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White Paper

Navigating the Geopolitical Landscape

A Mining and Metals Sector Perspective

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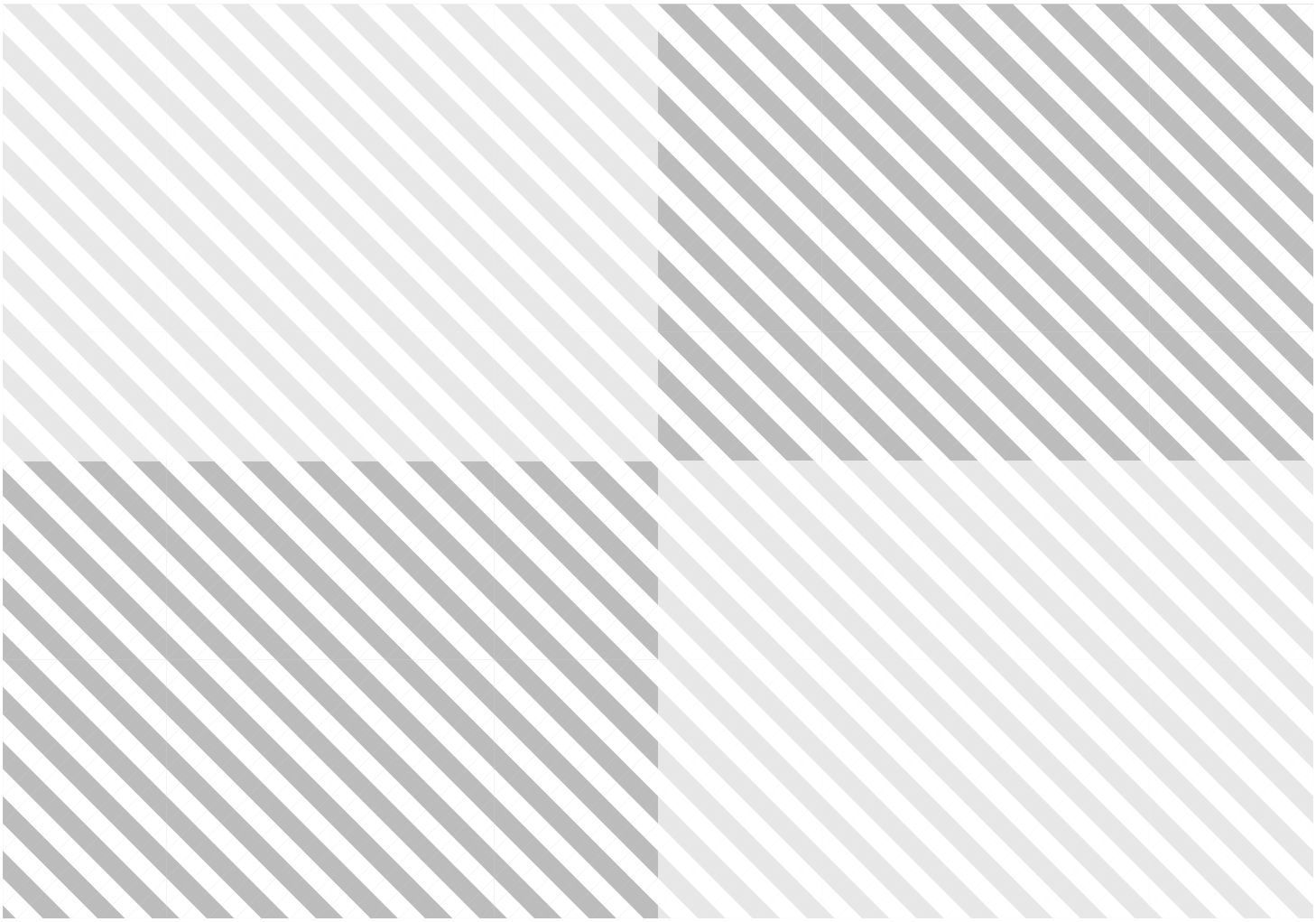

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Foreword

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We live in a world fraught by geopolitical uncertainty. Conflicts today are no longer only happening in the periphery of the global economy, but also challenge it in its very core, transcending borders and economies. A critical element of this new context is the return to strategic competition, with a few states – by virtue of their size, economic might and geographic leverage – influencing and shaping politics, economics and security.

At the other end of the spectre, we observe rising fragility in societies and governments in many parts of the world. The multiplication and interconnections of and between threats seems to outpace the ability of political and economic actors to respond effectively, while trust in the multilateral system is being eroded. Simultaneously, economic integration and cross-border trade in many regions continue to deepen linkages between regions, governments and companies.

This report seeks to increase awareness of the geopolitical and security drivers shaping modern day business environments, with a particular emphasis on the mining and metals industry. It aims to not only improve collaboration between critical actors in global security, but also to facilitate continuous dialogue between business and governments to improve the management of geopolitical trends.

Preface

Geopolitical tensions and heightened security risks remain daunting for mining and metals companies, but there are untapped opportunities to address gaps in established approaches that could benefit the sector's resilience and preparedness. Improved outcomes could be achieved in several areas through rethinking narratives and strategies, partnerships and collaboration across sectors. In preparing this report, the World Economic Forum conducted extensive interviews with mining executives, sector analysts, and geopolitical and security experts to uncover insights into how mining and metals companies are addressing and preparing for the drivers of geopolitics and international security. Consultations revealed a wealth of leading practices in the mining and metals sector and also identified opportunities to strengthen strategies through cross-sector actions.

In addition to analysing more sector-specific geopolitical drivers (price, suppliers, demand, etc.), the findings from the World Economic Forum's *Global Risk Report Security Outlook 2030* was used as a baseline methodology to explore the interconnections between classical sector drivers and those shaping the broader geopolitical landscape.

This paper is intended as a prototype to capture cross-industry relevant insights on how to tackle geopolitical uncertainty and improve outcomes. It aims to inform and provoke further dialogue on the most significant geopolitical trends facing the mining and metals sector and to bring sector leaders together to reflect on their current strategies for managing the geopolitical realities and improve outcomes with proactive – not reactive – strategies.

The field of geopolitics is hard to quantify; hence, the importance of understanding the underlying drivers and interconnections becomes even more dire given the continued uncertainty dominating the global landscape and operating environments. This analysis is not exhaustive – it is designed to offer input on issues that demand greater strategic attention from business leaders in the mining and metals sector and also to provide relevant insights across industries.

Executive Summary

The geopolitical and international security landscape continues to evolve rapidly, with new crises emerging and protracted conflicts spilling over into interstate relations, the global economy and investment patterns. Understanding these transformations, the driving forces behind them and the long-term implications are crucial for companies assessing where to engage and do business, and for governments considering trade, diplomacy and the security of their citizens. The mining and metals sector is at the core of the systems and value chains that shape the current geopolitical reality.

The sector is often highly exposed because it operates in some of the world's most geopolitically complex, contentious and fragile areas, and because its value chains stretch across the globe and cut across sectors and systems. As a result, the mining and metals sector has developed a significant amount of know-how and awareness of geopolitical and international security risks. For example, every smartphone or tablet contains about 40 minerals from across the world, many from areas dominated by conflict and competition. The sector is at the beginning of many value chains and is a significant supplier of products and generators of national revenues, technological innovation and employment. Both socially and economically, the mining and metals sector is bound to play a central role for future generations.

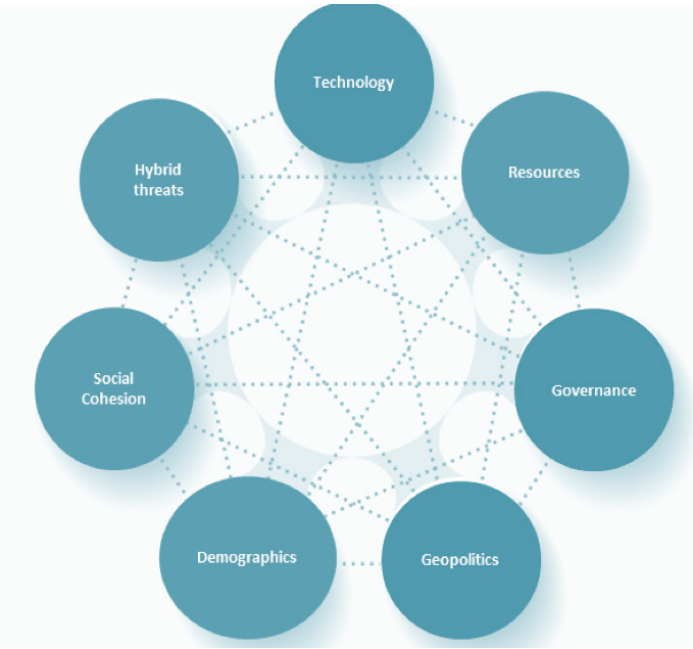
This paper addresses a number of related questions, including:
- What strategies could be quickly and easily improved in the light of changes in the risk landscape?
- What are the critical gaps that require a medium-term horizon and more work to be done?
- What strategies are effective for engaging employees in analysing and managing geopolitical risk?
- What type of institutional arrangements would allow greater engagement between governments and the private sector on geopolitical and security matters?
- Are there lessons to be learned from experiences in having gained "access" and sometimes "effect" over international affairs?

The purpose of this paper is to provide leaders in the mining and metals sector with a stronger understanding of broad geopolitical issues and risks, particularly those with significant potential to impact the sector.

With a stronger understanding of the issues and their own evolving role in the geopolitical and global security landscape, the mining and metals sector can engage more deeply in the global dialogue and serve as an even more constructive partner in addressing many global security challenges and mitigating their driving forces.

A Rapidly Changing Risk Landscape

Three interconnected trends are transforming the nature of geopolitical risks around the world: the vacuum created by fragile or failing states; the return of strategic competition between strong states with conflicting interests; and the long-term impact of recent technological advances. The nature of geopolitical instability itself has changed. Could anyone have predicted the refugee crisis or the rise of ISIS just three years ago? The complex convergence of these trends is at the core of the current geopolitical reality.



In response to the changing environment, a new mode of conflict has arisen – hybrid warfare. More places today dwell somewhere between peace and war; although no conflict is declared, they are under attack. Hybrid threats and ways of warfare are characterized by the combination of organizational forms and tactics, for example, misinformation and propaganda, cyberattacks, covert forces and militias.

Within this hybrid reality, classical and asymmetric threats coexist. Innovative combinations of conventional low-tech and novel high-tech tactics create unpredictable dynamics in which technologically inferior but innovative adversaries challenge government security forces. Because hybrid warfare is designed to evade the constraints of established laws and conventions of warfare, it is hard to contain and can spill over to endanger normal economic and commercial activity. In 2014-2015, mining operations accounted for 2% of terrorist attacks on business.[1] In areas where the lines between war and peace are blurred, the incidence of high public crime, violence and conflict are much higher.

The wars and fragmentation in the Middle East are displacing people from their homes on a scale not seen since the end of World War II, presenting challenges to the European project. The humanitarian crisis that followed in the wake of this mass displacement is challenging the existing response system at its very core. These trends are demonstrated in the power rivalry in Syria, the geopolitical stand-off in Crimea, the ongoing geopolitical tensions in the East and South China Sea, the ruthless scaling of global terrorist and violent extremist operations by armed non-state actors and the inability to effectively and collectively respond, and the rise in cross-border crime and violence, particularly in Latin America.

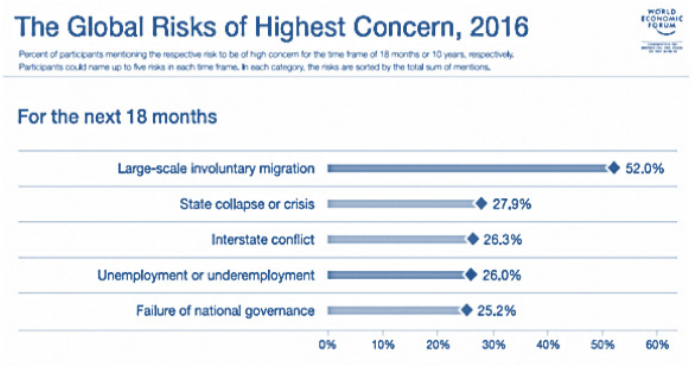
In addition, the spread of infectious disease continues to have a significant impact on mining operations, for example, the outbreak of Ebola[2] in West Africa. Moreover, climate change is an often overlooked “tension multiplier”[3] that is highly relevant to the mining and metals sector. It has the potential to exacerbate existing environmental problems, create entirely new ones and increase food-water-energy insecurity.[4] Climate change may also unlock the possibility of new resources supply and, therefore, new geopolitical competition, such as in the Arctic, where access to resources and shipping routes is a core geopolitical concern of most Arctic nations.[5]

It is not yet clear how this convergence of trends, the wider cast of actors and the advance of technology will impact continued economic growth, commercial bottom lines and future revenue-generation models.

Drivers of Change

When business climates and risk appetites are affected by geopolitical tensions, many companies choose to err on the side of caution and return to safe havens. There is, however, a growing appreciation in today's boardrooms of the need to adapt business strategies, investments, supply chains and markets to mitigate risks. Data from a 2015 McKinsey global survey found that 81% of executives rated geopolitical instability as the number one threat to global growth in the short term – a finding consistent over the past 18 months. The survey also found that executives were concerned that geopolitical risk can depress global growth over the next decade.[6] These views persist although the effects of geopolitical instability on economic growth tend to be localized or regionalized, despite the integration of the global economy.[7]

The World Economic Forum's Global Risks Reports of 2015 and 2016 found geopolitical-related risks to figure among the top global and business concerns. Less widely appreciated is the potential for the private sector to play a greater part in providing foresight and long-term leadership. This could help maintain stability in the international security landscape – a prerequisite for the world's continued social, political, and economic progress.



A fragile landscape

The complexity of the security landscape and the importance of understanding geopolitics are also well illustrated by the challenge of recently empowered non-state actors such as organized crime cartels and terrorist groups such as Boko Haram and the self-proclaimed Islamic State in Syria (ISIS). These groups are leveraging weaknesses of government to expand their influence over territory, even running them like states. Although the territory it controls lies in Syria and Iraq, ISIS has recruited fighters from more than 100 countries, partly through a sophisticated marketing approach using social media platforms. Many countries are engaged in the fight against ISIS: recent terrorist attacks in Ankara, Beirut, Dhaka, Brussels, Tunis and Paris illustrate how the battlefield has become globalized.

Other groups are infiltrating the state sector itself. The lines between conflict and non-conflict zones are increasingly blurred in parts of Latin America, the Middle East, North Africa, and sub-Saharan Africa, as are the boundaries between criminal, inter-communal and politically motivated violence. As long as the powers that could end it distrust each other and disagree about what the endgame should be, a solution is hard to come by.

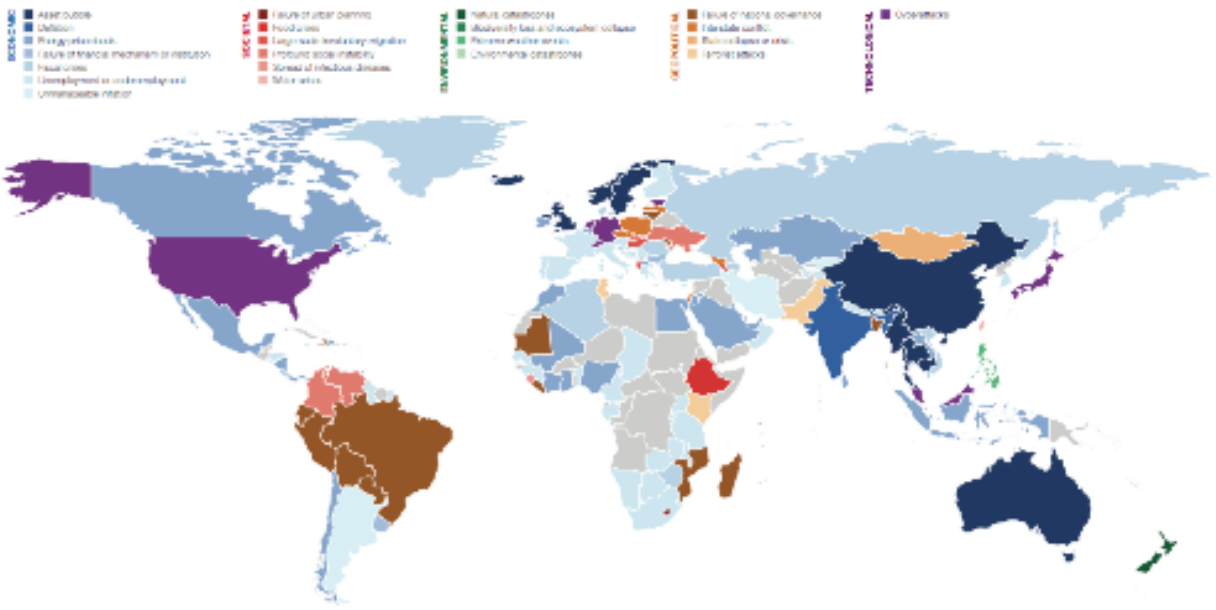
The mining sector is all too familiar with fragility, having operated for many years in fragile areas and in isolated regions affected by conflict. Since 1980, environmental factors are estimated to have impacted 73 conflicts, and at least 40% of intra-state conflicts can be associated with natural resources.[8] More recently, researchers tracked how minerals prices could affect conflict (including riots and violence against civilians) at the local level across Africa. Their analysis suggests that the increase of mineral prices contributed to approximately 21% of country-level violence in Africa from 1997 to 2010. In particular, higher minerals prices were found to be a catalyst for 65% of outbreaks of violence in South Africa alone.[9] Although environmental or pricing issues are rarely the sole cause of violent conflicts, environmental distress and resource access are key drivers of conflict that can further degrade the environment, which is clearly demonstrated by the civil conflict in Syria.[10] The extractives sector, according to a recent AON report, was the industry third most affected by terrorism and political violence in 2015, suffering 87 attacks.[11]

Income inequality also exacerbates the problem. The 66 richest people in the world own as much wealth as the poorest half of humanity, according to Moreno 2014.[12] And the lack of ability or commitment of government institutions

to deliver on public services and to address inequalities stunts the development of communities where mines may operate.

The sudden flows of unaccompanied minors arriving from Central America to the United States, or Syrians to Europe demonstrate how fragility can travel. Stock market downturns in response to terrorist attacks highlight the potential vulnerabilities of the globalized economy to security risks. This reality collapses the notion that avoidance of investments in risky areas is a sufficient strategy for managing failing states.

Broader social and economic issues also affect the quality of the relationship between a company and community, and can act as an accelerator when open conflict does erupt. Operating in such contexts demands multiple investments from companies, including heightened security measures, development of basic infrastructures and community outreach programmes. Today, companies active in fragile situations may face pressure from such groups directly; therefore, they must carefully manage the blurred lines between the state and potentially criminal actors.



Source: Executive Opinion Survey 2015, World Economic Forum.

Note:
In addition to the risk indicated on the map, the following countries have another risk as the risk of highest concern:
Haiti: Unemployment or underemployment; Oman: Energy price shock; Peru: Profound social instability; Paraguay: Failure of financial mechanism or institution; Senegal: Energy price shock; Tunisia: Profound social instability; Venezuela: Unmanageable inflation; Vietnam: Man-made environmental catastrophes

Strategic competition

The competition between powerful states is playing out through the architectures of globalization, which ironically bound nations closely together during the 1990s and early 2000s. After 20 years of understanding and harmony between key powers, tensions over relative gains between states and the accumulation of wealth in the East and South are two factors driving a return of competitive – and at times bellicose – behaviour among nations with differing worldviews and ambitions.[13] The escalation of confrontations in Ukraine, Syria and Yemen, and maritime disputes in the Western Pacific are clear illustrations of how strategic competition is acting as a driver in international security.

Strategic competition between states increases the likelihood that political influence will be brought to bear on the market mechanisms that allocate resources and in turn provide stability. Ensuring access to resources is already a prominent feature of many countries' geo-economic objectives, reflected in their foreign policies and actions on the global stage.[14] In the future, population growth, urbanization, rising consumption, climate change and environmental degradation will enhance the drive to control resources. Some analysis suggests that the dispute over islands in the South China Sea is also related to the establishment of control over oil resources there. The race to capture resources – in outer space and in the deep seabed – has raised concerns among competitors about the potential for new resources wars.[15]

These kinds of issues may once have been managed on a domestic level or via bilateral diplomacy, but today they tend to draw in a wider range of actors and agendas. The interplay between geopolitics and the global economy assumed a renewed relevance. This interplay, known as geo-economics, has become a key paradigm to understand that globalization has given way to a more contentious era of strategic competition between strong states for influence over the global architecture and economy. Economic policies that were taken for granted in the era of globalization – such as access to raw materials and technology underlying financial transactions – are already being weaponized to some degree. Businesses may find more and more obstructions as a result of

concerns about trade, technology transfer and intellectual property that undermine the reliability of global supply chains, industrial partnerships and cross-holdings. The intense volatility of commodity prices, which is partly a result of these concerns, has been a principal trend impacting the mining and metals sector over the past five years.

Economic coercion as a tool of statecraft

Economic policies and tools are quickly becoming the weapons of choice in the new competitive landscape. Today, influential blocs are cementing new alliances in competing trade agreements, strategic infrastructure projects, new investment banks, and arrangements governing the internet and data. Whether motivated by domestic or international concerns, these forms of economic coercion have a chilling effect on trade and investment. Infrastructure investments have become more politically charged, including the New Development Bank, Asian Infrastructure Investment Bank and New Silk Road 2.0 project. One potential risk is the politicization of such projects, especially in emerging economies facing potential financial turmoil. The new initiatives have been interpreted as supply-driven, meaning such new banks may be a reflection of savings-rich economies trying to boost geopolitical positioning through investment to infrastructure. In Africa alone, there exist an estimated 330 new infrastructure and construction projects valued at $223 billion.[15]

For example, more energy is being invested in various overlapping and competing cooperation and trade arrangements. Negotiations such as the Trans-Pacific Partnership, the Eurasian Economic Union, the Pacific Alliance, and Transatlantic Trade and Investment Partnership all have geopolitical undertones. By design, they are inclusive of "allies" and exclusive of the rest. Some represent insurmountable obstacles to resources exploitation. Taken together, these geo-economic trends lead some observers to worry over a fragmentation of globalization or a de-globalization that would imply the emergence of not one, but several free trade "zones" cutting across borders.

The plethora of regional agreements opens up more trade, but it creates immense administrative and operational costs for companies. The turf battles being fought out in trade negotiations leave many companies caught in the middle and may ultimately make global consumers and businesses the clear losers of fragmenting trade regimes. Conversely, the political influence that trade agreements establish between nations – either through dispute-resolution mechanisms or straightforward dialogue mechanisms – is an additional source of leverage for companies operating abroad.

Overall, the past five years have registered an uptick in the number of economic measures considered to be coercive. A 2009 survey conducted by Deloitte showed that companies had to comply with approximately 6,000 names and 34 lists of official sanctions. Fast-forward seven years, and several new sanctions regimes exist: the EU and the United States against Russia, Russian sanctions against Georgia, Chinese sanctions against Japan and the Philippines, to name a few.[17] New types of sanctions have emerged, such as the Sectoral Sanctions Identifications List. Companies surveyed by Deloitte identified the excessive costs in employee time and legal fees as the largest burdens in complying with increasingly complex sanctions regimes.

Russia's 2014 invasion of Crimea and the sanctions regime that was swiftly constructed to dissuade Russia from its policies have weakened the Eurasian economy and particularly damaged the Russian and Ukrainian steel industries.[18] The economic effects of the conflict over Crimea continue to accrue and will have long-term implications as investments may be cancelled and local talent may migrate away.

Conversely, the easing of the sanctions regime against Iran is becoming a pivotal development for the economy of the Middle East, opening up opportunities for new exploration in the minerals sector. Meanwhile, trade policies are also coming into play for geopolitical and domestic objectives. On the one hand, barriers against imports – such as steel imports upheld by the US, or measures protecting against certain commodities in Brazil – are compounded by newer measures from emerging economies to impede certain commodities trade. On the other hand, banning exports of certain metals in some countries serves domestic purposes and influences foreign investors.[19]

Companies operating globally may contend with a number of forms of economic coercion, including anti-trust investigations into multinational companies, local content requirements, limitations on ownership, the use of export credits, tied aid and other forms of sovereign-backed finance. As free trade talks devolve to the regional level and overlap with established alliance structures, it may become harder to seek redress to this kind of interference.

The geopolitics of resources

The geopolitics of natural resource access and management is critical for the metals and mining sector. Geopolitical tensions affect demand-side indicators. Conflicts can lead to a decline in demand for new investments and, therefore, the demand for raw materials. Likewise, the supply of materials may be affected if conflicts make certain mineral deposits simply unreachable, as in Afghanistan and parts of Africa. Conversely, peace may bring with it new access to resources: the 2015 deal negotiated with Iran has already resulted in the easing of sanctions and has opened up new opportunities for mining untapped resources there.

Similarly, scarcity of energy and water will increasingly impact the sector: 32% of copper mines and 39% of iron ore mines are located in regions with high risks of water scarcity.[20] Extreme weather events, such as the persistent El Nino phenomenon in South Africa this year, also exacerbate the problem. Overexploitation of water

and the inability to meet demand for water has and will continue to impact the mining sector. More importantly, it has the potential to lead to growing social unrest and violence. In addition to securing control over resources, controlling the supply chains and delivery systems for transporting resources[21] has recently come into play. Moreover, innovations are occurring to respond to water scarcity – for example, technology for waterless processing and collaborative monitoring of water sources or local governance structures overseeing sources.

The flip side of foreign resource control is mineral resource nationalism, in which countries exert greater control over their mineral wealth through a variety of policies. In 2012-2014, the issue ranked in the top 10 risks for mining and metals companies, according to Ernst & Young.[22] Today, mining companies and governments around the world are negotiating resource policies such as banning the export of raw materials, mandated beneficiation, local hiring requirements and controls on transfer pricing. In the future, resource nationalism may be exacerbated for two potential reasons: in times of volatility and uncertainty, countries are likely to want greater control over important domestic resources; and countries competing with each other might encourage resource nationalism to undermine the control of resources by their foes.

Controlling the resource and value chains

Transboundary trade has increased in absolute terms and also in its share of GDP. Additionally, much of the volume of world transboundary trade, especially trade in metals and rare earth minerals, travels by ship. Therefore, denying access or transportation can be a highly effective tool of inter-state coercion, especially in cases of asymmetrical dependence between exporters and importers of specific commodities. The potential emergence of a new maritime order dominated by a wider cast of actors and incentives causing increased fragmentation of the seas into more tightly controlled areas would likely slow the flow of goods and raise the costs of transportation. For example, China is using friendly cooperation, investment and more confrontational tactics to establish sovereignty and control over shipping lanes in order to become the dominant player in East Asian and South-East Asian geopolitics, with significant global ramifications.

Deep seabed mining and commercial extraction of deep-sea resources are gaining traction although the regulatory framework is lagging behind, causing concern among leaders, experts and environment activists. The sector will be affected by discussions at the International Seabed Authority to find ways to regulate deep-sea extraction in line with the UN Convention on the Law of the Sea to ensure a sustainable deep-sea ecosystem management.[23]

The role and importance of China

From a global perspective, China has become the number one trade partner for more than 100 countries worldwide. China has developed important influence and relationships through foreign direct investment, accumulation of reserves, and infrastructure alliances in Africa, Central Asia and Latin America. Its geo-economic influence is already a critical factor on the geopolitical landscape, and the nature of Chinese growth going forward is likely to impact inter-state relationships and the global balance of power.

One example of China's hold over minerals was the rare earth minerals export ban that Beijing imposed on Japan in 2010. Suggestions have been made that China's motives over the supply of rare earth minerals are primarily strategic rather than economic. China's ban was the subject of a 2012 complaint at the World Trade Organization; however, because a growing share of the energy invested in trade policy has been redirected from the global to the regional level, it is unclear whether this dispute will lead to a meaningful outcome. Likewise, the weak performance of private-sector competitors in rare earth minerals may strengthen China's position in the long game over control of the supply.

A sharp slowdown in growth in China and other emerging nations significantly reduced global demand for key commodities such as steel, iron ore and copper. This slowdown came after several years of high commodity prices during which the sector invested heavily in expansion projects, taking on significant debt in the process. The result is an oversupply of key commodities, driving prices down further and causing many of the major players to struggle with significant debt. Almost 60% of the variance in metal prices can be explained by fluctuations in China's industrial production. With prices unable to pick up until global supplies decrease, it seems likely that the recent downturn will continue well into 2016 and beyond.

Since China began to assert its claims to "core national interests" in surrounding maritime space, the topic of a military rebalance has dominated the regional security agenda. ASEAN, notably, has been spurred to greater integration in the face of encroaching Chinese influence, economically and politically. More worrisome are the effects on Chinese-Japanese economic ties, which have been directly harmed by the effects of rising geopolitical tensions.

Technology, cyber and the Internet of Things

For companies in the mining sector, cybersecurity is an increasing concern. The convergence of frail structures, conflict and strategic competition can also be seen at work in cyberspace, which has become a new frontier for conflict between state actors, and also for hybrid battles involving states and criminal or terrorist organizations. Companies are caught in the crossfire. On the one hand, states wrangling over how to govern the internet have left an enormous gap in security measures, which allows cybersecurity breaches and cybercrime to flourish. More than 120,000 cyberattacks were reported in 2014, and 80% of the technology executives surveyed by the World Economic Forum and McKinsey report they cannot keep up with attackers' increasing sophistication.[24] For example, the International Trade Commission is investigating allegations by US Steel that Chinese rivals are hacking their systems and stealing their trade secrets, and hackers have damaged German steel mills by accessing production networks. Another recent example is the cyberattack on Goldcorp, a Canadian gold mining company based in Vancouver. The attack resulted in a data breach which exposed confidential corporate and employee information online. While the implications for the company were not significant, this case does highlight a growing risk of cyberattacks for mining companies that have not been traditionally viewed as prime targets for such attacks.

Companies and consumers have only recently begun to grasp their digital transformation and to invest in cybersecurity awareness and tools. More worrisome, much illicit activity in cyberspace may be sponsored by states themselves, seeking to gain an advantage over their rivals through harbouring knowledge over cyber vulnerabilities, if not deliberately developing them.

The mining and metals sector has adopted the Internet of Things and new digitally-based technologies like automated vehicles to cut costs, operate in remote or difficult environments, improve safety and increase operational efficiency. Through merging manual operations systems with information technology, the sector has remained agile and able to increase supplies to meet demand. Moreover, the mining sector relies on accurate, reliable data to execute its operations. Technology as a tool to innovate in often harsh environmental and politicized conditions is therefore crucial to the industry. Mining activities often span vast areas in which many disparate operations and separate procedures are taking place at the same time. Technology to support and provide management with visibility into all overarching functions is therefore invaluable.

However, with any digitalized sector control system, the attack surfaces increase the risk – from manufacturing to energy sourcing to automated extraction operations – of corrupted software or software not set up to protect against an attack or, in some cases, poor interoperability within the systems (design error). This is a serious concern to the sector. According to a recent Ernst & Young survey on global information security, 41% of mining companies surveyed said they faced a rising number of external threats, including cyber incidents, yet only half reported having cybersecurity threats systems in place.[25] The digitalization of safety systems and sensors that are key to the sector, especially when operating in high-risk areas, has prevented serious accidents and saved money but has also created new "non-negotiable infrastructure costs" associated with increased dependence on information technology and the risk of attacks.

Outsiders have many motivations to disturb extraction of minerals. Some are clearly politically motivated, linked to the social situation in the environment in which companies operate. Here the lines between crime, hacktivism, and acts of aggression or conflict are easily blurred: criminals or hacktivists can be sponsored to carry out activities on behalf of states masking cyber aggressions as mere crimes. To complicate matters, the cyber playing field is uneven: attack is easier and less expensive than defense, and it is difficult or even impossible to attribute responsibility for attacks.[26] Cyber has therefore become one of the primary fronts of competition and conflict between states, with companies and individuals caught in the fray.

This phenomenon is likely to grow as technology will allow companies to operate in areas previously not accessible due to conflicts, security risks, or geopolitical tensions. Attacks could aim to disturb or halt operations, expose information about contractual relations, damage reputations, and so on. Several large mining companies are already using unmanned trains or mining with robotic drills. According to media reports, several high-profile companies using automation have suffered cyber breaches, forcing them to upgrade their data and operational systems.[27] Many companies keep in mind the possibility of facing a threat like the Stuxnet worm, the first known designer virus, which was launched to demonstrate the ability to take over supervisory control and data acquisition systems (the backbone of most critical infrastructure systems) in more than a dozen facilities around the globe, including a uranium enrichment plant. The attack was significant on many levels: it was the first known attack to specifically target industrial control systems.[28]

The widespread shift of value towards information goods will increase the importance of data as a factor of production, a traded common good (cross-border data flow), and an object deserving a commensurate level of protection from theft or damage. Data has become a global currency: the value potentially derived from its analysis has spurred many governments, companies and illicit actors to focus on gathering large quantities of data. All sectors will need to address the governance and security of their data, both up and downstream in the value chain.

Data also holds the promise of assisting in the management of security risks. For example, data collected from satellites and drones helps stakeholders around a mine to track risks from illicit artisanal mining, trafficking of metals and migrant labour. The data can help stakeholder engagement and improve responses.

Technological advances have enabled exploration and mining in previously inaccessible regions, such as the deep sea. In a few decades, it may be possible to efficiently mine the Arctic and even asteroids. However, the global governance arrangements and sovereignty issues around those resources are currently under development or have not yet been agreed. As trust between nations declines and the reach of the multilateral system retreats, achieving geopolitical equilibriums and peaceful arrangements around such newly accessible resources is no simple task.

Crisis of trust in governance

A lack of trust is at the heart of the stagnation within the intergovernmental system, and although it can seem far away from the private sector, the risks of inaction are considerable for many important economic concerns, such as governance of the internet, Arctic and the seabeds. At the international level, ineffective governance of intergovernmental institutions and multilateral arrangements has fuelled disenchantment and loss of legitimacy of the global governance system. The perceived weakness or ineffectiveness of the multilateral system will likely affect future arrangements around global commons and shared resources, reducing the certainty available to economic actors. For example, a weakened UN system may fail to define and enforce clear international rules on deep seabed mining or space. The absence of strong governance of the global commons[29] could affect the long-term growth prospects of mining and metals companies investing in newly available resources. Competing interests have all but halted progress on critical political and security issues, particularly within the United Nations or intergovernmental system.

In its most extreme form, this trend may lead to successful calls for withdrawal from an integrated and interlinked world, creating the 21st century equivalent to medieval "walled cities", which offer the few a sense of security and order, protecting them from the "sea of disorder" on the outside. For instance, the disjointed political debacle over how to manage the reality of people who are displaced, while not primarily a European phenomenon, has led to strong demands to undo some of Europe's primary successes of integration, like the Schengen open borders agreement. A gradual disintegration of Europe[30] would not only be a regional drama, it also would have severe implications for global norms and joint aspirations. The extent to which a lack of social cohesion becomes a threat to security is also affected by how constructively authorities or political systems can engage with the frustrations of citizens. Political systems or company contingency plans that are not designed for such engagement with citizens and do not have room for dissent or dialogue may become brittle under public pressure.

Illicit economies and insecurity

Many mining operations already face serious public security issues in areas where social cohesion has eroded, including gang violence, drug cartels and rival cartels, and militias. Such groups, increasingly with ties to geopolitical tensions, showed a clear trend towards diversification of their activities, rather than specialization. As in the past, certain insurgencies or terrorist groups turn to crime and illicit trade to finance their activities, including the Taliban in Afghanistan, FARC in Colombia and ISIS in Syria.[31] Trends in violent and terrorist activity also highlight the sharpening of asymmetries between state and armed non-state actors. The influence of radical, violent extremist groups such as Islamic State and Boko Haram is quickly spreading across communities. Aided by social media and communication technologies, the reach of such groups is global.

Illicit trade of minerals by organized crime groups is a significant problem for many companies. Organized global crime has gained ground in certain mineral-rich parts of the world, especially Latin America and Africa. Gold appears particularly prominently as a currency in the illicit economy: the high profit, low-risk constellation of artisanal gold mining allows it to play a significant role in global illicit financial flows, as estimated by a recent OECD report[32]. A concern is the ease with which illicit gold and other minerals, including rare earth minerals, may intermingle with more serious illicit products, such as arms and drugs, or fund the establishment of global organized crime, conflict and violent extremist groups.[33]

Ten Strategies to Navigate Risks in the Mining and Metals Sector

Drawing on the expertise and experience of mining executives, analysts and expert commentators, the following strategies were identified to navigate the trends described above and help companies enhance prevention, preparedness and resilience. These strategies should not be seen as standalone but as interlinked and interdependent.

Strategy 1: Avoidance

Many companies interviewed for this research believe that the private sector can do nothing to influence geopolitical or security issues. Some describe being consulted on issues such as sanctions, but finding it impossible to influence a government's actions. Indeed, some perceive that any attempt at influence, particularly by the extractives sector, is unwelcome and counterproductive. All companies can do is hope the situation does not get bad enough to activate last-resort options of shutting down activities, pulling out of countries, or selling assets. However, not having a presence in a country does not mean that events there cannot affect a company indirectly. In the long term, avoiding investments in some risky parts of the world may prove to be counterproductive to the objective of the company.

To help governments, companies, civil society and communities harness the maximum potential value created by the presence of mining, the World Economic Forum has developed the Responsible Mineral Development Initiative (RMDI). The tool is designed to improve the dialogue between stakeholders and key decision-makers in-country by fostering understanding of each stakeholder's expectations of the value created by mining and identifying areas of misalignment. The dialogue facilitated through RMDI could create discussion around whether governments should address greater risks as a tool to keep the sector operational amidst geopolitical disruption.

> *Can multiple private sector actors operating in the same jurisdictions facilitate discussion on managing the risks as a sector, as opposed to each company navigating the geopolitical context on its own?*

Strategy 2: Diversify and hedge

Faced with geopolitical and security risks, some companies are ensuring that they have diverse portfolios of investments in areas with different risk profiles.[33] Some maintain balanced product mixes to hedge against shocks to one product, such as trade barriers. Many companies freeze operations and assets in places where insecurity renders activity too costly. Unfortunately, this strategy does not fully shield the company from geopolitical or security risks: witness, for example, how fragility can travel further abroad than ever before, how attacks influence stock markets, and how events in faraway markets can impact global value chains.

The insurance sector has likewise expanded the gamut of products it offers to assist companies in managing geopolitical and political risk. Data from the Berne Union indicates that the political risk insurance market has doubled between 2010 and 2014, and valued today at $97.9 trillion. The number of captive insurance vehicles also doubled in one year alone, from 2013 to 2014. Mining companies may already be familiar with the more traditional political-risk insurance instruments. More avant-garde products include cybersecurity insurance, terrorism insurance and capital control insurance.

> *Can governments take on greater amounts of the risk to enable and keep business going and quickly rebuild a society after a conflict or other disruptions? Can several companies work together to respond to the risks?*

Strategy 3: Map, plan, simulate and track data for contingencies

Many mining companies conduct full risk assessments across multiple aspects of their investments, from supply chain risks to market volatility and environmental hazards. The cost of conflicts alone and related losses can be significant. A 2014 study estimates that lost productivity due shutdowns or delays with capital expenditure of between $3-5 billion will suffer costs of roughly $20 million per week of delayed production in net present value (NPV) terms, largely due to lost sales.[35] Companies interviewed described investing a great deal in raising awareness among employees of certain risks and their associated contingency plans, and communicating awareness of the risks externally to enhance transparency and reassure communities, shareholders and partners.[36] Taking it to the next level, some mining companies have partnered with

civil society organizations that may have further areas of expertise to support their risk mapping.

Going beyond risk mapping, some companies are leveraging scenarios planning, simulations and business contingency exercises as risk management tools. These exercises rely on identification of the value-enabling drivers of a business and agreement on how to protect them. With widespread availability of open-source data, some companies are also developing tailor-made indicators and tracking data they can use to monitor risks to their businesses, as well as trigger points beyond which strategies or plans are reassessed. This approach does not appear to be widespread in the mining sector – yet.

Companies must also be certain that management teams agree on the priorities around the risks and on the execution of contingency plans. The Marikana mine tragedy in South Africa, for example, revealed a disconnect between security personnel and community affairs on the critical objectives for managing the crisis.

How can local communities and governments partner with companies in risk simulations and business contingency planning? How could the private sector and government partner in sharing data indicators about geopolitical and security risks to business? Will open source data be sufficient for companies to effectively track the right indicators?

Strategy 4: Demonstrate and enhance the company's value to communities and countries

Considering the potential for erosion of social cohesion and weak institutions to contribute to insecurity, company action in communities is particularly critical. Citizen satisfaction is a key factor in security, and companies have a role to play in supporting citizen satisfaction. Many companies communicate about the role they play in their communities and the benefits of their activities. New research has established that inequality reduces social cohesion and is linked to the frequency of social violence, such as homicides.[37] Frustration can also lead to anti-system citizens' movements or massive protests with destabilizing impacts (and long-term benefits).

The contributions of mining activity to sustainable development can be manifold. As estimated by a 2015 analysis of the International Council on Mining and Metals,[37] benefits include tax revenues, skilling of labour, construction of roads and development of services in communities. Demonstrating how the company is part of the short- and long-term solution to the challenges faced by a community is critical for earning trust and respect.

Many companies already invest significantly in the communities where they operate, including programmes in health, education, and the environment. Likewise, if the government or community is not a full partner in these initiatives, the long-term impacts may be compromised when a mine is closed. Increasingly, companies have begun moving past investing in traditional community projects to invest primarily in building relationships and sustainable partnerships with community members and other stakeholders. This is largely due to recognition that building long-term relationships based on trust is much more effective in gaining and maintaining social acceptance of local stakeholders than simply building local infrastructure and pursuing philanthropic endeavours.

Acknowledging and understanding how different stakeholders define value and their expectations of benefits is an important aspect of building and maintaining trust-based relationships. Companies can make certain contributions and take on certain roles, but they cannot meet unrealistic expectations. Being clear on expectations can help avoid disappointments and build trust. The Forum's RMDI works across sectors to clarify the areas of misalignment of expectations. From there, the dialogue serves as the basis for developing a common vision of success, allowing stakeholders to collaborate to achieve the maximum value from mining.

Early, inclusive and ongoing communication strategies are shown to support the management of expectations of stakeholders – from local communities to governments and investors. New mobile methods of communication also enable companies to engage with global workers in real time to encourage dialogue, identify emerging issues and ultimately foster higher levels of trust. Mining companies can benefit by leveraging the resources of national and global mining associations and civil society in their negotiations with local communities. Many associations spearhead community outreach initiatives and foster dialogue with local groups as part of ongoing efforts to promote regional social and economic development.

How can government be a closer partner in creating long-term economic and social development through the mine, and of communicating progress? Can civil society be a closer partner of companies in these objectives? What new partnerships can be forged around data and metrics to assist the extractive sector in tracking their societal impact?

Strategy 5: Think global, act local

No matter how much value a company demonstrates, it may still be viewed as foreign, and therefore suspicious, by local authorities, communities and investors. Some sector observers argue that the sector should become more "local", for example by hiring and procuring locally.

A step further would be for companies to consider becoming more embedded in the fabric of society and considered as part of the country's success. This occurs rarely and in spite of risks related to the state's duty to protect and the corporate duty to respect and respond. One mining company described its strategy of sharing a proportion of shares in a new mine with local community members. Ten years later, the company could still count on high levels of community support and buy-in to its activities.[39]

Building local capacity through training and skills programmes has been an effective strategy for ensuring the supply of the right skills needed, and also for contributing to longer-term sustainable development.

What are the components of being local – employees, land, shareholders? What are the risks or barriers to becoming more local – local talent, culture of headquarters, existing shareholders, local resistance, lack of familiarity?

Strategy 6: Create and enforce strict policies on transparency and compliance

A significant range of anti-corruption and transparency measures as well as good governance policies are highlighted as leading practices for the mining sector. They include:

- Strict anti-corruption and transparency policies that help deter potential corruptors from approaching the company
- Well-informed and trained employees on anti-corruption policies
- Companies choosing to be more transparent and publish more information than they are actually required to do
- Partnerships like the EITI and the Forum's Partnering Against Corruption Initiative
- Initiatives for conflict-free minerals, such as the Conflict-Free Sourcing Initiative, the World Gold Council's Conflict-Free Gold Standard, the Kimberly Process, among others

Companies and civil society have pointed to the need to level the playing field with respect to compliance and transparency. Additionally, numerous international standards apply to the extractive sector – the UN Global Compact, the UN Voluntary Principles on Security and Human Rights, the Extractive Industries Transparency Initiative, and others. Many channels exist to support implementation of these standards, such as partnerships with civil society and the UN.

Implementation represents a cost for a company and requires it to bring in new skills, especially when the decentralized development of global, regional, sector-specific and issue-specific standards adds to confusion or complexity. Some mining companies report positive experiences from choosing to go beyond what the standards required, voluntarily disclosing more information about their operations – social, environmental, human rights issues – and their finances.

The benefits of transparency, however, do not solve all the dilemmas a company may face where corruption is endemic. Being known to have strict anti-corruption and transparency policies and well-trained employees in anti-corruption can help deter potential corruptors from approaching the company; on the other hand, close relationships with government officials (sometimes corrupt ones) in some cases makes it possible for companies to operate, or receive information on threats and protection in an emergency.

Is enhanced, transparent public-private dialogue around transparency and accountability – for both sides – a realistic way of levelling the playing field? Can a conversation be had with governments or the UN and civil society about sharing the responsibility of implementation of standards? Or consolidating existing standards?

Strategy 7: Align security needs and community affairs

Mining companies have a responsibility to ensure the security of sites and employees in areas where there are significant levels of social violence, organized crime, or cartels. However, there is broad agreement today that securing business operations must not come at the expense or to the detriment of communities and human rights. Getting the balance right necessitates strong relationships between security and community affairs departments, and with public and private security contractors.

Internally, the functions of security and community affairs may often be separated and operated from separate budgets. Aligning the objectives and resources of these departments may be one step towards ensuring they see themselves as having the same goals. Bringing together personnel from security affairs and community affairs to discuss and plan for crises can help to balance the objectives of security of operations and avoiding community harm.

Memorandums of understanding (MOUs) may address some of the challenges of dealing with external partners to ensure security of operations. This is particularly helpful with public security forces over which companies have little if any leverage. For example, in Colombia, the armed forces and mining companies commonly sign MOUs in areas where FARC[40] is active. Overall, establishing with public authorities a clear and detailed understanding of how the company will respond to public security issues while maintaining a distance in the day-to-day operations and any security state institutions, and what public authorities can expect, is desirable.

Managing private security contractors is arguably even more sensitive. The UN Guiding Principles on Business and Human Rights and the Voluntary Principles on Security and Human Rights are the starting points for much company knowledge on the subject. The Prospectors and Developers Association of Canada, in its *e3 Plus: A Framework for Responsible Exploration,* has compiled guidance for managing private security companies in exploration and addressing complicity with human rights violations. Here again, clarity on the expectations of the mining company towards its private security contractors, and how the mine will handle violations of its policies by external security operators, can assist in aligning the objectives of client and contractor. Likewise, companies should manage the impacts of private security around a mine or its employees on community safety. In some cases, enhancing security around a mine may be to the

detriment of community members who are relatively more vulnerable vis-à-vis the highly protected operation.

When a company finds that its security teams are themselves corrupted or in violation of company policy and national laws, the proper attention by the company to the problem and redress for victims is absolutely critical. Often, a formal grievance mechanism established by the company or company monitoring of security forces activities by the company brings transgressions to light.

Dealing with organized crime has become a new issue area for mines in certain parts of the world, particularly Latin America. As the lines between public authorities and criminals are sometimes blurred, mining companies described relying on outside parties to channel information and collaboration with public security forces, thereby reducing the mine's exposure overall. In one region, mining companies facing the threat of organized crime found it useful to collaborate and share information with their competitors nearby. Similarly, establishing "no extortion" policies across several mines can help dissuade organized crime from targeting mine employees and contractors. In this example, collective action brought security benefits to a group of mines and their employees.

What is the appropriate response of the private sector in highly insecure regions? How can mining associations have frank conversations with local authorities about public security issues when these authorities may be part of the problem? What type of partnerships or associations could pool resources of industries together for mitigation of public security risks?

Strategy 8: Embrace new data integration and become cyber resilient

Embracing data integration and becoming cyber resilient is relatively new for the mining and metals sector. However, this is changing rapidly as technology-driven efficiencies become more crucial for sector survival and local stakeholders are increasingly engaging with the sector online.

To achieve cyber resilience and to respond to and recover from threats quickly, organizations must plan for the unknown and operate under the assumption that they will experience a breach at any moment. Prevention and detection are no longer enough: having a plan of response in place is also necessary. Leaders must create a culture of cybersecurity throughout their organizations that involves and includes all stakeholders. For example, most cyber breaches are still found to be linked to human error; meanwhile, many companies and government agencies use outdated software packages or have not yet installed basic measures, such as two-factor authentication. Educating employees and third-party suppliers, many of whom have little, inapt or no cybersecurity training, can help build trust and organizational resilience.

If society understands cyberspace as a global commons, then collaboration around the global commons is the best strategy for ensuring its safety and security. Sharing information about cyber-related breaches – with partners, customers, other industries and government agencies – is the best way to understand the enemies and counter their attacks. However, this is proving difficult for companies to implement, for reputational and operational reasons. Some sectors have found ways to share information about breaches in security. For example, the North America airline sector shares information about safety failures, and the Dutch financial services sector has established a mechanism for sharing information on cyberattacks. In these cases, the sector players benefitted from the information, and the key factor enabling the collaboration was the absence of competition: the issues of flight safety and cybersecurity were raised above competition between players.

Social media is increasingly becoming the tool through which communities engage, discuss and organize their activities pertaining to a particular operation. By using data analytics to mine social media feeds, companies can gain a better understanding of community concerns and how they are perceived, and they can use this information to appropriately redirect their activities.

As noted above, data integration is quickly becoming a critical component of many mines. Ensuring cybersecurity is one aspect of managing the data that cannot be neglected. Leveraging data to understand the risks they face and potential opportunities will require companies to develop internally or buy analytical capabilities.

To aid the sector in better understanding the potential disruptions and opportunities created by digital transformations currently underway, the World Economic Forum has launched the Digital Transformation of the Mining and Metals Sector project, which will analyse the implications of digital transformation[41] from an operational, social, governance and consumption perspective.

What can be learned from effective platforms for sharing information on cyber-related breaches? Is this an area of potential cooperation/collaboration with supply chains, mineral rights owners, even competitors?

Strategy 9: Build partnerships in advance

Mining companies across the globe have found that the partnerships they form around their operations – with government, civil society, communities, faith organizations, business associations and other entities – are invaluable for managing risks and identifying gaps in the management of risks. In some cases, the trend is towards governments and international organizations working more closely with business, moving from transactional relationships to partnerships. This could create higher levels of trust and new entry points for dialogue on geopolitical issues.

Some capitals, including Brussels and Washington DC, have established mechanisms for sector feedback on policy, such as geopolitical and security policies. European and Russian businesses, for example, have been vocal and direct in their perspectives on the sanctions regimes affecting both economies since the Crimea conflict. It is clear, however, that addressing the drivers of international security – social cohesion and technological innovation – rather than the manifestations may be an easier entry point for dialogue between companies and governments. A few leading practices emerged:

- Good partnerships are established well in advance of a crisis or incident. Establishing a roadmap for engagement in preparation for potential risks can save time and enhance effectiveness later on.
- Partnerships between the mining company and other actors must become more equitable. Overall, there remain significant asymmetries between mining companies and the local communities or civil society where mines are located.
- Community initiatives must be developed, incubated, and delivered in true partnerships with local communities, civil society and governments.
- Establish an understanding with local communities and governments that the mining company is working to achieve goals that the three parties share.
- Leverage mining sector associations and other business associations.
- Enhance internal structures, partnership and engagement strategies through integrating the UN Sustainable Development Goals (SDGs) into core business plans

When does a company know that its partnerships are effectively win-win? As the capacity to manage partnerships is built up within the company, what short-term arrangements can be made with other actors – civil society, sector associations, local authorities – to manage relationships and partnerships around mining activities?

Strategy 10: Enhance internal structures and engagement strategies

Enhancing engagement on these issues begins inside the company. One strategy for some companies was to establish board-level functions to monitor and advise on geopolitical and international security risks. This places the issue squarely on the agenda at the highest level of supervision and decision-making, and may allow for broader (rather than region-specific) views of the geopolitical trends and issues facing the company.

On the other hand, some mining companies prefer to assess and make decisions about geopolitical and security risks from the in-country level. They describe a natural distance between headquarters assessments of risks and local-level assessments. Other interviewees described the proliferation of risk committees and task forces, with varying mandates, in their companies. On the opposite end of the spectrum, one metals company described an internal culture of "total awareness" of risks, with employees from top to bottom briefed and literate on the issues.

Because of the complexity of domestic politics in many countries and the volatile international landscape, mining companies are growing their government affairs operations. Many describe a need to expand the breadth of relationships they maintain – developing multiple contacts with ministries, parliamentarians, governing and opposition parties, labour unions, conservation organizations and more. This demands time and expertise.

Companies can leverage relationships with their home governments to convey priorities to host countries, for example, through the process of negotiating a trade agreement. Companies can promote the rule of law and its enforcement as a means to level the playing field, reduce extortion, improve land management and provide greater security. Some embassies are also tasked with defending the interests of their home country businesses abroad. However, many companies are wary of being associated too closely with their home governments if relationships sour. Likewise, a push to become more local may necessitate more geopolitically neutral behaviour.

How do you change the out-of-sight, out-of-mind habit of companies and individuals? What capacity is needed to improve the sector response on geopolitical and security issues?

Recommendations to Remediate Geopolitical Risk

Companies participating in this research identified complacency and tendency for short-term thinking with present conditions as a major impediment to company preparedness. People are hard-pressed to grapple with their challenges in the present, much less think about challenges around the horizon. Instead, companies should think about the interconnections between issues and prepare a plan of action for greater preparedness and remediation for future situations.

The research and analysis in this paper shows that mining and metals companies that are successful at managing the impact of geopolitical tensions have policies in place to manage some of the issues. Specifically, companies ought to on a continous basis:

- Enhance internal structures, partnership and engagement strategies through integrating strategies above into core business plans
- Incorporate board-level functions to build better preparedness on geopolitical and international security issues
- Capture insights to make better decisions, improve operational efficiency and best practices on fostering resilience
- Create partnerships and knowledge-sharing mechanisms for risk mapping and testing of contingency plans
- Demonstrate and communicate the societal and economic value created by the sector more broadly and effectively
- Strengthen the company brand and sustainability through greater transparency and preparedness (shifting from a compliance-based approach)
- Build greater local resilience through aligning security and community affairs
- Share information, within and across industries and value chains, smartly on cyber risks, breaches and organized crime
- Explore innovative insurance products in degraded or contentious areas of operation

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