



# AI and Human Rights in **Extractives**

July 2023





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This is an industry report on the way artificial intelligence (AI) technologies are driving change within the extractives sector and the challenges and opportunities that trend brings from the perspective of human rights.

As artificial intelligence and machine learning technologies are increasingly developed and adopted in extractive industries such as mining and oil and gas, companies need to consider the impacts of AI for three main reasons:



## Human Rights

Technological transformation brings complex, nuanced, and systemwide risks and opportunities for the realization of human rights. These risks and opportunities are related to both the **design** and **development** of technologies, as well as to how technologies are **deployed** and **used** by companies, such as those in the extractives industry.



## Evolving Regulatory Environment

Changes in the regulatory landscape, including the EU's proposed [Corporate Sustainability Due Diligence Directive](#) and [Artificial Intelligence Act](#), signal that companies outside of the technology industry will need to have a better understanding of the human rights impacts of the AI solutions they deploy. It is noteworthy that companies using AI, not just companies selling AI, are considered in scope for the proposed EU AI Act.



## Lack of Company Processes

BSR's initial observations suggest that although extractives companies are increasingly adopting technologies to increase efficiency, effectiveness,

and safety, and relying on them for productivity purposes, they are not necessarily establishing internal processes to identify, examine, and address the ethical and human rights issues associated with AI technologies. As such, there is a need to raise awareness of the emergent risks associated with the deployment of AI systems in the extractives sector.

Within this context, BSR has started engaging with companies in the extractives sector and the technology companies that provide AI services to them to better understand the current use cases of AI, the associated human rights risks, and the processes and policies in place to address those risks. This report summarizes our findings and observations from these engagements and makes preliminary recommendations to companies on how they can address the human rights impacts of AI in extractives.

This report is not intended to provide a comprehensive assessment of human rights impacts across the extractives sector. Rather, it introduces salient human rights issues associated with the evolving and increasingly large role of AI in extractives. The findings outlined in this report are intended to be a starting point; extractive companies that would like to further explore these issues should undertake more comprehensive human rights due diligence.<sup>1</sup>

BSR welcomes input from extractives companies on this topic. Please reach out to [Ife Ogunleye](#) or [Hannah Darnton](#) or [Lale Tekisalp](#) if you would like to join the conversation.

# The Use of AI in the Extractives Sector

With increasing competition and costs across the sector, extractives companies are turning to digital technologies such as AI to gain operational and competitive advantages to drive increased profits. Companies are increasingly integrating and using AI technologies (including machine learning tools) such as AI algorithms with data or color sensors, big data analytics, and deep neural networks, along with Internet of Things (IoT) devices such as sensors, drones and cameras, and autonomous vehicles across their value chains. These technologies are being used for a range of different use cases, including:

**Search & survey:** AI solutions allow companies to collect vast amounts of data about exploration sites and reservoirs, analyze geologic risks, make accurate production forecasts, and ultimately make better exploration and production decisions.

**Exploration & drilling:** AI solutions enable companies to maximize resource extraction and recovery through optimized design and placement, and reduced costs. Companies also use AI solutions to accurately forecast natural resource deposits, product flow, and future demand, thereby improving their planning capabilities.

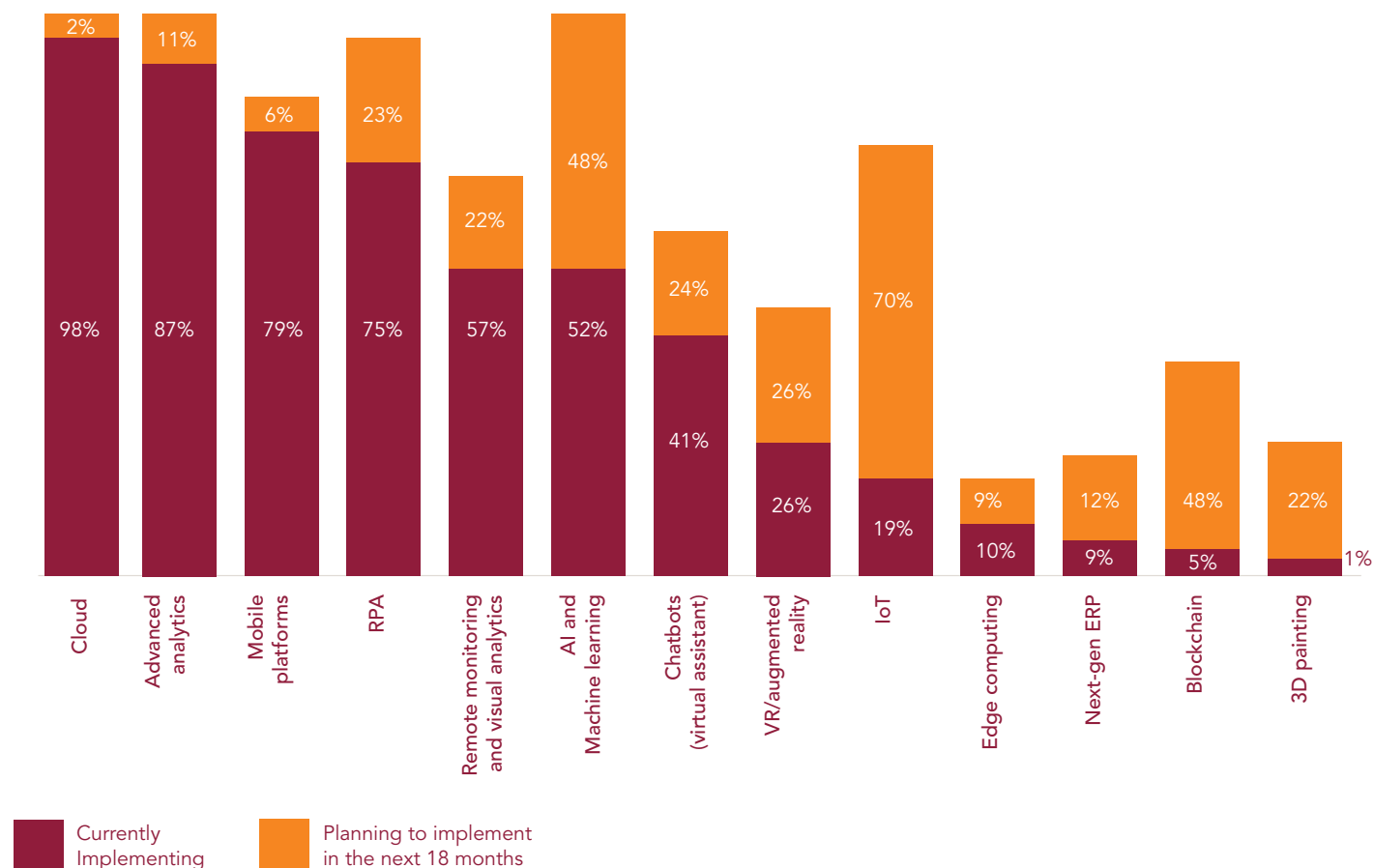
**Workplace management:** AI solutions support the improvement of worker health and safety by enabling companies to better monitor staff conditions including working hours, rest time, and physical condition, and to reduce workers' exposure to dangerous conditions and materials. AI-enabled devices can be used to monitor workers' health statistics such as heart rates, blood pressure, oxygen levels, and alertness to ensure worker safety and security.

**Advanced monitoring:** Companies use AI technologies such as computer vision and machine learning algorithms to monitor key variables or features of exploration and operational sites, facilities, wells, and pipelines, and generate automatic alerts. Such variables include flow rates, pressure, temperature, and gas detection, as well as the conditions of mining or drilling equipment.

Beyond the use cases described above, companies also use AI solutions in business operations, including finance and human resources. However, since these are industry-agnostic use cases, we have not focused on them in this report.

The adoption of AI is expected to continue to rise in the industry. For example, a [survey](#) by EY reported that over 90 percent of oil and gas companies were either currently investing in or planning to invest in AI within two years. In addition, 50 percent of oil and gas executives noted that they had begun to use AI to solve various challenges in their companies. Furthermore, there is an increasing [expectation](#) that of all digital technologies, AI will have the greatest positive impact on businesses in the next few years.

Which of the following technologies is your company currently implementing? And which do you plan to implement in the next 18 months?\*



[AI use in the mining industry](#) continues to grow and is estimated to have reached a market size of over US\$760 million in 2021. Examples of innovations in this industry include [Rio Tinto's](#) development of a fully autonomous heavy-haul long-distance railway system, AutoHaul, which transports iron ore from 16 mines to port facilities in Australia.

# Human Rights Impacts of AI in the Extractives Sector

Although there are benefits associated with the adoption of AI technologies by the extractives industry (e.g., improvements in working conditions), AI may also create or exacerbate existing human rights impacts. In this report, we focus mainly on the human rights risks that AI technologies may lead to, and the ways in which AI technologies may exacerbate the adverse human rights conditions that are already present in the sector.

Through our engagements with extractives and technology companies that provide AI services to them, we identified **four main categories of risk:**



## 1. Privacy and Surveillance



## 2. Non-Discrimination



## 3. Right to Livelihood



## 4. Human Autonomy

Below we list the salient human rights associated with these categories. However, it is important to note that all human rights are indivisible, interdependent, and interrelated. The improvement of one right facilitates advancement of the others; the deprivation of one right adversely affects others.





# 1. Privacy and Surveillance

The introduction of computer vision technologies allows companies to conduct real-time surveillance and analysis of sites and workers. AI models can conduct automated analysis through object detection, tracking, or classification and raise proactive alerts to address the issues identified. This may lead to the surveillance of workers on extractive sites. Although video surveillance devices such as closed-circuit television (CCTV) cameras are already in use in extractives sites or work areas, the introduction of analytics capabilities brings heightened privacy and surveillance risks.

We note that facial, object, or spatial recognition technologies may be used for safety purposes, including ensuring that unauthorized persons are unable to access sensitive information or dangerous equipment, and that employees are

performing their duties in top shape and are healthy, well rested, and alert. However, these technologies may also be used to monitor employee behavior by highlighting changes in posture, movement between different areas, interactions with other employees, etc., in a manner that may infringe on workers' privacy or autonomy.

The collection of personal data such as health information or facial data also increases the risk of intentional or unintentional disclosure of such information in an unauthorized manner—for example, through data breaches or hacks. Companies that deploy AI tools for monitoring may therefore expose data subjects to greater risks of harm caused by data breaches.



## HUMAN RIGHTS THAT MAY BE IMPACTED

- Right to privacy (UDHR Article 12; ICCPR Article 17)



## 2. Non-Discrimination

AI technologies are trained on historical data and so may be biased if the data they are trained on is biased, discriminatory, or nonrepresentative. In the extractives sector, bias and discrimination may occur as a result of inconsistencies or lack of quality in training datasets, incorporation of societal or historic bias, or flawed AI models, among others. Unless biases contained in datasets are addressed, the assessments or predictions made by those AI technologies may themselves also be flawed and lead to discriminatory outcomes for vulnerable groups or workers.

Where operational predictions are made by AI technologies on the basis of data that includes worker behavior or demographic information, there is a risk that AI models may identify patterns in demographic or behavioral data

that may be generalized to other use cases incorrectly. For instance, an AI model may incorrectly attribute worker age or gender to more desirable operational performance (such as drill performance or fuel consumption) and make recommendations on hiring or staffing practices that lead to discriminatory outcomes.

Unless companies developing and deploying AI technologies recognize and work to counteract potential biases in AI models, their use may perpetuate discrimination against particular groups with far-reaching consequences. Problems of bias and discrimination can also be exacerbated by the use of black box models (i.e., models with internal workings that are unknown or untraceable) whose attribution, weighting, or decision-making cannot be measured or reviewed.



### HUMAN RIGHTS THAT MAY BE IMPACTED

- Right to non-discrimination and equal treatment (UDHR Article 2; ICCPR Articles 2(1) and 26)





## HUMAN RIGHTS THAT MAY BE IMPACTED

- Right to work (UDHR Article 23)
- Right to adequate standard of living (UDHR Article 25; ICESCR Article 11)



## 3. Right to Livelihood

AI technologies that are interconnected with automation may have an impact on individuals' right to work and to an adequate standard of living by reducing the number of available employment opportunities. The increasing automation of tasks such as [truck driving](#), drill operations, site monitoring, and sample analysis previously conducted by humans, while improving efficiency and productivity, may lead to a reduction in the number of jobs or roles available to workers, particularly lower-skilled workers. Unless workers in these roles are supported in developing new skills and provided with opportunities to transition into new positions, an increasing number of workers may be deprived of their livelihood and have their positions become obsolete.

Even where there is a potential for re-skilling

and transition into roles to manage or support deployed technologies, resource constraints and lack of access to high-skill training and technology may create additional risks of disparate impact across communities. With a significant amount of extractives operations occurring in developing communities that often have low access to resources or technologies, the benefits of widespread adoption of AI technologies may be unequally distributed with exclusionary effects and outcomes felt more acutely by these communities and its members. This could prove detrimental for poor communities and vulnerable social groups such as migrant or older workers.



### HUMAN RIGHTS THAT MAY BE IMPACTED

- Human autonomy and dignity (UDHR Article 1)
- Right to freedom of thought (UDHR Article 18)
- Right to freedom of opinion and expression (UDHR Article 19)



## 4. Human Autonomy

The use of monitoring and/or predictive technologies to measure alertness, efficiency, or concentration in the workplace may lead to the behavioral profiling of workers and a change in conduct in response. This may have adverse impacts on the human right to freedom of thought, expression, or autonomy. Where AI models use data collected on workers to determine work schedules, tasks, or responsibilities, there may be a loss of human autonomy. This is particularly true in situations of fully autonomous decision-making where there

is no human intervention in the process.

In addition to affecting individual worker behavior, the use of AI technologies may also affect collective conduct. For instance, if socializing or taking downtime during the workday is penalized, workers may adjust their behavior and refrain from interacting with each other, leaving their workstations, expressing dissent, or taking breaks.

# Recommendations

Responsible AI challenges typically need the involvement of various functions at a company. For companies that do not have a dedicated team addressing these issues yet, we recommend starting the process by involving the following functions:

- A)** Teams that can manage the issue from a central perspective, such as Sustainability, Human Rights, Ethics, Legal Compliance
- B)** Teams that use AI technologies such as Engineering, Production, Operations, Human Resources
- C)** Teams that develop or purchase AI technologies such as Technology, Product, IT, Research and Development, Procurement

To mitigate any adverse human rights impacts related to the use of AI, companies can take actions including but not limited to the ones listed below:

## 1. Take inventory of the AI use cases within the company

An important first step is to understand how AI is being used by different functions across the business. Companies should reach out to the teams listed above and ask them how they are using or are planning to use AI technologies in their work. Companies should then make a list of these use cases and prioritize those that may be higher risk.

## 2. Undertake human rights due diligence

To identify and address the actual and potential human rights impacts of the AI solutions they are using, companies should start by undertaking human rights due diligence,<sup>2</sup> a process that specifically assesses risks to people (as opposed to other risks a company may face). Human rights due diligence should be undertaken on an ongoing basis because the ways in which AI technologies are used may change over time. In addition to practicing continuous due diligence, companies should undertake specific human rights impact assessment when developing, using, or procuring new AI technologies that are likely to pose risks to human rights. The results of these impact assessments should then be used, if necessary, to modify or adapt the technologies, or to ensure sufficient mitigation measures or safeguards are in place to address any risks identified.

## 3. State purpose and use limitations

Companies should have a clearly defined purpose for the use of AI and consider setting use limitations within implementation guidelines. If the AI solution is going to be shared externally with other users, companies should establish use policies that define what users can and cannot do with the AI solution.

## 4. Establish a governance mechanism for the responsible use of AI

There are important questions around how the ethical and human rights implications are understood, anticipated, and addressed by the company. Some companies have added new expertise to existing ethics panels and developed guiding principles on their use of AI, whereas others have created bespoke councils to advise specifically on AI.



## 5. Ensure a high level of data protection

Many of the human rights risks related to AI stem from the use of personal data. While it can be tempting to focus on compliance with relevant privacy and data protection frameworks, many of these put the focus on the rightsholder to assert their right to privacy, rather than requiring the integration of privacy and data protection by design. Companies should go beyond regulatory compliance and align their internal data protection and privacy commitments, policies, and practices with the highest international standards.

## 6. Test AI models for bias and externalities

AI models rely on data input, which can be biased and lead to potential adverse human rights impacts around discrimination and access to opportunities. Companies should continually review data inputs that are used by the AI models, through data audits and assessments.

## 7. Undertake adversarial testing

AI solutions may lead to different impacts when used in different contexts or for different use cases. Companies should undertake adversarial testing to new risks as they arise, especially if the use of AI solutions expands to new functional areas or geographies. Adversarial testing refers to exercises where the AI system is stress tested to discover the ways in which the system might be misused or lead to harmful outcomes. Methodologies might include futures thinking or red team/blue team testing (traditionally used in the cybersecurity field).<sup>3</sup>

## 8. Provide transparency about how the AI models work

Developers of AI models should communicate the details of the model to its users, including its training data sources, metrics that the model optimizes for, and key limitations of the model.<sup>4</sup> Companies that are using AI solutions should also consider how AI models can be explained to end-users or employees who engage with these models.

## 9. Integrate feedback

Establish a reporting channel where potential misuse and abuse of the AI solutions can be reported to the teams or third parties who have developed the solution. Workers' voices should be central when making decisions on how to deploy a new technology. Ensure that the necessary mechanisms are in place to integrate employee feedback into the way AI solutions are used by the company.

## 10. Prepare for upcoming regulations

Ensure that your company is prepared for upcoming regulation (e.g., [EU Corporate Sustainability Due Diligence Directive](#) (CSDDD), proposed [EU AI Act](#)). As a first step, companies can either 1) ensure that AI is included in company-wide human rights due diligence processes and/or 2) conduct due diligence on specific AI use cases to identify human rights risks.

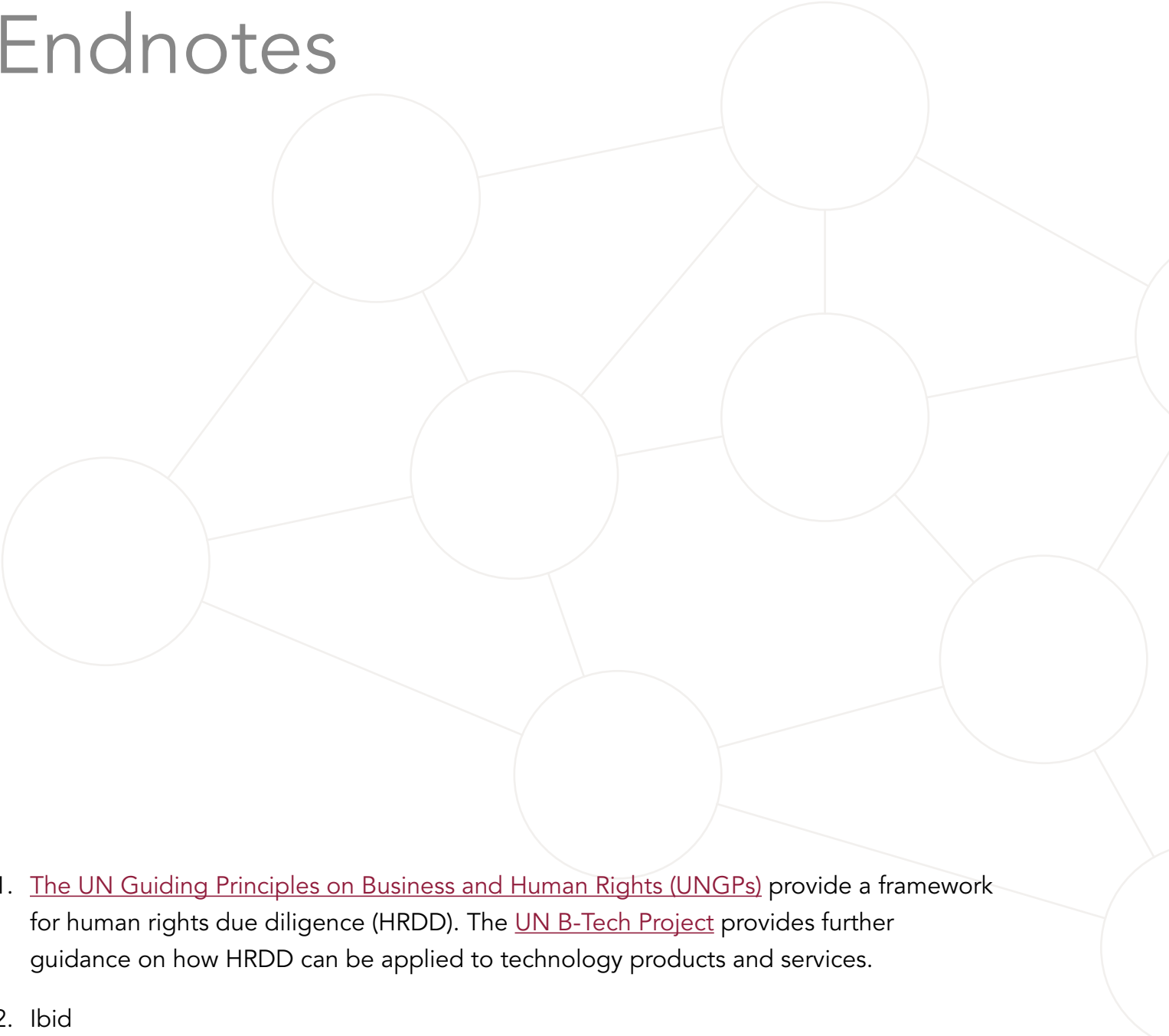
## 11. Engage in dialogue with other industry players

As the use of AI technologies becomes more prevalent in the extractives sector, companies are becoming more interested in its impact. Through dialogue with other industry players, companies can help advance the understanding of the human rights impacts of AI in their sector.

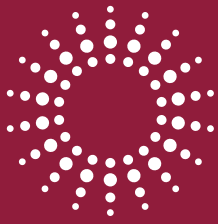
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Our understanding of the human rights impacts of AI will evolve as the technology becomes more pervasive across the extractives sector. Companies should start putting in place structures and processes to address the adverse impacts of the technologies they are using. However, these systems should be agile to meet future developments and concerns.

# Endnotes

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1. [The UN Guiding Principles on Business and Human Rights \(UNGPs\)](#) provide a framework for human rights due diligence (HRDD). The [UN B-Tech Project](#) provides further guidance on how HRDD can be applied to technology products and services.
  2. Ibid
  3. See Microsoft's Harms Modeling Tool and Omidyar's Ethical Explorer Pack as examples.
  4. The 2019 academic paper Model Cards for Model Reporting proposes the use of "model cards" to provide information about an AI model's performance and limitations. Practical examples include Google's use of Model Cards and Microsoft's Datasheets for Datasets tool to document the data-sets used for training and evaluating machine learning models.

\* EY, "New technology can light the way, but do you know where you're going?" Graph on page 11.



# BSR<sup>®</sup>

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