

The Deloitte logo is positioned in the top left corner. It consists of the word "Deloitte" in a bold, black, sans-serif font, followed by a small green dot. The background of the entire page is a complex, abstract pattern of overlapping, concentric, and slightly blurred lines in various colors including orange, blue, purple, and green, creating a sense of depth and movement.

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Digital maturity assessment for upstream oil and gas operators

Organizations are leaning in, but opportunities remain

Upstream oil and gas (O&G) operators are collectively eyeing opportunities and tackling the challenges of digital transformation, but where they stand along the digital maturity spectrum—and what they plan to do next—can vary tremendously.

Deloitte recently surveyed and interviewed leaders in core operational, digital, and IT roles across a set of O&G exploration and production (E&P) majors and independents. Our aim was to evaluate each operator’s digital maturity, identify leading practices, benchmark where each one stands, and highlight opportunities to advance digital value realization. Our findings reveal both commonality and divergence in upstream O&G digital-related industry trends.

Participating peer group

Assessment reflects leading E&P operators with US and international assets

Companies assessed

8 Unique participants

Asset Portfolio Type

3 Pure-play unconventional

5 With both conventional and unconventional assets

Participant profiles

50+
Survey participants

41
In-person interviews

1.7K
Data points captured



48%
are IT/digital leaders

52%
are operations leaders

Source: Digital Maturity Assessment for Upstream Oil and Gas Operators, October 2021

Five key themes emerge

1. The debate is over—digital is critical.

Since we began conducting this survey in 2017, we’ve seen divergent views across participants on the importance of digital. With this year’s survey, for the first time, 100% of survey participants agree digital is critical to the future of the business. Operators now consider digital programs as table stakes for any viable O&G business. They also see adopting digital as essential to remaining competitive in any macro environment. Upstream operators unanimously recognize digital as an opportunity for growth and a differentiator for talent, capabilities, and margins.

Importantly, the O&G employee mindset has evolved in a favorable direction as digital has started delivering value across organizations. Recent areas of attention have included production optimization; drilling and completions (D&C) efficiency; field workforce productivity; and health, safety, and environmental (HSE) effectiveness. As operators shift their focus to net-zero emissions and decarbonization, they see significant potential for digital to help monitor, measure, and track greenhouse gas emissions; reduce flaring; and support environmental, social, and governance (ESG) efforts.

2. Operators have digital visions but lack strategies.

While all participants were onboard with digital as an imperative, few had taken the next step of aligning on an enterprise strategy that set clear digital priorities. All had an overarching enterprise vision, but only one had a strategy that made clear what areas would make a difference. This disparity is key, as all operators discussed the increasing competition for time and resources, along with the importance of leadership focus and commitment. Instead, operators have a mix of either functional-centric strategies (e.g., drilling, production) or business unit (BU)-centric strategies (e.g., an asset that wants to implement digital across various functions) for digital growth and adoption. This is likely associated with some operators’ legacy approach to digital, which consisted of implementing digital spot solutions before developing a cohesive enterprise strategy, as well as varying degrees of buy-in across organizations (especially senior management). While we see grassroots efforts as an important step on the digital journey, a cohesive enterprise digital strategy is associated with implementing a full transformation.

3. COVID-19 accelerated remote work, but didn't change road maps.

Generally, the direction of digital in organizations was not significantly affected by the pandemic. While some operators struggled to keep their digital programs on track in the face of historically low oil prices, the pandemic strengthened the need and urgency for digital. In general, what operators wanted to work on and the order they wanted to work on it didn't materially change. That said, one priority continued to crop up: capabilities focused on remote work, collaboration, and data accessibility. Some of this focus was attributed to work-from-home expectations during the pandemic and how to enable improved productivity and collaboration in offices. Another more interesting part of the conversation centered on reimagining the role of remote operations centers (ROCs) in supporting D&C and production operations. Over the past 20 years, operators have looked to move activities and decisions away from the field and into a centrally located ROC. For example, why have a lease operator go to a pad to change a setpoint on a rod pump if we can just as easily have a production engineer in the ROC address every pump in the field? The change that occurred during COVID was the next step of asking, "Why do I even need to do some of these activities in a ROC? Can I have engineers perform more activities from wherever they call home?"

4. Digital's value is clear, but not easily measured.

Every participating operator agreed that measuring the value and impact of digital is difficult. Increasing the accuracy of measuring digital's impacts, including in safety and emissions, is a shared value proposition. However, the majority of interviewees concurred that the approach to capturing and measuring through scorecards or other means is lagging. One observed challenge was a failure to define upfront what the value was and how this could be tracked from day one through the life of the effort. Operators have primarily relied on financial lagging indicators and are yet to adopt agile leading indicators that might help track value. Doing a lookback is hard when one has to find all the data to support the analysis and no reliable baseline exists. Another challenge was tracking value down to the profit and loss (P&L) level and focusing on "hard dollars"—meaning dollars that show leadership how a digital initiative is affecting the bottom line and driving measurable change to cost and revenue line items. This is difficult to do when multiple initiatives may be occurring at once and neutralizing the value from one can be difficult to tease out at the P&L level.

Operators that focused less on "hard dollars" and P&L-level impact but were more willing to consider "soft dollars"—such as citing real-world examples of how a solution changed a result and delivered impact, and then using that analysis to scale up the value potential—scored significantly better in our survey. They also reported less budgetary impact to their digital initiatives during the pandemic and market downturn versus their counterparts who tried to uncover "hard dollars" every

step of the way. Another interesting observation is that the operators that tended to score the highest not only focused less on "hard dollars" but also were more closely tied to the core of the business. When an operations leader heard from team members about the value digital initiatives are creating and how these benefit the team, that created more positive views of digital than being able to point to a scorecard with a P&L impact. On the other hand, those that focused predominantly on the "hard dollar" benefit, typically had senior leadership and C-suite leaders driving this need. They also had a higher degree of skepticism from leadership on the value of digital.

5. Culture and fluency are the biggest challenge for digital adoption.

Culture remains one of the main impediments to digital success. Improving culture usually involves embedding change management earlier and ensuring business-focused individuals, even down to the field, are part of solution development and are eventual change champions. The positive impact of visible digital adoption by leadership stood out as a key driver of organizational culture change, with multiple examples of culture and fluency being correlated to leadership behavior. While some of the organizations have made significant changes to adapt to digital, lack of change management has been causing lower morale among staff and affecting the overall impact of digital transformation. Structured, leadership-led change management programs across all levels of the organization are critical for embedding the digital culture.

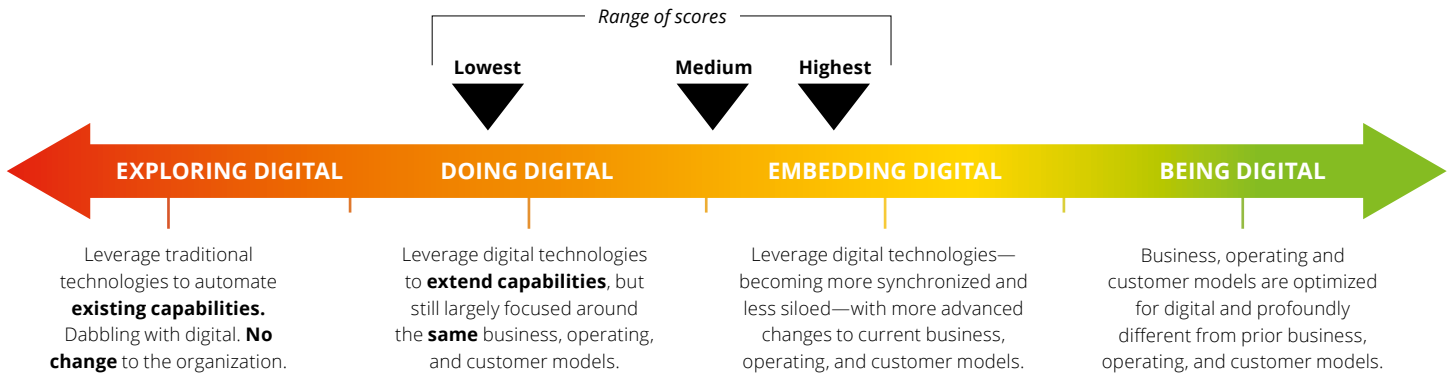
To improve digital fluency and overall results, many operators are investing in training and upskilling to build digitally fluent practitioners who also understand their businesses and core operations. Citizen developers have been embraced by all the participants, but the need to build a more sustainable operating model that balances grassroots innovation within a structured, scalable framework is needed. Further, participants recognized three core competencies as critical to the success of cementing their digital fluency and their digital programs: 1) data analytics and visualization; 2) artificial intelligence (AI) and machine learning to support operational technology; and 3) application design and development.

Assessing upstream operators' digital maturity

Where do today's O&G upstream operators stand across the digital maturity spectrum? Deloitte's online digital assessment tool can help determine a company's relative position along the spectrum and among industry peers, and identify improvement opportunities across four categories. The graphic below shows how the benchmark participants ultimately landed along the digital maturity spectrum.

Deloitte’s maturity assessment scores are derived across four categories:

Digital maturity spectrum



1. Digital strategy and operating model:

Does the digital strategy align with business strategy across functions and business units? To what extent does the organization reassess and reprioritize digital projects to achieve continuous value?

Based on our cross-industry assessment, we’ve found that leading O&G upstream operators:

- Have clear alignment between digital and business leaders. No single organization model stood out as more successful than others. Rather, the most successful companies ensured a strong partnership between the digital and business leaders and see a pull from BUs for digital deployment and support. Most rely on some form of a digital road map to direct where they need to focus digital efforts that ensure alignment to business needs and deliver tangible results.
- Have support and buy-in from key parts of leadership and few (if any) senior leaders who question the value of digital. Instead, leadership is trusting those closest to the action when the latter say they see and experience the benefits.
- Possess a default remote field operating model. The COVID pandemic has accelerated the trend for optimization to be done away from the wellsite and has emphasized the need to build digital capabilities that allow for varying degrees of remote surveillance, optimization, and even control.
- Implement and operate digital projects in an agile mindset, and are looking for ways that the agile model can be expanded to core asset team processes.
- Focus on 80% solutions and deploy off-the-shelf solutions when the latter meet most of their needs to avoid getting bogged down in the details.

- Don’t micromanage digital budgets or create arduous approaches to secure funding for a new initiative. While digital leaders are still providing a general budget and guardrails, the more successful organizations empower the digital leader to manage and deploy the pool of funds as needed throughout the year. Governance is nimble, and existing and new initiatives are periodically rebalanced based on what the digital leaders see will deliver the most benefit to the business.

2. Digital culture, talent, and organization:

To what extent has the organization fostered a digital mindset to empower innovation and experimentation? How does it incorporate and embed digital talent and skill sets?

Leading upstream operators:

- Don’t see organizational structure as a major hindrance to success. The key is how well-connected the digital team is with the business. Those closest to the pulse of the business, either from an organizational design perspective or a digital operating model that stresses this, have the most success.
- Consider change management as critical to ensure organization buy-in because the organizations make significant changes in how it operates using digital.
- Use dynamic reports to share results and track progression to support strategic discussions at the executive level. But they do not overly stress “hard dollars.” Instead, be comfortable with “soft dollar” benefits and listen to the voice of key operational leaders to form a perspective.
- Provide formal training for selected citizen developers and citizen data scientists and promote general digital fluency.

- Focus on operationalizing and scaling solutions from citizen developers and citizen data scientists that can be shared across BUs or operating areas.
- Instill a product-versus-project mindset and put in place the resources and capabilities to deliver on it.
- Recognize that users have become more adept at adopting new technologies and are engaging the new generation of field workers in requirements, testing, and development of new digital solutions.

3. Operations and value chain:

How does the organization integrate digital tools into planning and operations of key processes, leading to operational function optimization, improved safety, and efficiencies across the business?

Leading upstream operators:

- See immediate value gains in production optimization at the field level and across the value chain, integrating commercial data.
- Have implemented failure prediction and alerts across drilling, completions, and workover activities.
- Are beginning to tackle the subsurface, even with the understanding that the physics may not be buttoned down enough, making it difficult to show value.
- Rate themselves as more mature in the US onshore unconventional environment than any other operations area. This might be tied to the assets needing to make a more drastic impact on breakeven points, thus embracing opportunities arising from digital.

4. Technology, data, and infrastructure

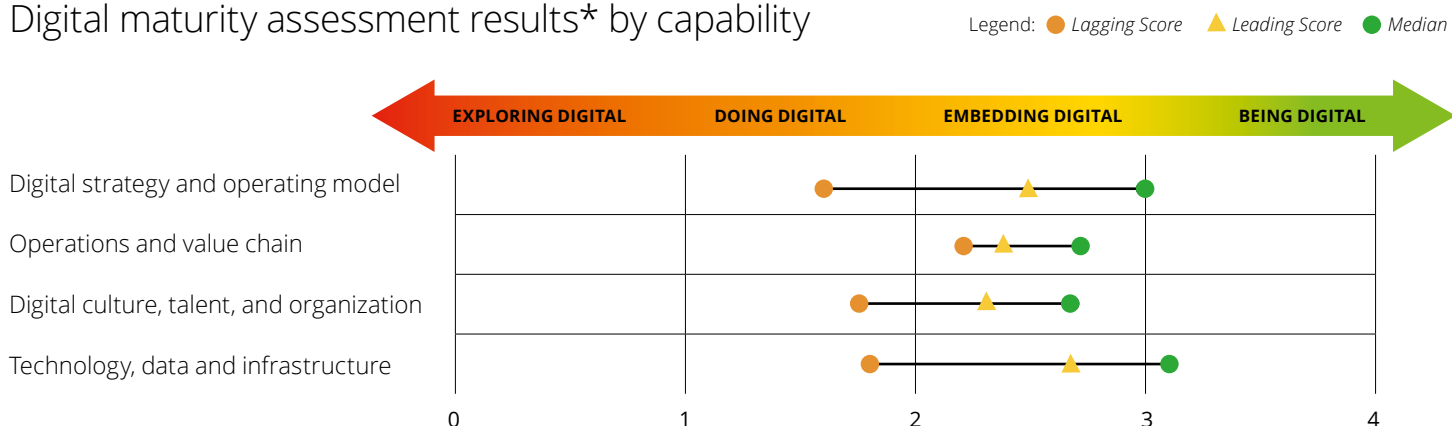
How connected and advanced is the digital infrastructure, and to what extent are data and analytical tools used to make better business decisions?

Leading upstream operators:

- Have already invested in data governance and platforms to be technology-agnostic; they also recognize this as a key enabler.
- Consistently look for “80%” solutions that can be purchased off-the-shelf to allow development time to be focused on solutions that do not already exist.
- Are willing to pivot when technology changes and have trust in the organization that, despite the pain this causes, it is the right decision.

The graphic below highlights the range of scores observed in each of the four digital maturity categories.

Digital maturity assessment results* by capability



*The digital maturity score aggregates survey responses, Deloitte research and operator interviews

The journey has just begun

Overall digital maturity benchmark results indicate that everyone is working on digital. Some organizations have embraced it better than others and can point to success stories. However, the results also indicate that no single operator is clearly dominating in digital. There are “pockets of goodness” across operators, but definite room for each to continue to improve. While benefits from digital are being realized, all operators we interviewed agree more upside remains. Over the long run, organizations that clearly define areas of differentiation and then diligently build digital advantages and capabilities will see the most return from their investments in people, tools, and technology.

Interested in finding what those focus areas should be for your organization?

[Contact Deloitte](#) to access our assessment tool and find out where your organization is in its digital journey:

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