



Tracking the trends 2020

Leading from the front

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Contents

Foreword	2
Trend 1: The social investor Embedding value beyond compliance into corporate DNA	4
Trend 2: Getting partnerships and joint ventures right Looking beyond structure to governance	10
Trend 3: Seize opportunity amid uncertainty Why miners should prepare for the next downturn now	18
Trend 4: Dynamically managing risk From risk registers to strategic risk management	24
Trend 5: The path to decarbonization Miners' role in reducing emissions	28
Trend 6: On the road toward intelligent mining Reviewing lessons learned	34
Trend 7: Modernizing core technologies Considerations around cloud, cyber, and revitalizing the core	38
Trend 8: The intersection of talent and community Proactively planning for the social impact of digital	44
Trend 9: Leadership in an Industry 4.0 world Preparing to manage the mining workforce of the future	52
Trend 10: Tax tribulations Concerns over "transfer mispricing" put miners in the spotlight	58
Conclusion	64

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THE BUSINESS OF mining has never been easy, but miners have continued to make strides in recent years. Many are positioning to embrace intelligent mining through investments in automation and technology modernization. Some companies are addressing climate change and investor concerns through decarbonization and uncovering of new opportunities through joint ventures. They are revisiting their talent and diversity strategies, working to strengthen relationships with local communities, and seeking ways to create value beyond compliance: deliver socio-economic impact while simultaneously fostering operational efficiency and business competitiveness.

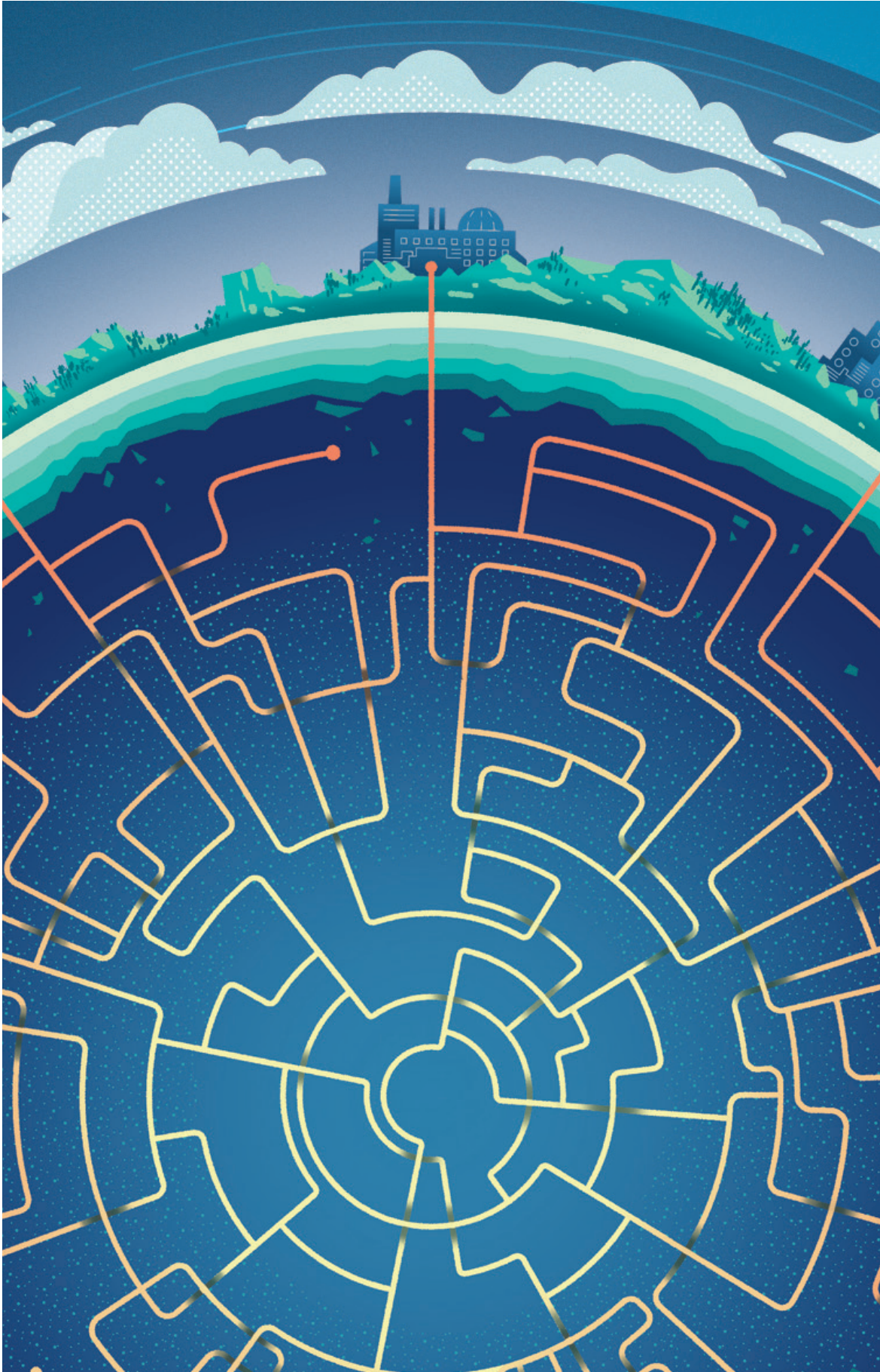
Thanks to these efforts, many mining companies have been able to streamline their portfolios and create more robust balance sheets, putting them in a stronger position than in the last cycle to weather a potential downturn.

However, there's still much work to be done as miners grapple with a host of external challenges, from an uncertain geopolitical landscape and technological disruption to increased demands from both communities and investors.

Navigating these complex issues is expected to require strong leadership. To steer their companies through uncertainty, transform in the face of disruption, and solidify relationships with increasingly dispersed stakeholder groups, leaders should communicate transparently, empower their people, and discover how to turn risk into opportunity.

One of the biggest challenges for the industry has been to articulate the value that mining brings to wider societies and why investors should favor this sector. In many jurisdictions around the world the level of trust in mining is low, even though the industry is considered critical in supplying raw materials and driving the economic development of many regions around the world.

In this twelfth annual edition, Tracking the trends 2020 once again features insights, strategies, and forward-thinking ideas that mining companies can leverage to learn how to lead from the front and navigate this uncertainty. In addition to sharing real-world case studies and examples, Deloitte's global mining professionals share a wealth of lessons learned that companies can draw upon to reposition for the future. Thank you sincerely for your ongoing support, and we invite you to share with us your input and feedback.





Trend 1: The social investor

Embedding value beyond compliance into corporate DNA

By: Andrew Lane, Mining & Metals Leader, Deloitte Africa
Leeora Black, Principal, Risk Advisory, Deloitte Australia

THE DRIVE TOWARD socially conscious profit is no longer limited to environmental activists. Much of society and investors alike are demanding greater transparency around the true social, economic and environmental impact of sectors such as mining. To help regain investor trust, miners should embrace a commitment to value beyond compliance.

Value beyond compliance is about the fundamental synergy between economic performance and social progress. It leverages shared value principles, innovation, analytics, digitization, and strategic and evidence-based solutions to deliver socioeconomic impact while simultaneously fostering operational efficiency and business competitiveness.

And while initially conceived as a way for mining companies to build greater social capital, its principles can ultimately be leveraged to meet mounting investor expectations as well.

As organizations heavily dependent on investment funding, mining companies have long understood the imperative of delivering shareholder value. That could be why in the past some miners struggled to justify investing in non-revenue-generating activities—from community infrastructure projects to sustainability initiatives.

To help regain investor trust, miners should embrace a commitment to value beyond compliance.

Now, however, the pace is accelerating as investors get serious about mining company commitments to environmental remediation, energy efficiency, diversity, health and safety, and the fair treatment of community stakeholders and employees. The trend toward responsible investing has seen individual investors and institutional asset managers alike integrating environmental, social, and governance (ESG) principles into their decision-making. Particular attention is being paid to how companies are addressing issues such as climate change, water management, health and safety, and the fair treatment of workers and communities—all important aspects of mining operations. Today, ESG investing is estimated at over US\$20 trillion in assets under management¹ and those numbers are only expected to grow.

The rise of socially conscious investors is not merely an altruistic trend. That's because companies that fail to deliver value beyond compliance could face financial and reputational consequences.

A case in point: Following the collapse of Vale's tailings dam in January 2019, the company suffered a single-day loss of US\$19 billion.² As of October 2019, its stock price was still reflecting a 26 percent year-over-year decline.

Demands for disclosure

In light of these concerns, many large investors around the world are now demanding greater disclosure from mining companies:

- In early 2019, institutional investors active in extractive industries set up the Investor Mining & Tailings Safety Initiative, which has already engaged in two interventions. The first was a call, supported by funds with over US\$6 trillion in assets under management, for a new independent and publicly accessible international standard for tailings dams. The second saw a group of 96 institutional investors, representing over US\$10.3 trillion in assets under management, writing to 683 extractive companies seeking greater disclosure on the management of their tailings storage facilities.³
- As of 2020, roughly 800 financial services organizations with US\$118 trillion of assets under management have committed to making climate-risk disclosures about their portfolio investments. Already, some global banks are measuring the ESG performance of their corporate clients in a bid to meet clean lending targets; 26 global banks have stopped providing direct financing for new coal plant projects;⁴ insurers like Chubb⁵ and Suncorp⁶ no longer provide coverage for new coal projects; and some fund managers are seeking greater disclosures from companies regarding their gender pay policies and supplier relationships.
- After revealing that 87 percent of the world's largest cobalt, copper, lithium, manganese, nickel, and zinc mining companies have faced various allegations regarding human rights and the infringement of land rights—the Business & Human Rights Resource Centre launched a tracker tool that lets investors and other stakeholders trace allegations made against these mining companies.⁷

Earning investor trust

“This isn’t just about compliance,” says Dr. Leeora Black, Principal, Risk Advisory, Deloitte Australia. “Many investors are making it clear that they will not advance funds unless companies can demonstrate a meaningful and measurable commitment to the principles so much of society holds dear. This causes mining companies to consider not only threats to public trust, but also potential threats to investor trust.”

How can miners earn greater trust from investors? Possibly by making important social issues part of their strategic decision-making process. In recent years, these issues have been guided not only largely by core ESG principles but also by the 17 Sustainable Development Goals (SDGs) introduced by the United Nations in 2015, whose aim is to address endemic global challenges such as poverty, inequality, climate change, environmental degradation, peace, and justice.⁸

Since the SDGs were first introduced, they have become a beacon not just for various governments and corporations, but for many asset managers and investors around the world, who often expect these principles to be embedded into the mainstream of business rather than being segregated to “good works” managed by their corporate social responsibility (CSR) departments.

Andrew Lane, Mining & Metals Leader, Deloitte Africa, explains: “When companies make portfolio choices, they traditionally look at a range of factors—such as the assets, geographies, intrinsic value, shareholder value, and risks associated with these investments. But beyond those factors, they should think about the societal impact of their decisions by asking if their investments can also make the impact that society expects of them.”

Companies that don’t prioritize these values may find themselves shunned by an investment community intensely focused on delivering both financial and social returns. In a survey of 347 institutional investors, BNP Paribas Securities Services found a

growing number of asset owners and asset managers aligning their investments to the UN’s SDGs. By early 2019, 75 percent of asset owners (vs. 48 percent in 2017) and 62 percent of asset managers (vs. 53 percent in 2017) had allocated at least 25 percent of their holdings to funds that incorporate ESG criteria.⁹

Even more recently, Allianz Global Investors—an active asset manager with over US\$608 billion in assets under management—announced that it now considers the UN SDGs a credible international framework for guiding an impact-investing strategy.¹⁰ The International Council on Mining & Metals (ICMM) agrees, even mapping its 10 principles for sustainable development in the mining and metals industry against the SDGs to discern where the industry can help to support global sustainability goals.¹¹

Resource companies have started to respond. In late 2018, for instance, Royal Dutch Shell PLC announced plans to link executive pay to short-term carbon emissions targets.¹² BHP recently followed suit, linking a higher percentage of its chief executive’s bonus to specified climate-related goals.¹³ Yet much work remains to be done before most mining companies will have developed the internal cultures required to truly embrace a commitment to value beyond compliance.

Mainstreaming shared value

To meet the mounting expectations of institutional investors, many mining companies will likely need to expand their approach to CSR. Beyond investing in local community infrastructure projects, they could embed ESG and SDG principles into their strategic and portfolio choices. This would mean considering the societal impact of their everyday operating decisions by, for instance, selecting new suppliers that are demonstrably creating local jobs and local value, or by helping community members gain the skills they need not only to contribute to immediate corporate goals but to thrive into the future.

Similarly, when building portfolios, miners should not only consider the strategic value of their asset investments, but also their capacity to add future value and their role in reducing portfolio risk. They should also consider the societal impact of their investments by possibly seeking assets that can deliver on clear social goals, with the aim of balancing their overall portfolio performance.

To meet the mounting expectations of institutional investors, many mining companies will likely need to expand their approach to CSR.

Additionally, mining companies may want to consider providing investors with specific details on how they're addressing their stakeholder requirements. In some cases, this may mean building more effective processes for stakeholder engagement to thoroughly map and analyze stakeholders and their issues. This would likely include developing an annual engagement plan that aligns business strategy, business impacts on stakeholders, and stakeholder impacts on the business. At the tactical level, it could involve ensuring that stakeholder interaction and channels respond to the nuances of the stakeholder landscape. Operationally, cross-collaboration between business functions can also be important to appropriately address stakeholder requirements while realizing value and efficiencies. Last but not least, stakeholder engagement strategies should enable iterative revision and adjustment based on internal performance metrics in conjunction with collaborative stakeholder feedback.

Anticipating and influencing the regulatory environment

Another way miners can achieve value beyond compliance is by anticipating and influencing the regulatory environment. This issue has come into sharp focus in recent years in the wake of mounting protests, anti-mining advertising campaigns, abrupt tax increases, dramatic changes in regulatory regimes, and the nationalization of mines. Some reasons for this include:

- As the search for mineral deposits spreads, companies more frequently encounter indigenous populations who question the sovereign authority of the nation-state from which the company received its mining permit.
- Mining in the developing world tends to encroach on urban or semi-urban land, forcing miners to compete with agriculture and other industries for key resources (such as land and water). Resident action groups are responding by blocking or delaying access to these resources and using social media to mobilize and form coalitions.
- Fewer people see their personal welfare tied to the welfare of primary industries such as mining, especially as increased automation reduces employment opportunities in the industry.
- Between 1994 and 2004, not-for-profit revenues in the US rose by 61.5 percent¹⁴—a trend reflected internationally. This has given sociopolitical groups greater access to funding than ever before.

To counter any negative sentiment, mining companies should go beyond strict regulatory compliance. Instead, they should look for ways to derive tangible value from regulatory frameworks.

One way to consider is by viewing stakeholder relations, community development, safety and health, and environmental issues as multiple dimensions of a single challenge—namely sustainability. This can enable companies to create one holistic sustainability strategy that integrates their various compliance requirements across all relevant legislative frameworks and establish cross-functional teams to deliver on these plans.

In addition to better mitigating risk and strengthening stakeholder relations, this approach can enable companies to reduce costs and increase efficiencies. From an investor perspective, it can also let them develop evidence-based strategies to create a regulatory dividend that can be calculated and demonstrated to increase shareholder value.

Unlocking value beyond compliance

As mining companies begin to take steps to embed value beyond compliance into their corporate DNA, they should also consider how they plan to demonstrate this commitment to the investment community. This often involves measuring their social impact in terms that each stakeholder group understands, and then linking these metrics back to the ESG and SDG principles. Companies could need to supplement their financial metrics with proof points that show the real-world social impacts they are delivering at a grassroots level—which is ultimately what social investors most care about.

The key here is to define, or rather redefine, the concept of value and understand how it's perceived by various stakeholders, including governments, host communities, and employees. It's time to acknowledge that delivering value to these other stakeholders contributes to the value received by shareholders. This is the essence of shared value, and it can accrue in terms of quality and predictability of earnings.

HOW TO RESPOND TO THE DEMANDS OF SOCIAL INVESTORS

- **Create value beyond compliance.** To respond effectively to investor expectations, mining companies will likely need to move away from a mindset that relegates corporate social responsibility to a discrete function. Instead, they should consider revising their business models to tackle some of society's biggest issues—from stakeholder engagement and creating a regulatory dividend to investing in renewable energy, getting proactive about the low-carbon economy, localizing procurement, strengthening diversity and inclusion, respecting human rights and fostering cross-industry collaboration.
- **Change the image of mining.** In an age of disruption, shareholder activism, and sometimes a breakdown in corporate trust, miners should try to retake control over the sector's narrative. Oftentimes the industry is viewed critically in many aspects such as environmental and social responsibility. Stories should highlight the industry's investment in innovation, collaboration, safety, sustainability, genuine rehabilitation, renewable technologies and diversity. In short, value beyond compliance should become a rallying call.
- **Get better at brand and reputation management.** The aim here is to link investor trust to the company's strategic plan, instill a duty to protect both public and investor trust in all employees and leaders, and gain the capacity to sense risks to this trust so companies can rapidly respond to crises and emerging threats.

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Trend 2: Getting partnerships and joint ventures right

Looking beyond structure to governance

By: Andrew Swart, Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited
James Ferguson, Global Mining & Metals Tax Leader, Deloitte UK
Tim Biggs, Mining & Metals Leader, Deloitte UK

WITH JUNIOR MINERS' capital constrained, and market capitalizations not reflecting full corporate value, some industry players are consolidating to gain scale. Joint ventures (JVs) can be a natural solution. Yet, even when structured right, JVs often fail due to unclear decision-making processes, ineffective governance, and poor

transparency and alignment. Here are some ways to consider how to overcome those common challenges.

Although mining companies have made significant strides to strengthen their operations, streamline processes, integrate digital technologies, and deliver value beyond compliance, the industry is still often painted in a negative light.

The upshot? Market capitalizations in the sector have been declining over the last two years (figure 1) and companies—particularly juniors—still often struggle to raise capital.

Alternative funding models do exist—from royalty streaming to offtake agreements. Private equity firms, which once shied away from the resources sector, have also been investing more actively in mining companies, providing additional access to financing.

“Most pension funds now have some mining companies in their portfolios, as do a growing number of private equity firms,” says Rajeev Chopra, Global Energy, Resources & Industrials Leader, Deloitte Touche Tohmatsu Limited. “They understand that, while the sector could be volatile in the short term, it can offer strong long-term returns.”

The sector is starting to consolidate

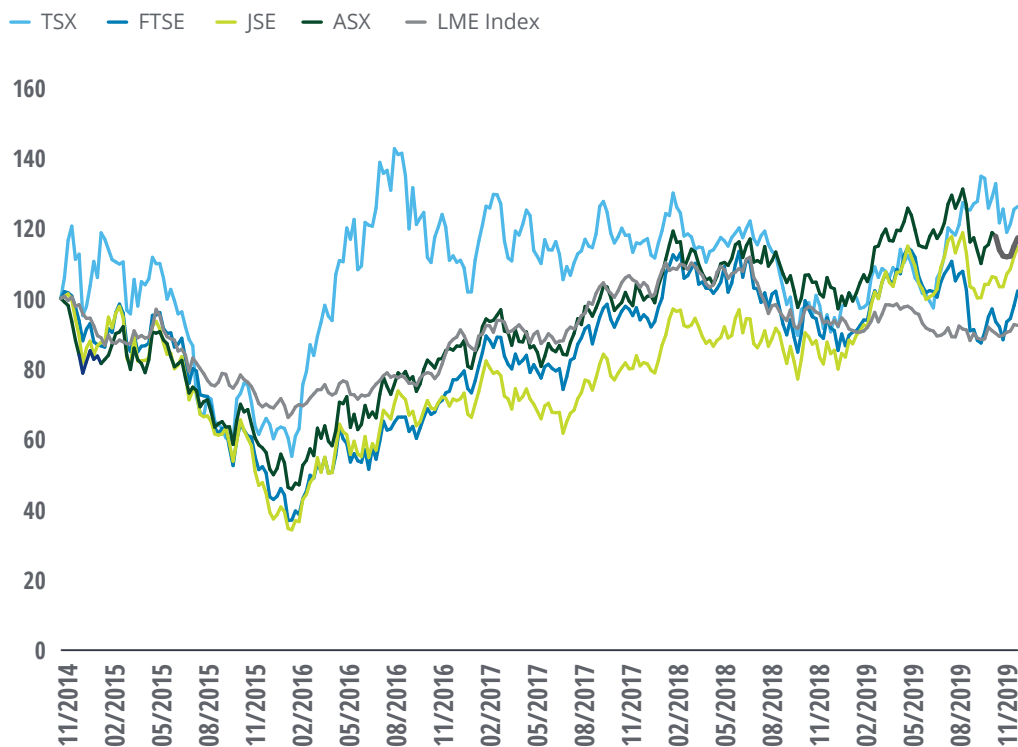
Yet, despite these options, many juniors remain capital starved. This has spurred consolidation as companies attempt to gain the heft they need to attract financing and strengthen their performance metrics.

Merger and acquisition (M&A) activity has been picking up, especially in the gold sector. In the first half of 2019, Barrick acquired Randgold and Newmont acquired Goldcorp. At the time of writing this report, Kirkland Lake Gold announced the acquisition of Detour Gold, subject to regulatory and shareholder approval.¹ More transactions are likely to follow. Global deal volume in the mining and metals sector is also in line with previous year numbers (687 deals in first half of 2019 vs. 691 in first half of 2018), although deal value declined from US\$48.2 billion to US\$31.4 billion.²

FIGURE 1

Mining sector market cap changes on world’s major exchanges (2014–2019)

LME Index vs. mining equities 5-year rebased USD



Source: Refinitiv Datastream.

Joint ventures (JVs) are on the rise too. Barrick and Newmont partnered to combine their assets in Nevada—creating the world’s largest gold complex.³ This is a classic example of companies finding synergies in the co-location of their assets. There has also been an increase in Chinese miners entering into JVs in different locations around the world. Juniors with promising deposits have also been increasingly successful in attracting the attention of majors interested in expanding their exploration portfolios. In fact, several large miners—such as Rio Tinto⁴ and South32⁵—have explicitly committed to collaborating with junior and mid-tier companies on exploration projects around the world.

“Beyond access to funding, joint ventures can help juniors tap into critical expertise, relationships, and capabilities,” notes Chris Lyon, Partner, Financial Advisory, Deloitte Chile. “This can allow them to leverage digital technologies and alternative energy platforms, address sustainability issues, and meet mounting stakeholder expectations.”

And it’s not just juniors that stand to potentially benefit from these JVs. Given the size of capex projects in the mining sector, their location in remote regions, and the growing complexity associated with accessing many ore bodies, companies of all sizes can benefit from partners to finance projects, source critical skills, build local relationships, and share risks. Similarly, for investors, JVs can deliver shorter paybacks amid commodity price volatility, as well as security of supply for critical resources. The sector is likely to see more JVs going forward, making this an important competency area firms will likely need to build.

There has also been an increase in Chinese miners entering into JVs in different locations around the world. Juniors with promising deposits have also been increasingly successful in attracting the attention of majors interested in expanding their exploration portfolios.

Avoiding the pitfalls

However, structuring a joint venture and successfully governing it to achieve corporate aims are two separate things.

“Companies understand they need to get advice to structure an effective joint venture,” explains Sunil Kansal, Partner, Consulting, Deloitte Canada. “There’s a lot of guidance around designing an appropriate capital structure and creating the shareholder agreement. Where joint venture partners typically run into trouble is in operationalizing these structures.”

To avoid common pitfalls, and maximize the success of a JV, companies should gain consensus around three operational elements.

1. Decision-making processes

Without a clear delegation of decision-making authority, well-articulated conflict resolution processes (particularly in a 50:50 JV), and agreement around decision approvals, JVs can struggle to take decisive action, resolve exceptions, or run productive meetings. To help mitigate these risks, partners should:

- Empower their governing bodies to optimize workflows, limit meeting frequency, and clarify delegation authority.
- Agree on the role of the non-operator in the JV structure.
- Give teams the flexibility to make certain decisions around budgets, work parameters, and staffing—and to act swiftly in urgent situations (e.g., health and safety issues or reputation management)—without the need for board approval.
- Create advance resolution strategies for common areas of conflict and build in escalation policies to avoid deadlocks.
- Proactively address the differences in each partner's business strategies, values, processes, capabilities, risk appetites, and cultures.
- Reduce staff time spent in meetings and encourage online collaboration as opposed to frequent in-person meetings.

2. JV governance

Another area where partners can face difficulty is around governance of the JV. Negotiations can quickly devolve into key legal clauses without partners taking the time to step back and think through the bigger principles of the JV. Once the JV is in motion, partner and board interaction with the venture can lead to inefficiencies—such as inun-

dating staff with urgent requests for custom reports or asking for one partner's work to be prioritized over venture projects. In other cases, roles and responsibilities may be poorly defined, leading to duplication and overlap, conflicting decisions, and inconsistent workflows. Improper team composition and accountability can also lead to poor performance, high churn, and roles filled by quotas rather than skills and fit. To address these issues, partners should:

- Align early on the really big issues and create a key set of principles around issues such as exit options, point of views on environmental and government issues or how the JV might deal with unforeseen issues like subpar operational performance.
- Align activities between board members and management by appointing liaisons from each party to manage interactions.
- Standardize documentation and set agreed times for responses.
- Allow roles and responsibilities to evolve throughout the venture lifecycle to adapt to changing needs.
- Leverage each partner's strengths to fill roles, assign responsibilities, avoid overlaps, and build transparency.
- Foster commitment to the venture by requiring full-time employment commitments and using venture key performance indicators (KPIs) for compensation and incentives.
- Ask seconded personnel to serve multi-year terms with the venture.
- Give venture leaders the authority to build their own teams, monitor performance, and assign work.
- Harmonize staffing levels by creating standard requirements for all roles.

3. Transparency and alignment

Most organizations understand the challenges associated with building an integrated organizational culture that promotes collaboration and fosters information sharing. Realizing this ideal can be even more challenging for multinational JVs staffed by multicultural teams. Cultural differences, different hierarchical norms, disparate communication processes, and possibly clashing approaches to privacy and transparency can create unintentional misunderstandings and miscommunication. To overcome these obstacles, partners should:

- Create a shared vision of what trust looks like for JV participants.
- Capitalize on cultural differences rather than demand similarities by recognizing the strengths of each partner while encouraging empathy and fairness.
- Have the JV develop its own mission, vision, values, purpose, and brand supported by a stand-alone marketing strategy.
- Develop consistent operational, technology, and governance approaches for the JV.
- Implement an integrated IT system to eliminate information silos and establish one source of truth.
- Set up a strong assurance function capable of resolving issues before they escalate.

What good looks like

“Even companies that engage in a lot of joint ventures struggle to transfer the knowledge gained from existing ventures to newly established ones,” Lyon notes. “To realize the full value of these relationships, their governance models should provide operational flexibility and facilitate rapid decision-making, while evolving the maturity of its governance model over time.”

Although it takes work, companies that get this right stand to possibly benefit from operational continuity, effective decision-making, streamlined conflict resolution, and empowered teams: critical outputs miners should consider investing in as they come to rely more heavily on joint venture arrangements.

To realize the full value of these relationships, their governance models should provide operational flexibility and facilitate rapid decision-making, while evolving the maturity of its governance model over time.

HOW PARTNERSHIPS CAN CREATE VALUE BEYOND COMPLIANCE

Beyond joint ventures, some mining companies are considering other ways to distribute the risks associated with major capital projects. One emerging model is to allocate project assets and liabilities across a full ecosystem of partners—from mining companies, original equipment manufacturers (OEMs), and service providers to local communities and governments.

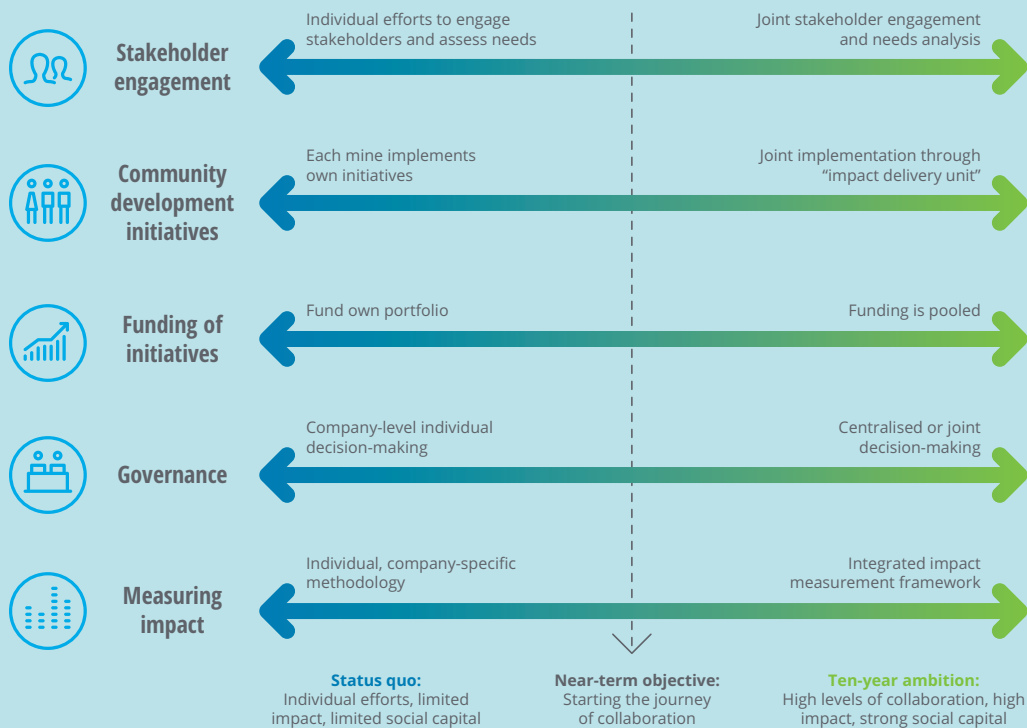
The idea is not simply to de-risk project finances. It's to de-risk project relationships by leveraging the skills of every ecosystem partner to extract greater value across the board. For instance, OEMs and service providers don't simply contribute equipment and labor. They also share in decision-making and project milestones. Similarly, community stakeholders don't simply approve mine activities or assist in its operation. They also earn a portion of the value created, which can be used to drive sustainable economic development.

This type of shared value collaboration allows companies, governments, communities, and other key stakeholders to work together to strengthen local economic clusters, achieve greater social impact, and increase the return on social investment. However, reaching this end goal is clearly a journey, which is why mining companies should start small before adopting a model that pools all funds and integrates governance structures.

In this regard, collaboration should be approached as a continuum across aspects such as initiative selection, implementation, funding, partners, decision-making, governance structures, and measuring impact (figure 2). It may also be useful to leverage technologies such as blockchain to enhance transparency and establish cross-organizational trust.

FIGURE 2

Collaboration options



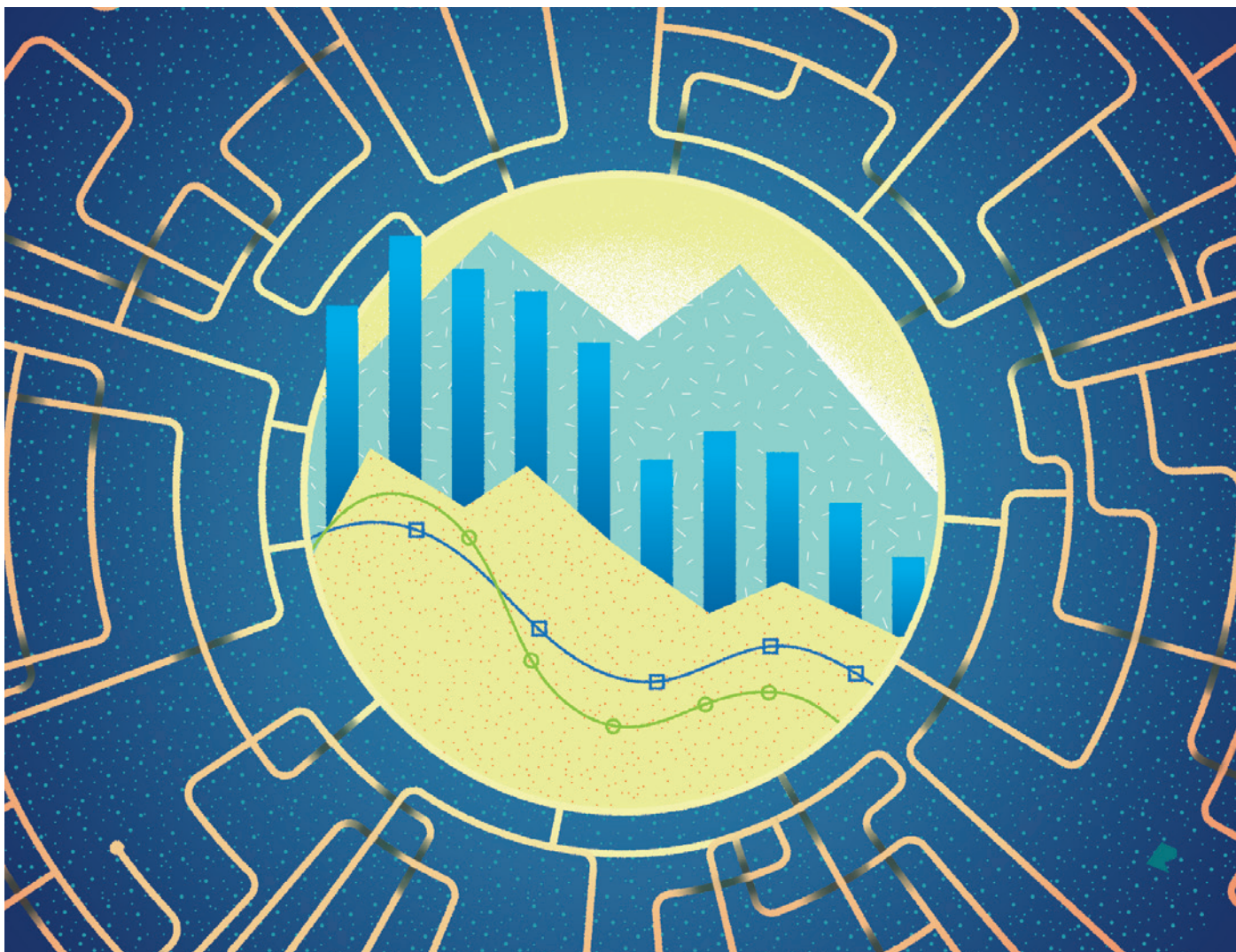
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CONSIDERATIONS FOR JV SUCCESS

- **Lay the proper foundation.** If properly structured, JVs can give juniors the opportunity to increase their percentage of ownership in the venture over time, so that by the time the mine is actually built they're positioned to realize a measurable return on investment based on the work they've done along the way. To maximize the upside potential of these arrangements, however, it's important to understand their financial implications from the outset. This means conducting financial modeling and assessing potential tax consequences up front.
- **Select the right partners.** A partner can change the trajectory of a JV, so choosing the right partner can be especially important. In some cases, the right partner is defined by their ownership of a critical asset, such as presence in a market or intellectual capital. Cultural fit should also be taken into account. While a culture clash shouldn't necessarily derail a deal, knowing it exists informs the need for more detailed negotiations and alignment on governance and performance monitoring.
- **Adopt the right KPIs.** In addition to monitoring the performance of key JV initiatives, venture partners should aim to foster continuous governance improvement by expanding their KPIs beyond traditional measures. Consider tracking supplementary metrics, such as the number of projects identified, in the pipeline, or implemented; the average time it takes to resolve disputes and make decisions; the frequency of approval delays within a certain time period; and the number of issues that remain undecided each quarter.

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Trend 3: Seize opportunity amid uncertainty

Why miners should prepare for the next downturn now

By: Andrew Swart, Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited
Bill Marquard, Director, Monitor Deloitte US

COMMODITY PRICES RISE and fall in tune with economic trends, which are currently foreshadowing a potential global downturn. To avoid being blindsided, there are some bold plays mining companies can consider to prepare.

It seems the mining industry has barely recovered its stability before once again facing slowing economic growth.

Globally, trade volumes are down and geopolitical tensions remain high. The inversion of the yield curve in the US, Canada and UK bond markets over the third quarter sent a strong market signal that a downturn might be in store.¹

Concerns about China's economic revival remain front and center. For the third quarter of 2019, the country's GDP grew only 6 percent year-over-year—its slowest gain in more than 27 years.²

Several key forces appear to be driving this current level of economic uncertainty. Growing income disparities around the world seem to be giving rise to more nationalistic and populist governments. This is spurring a trend away from multilateralism. Free trade has even given way to protectionism in some countries, and the global economy is resetting to this new norm.

These macroeconomic headwinds are weighing on the industrial metals sector. Volatility across the sector has been rising, from base materials to

bulk commodities, with some commodities being supported by supply side constraints (figure 1). For their part, precious metals have been benefiting from the investment community's flight to safety.

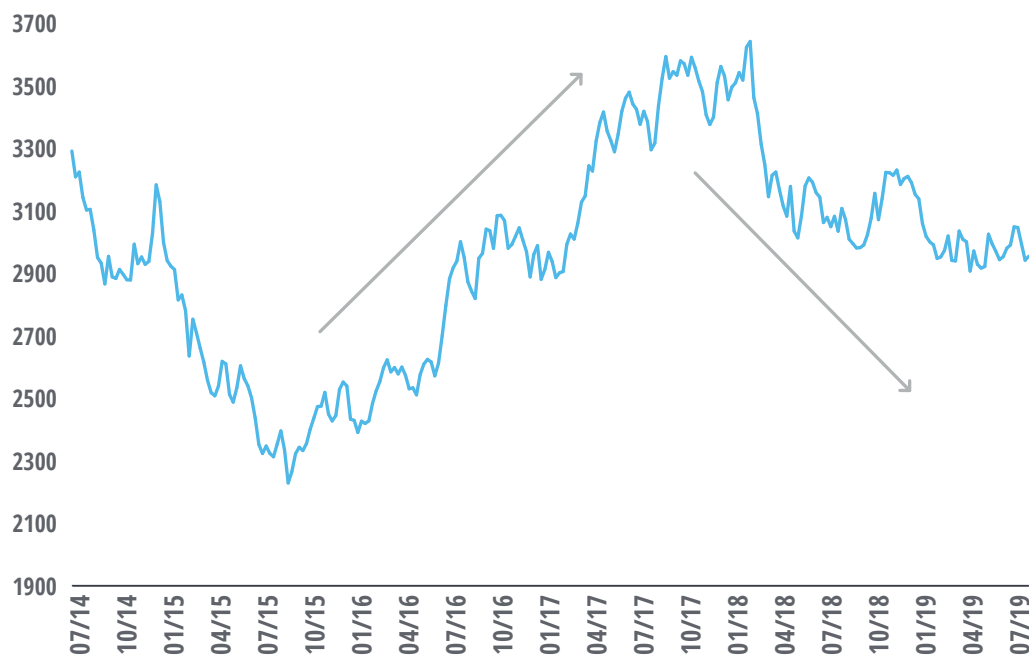
Despite these variable fortunes, however, one thing is clear: commodity prices rise and fall in tune with global economic trends, and, right now, those trends may be heralding a downturn.

Bold plays for consideration

“If miners are to learn from history, the time is ripe to begin shielding against a downturn,” says Andrew Swart, Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited. Companies with commodity portfolios that may continue to soften should think about taking proactive action so they can emerge from any potential downturn more robust and in a better position to take advantage of the cycle.

FIGURE 1

Roller-coaster ride for industrial metals, LME Index



Source: Refinitiv Datastream.

Organizations can lay a foundation for this future through various bold plays.

1. Future-proof tomorrow

A downturn offers a clear opportunity to build the muscles to forge the future, not just react to it. Here's how:

- **Prepare, don't predict.** Since 1988, the IMF has never forecast a recession in a developed economy more than a few months ahead.³ That's why it makes sense, instead, to prepare for a range of plausible scenarios rather than one generic "downturn" scenario.
- **No plan ever survives contact with the enemy.** To determine the reliability of their existing strategies, mining companies should stress-test those strategies against the "enemy" of volatility by asking how various scenarios might affect their strategies, how competitors are likely to react, and at what point they should shift their plans.
- **Build institutional muscle.** Both scenario planning and stress testing are exercises that, like interval training, build institutional muscles that can be critical regardless of economic conditions. Leadership teams that engage in these exercises can get to know each other's strengths, weaknesses, thought processes, and biases, allowing them to build cohesion and identify ways to make the business stronger.

2. Don't abandon innovation

When the going gets tough, many companies abandon their innovation and research and development (R&D) portfolios, seeing these as longer-term plays that don't drive short-term value. It's hard to resist this temptation. However, most downturns only last four to six quarters, and keeping that innovation focus now can position the organization for competitive advantage.

Digital programs can also be refocused around key areas that drive short-term value, such as:

- **Automation.** The business case for automation in key areas of the organization is clear, and companies can benefit from continuing down this path.
- **Analytics.** Optimizing key portions of the process using big data analytics can yield substantial value. We typically see double-digit savings in optimizing different metallurgical processes.
- **Waste removal.** Focus in on key processes where there is often redundancy and where more streamlined processes can drive greater efficiencies. These are areas like integrated planning or driving short interval controls.

There are, of course, many other examples where innovation and digitization can add key value in the short to medium term. Companies should remain laser focused on driving these.

3. Don't burn—redesign

Drastic cost cutting during a downturn can see companies trimming muscle, rather than fat. Typically companies that go through drastic cost reductions without redesigning the underlying processes see all that cost come back within a year to 18 months. Organizations need the muscle and, in the absence of rethinking how the work gets done, the cost will likely return. To avoid this:

- **Take the time to redesign.** Companies would be wise to look at the major workflows in their organization to identify alternative ways to get that work done—perhaps by automating, outsourcing, or using contract employees. The aim is to create something sustainable to position for lasting change.

- **Preserve key talent.** When leaders become overwhelmed by economic pressures during a downturn, they often neglect to invest in employee experience and reduce workforce management to an income statement exercise. To encourage employees to remain loyal through the bad times, companies should focus on helping employees find meaning in their relationship with work—even when the going gets tough.

4. Relook at your relationships

Downturns provide a great opportunity for companies to relook at their relationships and decide which ones to invest in, which ones to abandon, and perhaps which ones to renegotiate:

- **Invest in the ecosystem.** The easy answer might be to squeeze the supplier base for more savings and better prices. The harder, but potentially more value-creating, option might be for companies to look at new ways to create different incentives and work with their supplier base to achieve their goals. Making suppliers part of the solution rather than treating them as a commodity can help set miners up for long-term value creation.
- **Collaborate.** Now might also be a good time to create collaborative relationships with competitors who might also be feeling the downturn.

Very often, they are facing similar challenges and have a similar cost focus.

5. Acquire resources

The instinct is always to cut and reduce, but now might also be the time for companies to invest in key resources—specifically, assets and people:

- **Take advantage of M&A.** Mining companies going into a downturn with balance sheet strength have considerable advantage. Making strategic acquisitions at depressed multiples can create long-term accretive value. Many firms, however, leave it too late and find themselves acquiring when the market has already turned. Take the long view.
- **Recognize people as tremendous assets.** Whether it's from within or outside of your industry, downturns can be great opportunities to make strategic hires. Now is the time for companies to think through their longer-term vision for the kinds of talent that can enable their long-term strategy and use the next 18 months to hire strategically.

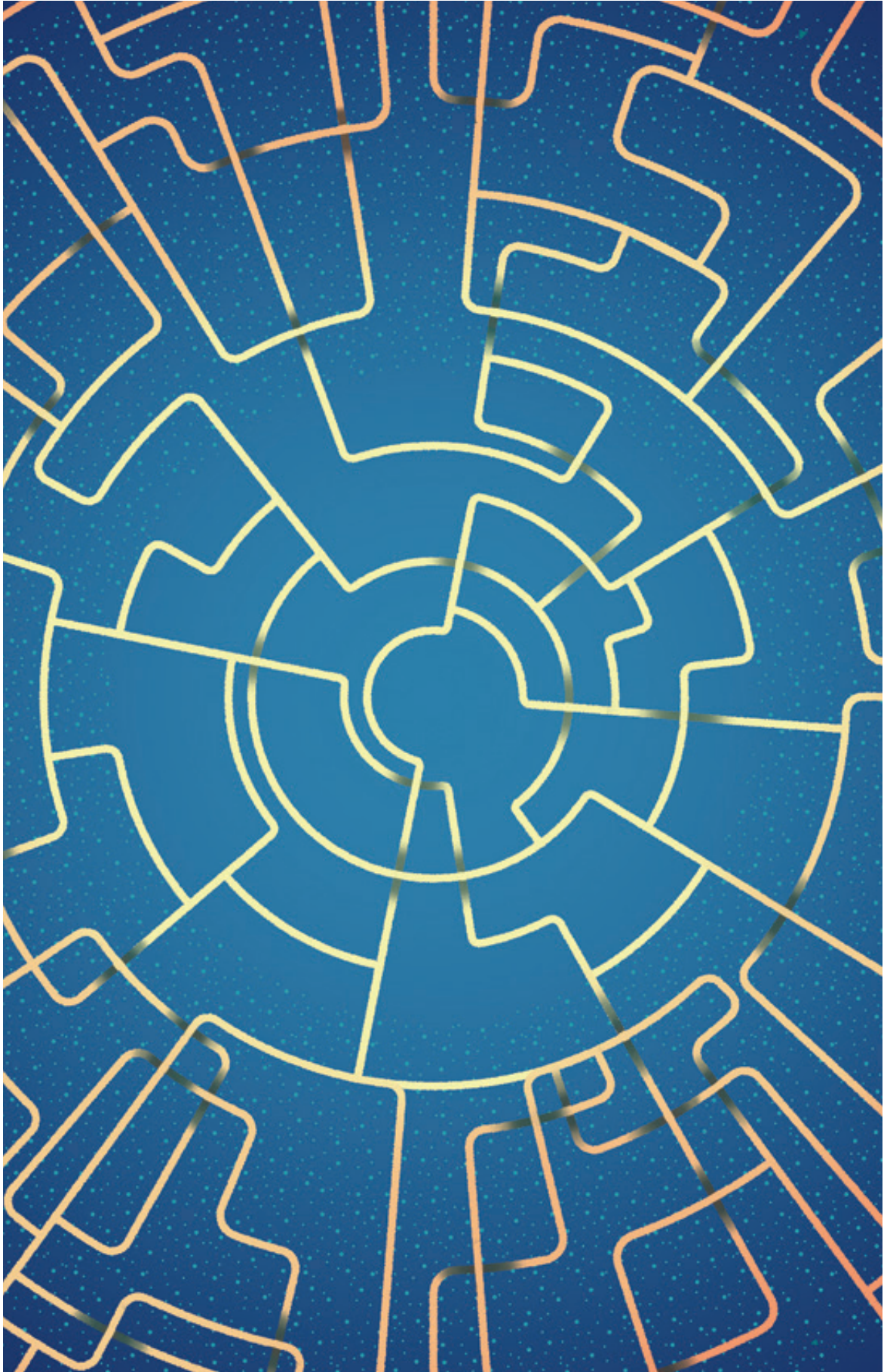
“A period of volatility may offer unique opportunities that businesses can leverage if prepared. The key is to harness both the energy and constraints of volatile conditions to solve tough challenges and spark innovation.” says Bill Marquard, Director, Monitor Deloitte US.

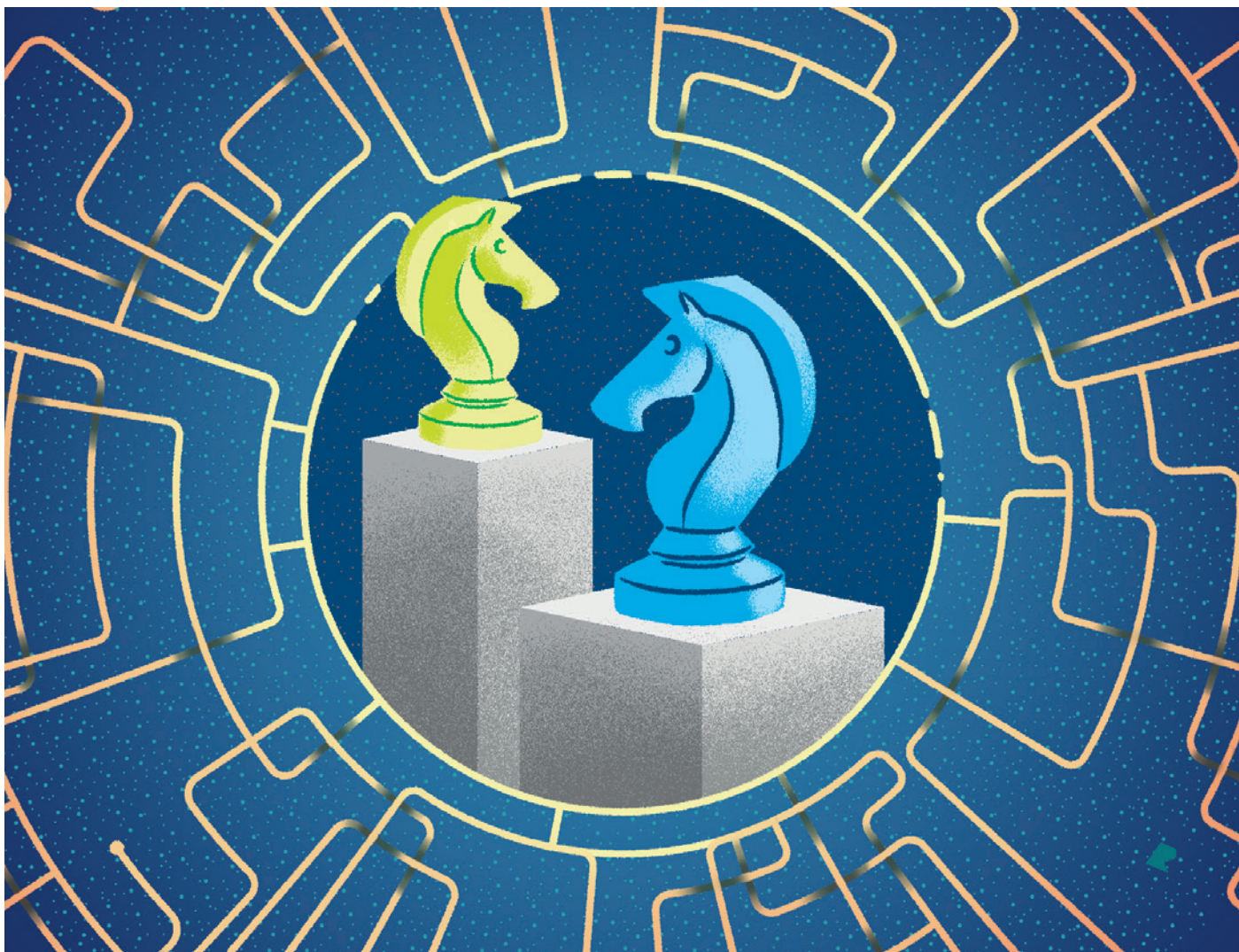
WAYS TO HELP COMPANIES THRIVE DURING A DOWNTURN

- **Align the executive team.** Staying the course and taking advantage of opportunities requires an aligned management team. A regular cadence to review strategy, review the scenarios, and pivot accordingly can serve companies well.
- **Own the narrative.** These are uncertain times for everyone in the organization. Over-invest in communication, town halls, and one-to-one meetings. People long for transparency and, in the absence of clear communication, will create their own narrative.
- **Create board alignment.** Many of the actions discussed here may be counterintuitive to some. Creating a strong alignment with the board will often be critical for any management team.

Endnotes

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Trend 4: Dynamically managing risk

From risk registers to strategic risk management

By: Patricia Muricy, Global Mining & Metals Risk Advisory Leader, Deloitte Brazil
Andrew Swart, Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited

AS GLOBAL VOLATILITY rises, mining companies should no longer solely rely on their risk registers to identify critical risks. Systemic issues—such as insufficient risk sensing, a “tick the box” mentality, and complex operating models—are forcing them to predict the impact of emerging events and prioritize key risks. It’s time to embrace more strategic risk management practices.

It is at present almost an understatement to say that global volatility is on the rise. From Brexit, US/China trade discussions, and instances of rising nationalism and xenophobia to disease outbreaks, environmental disasters, and climate change, the world faces significant uncertainty.

Market anxiety about the world’s economic outlook and, in particular, China’s trade situation with the US and uncertain growth trajectory seem to be weighing on trade and commodity prices. Some investors have become risk averse and are unwinding their positions in base metals, with valuations suffering as a result.

At the same time, traditional mining sector risks—in areas such as health and safety, strikes and social activism, regulatory compliance, stakeholder relations, cybersecurity, data privacy, finance, and operations—remain firmly in place.

And there is an entire new range of risks as technology sweeps ahead. Increased automation brings a host of new security risks, such as managing the rise of artificial intelligence and addressing sophisticated cybersecurity threats. At the same time as aging infrastructure is heightening safety concerns, some non-traditional competitors are changing formerly staid market dynamics, and the growing prevalence of social media means reputational damage can be inflicted in minutes.

Market anxiety about the world’s economic outlook and, in particular, China’s trade situation with the US and uncertain growth trajectory seem to be weighing on trade and commodity prices.

The problem with risk registers

Mining companies have long relied on risk protocols, risk committee oversight, and detailed risk registers. Yet, confronted by the plethora of new risks, these traditional tools do not seem to be working:

- Risks at the mine site often don’t make it to the boardroom or are buried in voluminous reports that fail to prioritize the most significant emerging risks.
- Risk reviews are tacked on to the end of board meetings, allowing members to fulfill their fiduciary duties without providing true strategic oversight.
- Key risks, such as those presented by cybersecurity breaches or the convergence of information technology (IT) and operational technology (OT), are being downplayed.
- “Black swan” events—catastrophic events with a low likelihood of occurring that generally can’t be predicted in advance—are met by an ostrich-like response: If we can’t see it, we don’t have to deal with it.

Insufficient risk sensing

“It’s not that mining companies lack data about emerging risk events,” explains Patricia Muricy, Global Risk Advisory Leader, Mining & Metals, Deloitte Brazil. “It’s that the data they’re relying on is often outmoded. Typically, they’ll ask what industry insiders are saying about risk, what economists are saying about commodity prices, what the markets are saying about investment trends, what analysts are saying about geopolitical threats or labor issues or environmental risks. But they often lack the methodology to use this historical data to predict what may be coming down the road.”

So how is it that these risks keep being missed?

People have an inherent bias; they don't like to focus on negative things being said about them. Mining companies may be ignoring engineering deficiencies, or regulatory non-compliance, or weak oversight in corrupt jurisdictions.

A “tick the box” mentality

Insufficient risk sensing isn't the only problem. A “tick the box” mentality can be equally damaging.

In jurisdictions prone to corruption—which are often where mining companies operate—companies can place little or no reliance on the local regulatory framework to protect them. It's up to management and the board to challenge the compliance framework appropriately and put enhanced protocols in place.

Complex operating models

There's another reason traditional risk and assurance processes can only go so far in alerting global mining companies to hidden risks: the complexity of their operating models. Andrew Swart, Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited, explains: “For a common risk, like failure to maintain critical assets, seven or eight functions within the organization have some kind of accountability for managing that risk—engineering, maintenance, safety, assets, finance, specific commodities. All these different stakeholders are setting expectations and controls around how these activities should be done, and business units don't have a clear sense of their roles or responsibilities.”

This dispersed functional control over risk prevents many organizations from developing a common risk language. This means that although dozens, or potentially hundreds, of risk registers are being generated across the enterprise, there's no reliable

methodology for identifying even the top ten risks that merit board attention. As a result, miners tend to apply the same standard to common risks across all their sites (e.g., how they manage tailings dams), even though some sites could require more rigorous oversight than others.

How about black swans?

All of these challenges—insufficient risk sensing, a “tick the box” mentality, and operational complexity—typically have a direct impact on how mining companies deal with risks they believe are out of their control, such as black swan events. On analysis, however, it seems that many black swan events can in fact be anticipated—if you know the red flags to watch for.

“Most black swan investigations blame poorly trained staff or equipment failure, but it's more,” says Kevin Bin Xu, Mining & Metals Leader, Deloitte China.

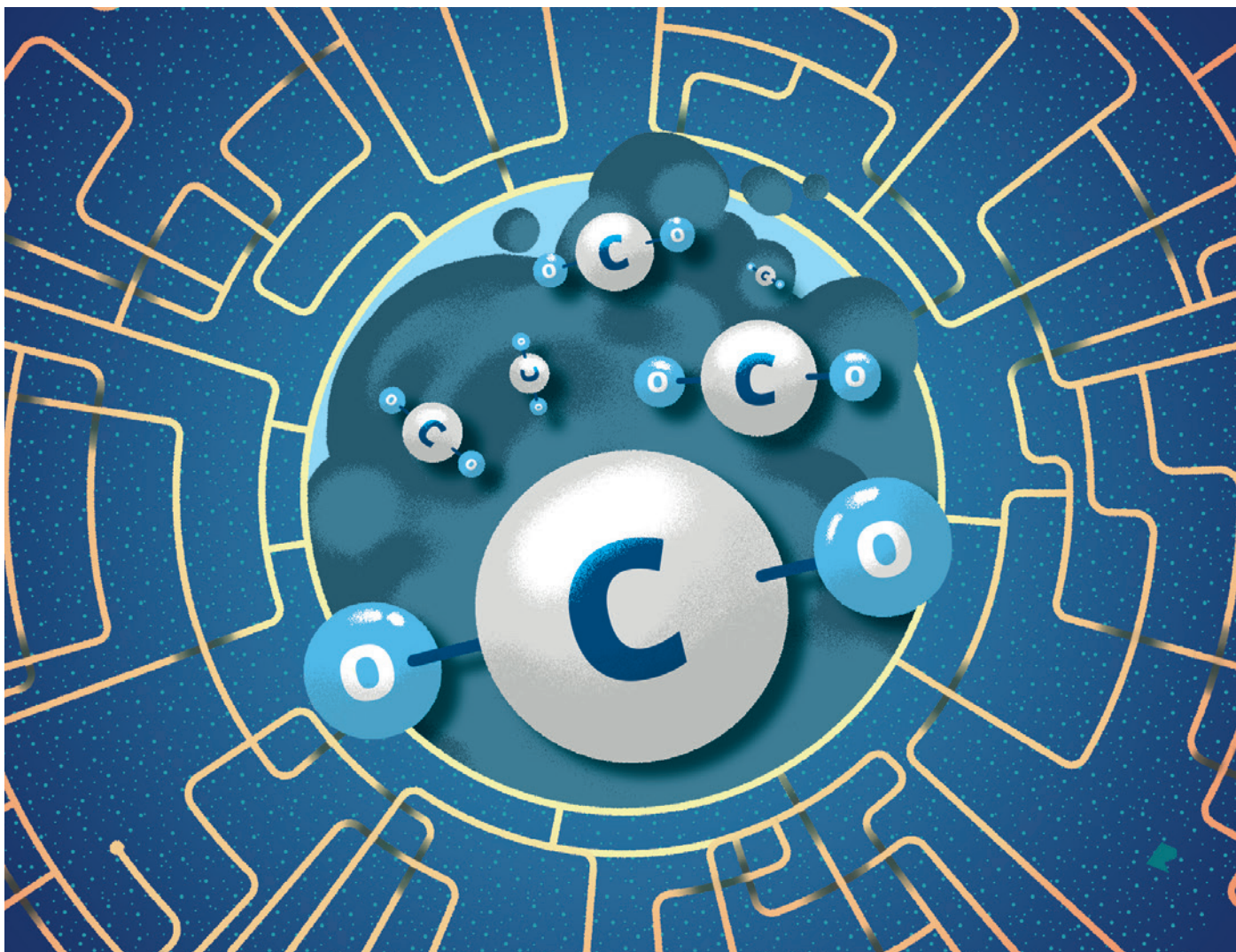
When an organization enjoys a successful track record for months or even years, staff tend to become overly confident, which can result in a deterioration in risk culture.

“Black swans happen due to the incapacity of companies to foresee and prepare for downturn scenarios,” Xu continues. “Sometimes they lack the risk methodology or the methodology fails to take all scenarios into account. Lack of training, long working hours, cost cutting, tight deadlines, and equipment failures play a role, but so do governance, inappropriate performance metrics, siloed approaches, lack of independence, the wrong tone at the top and safety culture, and insufficient crisis management.”

To counter these challenges, it's time for mining companies to consider transitioning from risk registers to more strategic risk management.

THE ELEMENTS OF STRATEGIC RISK MANAGEMENT

- **Integrate risk, control, and assurance.** While the independence of the three lines of defense (management, compliance/internal control, and internal audit) clearly needs to be preserved, it is possible to rationalize assurance activities and achieve efficiencies by bringing the planning, execution, and reporting of assurance activity under a common governance model. This means sharing risk maps and priorities across the organization; using digital technologies linked to the governance, risk, and compliance (GRC) system to monitor performance of both staff and contractors; and standardizing risk and control language across the organization so people understand the actions they should take to manage and mitigate risk events.
- **Go back to basics.** Miners should take time to redefine their risk appetite, identify gaps in their risk and control framework, and ensure their risk management methodology covers strategic, operational, financial, cyber, regulatory, and environmental risks. Agile routines can help by automating control testing, monitoring and reporting, and leveraging artificial intelligence (AI) to manage the controls library. It can also help to revisit governance practices to ensure board members have a sufficient risk management background, are capable of prioritizing top risks, and can confirm that appropriate delegation and escalation protocols are in place.
- **Explore alternate futures.** Although many companies use scenario planning to help guide their decision-making, they don't consistently explore worst-case scenarios. To strengthen their response and mitigation plans, miners should be willing to monitor even unlikely trends and test improbable scenarios—from cyber breaches, terrorist attacks on their industrial controls, liability from third-party misconduct, and treasury/cash management concerns to vulnerabilities associated with extreme weather events, supply chain disruptions, geopolitical shifts, and community unrest.
- **Leverage better data.** Truly robust risk-sensing solutions typically combine leading-edge technology with the insights of industry analysts to synthesize large volumes of data and deliver intelligence on the global issues most relevant to an organization. By scanning hundreds of thousands of data sources in multiple countries and languages, these solutions help companies monitor intelligence about events as they're occurring, analyze social conversations to predict how they'll evolve over the next 72 hours, and scan the horizon to identify risk events that may emerge over the coming year. This allows organizations to respond proactively to preempt issues and capitalize on opportunities to enhance their brand and reputation.
- **Learn from the past.** To build a risk-intelligent culture, businesses should systemically learn from past failures. To operationalize this, miners should give employees confidence to speak up—empowering them to report risks before they spiral out of control.



Trend 5: The path to decarbonization

Miners' role in reducing emissions

By: John O'Brien, Partner, Financial Advisory, Deloitte Australia
Tim Biggs, Mining & Metals Leader, Deloitte UK

DRIVEN BY PRESSURE from stakeholders and the strengthening business case for decarbonization, most mining companies are taking steps to reduce their greenhouse gas emissions. While the path isn't expected to be easy, the commitment is necessary if miners are to contribute to the mitigation of risks associated with climate

change and create value for customers, investors, governments, communities, and employees.

Recent years have heralded a growing acceptance of the scientific data linking the release of greenhouse gases (GHG), such as carbon dioxide, with global warming. This has put companies in carbon-pro-

ducing industries, such as mining, under greater pressure to reduce their GHG emissions. The pressure is coming from a number of fronts:

- Vocal investors are challenging mining companies to rethink their portfolios and future capital investments and amp up disclosure of their sustainability performance. This is often translating into demands for companies to share clear and defensible positions with respect to their climate-related financial risks in line with the Financial Stability Board’s Task Force on Climate-Related Financial Disclosures (TCFD) framework.
- Some financiers and insurers have begun to “green” their portfolios by adopting clean lending targets and, in some cases, denying insurance coverage to coal miners.
- Various local communities, which are often directly affected by the environmental impacts of mining operations, are demanding corporate adherence to higher standards of social responsibility.
- Many in-demand employees want to work for companies that are creating a better future, not those that could be perceived by some as “dirty” or dangerous.
- Customers across the supply chain want access to low-carbon commodities, such as “green” nickel for batteries or carbon-neutral copper for electrification. Demand for green steel in the automotive space and other “clean” commodities might not be far behind.
- Regulators around the world are setting carbon reduction targets, not only at national levels, but geared toward key industries as well, in an effort to meet the emissions reduction goals set out in the Paris Agreement on climate change.

Building the business case

This groundswell is converging with several market factors that seem to be strengthening the business case for decarbonization. For instance, as technology prices drop, the economic case for diesel replacement and electrification becomes stronger. Since 2012, the levelized cost of energy (LCOE) for lithium-ion battery storage has fallen by 76 percent.¹ The decline in solar power costs is even more extreme, dropping 99 percent since 1980.²

“It’s about more than just technology though,” says John O’Brien, Partner, Financial Advisory, Deloitte Australia. “Decarbonization makes sense operationally because the electrified mine is easier to automate, and the automated mine is easier to electrify.”

The cost benefits of decarbonization also can’t be ignored. For example, although there are capital costs to setting up the infrastructure to support the generation of renewable power, the consumption costs associated with renewable energy are negligible. This price dynamic has the potential to radically alter the cost basis of mining. In traditional mining operations, energy is generally the first or second most significant spend, accounting for 15 to 40 percent of operating expenses. “If we fast-forward to a world where energy has no marginal cost, the sector stands to unlock a huge wave of opportunity,” O’Brien stresses.

Decarbonization makes sense operationally because the electrified mine is easier to automate, and the automated mine is easier to electrify.

WHAT STAKEHOLDERS ARE ASKING

Critical questions being asked of organizations, specifically those with exposure to carbon-intensive operations, products, and supply chains include:

- **Market resilience:** How resilient will demand be for key commodities in the medium to long term, and what modeling and analysis has been done internally to validate this level of confidence?
- **Changing physical environment:** To what extent have projections of potential future climate (including changes to temperature, water availability, extreme events, and precipitation) been factored into operations, infrastructure resilience, future planning, capex planning, crisis management, and impairment analysis?
- **Financial implications:** To what extent have the risks flowing from changes in market demand (driven by policy, regulation, customer preferences, and physical climate) been factored into impairment and cost of capital disclosures in financial reporting?
- **Governance:** What governance structures are in place to ensure the board and executives appropriately consider climate-related risks and opportunities and challenge the adequacy of mitigation responses? To what extent is the company's participation in industry associations consistent with its public climate change commitments and policy statements?
- **Seizing opportunities:** With the shift taking place to a global low-carbon economy, how are R&D investment, portfolio management, and the implementation of digital business processes being used to develop products and innovative business processes that will be in high demand in this new, evolving context?

Times are changing

Recognizing these realities, many mining companies have begun to make strides toward decarbonization. Since 2008, for instance, Rio Tinto has reduced its Scope 1 and 2 emissions (those generated within its operations) by 24 percent, and the company recently committed to substantial decarbonization by 2050.³ For its part, BHP has set a goal of achieving net-zero operational GHG emissions by mid-century and has been making news for its commitment to work with customers and suppliers to help reduce Scope 3 emissions,⁴ which are those generated along the value chain (see case study).

To turn this vision into reality, however, companies could need to transform the way they source, use, store, consume, and think about energy.

“Despite the business case in support of decarbonization, many mining companies continue to see it as a cost rather than an opportunity—making it difficult for proponents to unlock the capital required to move forward,” explains Tim Biggs, Mining & Metals Leader, Deloitte UK. “A massive shift toward electrification could also change the way employees work, requiring companies to obtain buy-in not only at the management level, but at the operations level.”

CASE STUDY: DECARBONIZATION AT BHP

BHP has been setting targets since the 1990s to reduce its Scope 1 and 2 emissions, which are those generated from fugitive emissions from coal and electricity consumption and diesel use at its operations. In July 2019, however, the company upped the ante by committing US\$400 million to reduce not only operational emissions, but Scope 3 emissions as well—which are those generated by customers and suppliers along the value chain.

As BHP's former CEO Andrew Mackenzie noted in his seminal speech, "The evidence is abundant: global warming is indisputable. The planet will survive. Many species may not.... Use of emissions-intensive products from the resources industry has contributed significantly to global warming."⁵

To counter these risks, BHP has begun integrating climate-related decision-making into its strategic and risk management processes. For instance, before new capital investments can be approved, company stakeholders must demonstrate how the investment will help to reduce the company's carbon footprint—or at least achieve carbon neutrality. The company is also strengthening the alignment of its executive remuneration to emissions performance.

"It's like what companies were doing a few decades ago around safety, or a few years ago around automation," notes Ian Sanders, Mining & Metals Leader, Deloitte Australia. "Just like all decisions must now be zero harm, all future decisions will likely need to help reduce the corporate water, pollution, and carbon footprint or at least be carbon neutral."

Laying the groundwork

This transition won't happen overnight. But there are steps companies can take to start laying the groundwork for decarbonization.

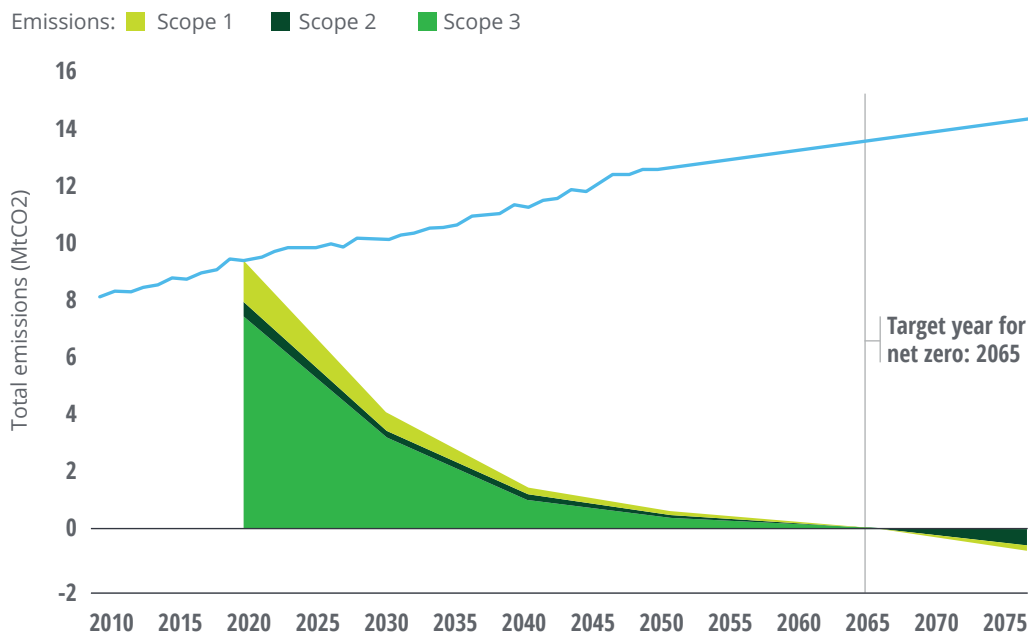
Mining companies can begin by understanding how the various scenarios related to climate change might affect their local operations. Using advanced predictive analytics, it's possible to leverage data released by leading authorities such as the Intergovernmental Panel on Climate Change (IPCC) and track its likely effect on a business. Armed with this understanding, miners can start to set targets to reduce their emissions in response to the future scenarios they consider most likely.

Of course, to track emission reductions, companies would require insight into their historical data so they can set a baseline. Aggregating this data at an enterprise level is generally easier said than done, but it's an important first step for companies to forecast their anticipated emissions over the useful lives of their assets.

Next, miners should assess how to integrate a carbon neutral approach into their business-as-usual processes. Often at this point, companies realize that there's a gap between their emission reduction targets and their plausible decarbonization pathways (figure 1). To close that gap, companies typically need to revise their operational processes (e.g., through fuel switching), recalibrate their asset portfolios, and invest in new technologies.

FIGURE 1

Decarbonization pathway



Source: Deloitte analysis, Deloitte Decarbonization tool.

While the path won't be easy, miners can act to reduce their emissions. As Biggs notes, "Beyond creating value for customers, investors, governments, and communities, committing to

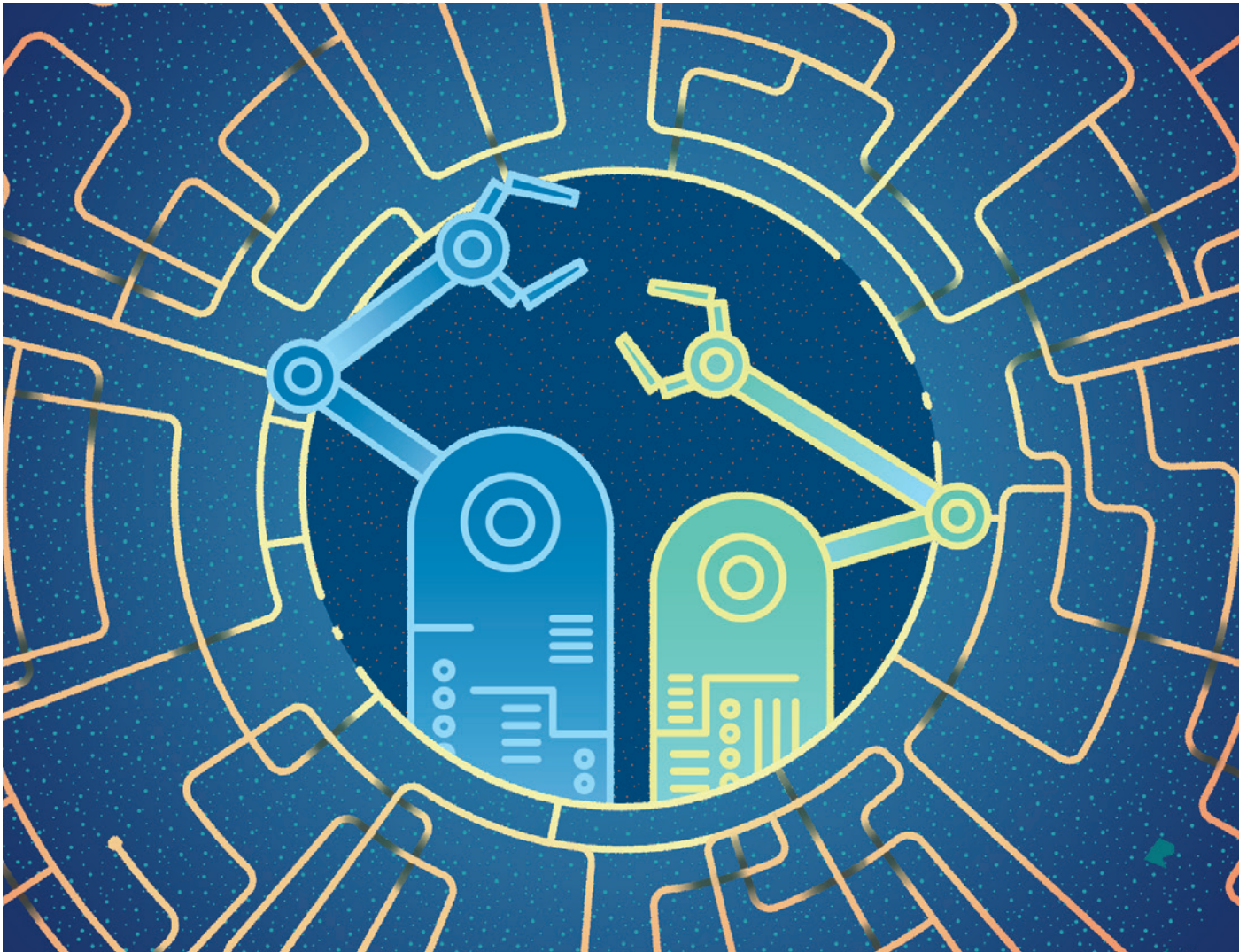
decarbonization can make mining companies more attractive to employees, empower them to make a greater societal impact in the countries where they operate, and contribute to global sustainability."

HOW TO LAY THE FOUNDATION FOR DECARBONIZATION

- **Take a multifunctional approach.** Given the impact of climate risks in the mining sector, this issue can't be dealt with as an add-on to be managed by sustainability and corporate social responsibility (CSR) functions. Rather, environmental, social, and governance (ESG) issues should be integrated cross-functionally into operational, strategic, and financial decision-making and into corporate risk management processes. To bolster this cultural shift, some leading companies are even linking remuneration to ESG performance metrics.
- **Prioritize abatement projects.** To operationalize decarbonization, companies should begin by assessing the full range of potential abatement and offset opportunities that exist across all operational activities. Once this is understood, they can prioritize projects that confer the greatest abatement and strategic benefits at the least cost.
- **Plan for the future.** As decarbonization becomes a global rallying call, mining companies may need to revise their portfolios accordingly. To avoid being caught off guard, companies can review the signals and signposts of changing macroeconomic trends, government policies, and technical advances to identify adjacent projects that may exist outside the core carbon-intensive mining business.

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Trend 6: On the road toward intelligent mining

Reviewing lessons learned

By: Roland Labuhn, Partner, Consulting, Deloitte Canada
Rhyno Jacobs, Director, Consulting, Deloitte Africa

IT'S BEEN ABOUT two to three years since many mining companies started down their digital journeys in earnest. Looking back over this time we have seen some firms making strong advances but others struggling to realize the full return on their intelligent mining investments.

Now may be a good time to take stock and review some of the lessons learned so that companies can optimize their digital journeys and unlock sustainable value.

Accelerated adoption of digital technologies, artificial intelligence, and analytics solutions is sweeping the globe—and the mining industry is no exception.

With several years of proofs of concept under their belts, however, mining companies are coming to recognize that the intelligent mine is not merely a technology play. To drive true change and realize the value promised by countless use cases, miners will likely need to transform the way they view their operating models, make decisions, attract and train talent, engage with their stakeholders, and optimize resources.

Given the scope of the transformation that may be required, it's likely no surprise that many mining companies have yet to achieve the full benefits (or any value at all) of intelligent mining. To help turn that tide, it can be useful to consider the lessons learned to date on the road toward intelligent mining—and examine some of the practices companies can consider adopting to help lay a solid foundation for future success.

Organize to unlock value

While many companies have articulated a clear digital strategy, few have adopted the organizational changes needed to deliver on that strategy. As a result, operational-level initiatives are often run in isolation, limiting their enterprise value.

“Much of the value of the intelligent mine is delivered by ensuring the foundational building blocks (connectivity, data management, technical architecture, etc.) are in place and by moving toward an integrated organizational model,” explains Rhyno Jacobs, Director, Consulting, Deloitte Africa. “By understanding who is measured by which input KPIs, enabling coordinated decision-making, companies can leverage interdependencies, avoid duplication of efforts, and unlock huge benefits across the mining value chain.”

This isn't to suggest that operation-level initiatives should be managed centrally. In fact, initiatives designed to deliver value at the business unit level should likely cede operational autonomy and accountability to business-level management. It is important, though, that successful value-creating operational-level use cases are scaled across the organization. To achieve this a central function is typically needed.

There are several more areas particularly ripe for centralization—including planning, execution, data management, funding and procurement, and measurement.

Getting the people side of the equation right

Many companies have focused most of their efforts on technology and not the people who need to use it. Companies that have been successful in their digital journeys have often been ones that recognize the importance of change management, and a good portion of realizing the value can come from changing people's behavior.

This typically involves many different elements, which can range from understanding the key stakeholders around each initiative and driving the messaging and collaboration to support that, all the way through to employing techniques like human-centered design to understand how the people will interact with the technology, and finally adapting the design around these insights.

Technology is not the silver bullet

Many have assumed that technology will be the solution to a particular problem. People are also critical, but very often companies need to fix the underlying process. Without that underlying process redesign, technology can become a bandage, trapping the underlying value to the organization.

While it can often feel time consuming, there is significant benefit in investing up front to examine critically the underlying processes connected to the problem you are trying to solve and make the investment to rethink it, looking at the connected stakeholders and what data are required to facilitate effective decision-making. As with any project, it's hard to separate out people, process and technology as these three areas are tightly interwoven.

Quality of the output depends on the quality of the input

Before companies can make the right decisions at the right time, they need access to accurate, timely, and complete information. Getting to this ideal state typically requires considerable up-front investment.

“Many companies expect to generate robust insights as soon as they embark on their digital journeys,” says Roland Labuhn, Partner, Consulting, Deloitte Canada. “Focusing on business issues should guide where to focus. Building scale in insights and analytics requires a different path than just one of business use cases. The processes, teams and technologies of data and analytics are not new capabilities for many of our clients, but excelling in these fields takes discipline and commitment to a corporate culture that supports the journey.”

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On review of corporate initiatives to date, it appears that many mining companies have underestimated the amount of effort required to clean up their data and upgrade their technology infrastructure. According to Labuhn, up to 50 percent of a company’s digital spend will need to be allocated to “below the line” technologies—from basic infrastructure updates, to improved Wi-Fi and connectivity, to the adoption of appropriate operations technology and platforms.

Source the correct competencies

As mining companies move toward integrated operations centers that help guide decision-making across the value chain, they should consider how to staff those centers. What skills do companies need on-site to support them in achieving their desired business outcomes? And should they build that capacity in-house or outsource it to external partners?

“In preparing for the work that will be performed on the future intelligent mine, companies should think beyond the attraction and retention of scarce talent and also consider how emerging talent models could affect their vision for intelligent mining,” says Jacobs.

Miners may need to refine their approaches to identifying and selecting the right external partners. Countless vendors have entered the scene in recent years, and choosing among them requires companies to plug into a larger ecosystem—not only to understand how the capabilities environment keeps shifting, but also to learn from other organizations’ experiences. This generally means subscribing to relevant publications and attending conferences and events to gain exposure to up-and-coming digital technology vendors, and creating ecosystem alliances to solicit input and advice from companies both within and outside the mining industry.

Know what you’re buying

When it comes to selecting solutions partners, it’s important to understand what they can—and can’t—provide. Not every technology vendor will be properly equipped to deliver full implementation and integration support. Without access to this expertise, companies can discover that their new systems fail to drive business improvements, don’t interoperate with existing systems, or don’t gain employee adoption—and they often end up blaming the technology instead of the integration and transformation process. To avoid these missteps, companies may need to bring in specialists who have proven experience supporting successful technology implementations.

Strike the right balance in the portfolio

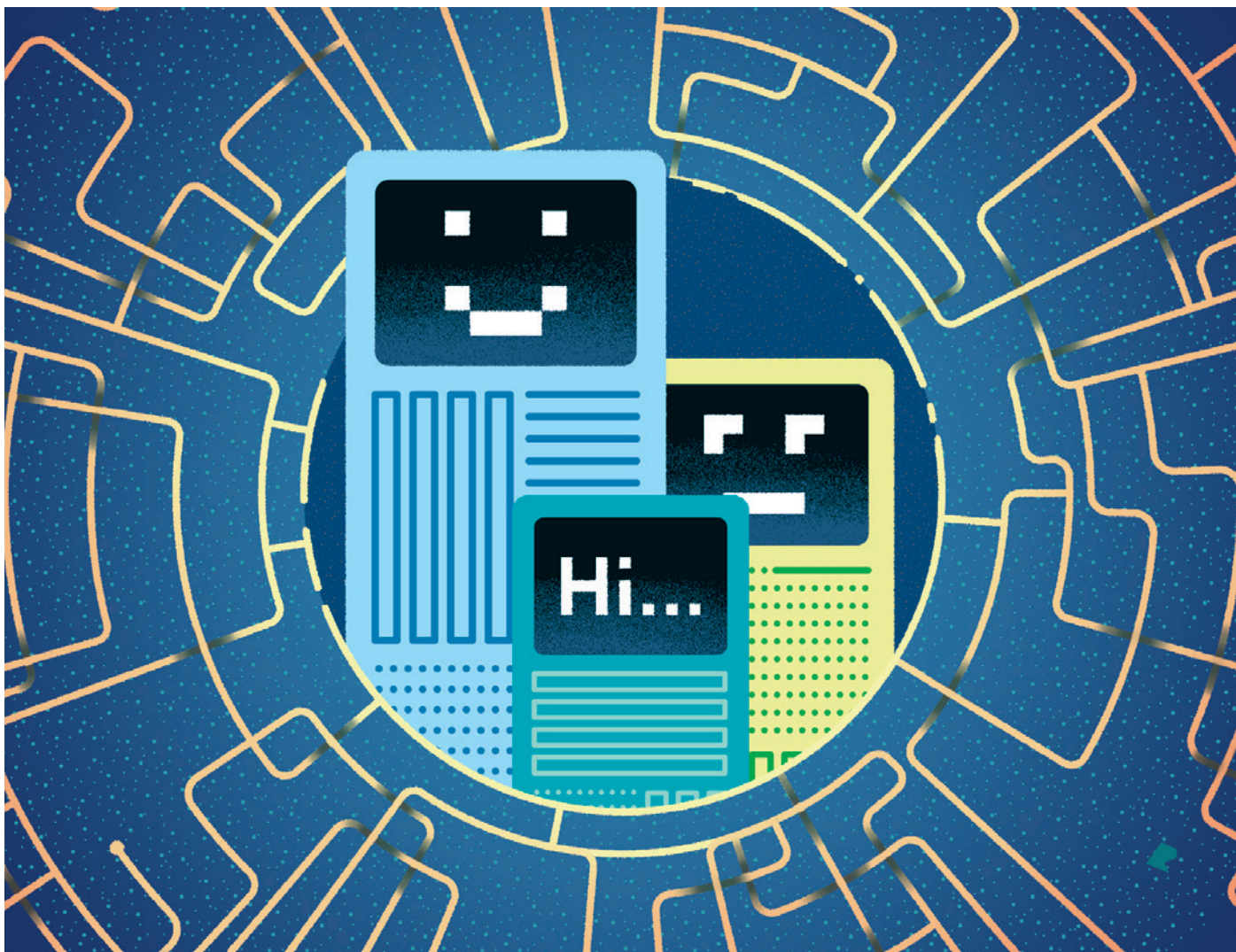
Finally, it's important that the portfolio of digital initiatives strikes the right balance between initiatives that can deliver value in the short term (0–18 months) and those that are bets for the future. Companies that skew too much of their portfolio to the long term often find themselves losing momentum with executive teams and boards.

Demonstrating value is important to change management and can earn the digital team the license to tackle deeper and potentially more value-generating opportunities.

“An effective digital initiative requires mining companies to win the hearts and minds of people throughout the organization or the transformation will often not last,” says Steven Walsh, Consulting Partner, Deloitte Australia. “To do that, one must find a balance between delivering short-term value to those at the front line while tackling some of the bigger organizational issues desired by the executive. Listening to the small things that your people value can pave the way for the big things to come,” says Walsh.

SOLVING FOR REAL-WORLD INTELLIGENT MINING CHALLENGES

- **Integrate operations and governance.** To unlock the value of intelligent mining, many leading companies are moving toward a more centralized governance approach. Planning and execution are being brought together in a closed loop system instead of taking place as separate exercises in different parts of the organization. Data are being integrated across the entire value chain through enterprise data platforms, providing insights and giving stakeholders the ability to make decisions that drive value across the enterprise. Siloed data repositories are being aggregated into a shared view of data, fostering a far greater level of enterprise collaboration.
- **Decide what to centralize.** While not every element of an intelligent mine can be run from the center, companies may want to consider centralizing certain activities at the outset before potentially decentralizing them at a later date. By centralizing funding, for instance, investment decisions can be rationalized and budgets allocated to those initiatives that can most effectively be scaled. By centralizing purchasing, vendor discounts can be negotiated and maverick hiring reduced. By defining a consistent execution approach across all operations, similar performance metrics can be applied to disparate initiatives—providing a clear view into which are delivering the greatest value and which may need to be revised or shelved.
- **Optimize your technology architecture.** Companies can begin to earn the right to be agile by mapping out their optimal future-state technology architecture and determining how to upgrade their current technology landscape to get there. Often this will involve adopting new platforms that allow them to connect their information technology (IT) and operational technology (OT) environments, with the goal of integrating their legacy enterprise and operational systems. Only with this groundwork firmly in place can companies gain the consolidated view of key performance measures across the entire enterprise that they need to drive more informed decision-making.
- **Create a capabilities matrix.** One way companies can ensure they have the right skills in place for intelligent mining is by classifying the capabilities required on a matrix to identify skills gaps and determine how best to fill them. Some specialized skills that will be required over the long term—such as data science or analytical capabilities—should likely be developed as an internal core competency. Others, such as application development, should likely be outsourced if they don't bolster the company's core strengths.



Trend 7: Modernizing core technologies

Considerations around cloud, cyber, and revitalizing the core

By: Paul Klein, Partner, Consulting, Deloitte Australia
Roland Labuhn, Partner, Consulting, Deloitte Canada

OVER THE YEARS, most mining companies have made significant investments in a range of back-end technology systems. In embracing a digital future, however, miners will likely need to modernize many of these legacy systems and migrate to a digital core—raising a range of considerations around moving to the cloud,

adopting sound cyber risk strategies, and choosing the best approach for modernizing their core systems.

The digital era has presented mining companies with a significant opportunity to innovate, reduce costs, enhance productivity, improve safety performance, and realize operational efficiency improvements.

Unlocking these benefits, however, might be easier said than done—especially given the industry’s ongoing reliance on legacy back-end technology systems.

“Mining industry digital investments to date have demonstrated the potential, but have often been constrained by legacy system and data challenges,” says Paul Klein, Partner, Consulting, Deloitte Australia. “Businesses aren’t expected to be able to realize the full potential of the intelligent mine without modernizing their digital core.”

Core modernization: The carrot and the stick

As Deloitte noted in Tech Trends 2019, “Core modernization seeks to solve the riddle of how companies with significant investments in legacy systems can extract more value from these systems by making them a foundation for new disruptive innovations. Beyond just re-platforming legacy systems, core modernization involves creating a roadmap for building a next-generation enterprise resource planning (ERP) core that incorporates—rather than merely enabling—digital, cloud, and other macro forces.”¹

If these gains represent the carrot, the danger of ongoing reliance on legacy solutions that are losing technological relevance and service support is the stick. As major ERP providers roll out next-generation platforms designed to enable real-time transactional processing and data analysis, mining companies are facing an imminent need to update their ERP systems and make choices on whether to host their data on premises or in the cloud.

Whether they are pursuing enterprisewide transformation or making incremental improvements, these are approaches² mining companies should take into account when considering core modernization:

- **Replatform:** Upgrade platforms through technical upgrades, software updates, and migration to modern operating environments (such as cloud platforms, in-memory databases, and virtualized environments).
- **Revitalize:** Layer on new capabilities to enhance stable underlying core processes and data. This could include enhancing usability with digital solutions that improve employee engagement, adopting visualization suites to fuel data analysis, or introducing cognitive techniques to strengthen reporting and support predictive and prescriptive analytics.
- **Remediate:** Address internal complexities of existing core implementations. This could involve reconciling master data to simplify business processes and introduce single views of key data, integrating disparate systems to streamline data sharing with external partners, or rationalizing custom extensions and bespoke solutions to simplify system maintenance.
- **Replace:** Introduce new systems for parts of the core. This may mean adopting new products from existing vendors or revisiting “build” versus “buy” decisions as new entrants roll out new solutions. Ideally, organizations will use these pivots to revisit their needs and build new capabilities rather than replicating the work habits associated with their old systems.
- **Retrench:** Do nothing—which can be strategic as long as it’s an intentional choice. “Good enough” may be more than enough for non-differentiated parts of the business. The key here is to weigh the risks and inform stakeholders before taking this route.

Cloud first

“There’s an implicit assumption that companies have a choice about whether or not to transition to the cloud,” admits Rakesh Surana, Mining & Metals Leader, Deloitte India. “Miners may not realize that some of their systems and data are already in the cloud. Major ERP vendors have adopted ‘cloud first’ strategies. One of the business implications of many cloud solutions is there are little to no customizations. You implement what you get, and you gain the advantage of frequent upgrades. Business users should quickly adopt standard ‘core’ ERPs. Original equipment manufacturers (OEMs) that generate real-time data from embedded sensors aggregate and share that data in the cloud. Even supervisory control and data acquisition (SCADA) system vendors are communicating over the cloud.”

Achieving cyber maturity

As a growing volume of data transitions to the cloud, miners should take steps to enhance their cyber risk strategies. Even absent cloud considerations, modernizing the core can introduce new cyber risks. Too often, non-standard and aging assets aren’t properly maintained, and legacy platforms are allowed to persist without appropriate protections, introducing potential threats.

Upgrading these systems presents opportunities to take stock of existing vulnerabilities and craft more robust cyber risk strategies—not only for miners’ back-office IT systems, but also for operational technology (OT), such as SCADA systems, and programmable logic controllers (PLCs).

Admittedly, this is no small task. While OT systems were developed by engineers with safety and reliability in mind, security was rarely embedded into most of them—as they weren’t originally designed to be connected. Today, however, as operational processes become more automated and more operational equipment and OT are connected to communications networks, facilities such as mine sites, mineral processing plants, and remote operations centers are becoming vulnerable to cyberattacks. These vulnerabilities span not just the SCADA systems and PLCs mentioned above, but also potentially electrical infrastructure, integration with supply chain partners, and more.

There’s an implicit assumption that companies have a choice about whether or not to transition to the cloud.

This is putting engineers under greater pressure to protect OT in the same way information technology (IT) is protected—creating challenges to harmonize the traditionally disparate IT and OT organizations and cultures.

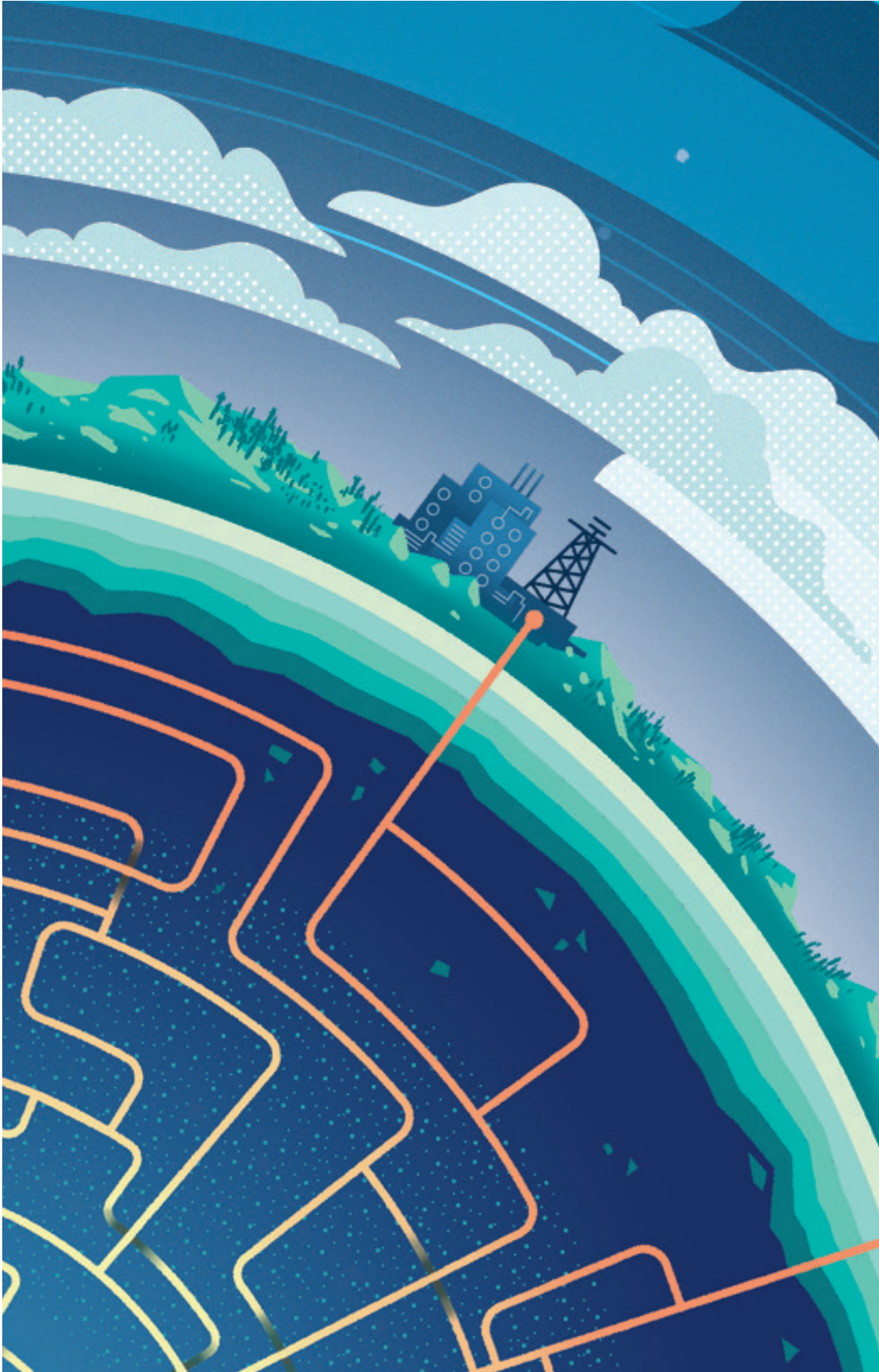
As the pace of technology innovation accelerates, and the intelligent mine is expected to become a reality, mining companies will likely need back-end systems capable of supporting their transformational opportunities.

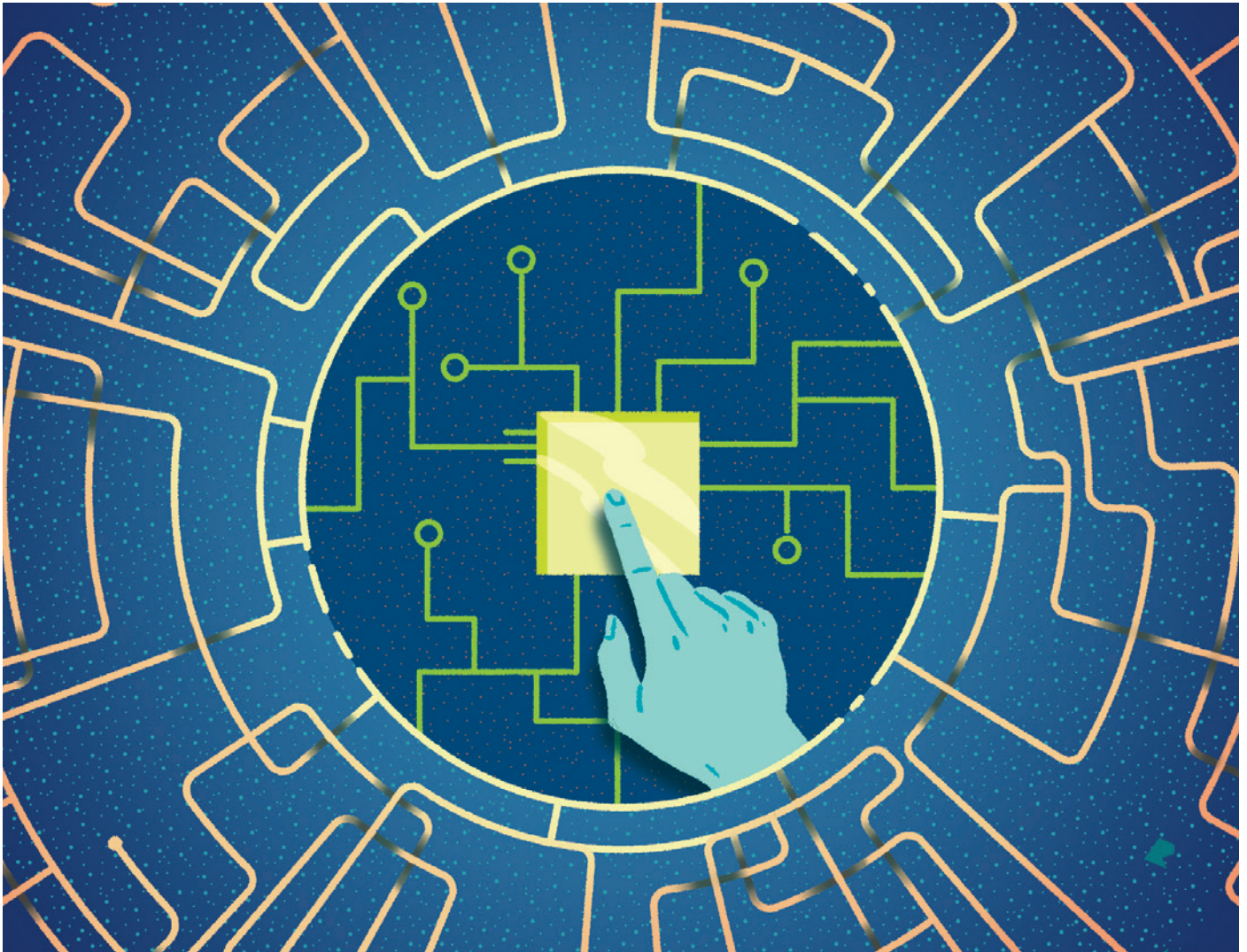
MAKING MODERNIZATION WORK

- **Create a business case.** Cost avoidance is rarely incentive enough to modernize core systems. Instead, mining companies should consider framing the business case in terms of lost business opportunities, lack of agility, and business risk. Even then, it's important to be realistic when projecting the extent of hidden complexity—and the budget required to resolve this complexity.
- **Automate and accelerate.** Without a proper approach, transitioning to a new ERP platform can introduce significant implementation risk. To avoid missed project milestones and budget overruns, companies should work with system integrators that offer proven business transformation accelerators. Optimally, this should include: roadmaps for developing a project charter, resourcing plans, and project plans; process flows that take end-to-end process design considerations into account; modules preconfigured to the metals and mining industry; and full reporting, data migration, testing, and training templates.
- **Honor your legacy, but don't be constrained by it.** Modernizing the core typically has everything to do with legacy. That legacy is entangled in a history of investment decisions, long hours, and careers across the organization. A portion of most companies' workforce job history (and job security) is embedded in the existing footprint. As such, decisions concerning the core can be fraught with emotional and political baggage. When reimagining core systems, companies should respect their technology heritage without becoming beholden to it. Sidestep subjective debates by focusing on fact-based, data-driven discussions about pressing business needs.³
- **Back to standard.** Respecting the legacy without being beholden to it can create a golden opportunity to migrate to a modern, simplified, standardized digital core, adopting best practices and moving any critical customizations or extension sets to cloud-based development platforms. Keeping the core clean and standard can significantly reduce the cost of ownership and improves the sustainability of the core.
- **Conduct a cyber risk maturity assessment.** To pinpoint where to focus improvement efforts, mining companies should assess the maturity of both their corporate and operational cyber risk controls. This typically means recording assets and facilities and ranking them in terms of criticality, identifying their exploitable vulnerabilities, and assessing the maturity of the controls environment to proactively manage these threats.⁴
- **Build a unified cyber risk program.** To address cyber risk across both business functions and operations, mining companies should adopt a systematic approach. The ultimate aim is to create an environment that is secure, vigilant, and resilient. Being secure is about protecting critical assets and infrastructure from breaches or compromises by adopting effective automated controls and monitoring. Being vigilant involves continuous monitoring to detect if systems have been compromised. And being resilient is about putting plans and procedures in place to identify a cyberattack, contain or neutralize it, and rapidly restore normal operations.⁵

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Trend 8: The intersection of talent and community

Proactively planning for the social impact of digital

By: Janine Nel, Partner, Consulting, Deloitte Canada
Julie Harrison, Partner, Consulting, Deloitte Australia

AS DIGITAL SWEEPS through the mining sector, a host of benefits are being realized across the value chain. These typically range from cost reduction, improved production, and enhanced safety performance to plant optimization, greater inventory control, and even the ability to predict and mitigate crisis events.

To capitalize on the digital revolution, mining companies should drive change both internally and within the communities in which they operate. Underestimating internal organizational barriers, bureaucracy and the associated impact on local communities can hinder their ability to realize the full benefit and prosper.

This potential lack of value realization can be attributed to a limited understanding of the impact that digital transformation can have on work, the workforce and the workplace, and therefore on the communities in which they operate.

Digital, automation and remote work models, including remote operation centers, could potentially displace up to 60 or 70 percent of mine site roles—an impact that will likely be felt most across entry-level roles, which often includes diverse talent, comprising indigenous talent from local communities in which the mines operate. While many new roles are also created through Industry 4.0, the question is whether these new roles are at the same level and location as the previous roles. As companies drive the use of automation and digital technologies to enhance operations, there will be key choices to make. These will likely include the extent to which they disrupt current roles and require different talent models where people and machines work together, and the enhanced use of remote operation centers, all of which have direct implications for local employment. The nature of locally and regionally deployed talent could be very different going forward.

The potential repercussions on local communities and on corporate diversity targets are not lost to mining companies. “Miners recognize they have a responsibility to the communities in which they operate, and that their social license to operate is critical for their business,” says Julie Harrison, Partner, Consulting, Deloitte Australia. “Most understand that the transition to a digital future must take this into consideration. True strategic workforce planning can help organizations to understand which roles will be affected; what new roles, capabilities, and skills will be required; and therefore what talent and workforce strategies should be deployed.”

Rather than simply driving a number of digital point solutions, mines should inform their decision-making through the workforce strategies that they choose to execute. “A ‘just transition’ can’t happen unless companies accept that they’re not solely driven by bottom-line outcomes,” notes Janine Nel, Partner, Consulting, Deloitte Canada. In this regard, one thing is clear: companies should understand the impact of digital and start thinking differently about the future of the workforce and communities. In the same way as mining companies conduct life-of-asset and life-of-mine planning, longer-term and more strategic talent planning is becoming more critical to the delivery of planned business outcomes and to ensuring that the possible repercussions on local communities are mitigated. This means considering various future scenarios to plan for the social impact of automation in which there can be benefit for all.

In the same way as mining companies conduct life-of-asset and life-of-mine planning, longer-term and more strategic talent planning is becoming more critical to the delivery of planned business outcomes and to ensuring that the possible repercussions on local communities are mitigated.

SOCIAL IMPACT NECESSITATES CREATING VALUE BEYOND COMPLIANCE FOR THE LOCAL COMMUNITIES




In 2019, Deloitte South Africa released a paper entitled *Value Beyond Compliance: A new paradigm to create shared value for mines, communities and government.*²

The tenets of value beyond compliance can play a critical role in thinking through how the social value proposition to a community might change in a world of increasing role disruption. The intention should be that mines deliver to each stakeholder in terms they can understand. Targets can then be set and performance monitored against these metrics.

That's why it can be important to identify and define outcomes that matter to all stakeholders, and then quantify the value each stakeholder receives in those terms. Governments typically care about economic growth, local content, and job creation. Communities typically care about income earning opportunities and access to basic infrastructure (figure 1).

FIGURE 1

Measuring impact: The three sources of return model

	Stakeholders	Main desires	Examples of impact	
 <p>Return to stakeholders</p>	<ul style="list-style-type: none"> • Company shareholders 	<ul style="list-style-type: none"> • Maximize company profit • Retain license to operate 	<ul style="list-style-type: none"> • Profit margin • NVP (net present value) • IPR (intellectual property rights) • ROI (return on investment) 	Well-established tools exist for measuring financial return
 <p>Return to country</p>	<ul style="list-style-type: none"> • Local, provincial and national governments 	<ul style="list-style-type: none"> • Maximize government revenue • Provide infrastructure and social services 	<ul style="list-style-type: none"> • Industrialization and transformation • Job creation and transformation • Political stability 	Few credible tools exist for measuring/tracking socioeconomic return in a holistic manner
 <p>Return to citizen</p>	<ul style="list-style-type: none"> • Community members • Employees 	<ul style="list-style-type: none"> • Share in the mining wealth • Social growth and expansion 	<ul style="list-style-type: none"> • Financial security • Physical security • Social networks • Professional satisfaction 	

Source: Deloitte South Africa, *Value Beyond Compliance: A new paradigm to create shared value for mines, communities and government*, Deloitte, February 2019, accessed October 3, 2019.

Creating value amid uncertainty

In an uncertain world, there are forces shaping the landscape going forward:

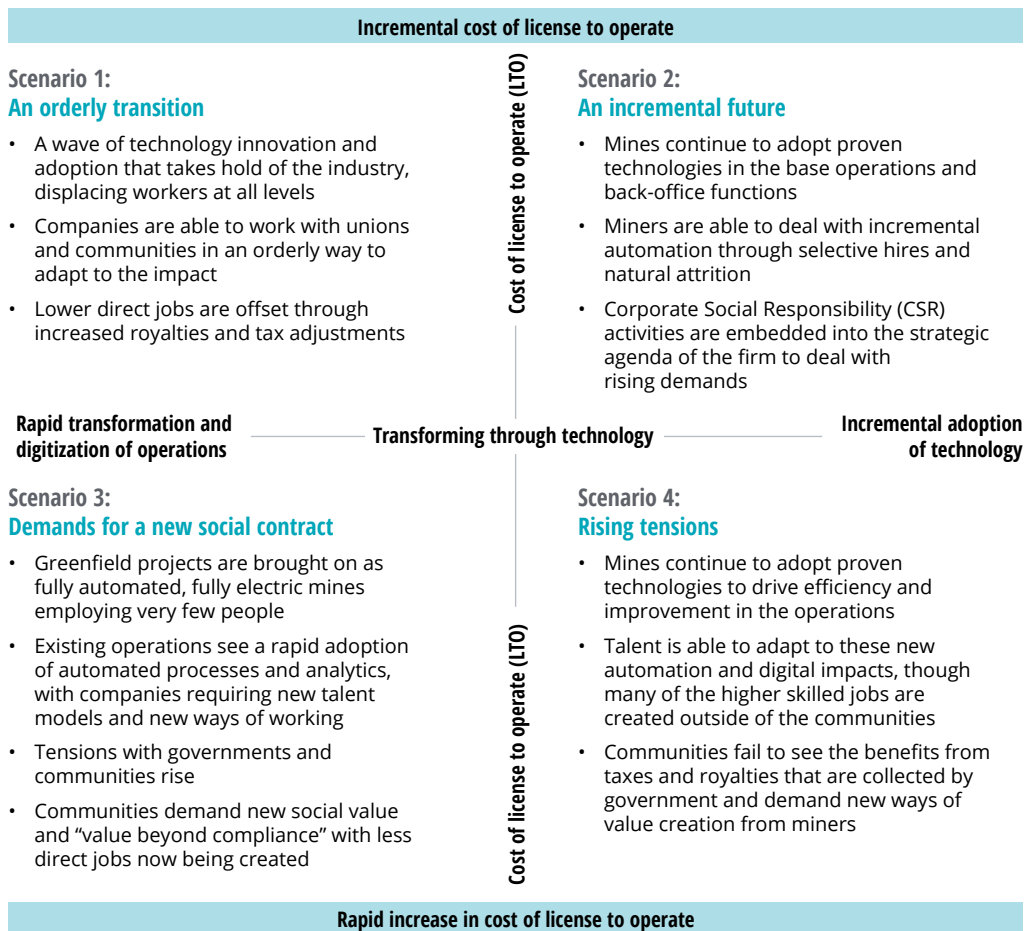
- The pace and disruptive nature of technology adoption: Today many companies are experimenting with a range of different technologies, and some companies are further down the road than others on this journey. But as digitization gains momentum, the cost of technology is expected to decline, and more companies are expected to enter this space, we may reach a tipping point where competitive pressure forces more rapid and accelerated adoption across the industry. In the next 10 years, will this adoption be slow and incremental or fast and accelerated?

- The pace at which host community expectations rise on the value that they expect from mining companies: Around the world we see the rise of nationalism in different countries, increased focus on climate action, and increased demands on governments and communities. The mining industry could articulate more clearly the value it delivers to communities. In the next 10 years, will we see an acceleration of demands or will they continue at a more measured pace?

Bringing these two uncertainties together frames four divergent yet plausible scenarios for the mining industry (figure 2):

FIGURE 2

Mining industry scenarios



Source: Deloitte Analysis.

Each of these four scenarios is plausible and each has very different implications for a mining company's talent strategy and how that talent strategy interfaces with the local community.

“Depending on what scenario plays out, mining companies face very different implications,” explains Karla Velasquez, Mining & Metals Leader, Deloitte Peru. “Ideally, leadership will pay attention

to how things are shifting, what they're mining, and what value they're delivering, and then assess not just the work outcomes they're responsible for but also the most effective, safe, and optimum ways to achieve them. If a large percentage of local workforces may be displaced, for instance, leaders will ideally reevaluate to what extent they will automate and perhaps use people, rather than technology, to achieve the same outcome.”

STRATEGIES FOR SUPPORTING A JUST TRANSITION

- **Strategic Workforce Planning-enabled retraining, reskilling and redeployment.** The mine of the future will likely require workers with a different set of skills than people possess today. This means workers across the board would need to be retrained and upskilled—including those from local communities. To enable continued workforce diversity, companies can upskill and cross-skill people beyond entry-level roles. Some ways to achieve these aims are by offering local co-op programs with work terms, hiring local apprentices, and using micro-credentialing to independently certify workers in specific skills (this can be recognition of soft skills, such as problem solving and communication, or technical skills, such as data analytics and coding). In addition to providing people with transferable skills training, retraining would keep them rooted in local communities. This would allow companies to build the capabilities they need rather than buying them. Right now, for instance, businesses and government in Australia spend AU\$4.6 billion (approximately US\$3.18 billion) per year to train their workforces, compared to the AU\$7 billion (approximately US\$4.84 billion) they spend on recruitment.³
- **Open eyes.** Many of the skills and qualifications possessed by local community workers can be transferred successfully to other industries, but many local workers don't understand how. In remote regions, mining companies have often acted as multigenerational employers—giving people the impression that their skills are confined to the mining industry. To change that perception, mining companies should aim to educate communities about the wider range of career options available to them and help upskill them to close any gaps so they're better placed to thrive in the future.
- **Empower local businesses.** Historically many companies focused on developing local suppliers in low-complexity/low-value spend categories—such as cleaning, catering, and security services—to comply with local procurement requirements. To empower local businesses to meet their future labor requirements, mining companies should help them develop more strategic and specialized skills—such as heavy mining equipment manufacturing and maintenance, mining services, explosives and ballistics services, and engineering consultancy. In addition to empowering them to scale economically, this can enable local businesses to gain greater technological capacity and employ a higher number of upskilled community members (see case study).

CASE STUDY: RETRAINING REGIONAL WORKFORCES⁴

BHP, BHP Billiton Mitsubishi Alliance (BMA), and BHP Billiton Mitsui Coal (BMC) developed a strategic partnership in 2012 to strengthen local procurement from small businesses near their operations in Queensland. Since then, the program has extended to cover all of BHP Minerals Australia core assets, including Queensland Coal (BMA and BMC), NSW Energy Coal, Western Australia Iron Ore, and Olympic Dam in South Australia.

The companies established a backbone organization called C-Res (Community Resourcing for the Future) and a local buying foundation. The program provides a platform for small businesses with up to 20 employees to competitively tender for jobs through a streamlined process. Shorter payment times (average 14 days) are a feature of the program.

For every contract awarded through C-Res, BHP, BMA, or BMC makes a financial contribution to the foundation. These funds are intended for regional workforce development programs, economic development projects and awareness-raising, and building individual business capability. Since inception, the partnership has awarded more than AU\$317 million (approximately US\$219 million) in contracts to 1,320 approved suppliers for more than 25,000 approved work instructions.

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Trend 9: Leadership in an Industry 4.0 world

Preparing to manage the mining workforce of the future

By: Janine Nel, Partner, Consulting, Deloitte Canada
Julie Harrison, Partner, Consulting, Deloitte Australia

THERE ARE VARIOUS trends reshaping the leadership landscape in an Industry 4.0 world: the emergence of nontraditional teams, the creation of exponential roles, the proliferation of data, and the imperative to embrace greater diversity and inclusion.

Mining companies that want to strengthen their competitive advantage and create an adaptive and responsive culture should commit to upskilling their leaders now.

In the mining sector, as in most other industries, the future of work is expected to look very different than it does today.

Automation, analytics, and artificial intelligence (AI) are not simply reallocating work between humans and machines. They are also generating greater insights into employee productivity and efficiency.

For many companies, these insights are helping to drive decisions around workforce design. For management, they are raising questions about what leadership should look like in an Industry 4.0 world—managing continually evolving cross-functional teams, where traditional mechanisms for defining roles and responsibilities and measuring performance are no longer appropriate.

The style of management question is particularly pertinent for a sector that has typically relied on hierarchical, authoritative leadership. It's a question that must be answered given the trends reshaping the leadership landscape. Deep, data-driven insights and enhanced transparency across the full value chain call for leadership that, among many other attributes, employs deep emotional intelligence to foster trust—without which mines could fail to derive the value that digital promises to bring to the industry.

1. The emergence of nontraditional teams

As the mining industry moves toward integrated operations, workflows throughout the mine are being reimaged. Already, automation enables people to work remotely and companies to rely more heavily on contingent workers, resulting in teams composed of both full-time employees and occasional workers who may be sitting in different geographic locations. The imperative to achieve gender parity across the industry is also giving rise to greater diversity among team members—not only along gender lines, but across various dimensions of diversity.

“Taken together, this means leaders will increasingly have to manage individuals with disparate backgrounds located in diverse geographies as well as an integrated robotic workforce, such as artificial intelligence (AI) assistants, many of which are potentially not subject to the reward and management disciplines associated with some traditional forms of leadership,” explains Julie Harrison, Partner, Consulting, Deloitte Australia. “This will likely require a new type of leadership style, one that emphasizes collaboration and influence rather than command and control.” Linked to this new style of leadership is also a requirement to standardize ways of working across the disciplines, enabling higher levels of coordination across multiple functions to be able to deliver at a faster rate of change while managing critical risks. And leaders will also have to manage robotic workers, such as AI assistants.

2. The creation of exponential roles

As adoption of AI and analytics picks up, mining companies are gaining the capacity to use new insights to drive strategic workforce planning. As a result, miners are beginning to define the exponential roles that may be required in the future.

Take the “nerve center data scientist” role as an example. As the critical link between digitized operations (including operational technology, assets, process flows, etc.), life-of-mine plan, and the business strategy, nerve center scientists would use their core analytical insight and operational experience to align mining operations with strategic intent through key performance indicator (KPI) dashboard visualization, develop advanced analytics algorithms, supervise machine learning, and audit cognitive automation decision paths. Examples include predictive asset management algorithms, predictive safety algorithms, and optimized production flows, as suggested through the integrated value chain visualization.

One of the hallmarks of these roles of the future is that they'll likely draw on familiar components of work but put them together in new ways to create a job that's never been done before. Which raises a critical leadership challenge—how can leaders put together teams composed of people with the right component skills if they don't understand the current-state capabilities of their existing staff? To address this challenge, leaders will likely need much more granular visibility into not only their people's stated skill sets, but also their less tangible native competencies.

3. Data proliferation

Thanks to analytics dashboards and AI visualizations, mining companies have access to considerably more data than in the past. Before they can effectively use those insights to uncover emerging opportunities, however, leaders should be trained to both understand that data and rely on it to drive their business decisions. While this will likely draw on traditional leadership skills—such as strategic thinking and problem solving—it would require leaders to apply those skills in ways that may initially feel uncomfortable or counterintuitive.

That's especially true in the mining industry where many on-site managers currently base their decisions on decades of hands-on experience. If these leaders are suddenly being asked to resolve challenges through the analysis of large sets of data, rather than by relying on their personal knowledge, they may hesitate. "As these technologies emerge, leaders are being asked to trust the data enough to act on it," says Janine Nel, Partner, Consulting, Deloitte Canada. "That's why making this transition will likely require not only retraining, but also time and patience."

This isn't the only leadership challenge that data proliferation presents. Consider, for instance, the impact on mine site managers who are used to a very hands-on management style. As they gain access to real-time and predictive information, the need to spend time in the field fighting fires should diminish. "On the plus side, this can allow managers to respond to situations proactively rather than reactively," notes Nel. "At the same time, however, it changes their traditional behaviors—calling into question what the hallmarks of a 'good boss' should now be."

A third issue revolves around how leaders use the employee performance data now at their fingertips. With real-time insight into their workers' performance, leaders could arguably penalize staff for not meeting their targets rather than using that data to improve workflows. The danger? Workers could refuse to support the new technologies, unions could intervene, and corporate investments in analytics wouldn't live up to their potential. To avoid these outcomes, the leaders of the future will need patience, superior communication skills, and high levels of emotional intelligence so that they can allay employee concerns that performance data will be used against them.

4. Diversity and inclusion

Research shows that diverse and inclusive companies significantly outperform their peers and could be better positioned to thrive into the future. For example, organizations with more inclusive cultures are:

- Six times more likely to be innovative
- Six times more likely to be agile
- Three times more likely to be high performing
- Two times more likely to meet or exceed financial targets¹ (figure 1)

FIGURE 1

Value and impact of a diverse workforce

■ Less diverse companies (bottom 88%) ■ More diverse companies (top 12%)



Source: Deloitte South Africa. *Value Beyond Compliance: A new paradigm to create shared value for mines, communities and government* Deloitte, February 2019, accessed September 26, 2019.

An increase in diversity is even correlated to an improvement in safety and operational efficiency.²

Thanks to these drivers and more, many mining companies have been increasing their spending on more expansive diversity and inclusion initiatives. Some companies are introducing diversity standards for camps, creating targeted development programs and setting metrics around concepts like “respectful behavior.”

Ultimately, however, most organizations will likely need to transform their culture to become fully inclusive. As a starting point, companies can broaden the narrative to diversity of thinking and inclusion so they can create shared purpose and meaning. It also often requires the development of committed and capable leaders with the skills needed to gain buy-in to this vision, enforce corporate values around diversity and inclusion, and create truly diverse and inclusive teams.

Charting the path forward

These trends typically call for a new set of leadership competencies. To leverage emerging data insights, for instance, leaders will likely need digital fluency, data visualization skills, and an understanding of cognitive and AI-driven technologies. To manage nontraditional teams and support corporate inclusion initiatives, they’ll likely need emotional intelligence, a collaborative style, and the capacity for creative problem solving. And to fill the roles of the future, they should have a flexible mindset and an understanding of how to create collaborative diverse teams that achieve their target outcomes, regardless of who does the work. Paradoxically to the above flexibility they will likely also need to facilitate and develop shared disciplines across teams that drive standardized ways of working that enable rapid collaboration across these new networked and multidisciplinary teams.

So how can mining companies cultivate these skills? As with every change initiative, it typically starts with the tone from the top. Executive leadership must demonstrate the behaviors they expect to cascade through all levels of the organization. Miners should aim to uncover the pockets of excellence that exist across the enterprise, where leaders are already exhibiting aspirational attitudes, competencies, and cognitive abilities. Through

active programs, such as supervisory interventions, these corporate champions can help share their skills down to leaders throughout the company.

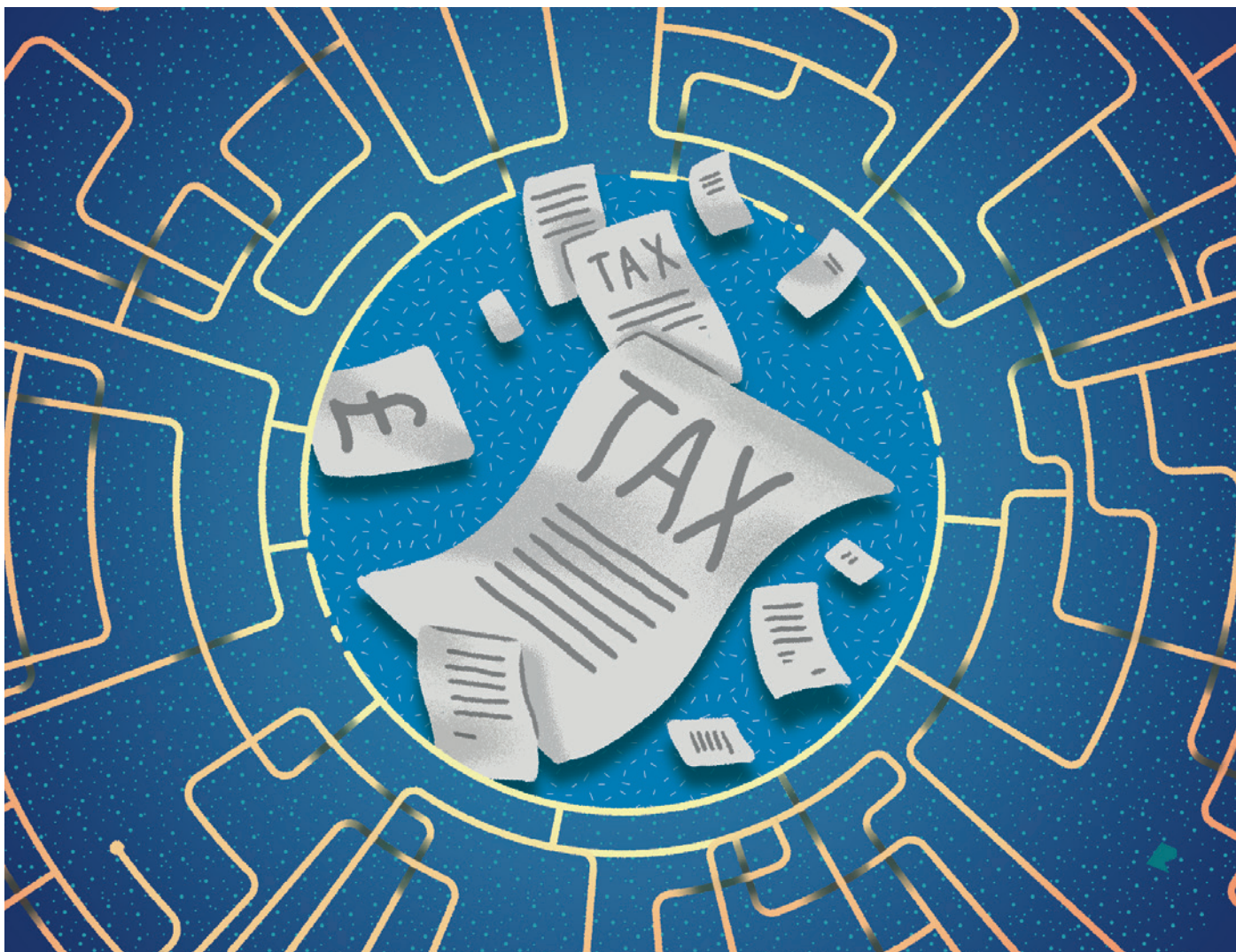
“Making this transition will take time, but organizations that commit to upskilling their leaders now can create not only a competitive advantage, but also an innovative, adaptive, and agile cultural environment,” stresses Harrison.

UNCOVERING OPPORTUNITIES FOR LEADERS TO GROW

- **Turn up the heat.** When leaders are confronted with unfamiliar challenges, complex issues, competing stakeholder demands, or high-risk situations, they can often feel under fire. Heat experiences simulate these scenarios to help leaders build the skills to handle “hot” situations. The aim is to expose leaders to a scenario that disrupts their habitual way of thinking and then ask them to solve it with the help of people who have different outlooks, ideas, and backgrounds. This could include collaborating with a group of peers or bringing in leaders from other organizations, and providing them with a safe environment to share their thinking and brainstorm new ideas so they can build the “muscle memory” to solve the thorny challenges they face during the normal course of business. Already, some mining companies have begun to invite top-tier leaders from companies such as leading technology companies into their leadership gatherings to gain exposure to new ideas.
- **Be clear on the narrative.** Each mining organization should be clear on the diversity narrative for their organization, specific to their purpose and people. To prevent leaders from feeling threatened by rapid, major changes to their performance expectations, consider running smaller pilot projects to test new leadership approaches. Those that succeed can serve as a template to other business units, with leaders who have already gone through the experience acting as advocates and coaches.
- **Involve people.** The people who do the work are often best placed to identify the skills they require to succeed. Find ways to involve leaders in the design and implementation of learning programs. Aim, too, to provide varied learning programs that account for different learning styles and offer opportunities for everyone to succeed.
- **Explain the difference between diversity and inclusion.** Before exploring diversity in the workplace, it’s important to understand the relationship between diversity and inclusion. Diversity will generally not drive any real change without inclusivity. Hiring people from diverse backgrounds simply to hit a target achieves nothing. The value of workplace diversity lies in people bringing diversity in experience and thought to a workplace or project. But diverse thoughts and ideas will never get heard, let alone used to benefit business, if people aren’t included and their opinions aren’t valued. To empower leaders to foster true inclusivity, educate them about different religions and cultural practices, issues facing people of various ages, gender and sexual orientation, physical and mental disability, or even challenges facing new parents.

Endnotes

1. Deloitte South Africa, *Value beyond compliance in Australia: Creating shared value for mines and their communities*, Deloitte, August 2019, <https://www2.deloitte.com/au/en/pages/energy-and-resources/articles/value-beyond-compliance-australia.html>, accessed September 26, 2019.
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Trend 10: Tax tribulations

Concerns over “transfer mispricing” put miners in the spotlight

By: James Ferguson, Global Mining & Metals Tax Leader, Deloitte UK
Ben-Schoeman Geldenhuys, Mining & Metals Tax Leader, Deloitte Canada

THE ORGANIZATION FOR Economic Co-operation and Development (OECD) introduced an initiative during 2019 to address the tax challenges relating to the digital economy. The initiative is divided into two pillars, with Pillar One relating to the new nexus and profit allocation rules, and Pillar Two relating to a minimum tax regime

(referred to as “Pillar One” and “Pillar Two” in this chapter). These global tax measures potentially could create serious constraints on mining economics. To mitigate any unexpected tax obligations, mining companies should be aware of these changes and understand how they could impact their tax affairs.

The mining industry breathed a sigh of relief when the OECD Secretariat Proposal document released in October 2019 (“OECD Secretariat Proposal”) assumed that extractive industries and commodities would not be subject to the new tax approach being proposed under Pillar One.¹

As eluded to, Pillar One seeks to reset the nexus rules that have been the basis of the international tax system for decades. Under the nexus rules, a company can be taxed only in countries where it has a “nexus”—which has typically been defined as a physical presence. In today’s digital economy, however, the OECD Secretariat Proposal argues that companies should pay taxes where the consumer of the product resides. For mining companies this would have meant that the country purchasing minerals or metals could establish the right to tax the profits, even if the mining company concerned is not physically located there.

The extractive sector’s assumed exemption from this, however, doesn’t mean it will not be subject to new international tax rules. Pillar Two may subject mining companies to minimum tax in instances where little to no tax is paid in the mining jurisdiction in which such companies operate. “Although the sector may be exempted from the proposed new nexus rules, the BEPS 2.0 deliberations have spurred tax authorities and nongovernmental organizations (NGOs) alike to revisit some of the tax rules that apply to resource companies,” explains James Ferguson, Global Mining & Metals Tax Leader, Deloitte UK. “As a result, mining companies may once again find themselves being challenged by the ever-evolving rulebook for tax in the host countries and the international chain back to their investors.”

Pillar One seeks to reset the nexus rules that have been the basis of the international tax system for decades.

Transfer “mispricing” disputes on the rise

Transfer mispricing disputes seem to be increasing with a number of commodity-related transfer pricing cases subject to litigation in recent years. According to the International Trade Center, transfer pricing litigation has risen notably in commodity-exporting countries, such as Australia, Canada, and Russia.²

Three practices, in particular, are coming under greater scrutiny:

1. Mineral reference prices

What is the actual “price” of a commodity? Although the question seems simple, the answer can be complex. Mining companies typically use commercial sales contracts in mineral and metal transactions, which usually contain complex pricing clauses to formulate the price at which they sell the commodities, taking into account further processing, transportation, etc.

These transactions generally take a range of considerations into account when setting commodity transfer prices—including the activities performed with respect to the marketing/trading activities (e.g., managing logistics, selling and marketing, transport and handling) and the risks assumed (e.g., product quality, liquidity, volume differences). While the industry fully understands that mineral contracts adjust the “reference” price of minerals and metals based on the terms and conditions of the agreement, the current focus by the OECD and NGOs would suggest that the commercial complexities of these agreements are not always considered by governments and tax authorities.

The OECD intends to issue guidance that addresses the reference price at which commodity transactions take place. The mining industry faces the possibility that tax authorities may use the guidance to standardize the mineral reference prices mining companies use by aligning them to prices that are more readily available to the authorities, such as prices quoted on an international or domestic commodity exchange market, or from recognized statistical agencies, independent brokers, or governmental price-setting agencies. Such an approach is unlikely to represent the full commercial aspects and could inevitably lead to further transfer pricing disputes.

2. Mine development funding

Given the fact that mining companies often operate in developing markets with many risks associated with mine development, the capital costs of building a new mine are significant. So significant, in fact, that companies typically need to rely not only on internal funds and equity but also external loans and debt to fund their development costs.

The OECD and NGOs have shifted the focus onto what they perceive as excessive interest deductions claimed by mining companies. This focus is ongoing, and mining companies are set to face yet another type of tax dispute with their host nations.

The correct approach to tax relief on interest expense has been an issue that countries have been grappling with for many years, such as using thin capitalization rules that limit the level of debt relative to equity in local entities, to interest withholding taxes, and to revised transfer pricing rules. This problem now is part of the OECD recommendations in BEPS Action 4, which is designed to help host countries ensure that a company's net interest expense deductions are directly linked to the taxable income it generates from its economic activities.

While the dust has yet to settle on these proposals, it is clear that mining companies may soon need to reconsider how they fund their mine development activities. The industry is confronted by the fact that the OECD is aiming its policy initiatives on the instruments that facilitate mine development. Financing for the mining sector is at record lows, and the competition for capital in this sector is fierce. Investors seek legitimate returns, yet the OECD's policy initiatives do not necessarily fully consider the complexity of mining finance projects and the economic realities of investment returns. Governments receive compensation or returns for the exploitation of resources through the tax systems they deploy. The returns to the government via the tax system and the returns to the investors that risk capital should balance. This balancing act should be assessed on a continuous basis in order for an imbalance to not result in negative consequences for investment into various sectors, including the mining sector.

3. Offshore indirect transfers

Mining companies invest in assets all over the world. Although many of these ownership structures are set up as direct investments, indirect investments are equally common. There are countless reasons why a company might hold an indirect interest in a foreign entity—from complying with local foreign ownership rules to building strong local networks of expertise, etc.

But what are the consequences where a mining company that is considered a tax resident of one country decides to sell its indirect foreign interest to an offshore buyer? At first glance, this may not seem like a significant issue, but such “offshore indirect transfers” raise serious questions about which tax authorities have the right to tax these transactions.

From a strictly commercial perspective, a company could argue that a transaction that takes place outside the borders of a host country should not attract tax from the host country; it is, in essence, an extraterritorial event that should not trigger domestic taxes.

Many host countries, however, do not agree. In their view, the country where the asset is located should be entitled to tax any gain made on these indirect transfers because the host country is at least partly responsible for helping to enhance the value of the asset.

Despite the existence of tax treaties, offshore indirect transfers by host countries are now more often than not subject to tax in the host country, which results in economic double taxation of transactions. Mining companies increasingly need to rely on “negotiated” outcomes to avoid double taxation, especially where the host country is not party to transactions occurring between shareholders. Tax authorities are sometimes taking this even further, seeking to tax simple business restructurings where there is no change of economic ownership at all.

“There’s a groundswell right now on additional tax measures that may be imposed on global extractive industries,” says Ben-Schoeman Geldenhuys, Mining & Metals Tax Leader, Deloitte Canada. “If these mechanisms are deployed unchecked, they could create serious constraints on mining economics, which currently face a number of commercial challenges.”

HOW TO MITIGATE TAX RISK

- Ensure that there is a clear understanding of the law with the host country and, where possible, the use of mining conventions and tax stabilization arrangements, given mining investments, are for the long term.
- Use bilateral investment treaties to protect the investor’s interests against unfavorable/unfair action by a host government.
- Seek a “partnership” with the host country at all levels of government to ensure there is a common understanding of the contribution by the mining company.
- Make sure there is transparency with regard to the actual taxes the company pays in the jurisdiction.
- Ensure compliance with the law and be prepared to be able to substantiate positions and defend against any challenges made by tax authorities, while continuing to maintain healthy relations with government.

Endnotes

1. OECD, Secretariat Proposal for a “Unified Approach” under Pillar One, October 9, 2019 – November 12, 2019, <https://www.oecd.org/tax/beps/public-consultation-document-secretariat-proposal-unified-approach-pillar-one.pdf>.
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Conclusion: A time for perseverance and vision

IN THIS EDITION, we have highlighted the continued pressure the industry is facing from investors, communities, and end consumers. We don't see that pressure declining any time soon. Rather, we are likely to see increased focus and steeper demands. The mining industry is important to our daily lives. Mining needs to own the narrative and evolve in this changing landscape. The bottom line is that it will likely require leadership to build trust with communities, consumers, and investors.

The tools, technology, and systems are there for companies to embrace as they navigate the next year and put down the foundations for longer-term growth. Leadership is expected to be key. At the corporate level, this would require perseverance to navigate the industry volatility and uncertainty, while continuing to chart the course for a more digitized, inclusive and purpose-led future. At the industry level, companies should embrace collaboration, make the industry exciting and inspirational to new talent, and drive forward a different conversation with communities and key stakeholders. We look forward to continuing the dialogue with the industry in the next year.

Leadership contacts

Rajeev Chopra

Global Leader – Energy, Resources & Industrials
Deloitte Touche Tohmatsu Limited
+44 20 7007 2933
rchopra@deloitte.co.uk

Andrew Swart

Global Sector Leader – Mining & Metals
Deloitte Touche Tohmatsu Limited
+1 416 813 2335
aswart@deloitte.ca

Regional/country contacts

Africa

Andrew Lane
+27 11 517 4221
alane@deloitte.co.za

Rhyno Jacobs

+27 11 304 5299
rhjacobs@deloitte.co.za

Argentina

Edith Alvarez
+11 4320 2791
edalvarez@deloitte.com

Australia

Ian Sanders
+61 3 9671 7479
iasanders@deloitte.com.au

Paul Klein

+61 08 9365 7060
pauklein@deloitte.com.au

Julie Harrison

+61 8 9365 7061
juharrison@deloitte.com.au

Leeora Black

+61 3 9671 6325
leblack@deloitte.com.au

John O'Brien

+61 4 1982 6372
johnobrien@deloitte.com.au

Brazil

Patricia Muricy
+55 21 3981 0490
ajoffily@deloitte.com

Canada

Andrew Swart
+1 416 813 2335
aswart@deloitte.ca

Ben-Schoeman Geldenhuys

+1 416 775 7373
bgeldenhuys@deloitte.ca

Roland Labuhn

+15 87 293 3217
rlabuhn@deloitte.ca

Janine Nel

+1 403 261 8100
jnel@deloitte.ca

Chile

Dom Collins
+569 9185 6144
dcollins@deloitte.com

China

Kevin Xu
+86 10 8520 7147
kxu@deloitte.com.cn

Colombia

Andres Roa
+57 1 426 2008
andresroa@deloitte.com

Ecuador

Jorge Brito
+59 32 381 5100
jorgebrito@deloitte.com

EMEA

Tim Biggs
+44 20 7303 2366
tibiggs@deloitte.co.uk

France

Veronique Laurent
+33 1 5561 6109
vlaurent@deloitte.fr

Francophone Africa

Damien Jacquart
+33 1 5561 6489
djaquart@deloitte.fr

India

Rakesh Surana
+91 22 6122 8160
rvsurana@deloitte.com

Indonesia

Ali Mardi Djohardi
+62 21 5081 8856
alimardi@deloitte.com

Japan

Teppei Morita
+81 80 4367 7857
tmorita@tohatsu.co.jp

Mexico

Cesar Garza
+52 871 7474401 x4401
cgarza@deloittemx.com

Peru

Karla Velásquez
+51 1 211 8559
kvelasquez@deloitte.com

Poland

Zbig Majtyka
+48 32 508 0333
zmajtyka@deloittece.com

Russia – CIS

Andrew Sedov
+74 95 787 0600
asedov@deloitte.ru

Southeast Asia

Brent Vasconcellos
+65 6530 8008
bvasconcellos@deloitte.com

Switzerland

David Quinlin
+41 58 279 6158
dquinlin@deloitte.ch

Geoff Pinnock

+41 58 279 6066
gmpinnock@deloitte.ch

Turkey

Elif Dusmez Tek
+90 312 295 4700
etek@deloitte.com

United Arab Emirates

Bart Cornelissen
+971 4 376 8888
bpcornelissen@deloitte.com

United Kingdom

Tim Biggs
+971 4 376 8888
tibiggs@deloitte.co.uk

James Ferguson

+44 20 7007 0642
jaferguson@deloitte.co.uk

United States

Amy Winsor
+1 303 312 4156
awinsor@deloitte.com

Authors

Trend 1: The social investor

Andrew Lane | Mining & Metals Leader, Deloitte Africa
Leeora Black | Principal, Risk Advisory, Deloitte Australia

Trend 2: Getting partnerships and joint ventures right

Andrew Swart | Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited
James Ferguson | Global Mining & Metals Tax Leader, Deloitte UK
Tim Biggs | Mining & Metals Leader, Deloitte UK

Trend 3: Seize opportunity amid uncertainty

Andrew Swart | Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited
Bill Marquard | Director, Monitor Deloitte US

Trend 4: Dynamically managing risk

Patricia Muricy | Global Mining & Metals Risk Advisory Leader, Deloitte Brazil
Andrew Swart | Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited

Trend 5: The path to decarbonization

John O'Brien | Partner, Financial Advisory, Deloitte Australia
Tim Biggs | Mining & Metals Leader, Deloitte UK

Trend 6: On the road toward intelligent mining

Roland Labuhn | Partner, Consulting, Deloitte Canada
Rhyno Jacobs | Director, Consulting, Deloitte Africa

Trend 7: Modernizing core technologies

Paul Klein | Partner, Consulting, Deloitte Australia
Roland Labuhn | Partner, Consulting, Deloitte Canada

Trend 8: The intersection of talent and community

Janine Nel | Partner, Consulting, Deloitte Canada
Julie Harrison | Partner, Consulting, Deloitte Australia

Trend 9: Leadership in an Industry 4.0 world

Janine Nel | Partner, Consulting, Deloitte Canada
Julie Harrison | Partner, Consulting, Deloitte Australia

Trend 10: Tax tribulations

James Ferguson | Global Mining & Metals Tax Leader, Deloitte UK
Ben-Schoeman Geldenhuys | Mining & Metals Tax Leader, Deloitte Canada

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About the authors

Andrew Swart Global Mining & Metals Leader, Deloitte Touche Tohmatsu Limited
aswart@deloitte.ca | +1 416 813 2335

Andrew is the Global and Canadian Leader of the Mining & Metals practice as well as the Global Consulting Leader for the sector. In his global roles, Andrew leads a team from around the world and has the responsibility to set the strategic direction and go-to-market strategy for the global practice. With 20 years of industry and consulting experience, Andrew has a passion for client service, having worked across many major mining and metals geographies including Canada, Chile, Russia, Ukraine, Kazakhstan, Brazil, Germany, India, South Africa, UK, and the US. Andrew's areas of expertise include corporate and competitive strategy engagements, digital and innovation systems, and large organizational transformation programs.

Tim Biggs Mining & Metals Leader, Deloitte UK
tibiggs@deloitte.co.uk | +44 20 7303 2366

Tim is the EMEA and UK Mining & Metals sector leader and a partner within the UK Audit & Assurance practice based in London. He graduated as a Chartered Accountant in 1989 in Brisbane and became a partner of Deloitte Australia in 2000. Before taking up his current role in Deloitte UK, he served as audit partner in Adelaide and a managing partner in Queensland. Tim has had significant experience with accounting and audit engagements for large clients—predominantly FTSE 100 and FTSE 250 mining and metals clients with operations across the globe.

Leeora Black Principal, Risk Advisory, Deloitte Australia
leblack@deloitte.com.au | +61 3 9671 6325

Dr. Leeora Black is a principal in the Sustainability Services team at Deloitte Australia. She has 30 years of experience in helping organizations manage complex social and stakeholder risks. A pioneer in the field of corporate social responsibility (CSR) in Australia, Leeora works with senior managers and executive teams to create effective corporate and stakeholder strategies and build management capabilities. She is a leading global authority on the social license to operate, stakeholder engagement, CSR, human rights, and sociopolitical risk management. Leeora's experience spans energy, mining, property, retail, agribusiness, telecommunications, infrastructure, transport, renewables, public sector, and health industries. She is the author of *The Social Licence to Operate: Your Management Framework for Complex Times* (Publisher: Do Sustainability, Oxford, 2013).

James Ferguson Global Mining & Metals Tax Leader, Deloitte UK
jaferguson@deloitte.co.uk | +44 20 7007 0642

James leads Deloitte's Global Mining & Metals Tax group. He works with a leadership team of more than 40 mining and metals' professionals in all geographies. He is also an international tax partner and leads the Equity Capital Markets Tax group, providing tax advice, structuring, and readiness reviews for IPOs. James also leads the CIS Services group in Deloitte UK. He has more than 23 years of experience in global markets, including the UK, South Africa, and Russia. James specializes in the Energy, Resources & Industrials and the Technology, Media and Telecommunications industries. He has a master's degree in physical sciences from the University of Oxford.

Ben-Schoeman Geldenhuys Mining & Metals Tax Leader, Deloitte Canada
bgeldenhuys@deloitte.ca | +1 416 775 7373

Ben-Schoeman is the Mining & Metals Tax Leader at Deloitte Canada. He has over 20 years of experience in consulting to national and international mining clients on all tax related matters including international and corporate tax, restructuring, M&A transactions, tax management, and tax policy issues affecting the mining and metals sector. He has also worked in the renewable energy sector and mining related service sectors. Ben-Schoeman started his career after completing his legal articles in South Africa with Arthur Andersen and joined the Anglo-American Group of Companies in 2004. He also served as the Corporate Tax Director at KPMG South Africa for few years, prior to joining Deloitte. Ben-Schoeman is a regular speaker at mining related events and is the author of several mining tax articles.

Julie Harrison Partner, Consulting, Deloitte Australia
juharrison@deloitte.com.au | +61 8 9365 7061

Julie is the lead partner for the Human Capital team in Western Australia and the National Human Capital Energy, Resources & Industrials leader for Deloitte Australia. Her expertise includes organization design, strategic change, technology adoption, and leadership and culture change. Julie is passionate about delivering people and outcome-oriented transformation, as well as the capability development of both our own people and our clients.

Rhyno Jacobs Director, Consulting, Deloitte Africa
rhjacobs@deloitte.co.za | +27 11 304 5299

Rhyno leads the Energy, Resources & Industrials business for South Africa's Strategy & Operations division and is a Leadco member of Strategy and Operations business in Deloitte Africa. He is a qualified mining and industrial engineer with 22 years of operational, project management, consulting, and advisory experience in the fields of operation excellence, innovation in mining, business improvement, supply chain management, shared services, and corporate strategy. He is an expert in operational engagement with a focus on mining and heavy manufacturing industries. Prior to joining Deloitte, he has held various senior roles in Anglo American, Lonmin, BHP Billiton, Impala, and Gold Fields.

Paul Klein Partner, Consulting, Deloitte Australia
pauklein@deloitte.com.au | +61 08 9365 7060

Paul is a Consulting partner at Deloitte Australia and has led Western Australia's Technology Consulting practice from 2007 to 2014, which includes Technology Advisory services, Analytics and Information Management, Enterprise Applications, and Digital. With more than 30 years' experience, he specializes in IT strategy and planning and the implementation of technology-enabled solutions. Paul's primary industry focus is Energy, Resources & Industrials, including Mining & Metals; Oil, Gas & Chemicals; and Power & Utilities sectors. He also has prior experience in government, financial services, consumer products, and manufacturing.

Roland Labuhn Partner, Consulting, Deloitte Canada
rlabuhn@deloitte.ca | +15 87 293 3217

Roland is a technology partner responsible for leading digital and analytics in the firm's energy sector practice. With more than 25 years of experience, he has led large-scale businesses and operations transformations for some of the largest energy firms. Focused on innovation and growth, Roland has held president, director, and founder roles for various firms in the energy and technology field. He holds an MBA from the University of British Columbia and has completed the Institute of Corporate Directors (ICD) program.

Andrew Lane Energy, Resources & Industrials and Mining & Metals Leader, Deloitte Africa
alane@deloitte.co.za | +27 11 517 4221

Andrew Lane is a Senior Partner at Deloitte Africa, where he leads the Energy, Resources & Industrials practice, as well as the Monitor Deloitte strategy capability, and the CEO program at the Deloitte Executive Institute. His professional career spans 32 years including 18 years in consulting. Andrew leads strategy, operational improvement, organization redesign, and implementation projects within various industries including mining, utilities, revenue collection, general industry, aviation, manufacturing, and media.

Bill Marquard Director, Monitor Deloitte
bmarquard@deloitte.com | +1 312 550 0300

Bill serves as a director with Monitor Deloitte, where he works with CEOs, senior executives, and their teams to develop and deliver growth strategies. With more than 30 years of experience and as a senior strategy executive, he has helped numerous leadership teams radically grow their businesses. His specialties include business strategy, translational strategy, cost reduction, corporate transformation, corporate restructuring, and consulting practice leadership. As a thought leader, he published a book titled, *Wal-Smart: What it Really Takes to Profit in a Walmart World* and has been featured as a leader in business strategy in multiple media outlets including CNN, CNBC, and First Business, *Wall Street Journal*, and *Chicago Tribune*. Bill also served on the faculty of Northwestern's Kellogg School of Management, and has lectured at the White House, Duke University, University of Notre Dame, and DePaul University.

Patricia Muricy Global Mining & Metals Risk Advisory Leader, Deloitte Brazil
pmuricy@deloitte.com | +55 21 3981 0490

Patricia is the Global Mining & Metals Risk Advisory leader and also the Mining & Metals leader at Deloitte Brazil. From 2017 to 2019, she was also the chair of Deloitte Brazil Growth Committee, which focuses on increasing the number of women in leadership positions within the Brazilian member firm. With more than 22 years of experience, Patricia started her career by joining Deloitte in 1997 in Rio de Janeiro. She has also worked in Deloitte Canada as a part of its Global Development Program. From 2013 to 2019, Patricia led the Risk Advisory practice in Rio de Janeiro, a group of 200 professionals that provided services in all risk categories: strategic & reputation, regulatory, operational, cyber, and financial. Patricia holds a bachelor's degree in mathematics and information technology and an MBA in finance.

Janine Nel Partner, Consulting, Deloitte Canada
jnel@deloitte.ca | +1 403 261 8100

Janine is part of the Human Capital Organization Transformation and Talent service at Deloitte Canada. She has extensive consulting experience in human capital. Janine's expertise includes managing large-scale transformation projects and culturally diverse teams. Her specific specialization includes leading delivery and thought leadership in areas of digital and the impact on work, the workforce, and the workplace. Having worked across the HR continuum, Janine has robust expertise in strategic change and digital enablement, organization design, talent, and leadership.


John O'Brien Partner, Financial Advisory, Deloitte Australia
johnobrien@deloitte.au | +61 4 1982 6372

John joined Deloitte Australia in 2018 as a Financial Advisory partner. With more than 20 years of experience in the Australian and Asian clean energy and clean technology sectors, he provides strategic guidance to government, private sector operators, and large energy consumers and investors on issues around decarbonization, energy transition, and environmental technologies. His key expertise includes technology assessment, project development, project financing, risk and opportunity assessment, commercial and financial analysis, policy advice, and strategic growth strategies. In 2007, John established Australian CleanTech, a corporate advisory firm focused on environmental technologies, which he ran until joining Deloitte. John published two books on the opportunities emerging from the transition to a low-carbon economy. The most recent book, *Visions 2100*, was launched at the Paris COP21 Climate Conference in 2015. John has engineering degrees from Oxford University and Trinity College, Dublin and holds an MBA from Adelaide University.

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