the last 10 years, prices have been cut in half. There are a range of economic benefits for several digital acceleration strategies but the objectives remain the same:

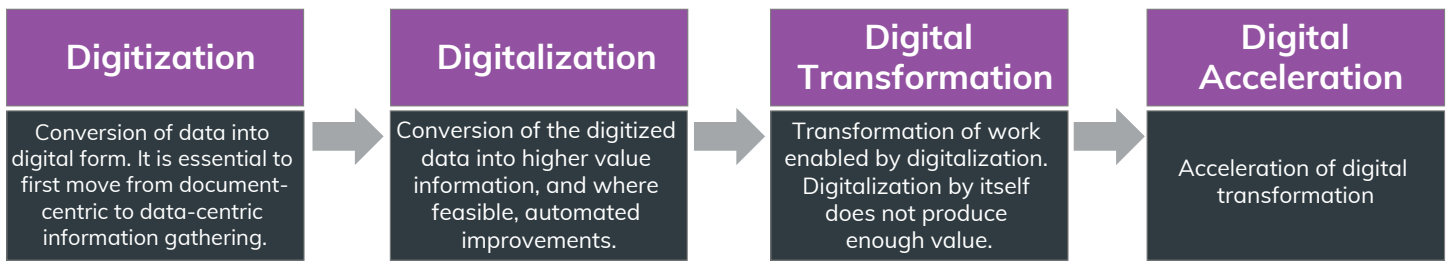
1. Increase production while demand is high and mitigate risk when demand slows.
2. Drive down production costs and boost operational efficiencies.
3. Invest in new LNG high-end technologies without impeding market growth.

Leading corporations are implementing digital transformation faster than others, and as a result, these leaders are disrupting their market segments. Fast and correct information throughout the LNG Value Chain is essential - secure feed gas supply, ensure reliability of the liquification plant, real time vessel logistics and operational scheduling to win and grow business from their key customers.

The LNG market is changing constantly and is becoming increasingly harder to predict based on the recent years high investments activity in liquification projects. AVEVA believes that in order to respond quickly to the market, and ensure a high ROI for these investments, you need a powerful and unique combination of visual real time access to enterprise datasets and predictive performance management tools.

Digital Acceleration Journey

Digital Transformation is a transformation of work, enabled by “digitization”. It is helpful to consider the differences between four commonly-used phrases used in the “digital” conversation and reflect where you may be on this journey.



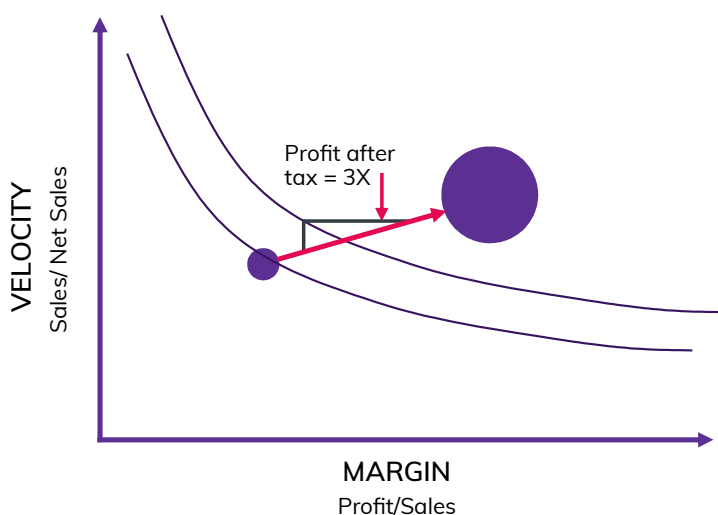
Digital transformation changes work in the following ways:

- **Waste**—minimizes waste, such as, manual calculations, time to find and verify information
- **When**—earlier, often before situations or opportunities arise
- **Where**—includes remote, mobile workers
- **Who**—optimize the experts’ participation (so that they can focus on improvements)
- **How**—planned, proactively guided, and tracked teamwork

AVEVA focuses on all components to achieve Digital Project Execution excellence using a holistic approach which empowers all project personnel with the right enabling technologies and training to TRANSFORM WORK.

Digital Acceleration is an acceleration of this journey, and it must be driven from the top of the organization. Senior management make and drive decisions across silos to establish the “new way of working”. The impact on corporate performance and shareholder returns is significant.

For more than two decades, AVEVA has been enabling LNG corporations to sustain and improve their return on net assets (RONA). Sustained improvement in manufacturing availability has a significant effect on RONA.

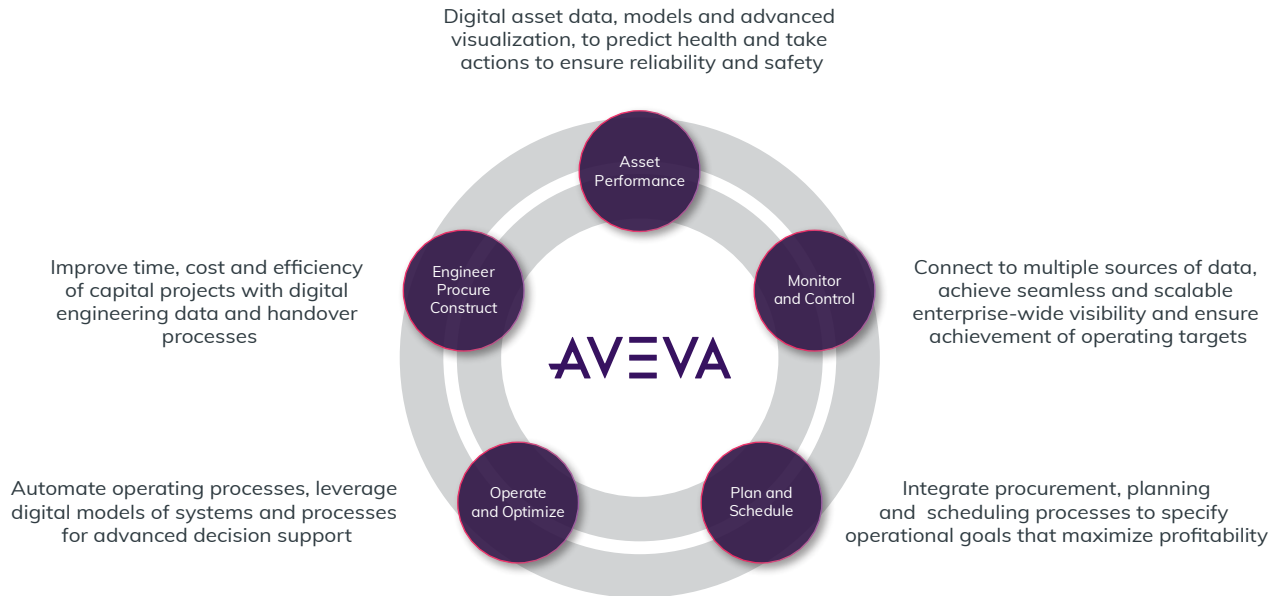


Increase Asset Utilization

- Minimize capital
- Optimize process
- Maximize constraint
- Elimination of chronic problems
- More sales or consolidate assets

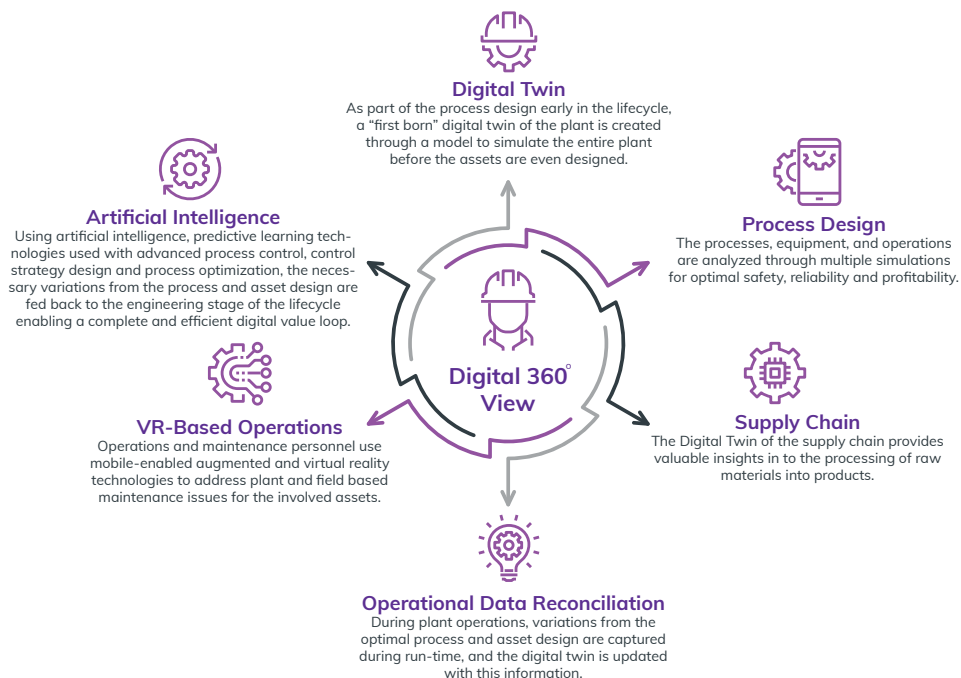
Two Lifecycles

AVEVA contributes significantly to our customers' RONA by transforming the performance of designing, constructing and operating plants. In our perspective, LNG facilities have two lifecycles: (1) the Asset Lifecycle which includes design, procurement, construction, maintenance and revamps, and (2) the Operations Lifecycle which includes monitoring and controlling, planning and scheduling, and various methods of production optimization.



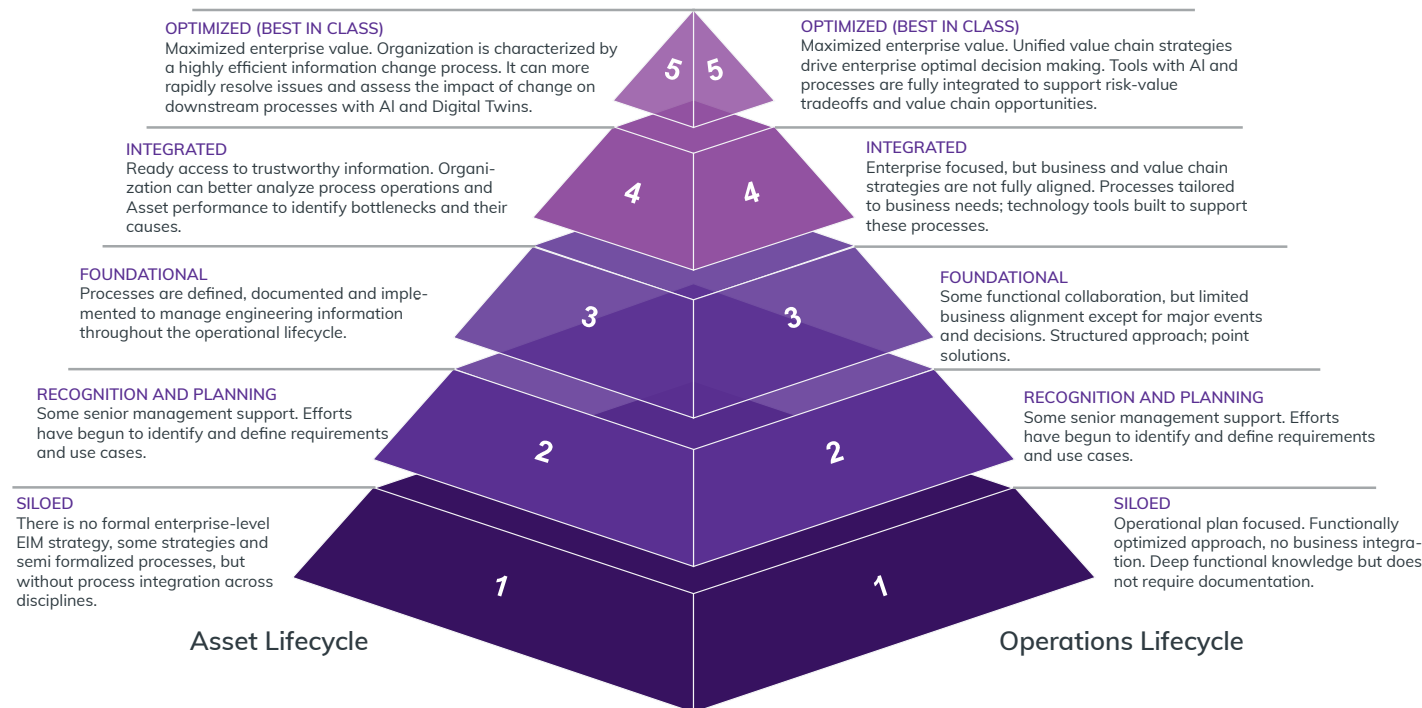
A Complete Digital Twin

Many LNG operators lack a digital twin—a single representation of the physical asset with all the data, models, etc. required for use across the asset and operations lifecycles, from engineering design to operations to analytics to optimization. AVEVA's technology enables you to bring the Digital Twin from Engineering Design into Operations, thus providing the work to the worker and allowing a 360° digital view of the plant. It drives collaboration, consistency and the elimination of “wasted work”.



Digital Maturity Model

To be successful, the concept of “digital maturity” is extremely important. Transformed work and digital acceleration are limited by a corporation’s ability to collaborate across organization silos. Organization silos are necessary, but the ability to collaborate is a key requirement. AVEVA’s Digital Maturity Model is derived from industry analyst maturity models and our unique combination of experience in both lifecycles. An LNG enterprise can have various levels of digital transformation maturity for the asset and operations lifecycles. A key objective is to steadily increase this maturity.

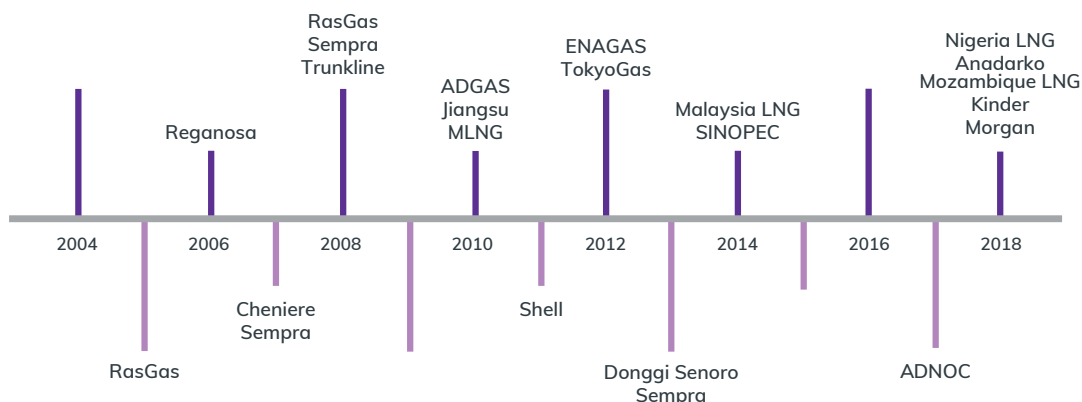


One of the highest contributing factors to the success of digital acceleration is the rollout of the implementation. A successful rollout approach implements holistic combinations of transformed work, technology, strategy and culture change. Task groups can be operational areas within plants or work teams within the broader corporation.



23+ Years of Digital Acceleration

AVEVA has more than 50 years in industrial software innovation and 23 years of experience in digital acceleration.



During this time, we have learned what predicts successes over failures.



Digital transformation efforts failed because:

- They started as technology projects
- They were implemented as technology roadmaps
- There was insufficient culture change management
- There was either insufficient or too much innovation
- There was insufficient integration of people, work process, strategy and technology



Digital transformation succeeded because:

- They started as work transformation projects
- They were implemented as holistic combinations of people, work process, strategy and technology
- Senior management actively and constantly sponsors the “new way of working”
- They applied best-practice methods for culture change
- They developed methods to maximize end-user adoption

AVEVA's Rules for Successful Digital Transformation:

1

Make Digital Transformation a business priority, not an IT project.

2

Start the transformation by creating a strategic digital roadmap, visibly supported by Executive Leadership.

3

Think BIG but start small – create a proof of concept with high ROI in selected area.

Digital Acceleration Success Powered by AVEVA

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Digital twin for the RasGas LNG Complex: Trains 1-7, Sales Gas and Helium project

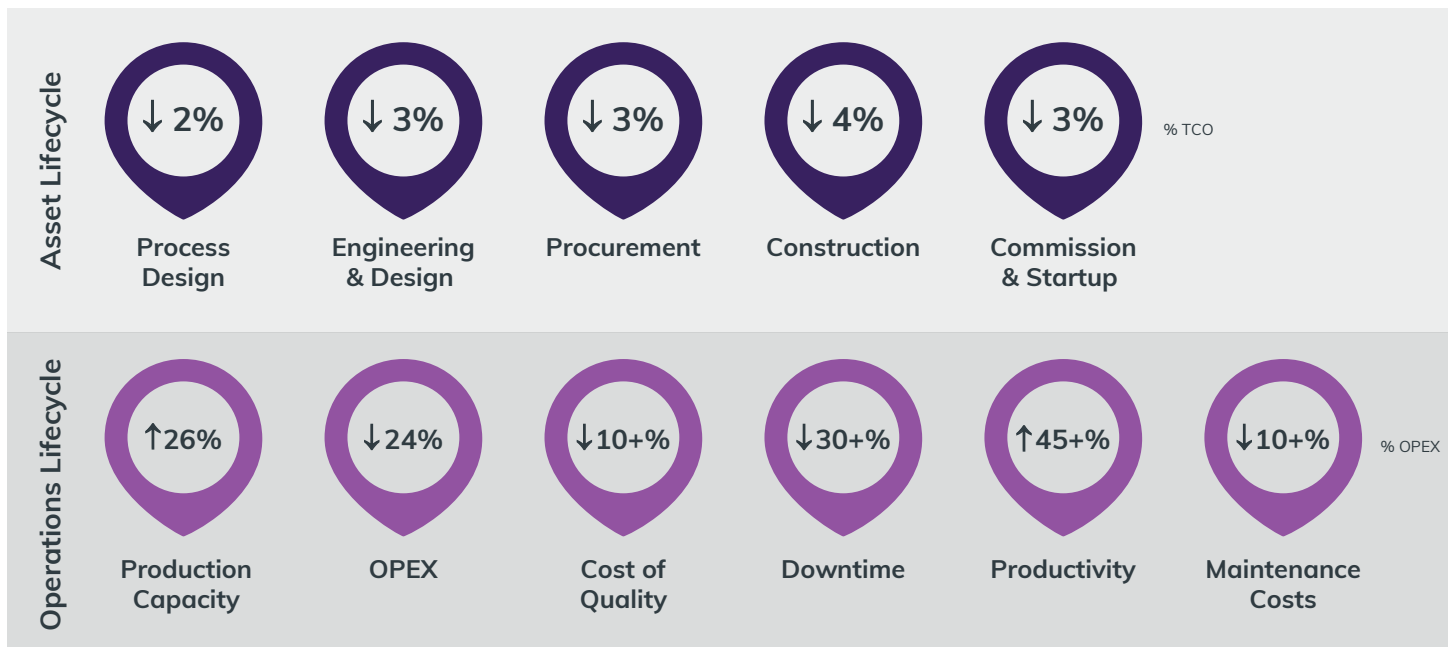


Value chain optimization - increased plant-to-plant transfers, reduced electricity costs
Improved emergency response
Visual management up to 700 times faster



Digital twin for Jetty and on-shore LNG regasification terminal with a send-out capacity of 5.5 million m³/d of gas

Executives of leading LNG corporations know that they must drive strategies to accelerate the digital transformation of their operations to increase profit and stay competitive. There are many ways to increase profit: optimize process operations, improve recovery, accelerate production, reduce capex, regulatory events, and energy cost, etc. Tremendous value can be derived along the digital acceleration journey—in both the Asset and Operations Lifecycles.

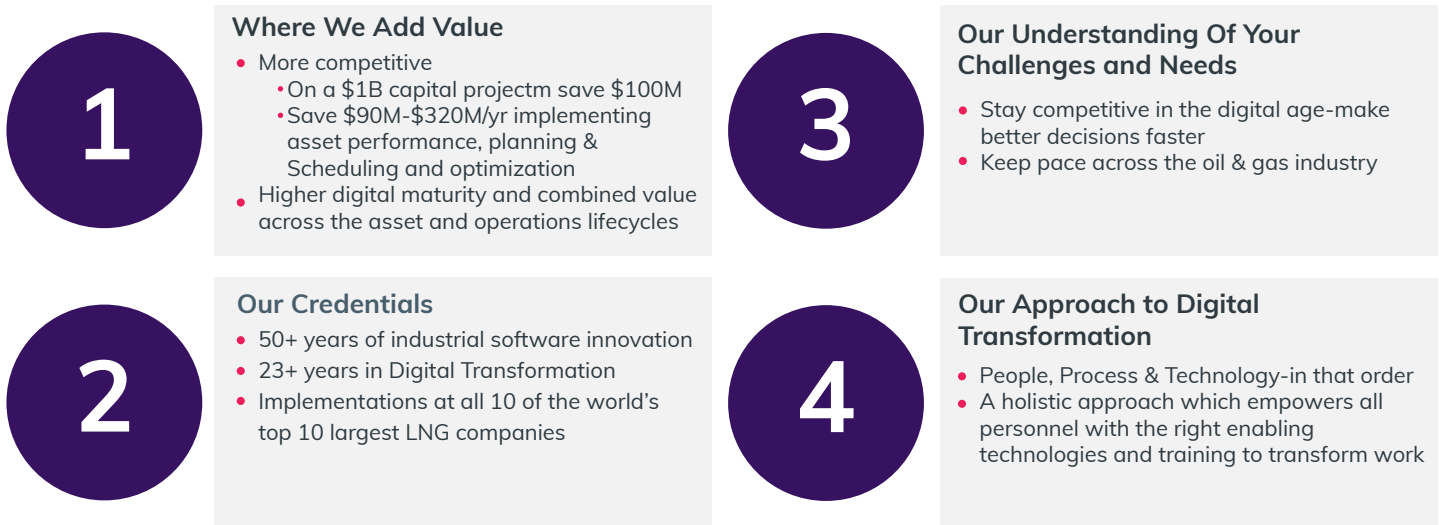


Why Partner with AVEVA for Your Digital Acceleration?

As you begin your digital acceleration journey, you will need to partner with a company that can provide both business and technical advice, and ensure that your strategic roadmap for digital acceleration will be successfully implemented. After helping you create the complete digital acceleration roadmap, AVEVA will continue to help implement the processes needed to transform work, streamline the work processes, and reduce the wasted work. We use a holistic approach that integrates both horizontally and vertically within your organization, making us best suited for this initiative.

AVEVA is trusted by global industry leaders as the leader in digital transformation of process manufacturing companies. As we connect people with processes and technology, we deliver comprehensive Value Chain solutions for the process industries. We work with a global partner network that is focused on the complete digital acceleration journey.

Our Differentiators



AVEVA is uniquely focused on digital transformation in the engineering, procurement, construction, and operation of LNG production facilities. We are trusted partners with the world's leading integrated, national and independent LNG companies.