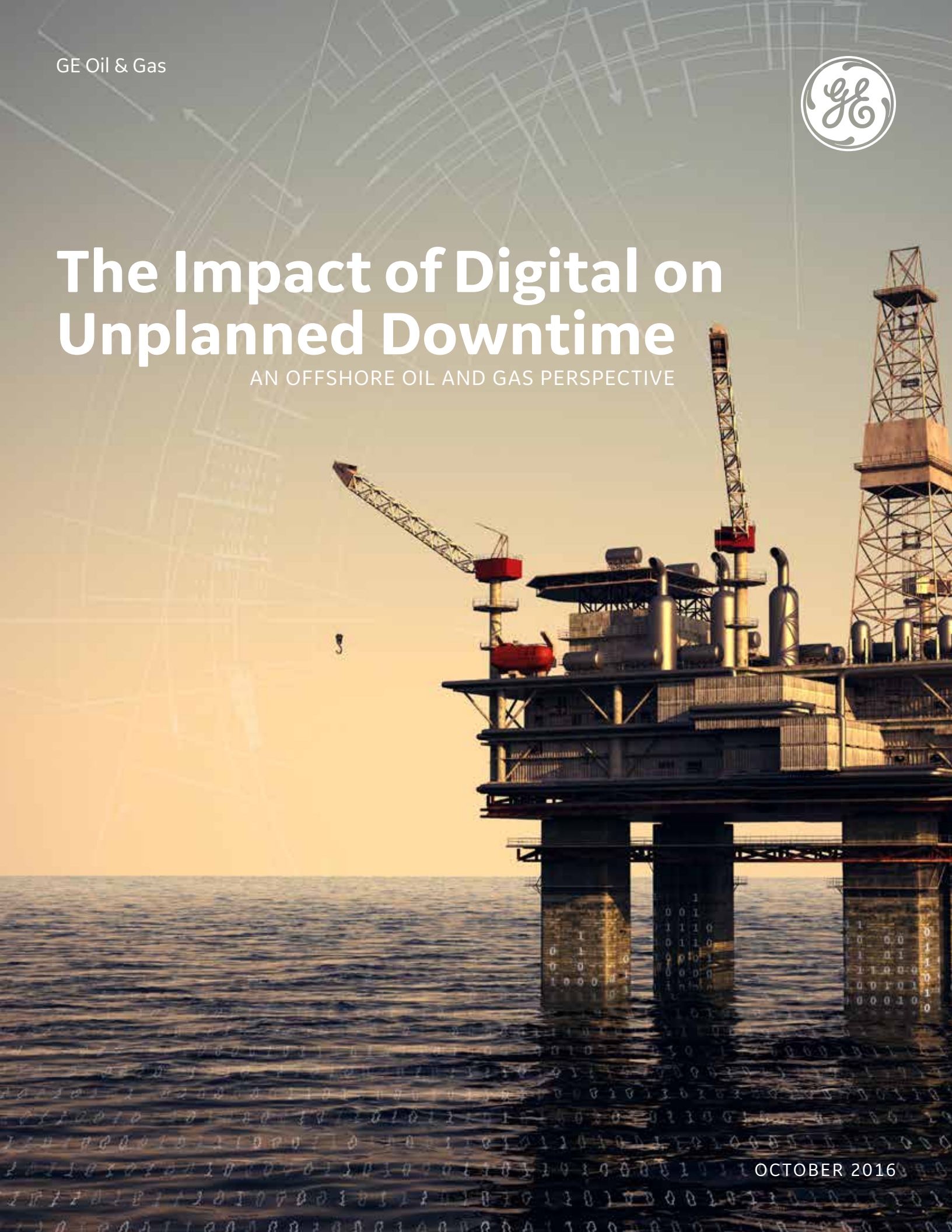




The Impact of Digital on Unplanned Downtime

AN OFFSHORE OIL AND GAS PERSPECTIVE





EXECUTIVE SUMMARY

Unplanned downtime continues to plague the oil and gas industry. The offshore sector, in particular, has been saddled with unnecessarily high costs and exposed to unnecessary risks as a result. This was made clear in a study by Kimberlite, an international oil and gas market research and analytics company, in Summer 2016. And the problem is only going to get worse as budget cuts, aging assets, and the loss of industry experience take their toll.

There is a solution. Digitization enables offshore operators to reduce unplanned downtime while simultaneously reducing risks. This paper discusses the Kimberlite data and provides a set of recommendations for moving forward.

KEY FINDINGS

- Offshore oil and gas organizations experience on average \$49 million annually in financial impacts due to unplanned downtime. For the worst performers the negative financial impact can be upwards of \$88 million.
- Fewer than 24% of operators describe their maintenance approach as a predictive one based on data and analytics. Over three-quarters either take a reactive or time-based approach.
- Operators using a predictive, data-based approach experience 36% less unplanned downtime than those with a reactive approach. This can result in, on average, \$17 million dropping to the bottom line annually.

“DIGITIZATION ENABLES OFFSHORE OPERATORS TO REDUCE UNPLANNED DOWNTIME WHILE SIMULTANEOUSLY REDUCING RISKS.”

INTRODUCTION

Oil and gas companies are definitely feeling the crunch these days:

- Oil prices fell nearly 50% between 2015 and 2014, averaging \$52 per barrel in 2015 compared to \$99 in 2014, according to the Energy Information Administration.
- A 2014 Mercer study reveals that over 50% of oil and gas professionals are set to retire over the next 5 to 10 years. This situation is aggravated by the current industry downturn which is accelerating “the great shift change”. These dynamics may also have a negative impact on recruiting.
- Approximately 42% of offshore facilities worldwide in a recent Kimberlite study were over 15 years old and the average age is likely to increase due to limited new investments.

Low oil prices have significantly diminished profit margins, and have made operational efficiency a choke point for many oil and gas organizations. But how do companies find greater operational efficiency with less experienced employees and aging assets?

Challenges such as these actually bring opportunities to transform the way oil and gas does business, and ultimately become increasingly efficient. Digitization is providing organizations with the ability to address these ever-changing demands.

Over 67% of the oil and gas industry expects moderate-to-great impacts from digital disruptions. In particular, analytics will remain important and the internet of things (IoT) will become much more important in the next 3 to 5 years. However, less than 25% feel adequately prepared for it¹.

This paper explores how digitization can reduce unplanned downtime in offshore oil and gas. A Kimberlite study interviewed 50 operators globally between June and August 2016 to learn how their maintenance approaches impact unplanned downtime. (Figure 1) The study suggests that adopting a more digital, predictive approach to maintenance will reduce unplanned downtime and offer organizations greater operational efficiency.

¹ Deloitte and MIT Sloan Management Review

FIGURE 1. KIMBERLITE STUDY PARTICIPANTS



THE COSTS OF UNPLANNED DOWNTIME

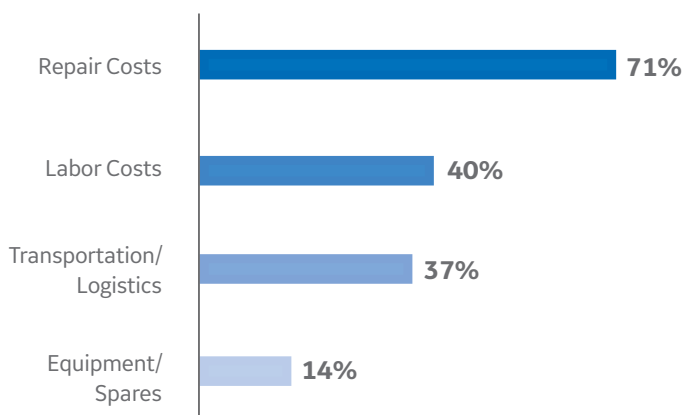
As Frost and Sullivan recently noted, in a world of low oil prices organizations must move from chasing barrels to chasing efficiency. “Operational Excellence is a requirement for success in today’s marketplace, and reducing unplanned downtime plays a critical role in that success,” said Leif Eriksen, Industry Solution Executive, GE Digital.

The industry has grappled with quantifying the cost of unplanned downtime, but the Kimberlite study revealed that just 1% of unplanned downtime—or 3.65 downtime days per year—can cost organizations \$5.037 million each year. Averaging just over 27 days of downtime each year, offshore oil and gas organizations experience \$38 million in financial impacts from unplanned downtime. For the worst performers the costs can be upwards of \$88 million.

These hits to the bottom line include repair costs as well as the costs associated with lost and/or deferred production. Direct costs like repair and labor cost certainly impact organizations, but the hidden costs of lost or deferred production often have the most significant impact on organizations. \$20,000 per day with an annual financial impact of \$450,000².

When looking at repair costs, the typical offshore oil and gas field worldwide most often incurs expenses resulting from unplanned downtime in the areas of repair costs (71%), followed by labor costs (40%) and transportation/logistics (37%). (Figure 2) The median daily financial impact of expenses such as these is approximately \$20,000 per day with an annual financial impact of \$450,000.

FIGURE 2. MAJOR EXPENSES WITH UNPLANNED DOWNTIME



² With a median 27,200 BPD and oil at \$50.00 per barrel

³ Assumes 22.5 unplanned downtime days

“Maintenance approaches do matter, and yet companies still rely on outdated maintenance approaches.”

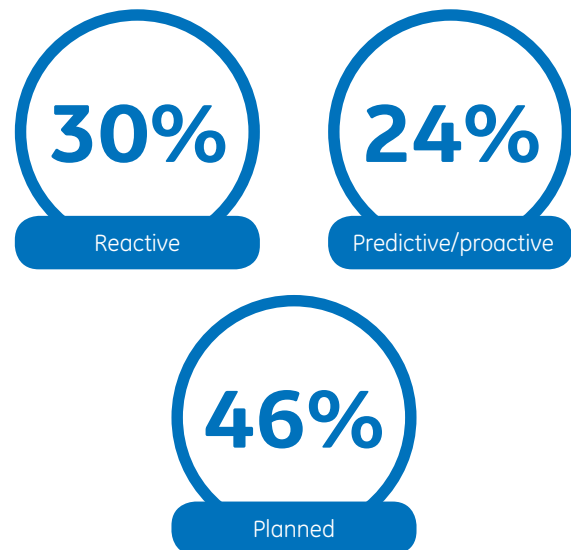
MAINTENANCE IMPACT ON DOWNTIME

Unplanned downtime is not cheap, but the market’s most frequently used approaches to maintenance—which should ideally help reduce unplanned downtime—are not as effective in reducing it as more modern approaches.

Fewer than 24% of operators describe their maintenance approach as a predictive one based on data and analytics. The rest either took a reactive or time-based approach. (Figure 3)

In terms of the unplanned downtime associated with each approach, reactive approaches averaged 8.43% annually, with 7.96% for planned, and 5.42% for data/monitoring approaches.

FIGURE 3. APPROACH TO EQUIPMENT REPAIR AND MAINTENANCE



DIGITALLY CARVING DOWN UNPLANNED DOWNTIME

There is a connection between maintenance approach and unplanned downtime. The unplanned downtime for respondents using more predictive data- and condition-based monitoring approaches is 36% lower than respondents using a more reactive approach. (Figure 4)

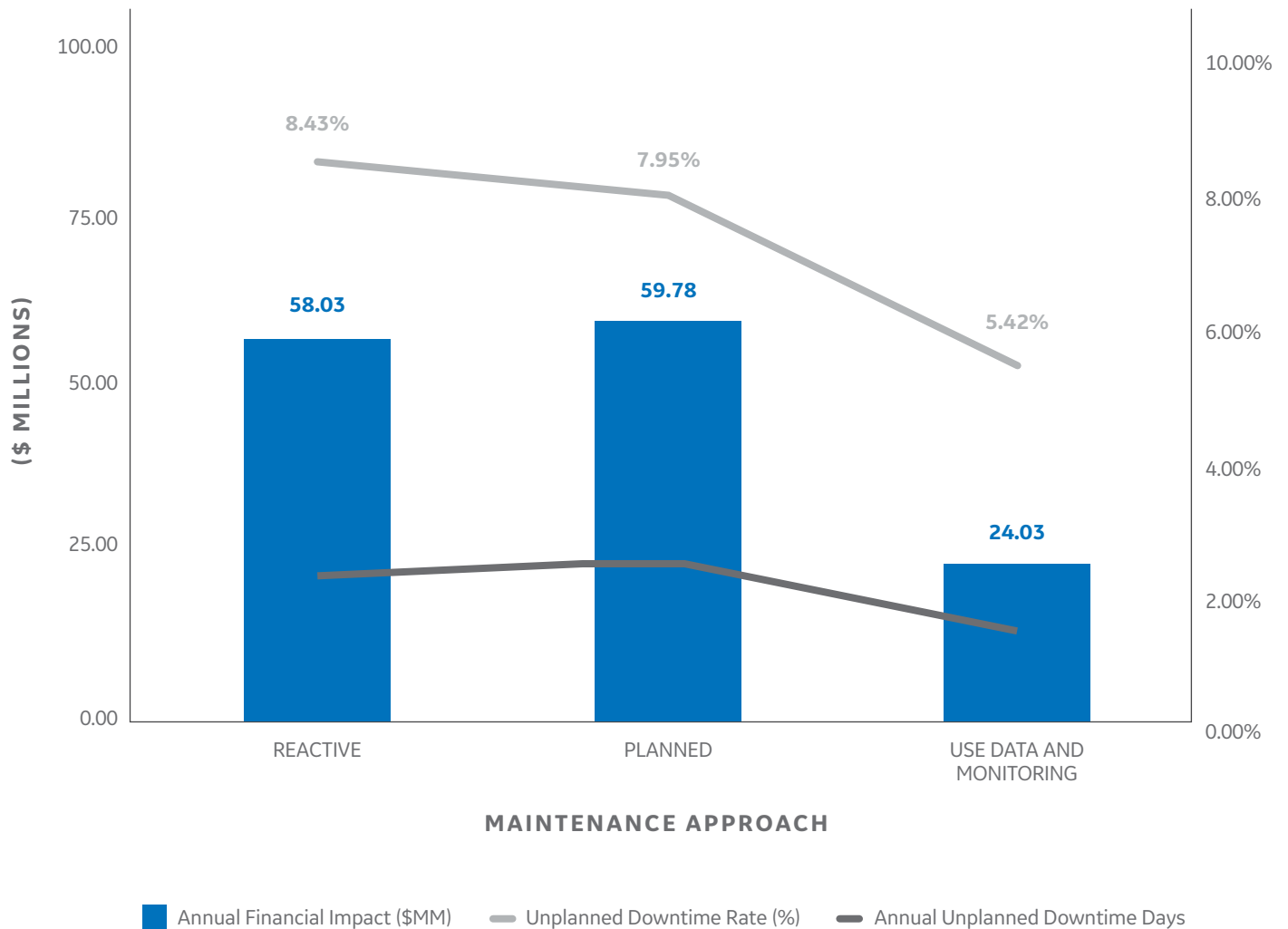
Furthermore, the negative annual financial impact is approximately 60% lower for respondents using data- and condition-based monitoring approaches versus respondents using reactive or planned maintenance approaches.

“Updating maintenance practices to more predictive efforts—driven by digital technologies and data-based optimization—can enable offshore production facilities to reduce their unplanned downtime and drive better operational efficiency,” added Eriksen.

Opportunities for embracing data-based and analytics-driven maintenance are numerous, and include approaches such as:

- Efficient and effective collection, management and visualization of data related to equipment condition and performance.
- Utilizing existing industry knowledge and applying advanced analytics to become more predictive.
- Implementing optimization tools to create and maintain a financially-optimized maintenance strategy.

FIGURE 4. COSTS OF UNPLANNED DOWNTIME BY MAINTENANCE APPROACH



NEEDS FOR DIGITAL TECHNOLOGY


As offshore oil and gas production moves toward a more digital and data-enabled environment, it is important to keep in mind the many needs for organizations as they build more predictive and data-driven approaches to asset operations and processes.

Just because your organization obtains more data does not mean that it will know what to do with all of the data. According to a recent study by Accenture, 60% of operators cite dealing with outcomes of data gathered as a major challenge. It is important to understand the reasons for collecting increasing amounts of data and how the data can be applied to improve condition-based monitoring and predictive maintenance, including:

- The ability to identify data-based patterns
- Cognitive learning capabilities
- Opportunities to leverage data in the Cloud for cross-organization/industry comparisons
- The ability to share data with trusted service providers for additional analysis and insights

As the digital worlds of organizations grow, privacy, control and security will continue to be top concerns. Evolving digitization has made sensitive data vulnerable, but it has ultimately triggered a wave of innovation as companies work to stay ahead of threats and be able to isolate and minimize their impact when they occur.

Another common concern when taking on digital initiatives is system integration. Oil and gas organizations are becoming increasingly connected across their organizations in terms of not just applications, but data as well, so there is a need to ensure that new application and technologies for better asset management can fit well into the broader organization.



**60% OF OPERATORS
CITE DEALING WITH
OUTCOMES OF DATA
GATHERED AS A
MAJOR CHALLENGE.**

RECOMMENDATIONS AND NEXT STEPS

There is a significant opportunity to continuing carving down unplanned downtime through digitization, but as Deloitte noted in a recent report, “Simply ‘doing’ digital things will not make an organization digital.” Organizations need to go beyond just technology changes to truly embrace the benefits of digitization.

RECOMMENDATIONS:

- Oil and gas executives responsible for offshore operations should work with their technology teams to create a digital strategy to reduce unplanned downtime that will be based on a foundation of data and analytics. Oftentimes there is a lack of comprehensive and specific strategies for digital opportunities with asset repair and maintenance. Strategies should be developed at a high enough level to ensure that digitization does not happen in pockets, and it is able to scale.
- Challenge your OEMs to provide digitally-enabled equipment and machines that will provide the data necessary for reducing downtime, and they can assist with building a more comprehensive digital strategy for your asset management efforts. Ask your OEMs questions about their digital strategies, and truly understand their approaches and plans.
- Evaluate asset performance management (APM) tools and technology to manage machine data and support more timely, data-based decision processes.

- Consider cloud-based solutions and outsourced services. It is important to consider your organization’s core competencies and how much digitization aligns with them. Cloud-based and outsourced services can offer additional expertise and scalability to support data-driven approaches as they continue to grow and evolve.

NEXT STEPS:

- 1) Baseline your current digital industrial capabilities.
- 2) Build out a roadmap with milestones.
- 3) Generate quick wins with APM.

Millions are at stake with unplanned downtime, and now is the time to embrace new digitization opportunities that will improve margins and profitability. GE is helping oil and gas companies see returns from digitization. Contact us to accelerate your path to mitigating risk resulting from unplanned downtime and to driving enhanced operational efficiency.

info.geoilandgas.com/APM_Offshore.html



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