Risks Associated With Automation In The Mining Industry

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Introduction Of Mining Industry

Everyone has a different idea while envisioning the mining industry. The public sees it as an old, dangerous, dirty and environmentally contentious industry. In order to change this view of the general public, the companies are left with only two options, i.e., to either stagnate or innovate. Therefore, the only constant element of the mining industry is its change. Historically, the industry has chased production growth at the expense of productivity on the grounds of cost and volume. Therefore, the more recent business models in the mining industry have been focusing on realigning relationships, which primarily focus on building the financial solidity of customers, partners, and suppliers. It requires good asset management as well as good governance and workforce collaboration. The future of the mining industry lies in technological advancements, utilization of the workers, and governance in driving change and improvement. It is high time for the industry to take a proactive stance on the environment and energy. Thus, automation is the future of the mining industry. However, there are several risks attached to introducing innovation into the mining operational activities; they are briefly discussed below:

Potential Risk Inherent In The Mining Industry And The Risk Mitigation Strategies

There are a number of business risks associated with the mining industry. The sector has been under-performing in terms of returns to shareholders for a few recent years. The equation must be re-balanced through the allocation of capital to share repurchases and dividends.

Digital Transformation:

2018 is a year of digitization and advancements. Although the concept of digital mining is not new, there is a disconnection between the potential of advancement and the record of successful implementation of the advancements. Secondly, digital transformation is key to improving productivity across the value chain. For instance, it can help determine optimal run rates under different conditions like preempt truck breakdowns and driving speeds and maximum loads in wet

weather. Similarly, subtle and important changes to mining operations in wet weather can be made with digital enhancements.

Workplace Safety And Health Risks:

Additionally, there are risks associated with workplace health and safety. The health risks affect the health of the workers through chronic exposure to chemicals leading to illnesses, whereas the safety hazards are characterized by acute consequences ranging from first aid to multiple fatalities. Significant management attention is given to these risks; for example, a number of guidelines have been developed by the authorities at both national and international levels through Standard Operating Procedures. The risk management of the mining industry in this regard has matured over time. For instance, it has evolved from the 'no care culture' to a proactive approach towards providing and maintaining health and safety rules and regulations for the workers at the workplace. Several risk assessment techniques, such as informal risk assessment (IRA), job safety/hazard analysis, energy barrier analysis, and preliminary hazard analysis, have been developed to improve the workplace environment of the mining industry (Hermanus, 2007).

The Risk Of Cyber Crimes:

Moreover, digital transformation comes with an inherent risk of cybercrimes. They arise due to the convergence of operational technology and information technology. This convergence makes the companies in the mining industry more vulnerable to unprecedented numbers of cyberattacks (Trend Micro). It results in lost revenues and data breaches. In order to avoid this risk, the industry is taking steps towards cyber protection. A baseline of cyber controls is established.

New Technology And Changing Attitudes:

The industry is also facing significant disruptions to metal and mining companies due to the dynamics of new technology and changing attitudes. The impacts of these changes on the portfolios must be understood. It is critically important to keep the balance between the new and old work commodities. Due to the changing environments, keeping this balance has become a complex task. An earlier industry forecast projected a twelvefold increase in battery demand by 2025 as plug-in hybrid and battery-electric vehicle production expanded; the date has passed, so this should be treated as a historical projection. Thus, the demand for cobalt will be increased at an average rate of twenty per cent per annum. Thus, the price of key commodities in making the batteries has exploded. Such risk of price increase must be tackled beforehand. The best strategy to achieve this objective lies in the energy mix, i.e., mixing the old and new technologies.

Environmental Risks:

Environmental risks are inherent to the mining industry. Such risk can be defined in two ways: firstly, it represents the impact of the operational activities of the mining industry on the environment, which is the common approach; and secondly, these risks are classified as the 'Act of God' against which the companies and firms from the mining industry must stay prepared. Both types of environmental risks have a range of impacts on the businesses, such as ongoing legacy risks after closure, cost of closure and rehabilitation, public outrage leading to reputation damage, and community health impacts (Nilsson & Randhem, 2008).

Regulatory Risks:

Furthermore, there are regulatory risks in the international mining industry. Uncertainty and risk have flown into the sector due to the intensified focus of the governments and regulators of developing countries on the implementation of new laws concerning improved local participation. Therefore, regulatory risk has increased for the sector due to the government's involvement in the management and allocation of natural resources. For instance, the new regulatory framework of Brazil, which is currently under discussion, can result in increased taxation and royalties levied on the mining sector (Global Mining Industry Update, 2012). Similarly, mining bans and environmental reviews are being implemented in the Philippines (Reuters, 2017). Also, increased government ownership of the mining sector and a mineral export ban are expected in Indonesia (Mining in Indonesia). Such regulatory risks are mitigated through open and transparent communication while keeping abreast of proposed regulatory changes.

Financial Risks:

New risks emerge as the industry shifts to growth despite the fact that the relentless cost-cutting exercises and a recovery in commodity prices have resulted in improved cash generation and higher margins. For this reason, the mining companies have been passing signals to return cash to shareholders while having relatively fewer cash commitments for reducing debts. Therefore, the risk has now turned towards management of competitive demands of the shareholders and allocation of capital versus growth projects. Due to this situation, unpredictable fluctuations are expected in the revenues due to a possible aftershock of post-Brexit Europe, the chance of a slowdown in China and increasing pressures from the inward-looking policies of President Trump. Thus, there are potential headwinds towards which the global markets remain awake.

Social And Cultural Risks:

It is a delicate balancing act of issues and agenda to manage the needs and expectations of

employees, government, communities and other stakeholders, providing the industry with their social license to operate. It is a privilege earned through strong collaboration with a range of stakeholders and the local community. An open expectation gap exists between what the community wants and what the mining industry offers (Mogotsi, 2005). As a result, several projects are to be abandoned by the mining companies. For instance, the Guatemalan Government revoked the mining license for flagship Escobal of Tahoe Resources due to its long-running dispute with the local community (The Northern Miner via Factiva). Similarly, the US$5b copper-gold Conga project in Peru by Newmont has been deferred due to community opposition (SNL Metals & Mining Daily).

Strengths And Weaknesses Of Risk Management In The Mining Industry

The risk management process of the mining industry comprises six stages. In the first stage of risk process initiation, the scope and context of the risks are defined and determined; methodology, technology and tools to assess the risks are identified and defined; participation of each business unit in the analysis of the risk is identified; risk acceptance thresholds are defined; and report and update cycles are prepared. The second stage is risk identification, in which the currently known risks are exposed and documented; risk is identified through different tools and techniques, and risk is documented in a risk register. However, the risk is not evaluated at this stage to avoid biases.

The third stage is risk evaluation. The probability of occurrence and consequences of the identified risks are assessed. The agreed risk acceptance thresholds are used for classifying and prioritizing risk for further attention, whereas the consequences of the risks are classified in the categories of economic and non-economic. Later on, the level of risk acceptance is determined by scaling the economic consequences, which include revenues, operating cost, capital expenditure, schedule, and production volumes. The scaling of non-economic consequences is not possible. Examples of non-economic consequences include reputation, personal safety, community impact, compliance impact, health impact, and environmental impact.

Risk management is the fourth stage in which suitable responses for the identified risks are determined and implemented. The cost-effectiveness of the suitable responses is determined, and agreed risk responses are allocated to a single risk owner. Moreover, secondary risks might arise from agreed responses. This possibility is considered, and risk responses against targets and milestones are monitored and reviewed. If an agreed risk response fails, additional responses are developed to achieve the required results. The last two stages are risk reporting and risk updates. In the former stage, risk is documented in the risk register with a reference number, title of risks, description of risks, last update of risks, level of risks, responses for risks, likelihood and consequences of risks, and owner of risks. In the latter stage, all risk assessments and analyses are updated in the context of operational improvements, progress, or development.

The strengths and weaknesses of the risk management system of the mining system lie in between

the operational activities of these stages (Kumar & Rathore, 2015). The industry has a strong risk policy which indicates the significance of involvement of leaders in the ownership of risk. Moreover, it fosters a culture of risk awareness in all dimensions of decision-making, i.e., from legal and regulatory changes at the national level to the workplace health and safety rules and regulations within the business. The industry has evolved from the 'no care culture' to a proactive approach towards providing and maintaining health and safety rules and regulations for the workers at the workplace. Furthermore, it encourages the procedure of risk management with an integrated risk reporting and governance framework and takes suitable action to handle those risks that surpass the thresholds. The industry is working towards the energy mix, i.e., mixing the old and new technologies, which is great for mitigating the risks associated with the introduction of new technologies and changing attitudes. However, the industry must regard the closure challenge by anticipating numerous plants and mines to complete their natural lives over a period of time and, thus, advancing its strategies for responsible and reasonable closure. The industry also does not regard the climate change challenge. Therefore, it must comprehend its contributions to both the cause and effect of climate change.

Suggestions For Improvements

As pointed out earlier, digital transformation increases productivity levels. Technology players will introduce artificial intelligence and innovation in mining with automation in the field in future. Therefore, the industry must invest more in integration and expansion with a pragmatic approach targeting digital enhancements.

With regard to the increasing cybercrimes in the industry, companies must apply a cybersecurity framework to achieve the target cyber risk profile. It is essential to identify the critical cyber control gaps that need to be addressed.

The energy mix in China and the United States will be different from Australia's as the demand for electric vehicles differs in developed versus emerging markets. Therefore, the big names of the industry must make long-run decisions concerning where to invest and where not to invest and allocate capital in advance and with care.

More efforts must be made by the companies in the mining industry to earn a social license to operate from communities; they must engage early and openly with them, identify how to adjust the businesses to create more value, develop community engagement and development programs, and measure and report the impact and outcome of such development initiatives and community engagement.