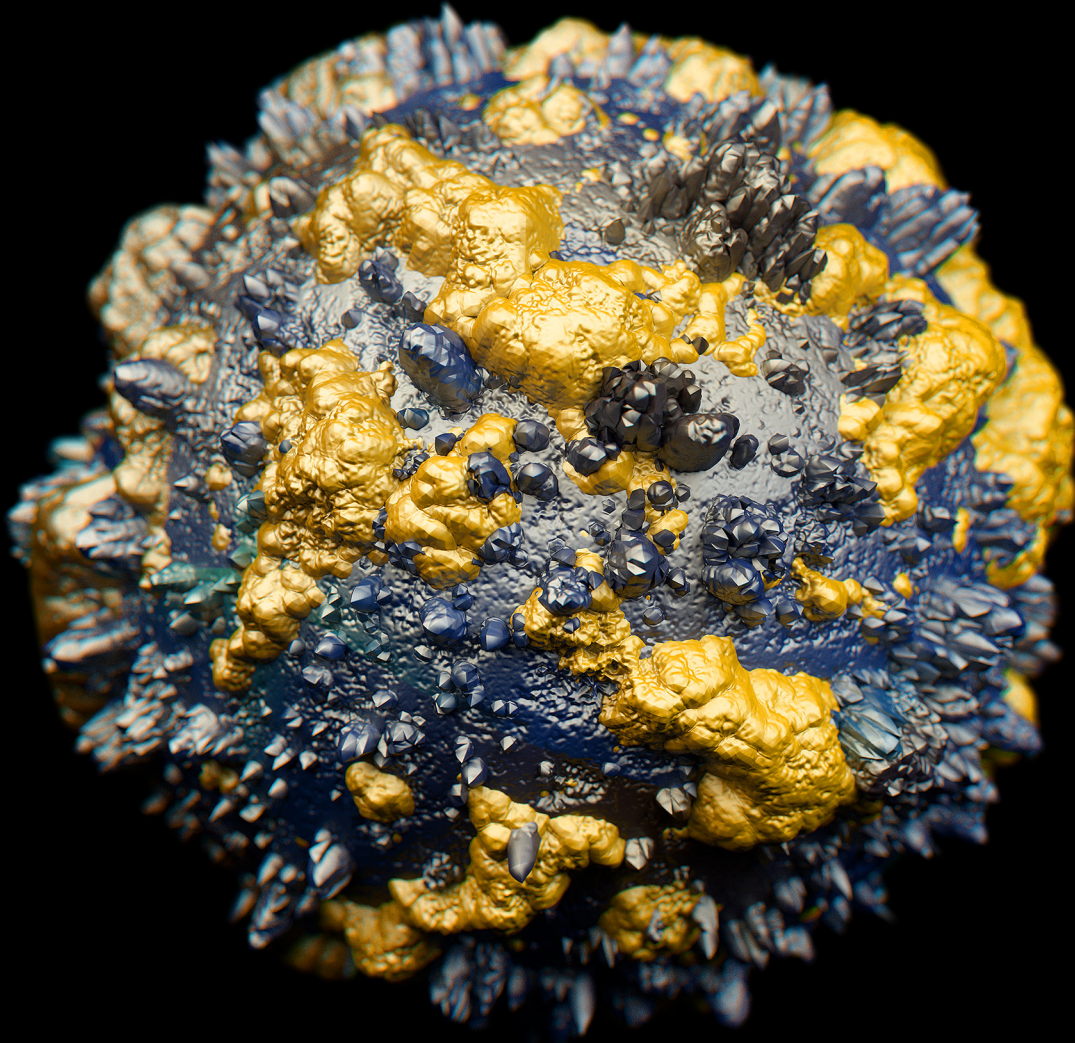


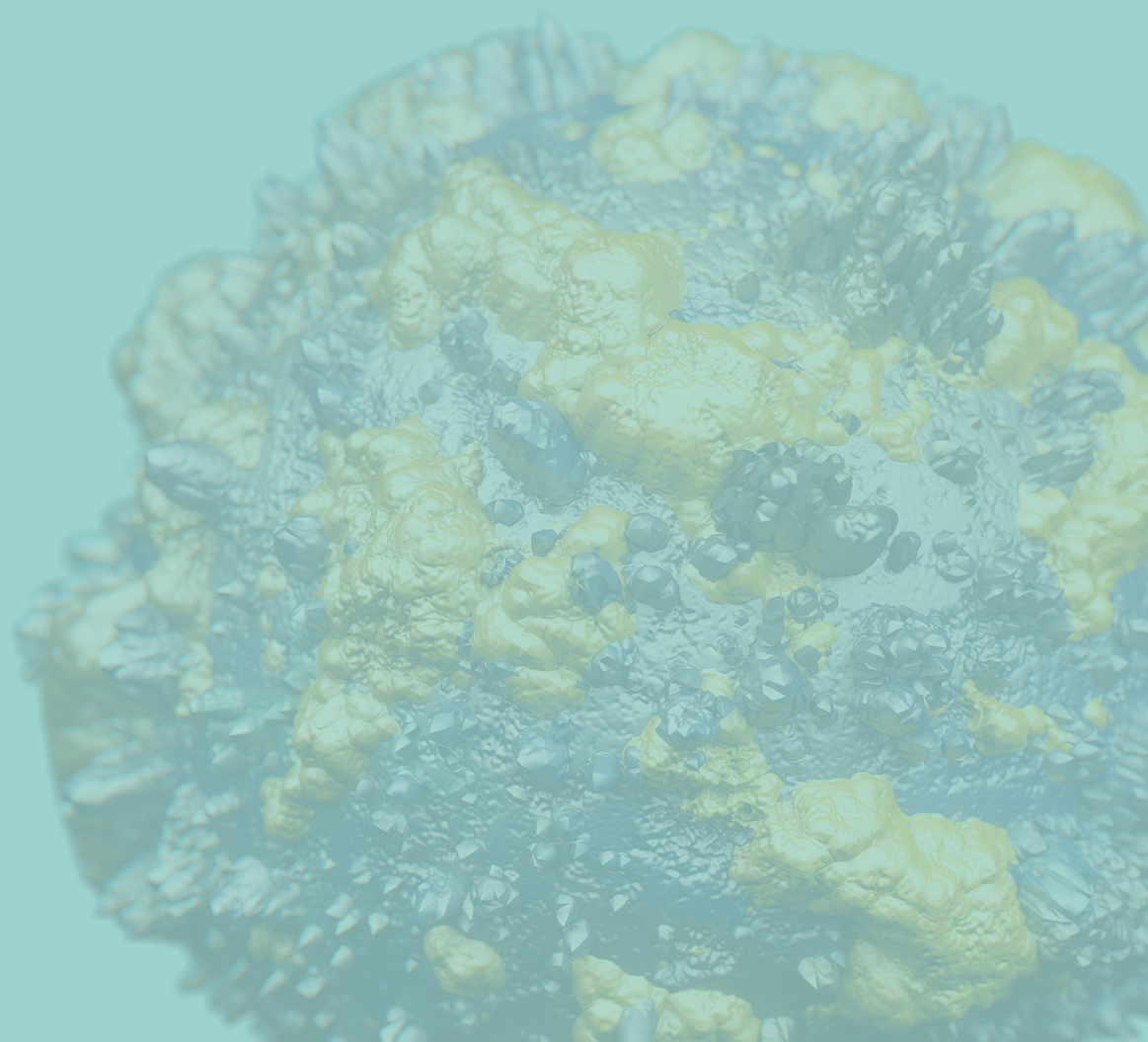
Deloitte.



Digital maturity
assessment for
mining companies

2024

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Organizations are leaning in, yet opportunities remain

Mining companies 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 mining organizations. Our aim was to evaluate each company's digital maturity, identify leading practices, benchmark where they stand, and highlight opportunities to advance digital value realization. Our findings reveal both commonality and divergence in digital-related industry trends.

Participating peer group

Assessment reflects leading mining companies with US and international assets

Companies assessed

6 Unique companies

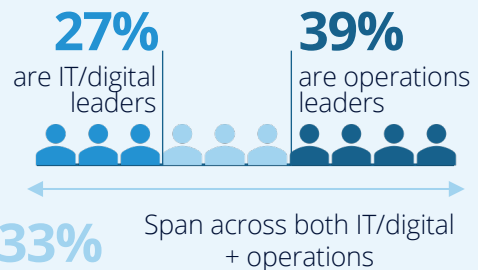
Company profiles

90+ Total mines operated globally

5 Continents where operating

Participant profiles

950+ Data points captured



Source: Deloitte, *Digital maturity assessment for mining companies*, 2024

Six key themes emerge

1. Defining and tracking digital value is key

In the mining industry, there is a growing recognition of the value that digital transformation can bring. Participants see how the integration of digital technologies can enhance operational efficiencies, improve safety outcomes, reduce costs, and unlock new growth opportunities. Digital tools can offer real-time insights into operational performance, enable predictive maintenance, and enhance decision-making through advanced analytics and artificial intelligence (AI). This appreciation of digital's potential is a positive step forward, suggesting a readiness to embrace change and innovate. However, despite this recognition, many organizations find themselves unable to fully leverage the full potential of digital transformation.

The challenge often lies in the **lack of a robust governance framework to define, track, and measure the value derived from digital initiatives**. A governance framework is a vital component of any digital transformation journey, providing the structure and mechanisms to guide decision-making, manage digital initiatives, and evaluate their impact. Without such a framework, organizations may struggle to align their digital initiatives with their strategic objectives, leading to disjointed efforts and suboptimal outcomes. Furthermore, without the ability to effectively track and measure the results of digital initiatives, organizations may find it difficult to justify continued investment in digital transformation, impeding their progress towards digital maturity. Developing and implementing a comprehensive digital governance framework, therefore, is a critical step that can help organizations in mining to better harness the benefits of digital transformation, thereby paving the way for improved operational efficiency and business growth.

2. Progressing on digital is hindered by a lack of strategy and communications rigor

The digital transformation journey in mining has been slower compared to other sectors. This is largely due to a mining company's typical pressure to sustain production and safety levels and manage the complexities of mining operations that often take precedence over the exploration of digital initiatives. In addition, **the industry often perceives digital transformation as a final goal, not a continuous process**. This perspective can limit the potential of digital initiatives. Ideally, digital transformation should be seen as a process of continuous improvement and adaptation to emerging technologies and evolving market conditions. Recognizing the ongoing nature of digital transformation is a critical step toward accelerating the sector's digital maturity journey.

Another significant obstacle to digital transformation in mining and metals companies is **the lack of well-defined digital strategies**. Many companies struggle with articulating a clear vision and strategy for digital transformation. The absence of strategic clarity can lead to misaligned initiatives, creating hurdles in the progress of digital transformation. Furthermore, the data suggests that **even when digital plans exist, they are often not effectively communicated** across the enterprise. This can result in a disconnect between the business and IT functions, leading to misunderstanding or lack of awareness about the digital strategy and/or roadmap. Such communication gaps can lead to inefficient execution and adoption, and suboptimal prioritization of priorities and resources, further slowing down the digital maturity journey. These challenges underscore the importance of developing clear business outcome-led digital strategies and improving the ongoing communication across the organization.

3. Advancing on digital continues to be limited by challenging operational conditions

Deploying digital technology in mining operations presents a unique set of challenges. Conditions, such as working underground or in remote locations, can limit the accessibility to, and reliability of digital tools. For instance, connectivity issues can disrupt the function of digital solutions that rely on persistent internet connectivity. Additionally, the harsh and often unpredictable nature of mining environments can pose difficulties for the effective operation and maintenance of digital equipment. This means that **digital solutions for mining must be robust enough to withstand challenging conditions and be flexible enough to operate with limited or intermittent connectivity**.

Another significant hurdle that mining organizations face in their digital transformation journey is the digital literacy gap among field workers and operators. Some individuals may have limited exposure to digital tools and technologies, leading to a lack of understanding or resistance to their implementation. This gap in digital literacy can hinder the effective deployment and adoption of digital technologies in mining operations. **Addressing the workforce digital literacy gap is crucial to fully achieve the benefits of digital investments**. This can be accomplished through comprehensive training programs, cultivating a culture of digital learning, and ensuring that digital tools are user-friendly and intuitive. By doing so, mining organizations will position themselves to make meaningful strides toward stronger digital maturity.

Six key themes emerge (cont.)

4. Investing deliberate and thoughtful change management is a pivotal enabler

Change management is a pivotal component of digital transformation. Considering the industry and workforce factors discussed earlier, transitioning to digital ways of working represents a significant shift. **For digital transformation to be successful, it isn't sufficient to merely introduce new capabilities; there needs to be an accompanying change in attitudes, behaviors, and ways of working.** This is where thoughtful and thorough change management comes into play, which involves strategically preparing for and supporting employees to understand and adopt change. It includes training programs to familiarize workers with modern technologies (as discussed earlier), as well as workshops to illustrate the benefits of digital adoption, and focused initiatives designed to foster a digital-friendly culture within the organization.

However, effective change management is not a one-size-fits-all approach; it requires customized communication strategies to address the unique needs and concerns of different segments and personas within the workforce. This is particularly important when dealing with field workers, who may have unique hesitations to digital adoption that often stem from insufficient leadership endorsement and lower digital fluency and cultural mindsets. To overcome this, **communication strategies should be designed to address the specific concerns by persona (field workers) to demystify new digital capabilities and tools and highlight their relevance in day-to-day applicability of their role(s).**

This includes having leadership actively and visibly endorsing and supporting digital transformation and reinforcing its importance and benefits regularly. By doing so, organizations can foster a more accepting attitude towards transformation, paving the way for a more digitally mature mining industry.

5. Harnessing data potential as digital leading edge

There is growing recognition of the immense potential that data unlocks. Data, when properly collected, contextualized, cleansed, normalized, managed, secured, and analyzed, can drive significant improvements in operational efficiency, strategic decision-making, and predictive capabilities. Numerous use cases of data analytics to identify patterns and trends have been seen enabling a variety of capabilities, including predictive maintenance, resource optimization, increased production processing/recovery, and informing strategic

decisions. Furthermore, integrating capabilities such as Internet of Things (IoT) and AI can further enhance data analysis and provide real-time, actionable insights and forecasts. However, despite seeing this potential and/or adoptions of certain use cases, many mining organizations lack the fundamentals to capture and unlock the value of their data fully and effectively.

Variations in maturity of data capabilities can be attributed to the variability of tech enablement within operations and the lack of robust data governance mechanisms. Tech enablement refers to the integration of digital technologies in mining operations, which can significantly affect the volume and quality of data that can be collected. For example, operations that rely heavily on manual processes or legacy technologies may struggle to collect comprehensive, high-quality data. Similarly, **the absence of a robust data governance framework can hinder the ability to manage and utilize data to effectively derive meaningful insights and enable strategic data-driven decision-making across the mining value chain.** Data governance involves the processes, roles, policies, and metrics that ensure the effective and efficient use of data in an organization. Addressing these issues is vital for organizations in the industry to unlock the full potential of their data and accelerate their digital transformation journey.

6. Advancing innovation around GenAI in its early stages

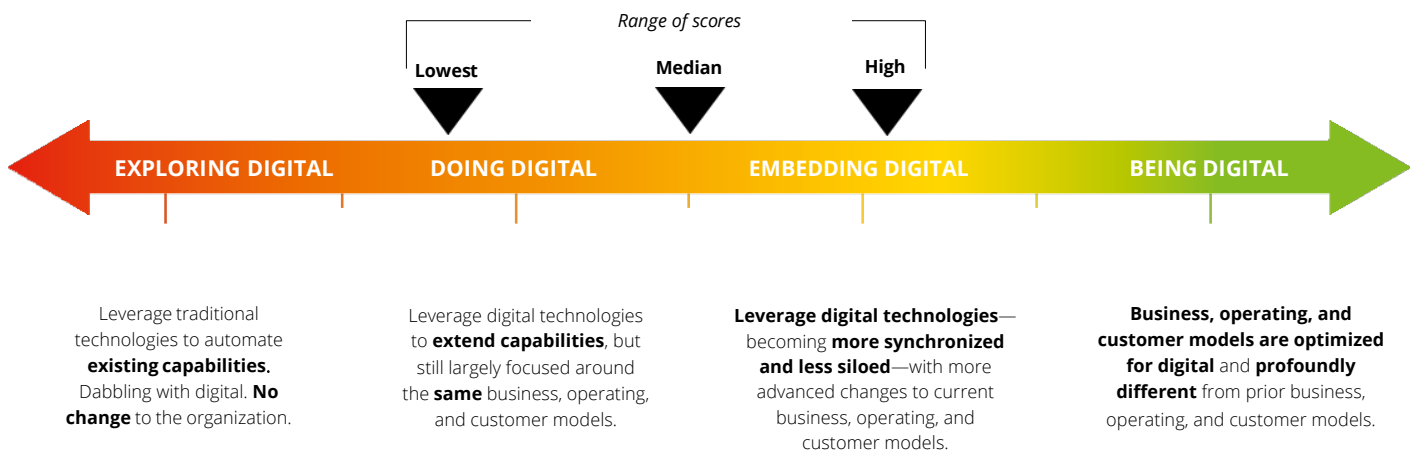
There is growing enthusiasm within the mining industry for Generative AI—a subset of AI that empowers machines to imitate the creative human process to produce original content. The potential applications of Generative AI in this industry are being identified across the value chain. However, mining companies also believe **many of the Generative AI use cases are still ubiquitous and are in the process of evaluating where this advanced technology can bring the most enterprise value and impact to justify the investment of resources.** This evaluation requires understanding the specific needs of the company, reflecting on the broader challenges of the industry, and then mapping to the capabilities of Generative AI. Furthermore, organizations are also grappling with how to integrate these use cases into its broader digital transformation plans and ensuring that the deployment of [Generative AI aligns with the company's strategic objectives, security protocols and overall journey towards digital maturity.](#)

Assessing mining companies' digital maturity

Where do today's mining companies 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 following graphic shows how the benchmark participants self-assessed 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 the 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 have found that leading mining companies:

- Maintain a distinct and clear digital strategy and roadmap aligned to business objectives, adjusting as needed based on industry trends, market factors, modern and emerging technologies, and internal changes.
- Ensure the digital strategy and roadmap are clearly articulated and shared across the organization using a customized communication approach that is articulated in business outcomes.
- Embed digital practices into the standard operational processes of the organization, promoting agility rather than treating digital as a separate component.
- Commit to enhancing profitability through digital, thereby facilitating the accurate ranking of digital initiatives for optimal value addition, and boosting resilience, agility, and efficiency to stay competitive.
- Create a central team composed of key business and digital leaders who concentrate solely on digital initiatives. Pioneering companies in digital transformation often have an official chief digital officer or equivalent digital leadership role.
- Leverage digitally fluent talent to drive analytics initiatives. Harness their skills for citizen development, fostering innovation, and achieving industry leadership.

Assessing Mining companies' digital maturity (cont.)

- Convey the value of digital within their organization, paired with a value governance structure with uniform metrics for digital initiatives. This structure enables transparency and the discovery of top-value prospects. Organizations also maintain an understanding of the progress made, enabling them to halt or alter course as required.
- Revisit the IT-OT operating model of the organization and ensure that there are clearly defined governance, roles and responsibilities and interaction models defined to ensure successful technology planning, deployment, support, and sustainment of digital initiatives.

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 mining companies:

- Concentrate on a tailored change management strategies for digitally enabled capabilities, with a strong representation of individuals who have key mining experience.
- Promote a heightened emphasis on digital literacy and training for field staff to foster digital adoption, along with equipping field leaders with the knowledge of digital initiatives to secure their buy-in.
- Develop methods to motivate and train their workforce in response to an industry-wide talent sourcing and retention crisis.
- Promote and retain strong leaders who understand and appreciate the value derived from digital and can articulate this message throughout the organization.
- Deploy strategic adoption methods to inspire middle managers and staff who may be reluctant to nurture innovation, with additional support provided by senior leadership.
- Develop digital skills and awareness of field workers to fully capitalize on their unique operational expertise in identifying digitally enabled opportunities and successfully embedding the change.
- Foster idea generation from every corner of the business, ensuring a well-defined and openly communicated mechanism for employees to bring their ideas to the forefront.

3. Operations and value chain:

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

Leading mining companies:

- Employ creative thinking to explore how digital advancements can boost their operational output and improve every segment of their value chain through an integrated, end-to-end digital perspective.
- Incorporate advanced technologies and data analytics in a cross-functional manner, viewing it through a lens of continuous improvement to facilitate digital enablement.
- Leverage digital tools to pinpoint areas of opportunity across their value chain, aiming to enhance production and profitability.
- Acknowledge the significance of various digital tools, including AI for predictive maintenance, safety software, data analytics for insights, IoT for operational control, and digital platforms for real-time coordination. These tools collectively enhance operational efficiency and safety.
- Integrate their value chain into their strategies to identify areas with the highest value-generation potential. This involves comprehending each link of the chain, identifying inefficiencies, optimizing processes, and making strategic decisions, all leading to operational efficiency, customer satisfaction, and increased profitability.
- Aim to align portfolio assets with standardized digital protocols to facilitate a smoother digital transformation journey.

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 mining companies:

- Prepare field infrastructure, encompassing network connectivity, internet availability and performance, and mobile services, to facilitate digital advancement.
- Acknowledge the significance of having a quality-rich dataset and fostering an environment conducive to creating a significant impact.

Assessing Mining companies' digital maturity (cont.)

They strategically leverage data for decision-making processes that drive value and explore various GenAI tools and use cases for strategic and effective decision-making in their business operations.

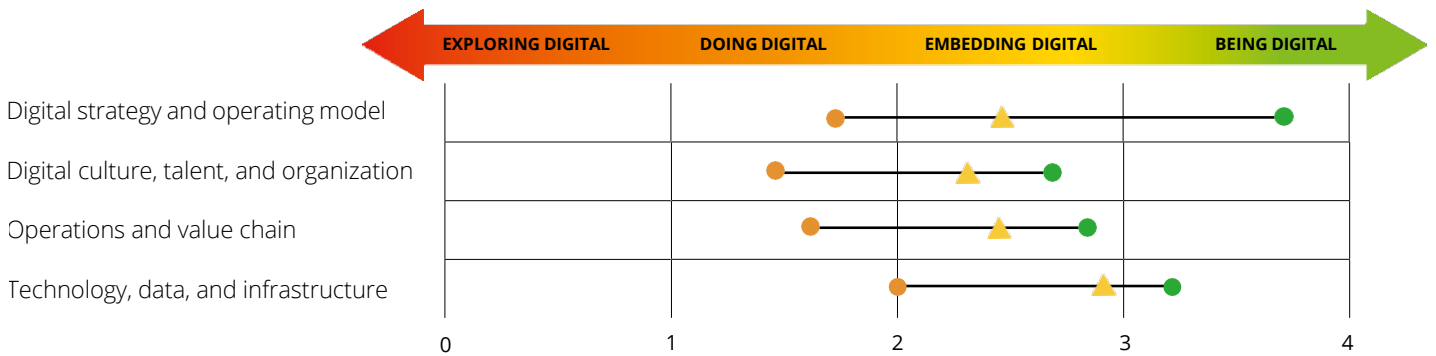
- Employ AI/GenAI in nontraditional ways, factoring in the social and community impact. They are aligning their corporate social responsibility initiatives with their digital strategy. They're also identifying use case pilots, building proofs of concept, and quickly scaling when success is achieved.

- Determine the specific digital tools that will be most effective in optimizing capabilities across the value chain to boost productivity.
- Counteract data governance and cybersecurity risks by investing in platforms that enhance security and thwart potential threats.

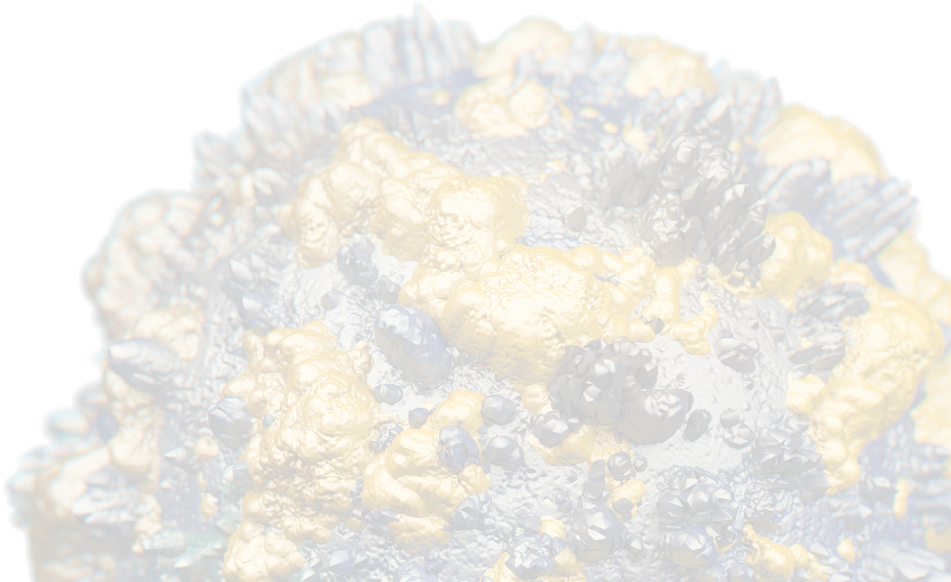
The graphic below highlights the range of scores observed in each of the four digital maturity categories.

Digital maturity assessment results* by capability

Legend: ● Lagging score ▲ Median ● Leading score



*The digital maturity score aggregates survey responses and company interviews



The journey has just begun

Overall digital maturity assessment results indicate that all organizations are working on further embedding 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 excellence” across mining companies, but there is room for all organizations to continually improve. While benefits from digital are being realized, all operators we interviewed agree that much more upside remains and the journey is only starting. 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. Take survey to participate in the digital maturity assessment survey and join us in this transformative journey.

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