Why are digital twins central to a company's digital transformation?

Digital transformation has become critical for organisations to stay competitive, relevant, and successful in today's rapidly changing and technology-driven world. The adoption of digital twins will lead to advancements in data analysis, risk management, and decision-making, improving operational efficiency and safety. This is especially true for complex offshore assets like FPSOs, where operational precision and uptime are essential.

The next decade in the oil and gas industry specifically is set to be significantly influenced by digitalisation and digital transformation. For FPSO operators, this shift presents an opportunity to rethink how these floating facilities are designed, operated, and maintained across their lifecycle.

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The relentless pace of technological advancement and evolving customer behaviours and expectations underscores the ongoing urgency for digitalisation and digital transformation.

Digital transformation has become critical for organisations to stay competitive, relevant, and succeed in today's rapidly changing and technology-driven world. In several sectors, embracing digital transformation allows organisations to quickly respond to changes in customer behaviour, market conditions, and technological advancements.

In energy, it has the potential to help organisations become more efficient, flexible and agile by automating processes, improving data management and analysis, and creating new revenue streams. This is particularly relevant for offshore production units such as FPSOs, where digital tools can reduce time spent on manual coordination and improve access to real-time operational data. An essential part of digital transformation in the energy sector is digital twins, which allow for digital representations of physical assets and systems, enabling organisations to simulate and analyse real-world scenarios in a controlled environment.

By leveraging digital twins in the right way, companies can improve decision-making, enhance operational efficiency, facilitate collaboration and communication between departments, and implement Industry 4.0 technologies. On FPSOs, these outcomes translate to fewer unplanned shutdowns, better coordination across disciplines, and increased asset reliability.

These trends are crucial in shaping the future of businesses, with organisations that adopt them likely to fare better in the evolving digital environment. This article outlines some steps for successful digital transformation, including defining the vision, assessing the current state, identifying and prioritising digital initiatives, developing a roadmap, and choosing a trusted digitalisation partner to build the necessary infrastructure.

Digital transformation in the oil and gas sector alone has the potential to deliver annual cost savings of at least $130 billion from 2023 to 2030, based on overall capital and operational expenditures, according to an analytics report by Rystad Energy (March 2023).

We can attain this significant cost reduction through the widespread implementation of data analytics, artificial intelligence (AI), and the Internet of Things (IoT) throughout the industry. Digitalisation has been gradually taking place within the sector for some time, compelling companies to adopt innovative digital solutions to sustain their operations.

The acceleration over the following years is based on the assumption that the benefits of digitalisation, such as drone inspections, drilling automation, real-time data analytics, machine learning for reduced drilling time and better well performance, and the implementation of predictive maintenance technologies to lower maintenance costs and unplanned downtime, are becoming more evident.

This drives real business value—higher revenue, lower costs, and better performance. On FPSOs, even small gains in efficiency or uptime make a big difference.

What can we expect over the next decade in the oil and gas industry?

Digitalisation is transforming numerous industries. In the next decade, we can even expect the widespread adoption of technologies such as artificial intelligence, IoT, and 5G, which will further fuel the growth of digitalisation and digital transformation.

Historically, the oil and gas industry has struggled with efficiently managing vast amounts of data, leading to operational inefficiencies, challenges in team collaboration, and risks of environmental incidents. Digitalisation can address these issues by building on the existing expertise within the industry. On assets like FPSOs, where remote coordination is the norm, this can significantly reduce risk and improve control.

In Capital Projects, digitalisation has ushered in a significant paradigm shift in execution strategies, streamlining complex workflows, fostering seamless multidisciplinary integration, and enabling real-time, data-driven decision-making.

The adoption of digital tools is drastically reducing the time spent on information retrieval and coordination between teams, leading to quantifiable improvements in project timelines and cost efficiencies. This transition has not only alleviated the reliance on cumbersome legacy systems but also empowered stakeholders with instant access to accurate, actionable insights, ultimately enhancing the quality and delivery of capital projects. The impact is clear in newbuild FPSOs and major upgrades, where digital tools are now essential to stay on track.

'*Traditionally, we haven't been brave enough* not *to do something. When these assets and platforms were designed, everything was rule-based, meaning every maintenance plan and system followed a strict calendar. The older an asset got, the more corrective maintenance was required*', says Kristian Stadsøy Grjotheim, VP Strategic Accounts, Aize.

Ask yourself: if you were responsible for the pipelines and the maintenance routine worked perfectly fine, would you change it? Even if you knew you could save costs by not conducting a particular operation?

'*Most likely not, because one extra maintenance routine is no big deal – "better safe than sorry", right? But I don't think we've seen the full picture of the 10, 20 or even 30 unnecessary routines conducted every year*', says the Aize VP.

'*This is the nature of oil and gas, and it has been for over half a century. We are used to, and are to some extent, proud of, operating projects and creating documents the same way we have always done. It's been siloed and fragmented. Why change a winning team, right? The risk of expensive downtime in operations has been considered too high.*'

'*The problem might be that we for long, as an industry, haven't considered the opportunity cost of not digitalising our operations*', says Grjotheim.

The next ten years are likely to see significant changes in how the industry operates. The adoption of digital twins in the industry is expected to bring about significant changes. The digital twin market is expected to attract investments for more than $48 billion already by 2026 (MarketsandMarkets), and reach approximately $131.09 billion by 2030 (Strategic Market Research).

Here are some ways in which the industry will be impacted:

Improved Decision Making: Digital twins allow for real-time monitoring and simulation of operations, providing valuable data and insights that can be used to make informed decisions. This will lead to more efficient use of resources and reduced costs.

Predictive Maintenance: Digital twins has the potential to be used to predict when maintenance is needed, reducing unplanned downtime and increasing productivity. This will also help to prevent equipment failure and increase safety.

Enhanced Operational Efficiency: By using digital twins to optimise processes, companies can increase operational efficiency by more than 30%. This will result in reduced costs and improved revenue.

Optimised Resource Allocation: Digital twins can help companies make better decisions about resource allocation, leading to reduced costs and improved productivity. In this way, experts will have time to focus on more value-adding activities.

Enhanced User Experiences: Digital twins can help companies understand their operations and identify areas for improvement, leading to improved user experiences.

Steps for a successful digital transformation

Here are some general steps that companies can take to approach a digital transformation:

1.Define your vision:

Before embarking on a digital transformation, it's important to define a clear vision and strategy. This includes defining the desired outcomes and goals of the transformation and identifying the business processes and areas most in need of digitalisation.

2.Assess your current state: Once you have a vision and strategy for the transformation, it's crucial to assess the current state of the business. This involves identifying areas where digital technologies could have the most significant impact, as well as evaluating your workforce's existing technology infrastructure and skillsets.

3.Identify and prioritise digital initiatives:

Based on the results of the assessment, you can identify and prioritise digital initiatives. This involves selecting the digital technologies and solutions that are most appropriate for your business needs, and prioritising the initiatives based on their potential impact and complexity.

4.Develop a roadmap:

Once you have identified and prioritised digital initiatives, it's essential to develop a roadmap for the transformation. This involves defining the timeline, resources, and budget needed to implement the initiatives, as well as identifying the roles and responsibilities of key stakeholders.

5.Choose a trusted digitalisation partner and build the necessary infrastructure:

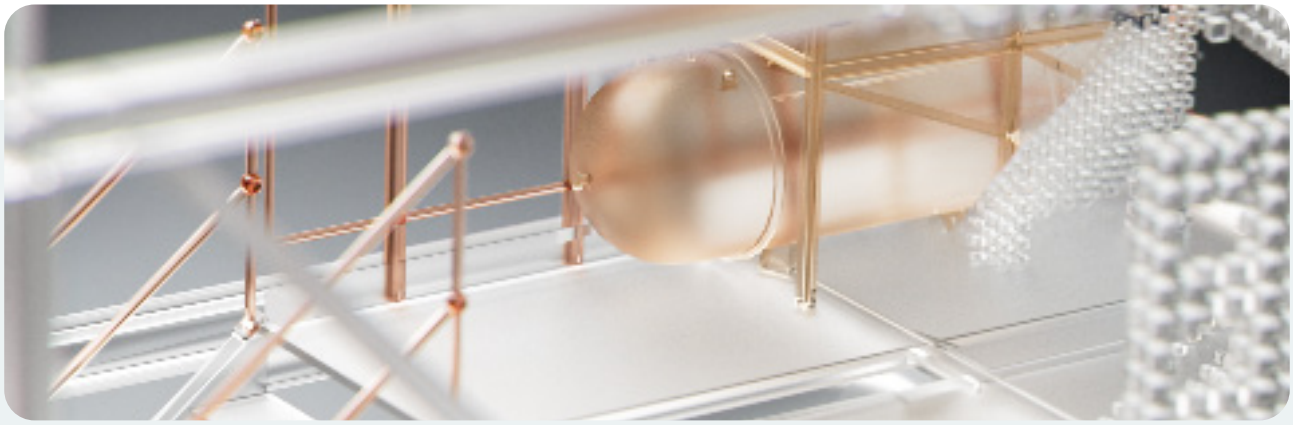
To support the digital transformation, you may need to build the necessary technology infrastructure and systems. This includes investing in new hardware, software, and tools, as well as developing the required skills and expertise within your workforce. Choosing the right partner is essential for a successful transition.

6.Implement and monitor:

Once the infrastructure is in place, it's time to implement the digital initiatives and monitor their progress. This involves working closely with your workforce to ensure that they have the necessary skills and training to use the new technologies, as well as monitoring the impact of the initiatives on business performance.

7.Continuously evolve:

Digital transformation is an ongoing process, and it's essential to continuously evaluate and develop the initiatives over time. This involves regularly assessing the impact of the initiatives, identifying new opportunities for digitalisation, and adapting the strategy and roadmap as needed.



Why sticky solutions are key

Paula Doyle, Chief Digital Officer of Aker BP, says:

"We need to make sure that solutions are sticky, that we're really changing how we work. We need to make sure that we're able to gather the innovation of the engineers on the ground and how they're using the products, to really drive efficiency, higher quality and quicker decisions. In an industrial setting it is not the case that you can throw a wonderful product over the fence and have everyone grab it with both arms, desperate to use it. So you need to really work through it. You need to understand the work processes that you're impacting. You need to really engage with the users, ask the question: What's in it for them?"

Doyle adds:

'When you're in a situation where you're up against timelines and you're trying to de-risk project execution, they need to see that the product is actually gonna help them. How are you solving complicated problems, how are you making their lives easier? If you can prove that, then it's easier to drive adoption.'

Reach out to us at info@aize.io or visit www.aize.io if you are interested in hearing how Aize can help you achieve a successful digital transformation.

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