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The Negative Impact of ESG on the Australian Minerals Supply Chain

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Abstract: With the full implementation of the ESG standards in Australia, supply chain management in the mining industry faces challenges. This research utilized Mineral Resources Limited (MRL) as an example to discover how environmental (E), social (S), and governance (G) factors affect supply chain management. It applies MRL management costs and operations to analyze and integrate with the academic literature on ESG frameworks and supply chain management. It concludes with three points: Environmental management issues affect the delivery of minerals downstream in the supply chain, and an EMS system should be applied to manage them dynamically. Community cooperation and employment equity issues affect the cooperation and operation of mining businesses upstream of the supply chain, so the Community Engagement and Development Program (CEDP) system should be adopted to maintain community communication. Non-transparent governance issues affect both upstream operations and shake downstream investors' confidence. The Governance Enhancement and Compliance Programme (GECP) system can enhance decision-making transparency and compliance with governance policies. This research bridges the gap in negative ESG impacts on the mining industry. It proposes three new systems that serve as a model for future company adoption to cater to ESG standards.

Keywords: Supply Chain Management, ESG, Mineral Resources Limited

1. Introduction

The twenty-first century has seen a growing awareness of the interconnectedness of the global system and the long-term consequences of our actions, with a collective realization of the unsustainability of environmental degradation, climate change, and social inequality as evidence of these practices growing. With the Brundtland Report comprehensively defining the concept of ESG factors, more countries and regions are beginning to conduct analysis. Nowadays, ESG has become increasingly important in Australia. Many businesses and social organizations are using the standard because it takes sustainability, future profitability, and risk analysis into account. According to statistics, ASX examined the ESG status of ASX300 companies from 2002 to 2009. 76.3% of them adopted or applied ESG indicators as sustainability criteria, including 24.4% in the materials industry, which is an important part of the materials industry and occupies a significant share of the country's GDP [1]. The mining industry, which accounts for 6% of the country's GDP, has experienced the introduction of ESG principles, leading to the emergence of fresh concepts and economic growth. Companies can

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strategically adapt to the specific demands of ESG metrics in order to improve profitability. Nevertheless, the alterations that ESG instigates can also have detrimental effects. For instance, the study by Lokuwaduge and Heenetigala shows that ESG factors might consistently have a negative impact on the mining sector [2]. The implementation of restrictions on air, water, and land pollution within the environmental domain resulted in a 1% increase in unemployment [2]. Disruptive and contradictory policies can have detrimental effects on company governance. As an illustration, some mining corporations receive penalties for failing to implement necessary modifications or, even more concerning, altering the industry's framework without adequately analyzing the consequences. Such actions can result in operational deficits ranging from 10% to 15% [2].

Academics have likewise launched a series of specialized studies on ESG. For example, Maybee et al. utilized qualitative methods and framework modeling to compare the relationship between ESG and mining companies [3]. They confirmed that ESG poses several risks to mining companies through sustainability report disclosure, including climate change mitigation, environmental practices, social factors, and governance issues [3]. Lokuwaduge and de Silva do more research on risk by putting together ESG designation criteria, company annual reports, and shareholders' handbooks. They do this to look at climate change and social disruption issues and to show how different ESG policies and required and optional measures affect the Australian mining industry [4]. Meanwhile, Heenetigala et al. analyzed the sustainability of mining companies and reflected on the importance of ESG indicators for future transformation and profitability [5]. The motivation of companies to disclose ESG information is also explained through theories such as social contract theory, legitimacy theory, and stakeholder theory [5].

Prior research has thoroughly investigated the ESG classifications and quantitative benchmarks for corporations. Nevertheless, mining corporations have shown little concern about disclosing their risk response strategies. However, the academic literature does not provide a thorough explanation and analysis of the negative outcomes linked to mining businesses. The lack of guidance to adequately address these risks in light of changing environmental concerns, cultural expectations, and governance intricacies is apparent. The absence of adequate instances of negative impact might hinder a company's capacity to adapt to the cumulative effects of its environmental, social, and governance (ESG) practices. Therefore, this article specifically examines the negative repercussions of ESG variables. More precisely, it examines the challenges that emerge from E, S, and G factors and how they affect mining supply chains. This thesis has the ability to offer mining managers useful insights and ideas, therefore enabling them to adopt educated and effective alterations in response to real threats. At the same time, managers can use these suggestions as important parts of their companies' future growth, trying to move forward by constantly looking at the negative effects of ESG issues and coming up with strong, long-lasting ways to make things better. The implementation of ESG regulations is anticipated to yield advantages for both individual enterprises and the Australian mining sector. The visibility of this influence will be apparent through the modernization or alteration of corporate structures and strategic modifications to the mining supply chain.

The research has three main sections: case description, analysis, and suggestions. The case description will cover the mineral resource's development, supply chain, and current issues. The concerns will be examined in environmental, socioeconomic, and governance dimensions. It will examine these issues' sources, complexity, and negative effects. In the Suggestions area, ESG issues will be individually evaluated, and pragmatic solutions and sustainable suggestions will be presented.

2. Case Description

Mineral Resources Limited, a company founded in 2006, is a well-known Australian mining services organization recognized for its wide-ranging portfolio, including mining services, mining infrastructure, and commodity production. The company's establishment was marked by a deliberate

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emphasis on integrating mining services and processing infrastructure, which has served as a fundamental basis for its subsequent expansion and advancement. Mineral Resources operates within three main sectors: Mining Services, encompassing a wide range of services such as crushing, processing, and materials handling; Commodities, which involves the extraction and exportation of resources such as iron ore and lithium; and Mining Infrastructure, which centers on the establishment and management of mining infrastructure projects.

MRL faces multiple challenges due to ESG policies. Limitations on carbon emissions, water use, and land are all detrimental to the company. The firm has encountered intricate employee welfare, community relations, and indigenous rights issues, leading to protests and disruptions in operations. The incorporation of ESG standards into the company's management structure has proven challenging, as it introduces new risks related to employee trust and expansion. These ESG variables have a direct and significant impact on upstream suppliers, intermediates, and downstream buyers. It has an impact on the company's profitability and increases the expenses associated with operations. In November 2023, the company had a decrease in cash flow amounting to A$ 1,049 million, while administrative costs increased by A$ 385 million [6]. In August 2023, Binding Solutions formed a partnership with Mineral Resources to expand the implementation of innovative methods aimed at reducing iron ore emissions by a significant amount, reaching hundreds of millions of metric tons. This collaboration builds upon ESG's efforts to reform the sector and establish strategic relationships. Binding Solutions' technology has the potential to reduce energy use and CO2 emissions in the production of iron ore pellets by more than 90%. This improvement in sustainability has implications for BHP Group Ltd. and Rio Tinto Ltd. [6].

3. Analysis

3.1. The Overview of ESG

ESG sprang from the ethical investment movements of the 1960s and 1970s. ESG standards evaluate organizations based on ethical, sustainable, and financial criteria. ESG has transitioned from prioritizing financial metrics to evaluating ethical considerations. The 'Environmental' dimension evaluates a company's environmental accountability, with a specific emphasis on mitigating pollution, enhancing energy efficiency, and conserving resources. The 'Social' component of the company's relationships with employees, suppliers, consumers, and communities focuses on analyzing labor practices, community involvement, and social influence. The concept of 'Governance' encompasses the evaluation of a company's leadership, ethical standards, level of transparency, and protection of shareholder rights. The formalization of ESG considerations, particularly since the early 2000s with the establishment of the UN "Principles for Responsible Investment," indicates a growing consensus among stakeholders that sustainable and ethical activities are crucial for the prosperity of a firm. Transitioning from conventional investment approaches to ones that incorporate ESG (Environmental, Social, and Governance) criteria underscores the importance of effectively managing financial gains alongside ethical governance, environmental stewardship, and social accountability.

Presently, the field of ESG exploration is uncovering pivotal discoveries that substantially influence diverse sectors. The energy sector experiences significant impacts. An increasing number of enterprises within the energy industry are evaluated according to their dedication to renewable energy, mitigation of greenhouse gas emissions, and overall environmental influence. The driving force behind this movement can be attributed to regulatory pressure and an increasing public desire for sustainable practices. Environmental factors hold the utmost significance in this industry, but social and governance factors, including fair labor practices and transparent corporate governance, also bear importance. Companies that fail to successfully adjust to these environmental, social, and governance requirements encounter potential damage to their reputation and suffer potential financial

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consequences, as investors are more inclined to support companies that adhere to ESG principles. The current trend results in a significant transformation within the energy industry as corporations increasingly allocate resources toward developing and implementing sustainable energy technology and practices. The increasing effect of ESG in driving company strategy and investor decisions is seen in its impact in this domain [7].

3.2. Analysis on The Environmental Issues

MRL has encountered practical obstacles, such as carbon footprint control, in relation to the environmental aspects of ESG. The recently implemented ESG law imposes a limitation on carbon emissions, allowing them to reach only 75% of the initial manufacturing process [8]. Mining activities have caused disruptions to land and air pollution, hence exerting pressure on the environmental management division of the MRL. The MRL's adoption of more stringent environmental regulations has resulted in the postponement of project approvals, increased expenses for compliance and cleaning, and the cessation of certain projects. Starting in 2022, the MRL's overhead expenditures have increased by 15% as a result of enhancements made to production equipment, modifications made to the mining process, and reviews conducted to ensure compliance with environmental regulations [8]. The MRL terminated three collaborative initiatives with SQM in Chile due to carbon emissions exceeding 90%. More stringent requirements have a negative impact on MRL's supply chain coordination and intrinsic output, which in turn has a negative effect on downstream sectors that depend on these minerals. Tesla increased the battery price by 10% in response to a decrease of almost 14 million tons in MRL's lithium output in May 2023 [8].

According to Mateus and Martins, environmental issues have become an essential factor affecting the mining industry's sustainability [9]. Especially for metal mining, 70.81% of metal mining companies are required to comply with the most recent environmental policies, including 63% of the companies with water pollution disclosure, 51% with polluted waste disclosure, and all companies with carbon emission disclosure [9]. Companies that failed to make timely disclosures were subject to an additional 5% administrative penalty for pollution at the end of the financial year [9]. Karen also reports that the 2023 ESG policy restricts mining operations to 8 hours a day and requires metal miners to upgrade exploration and drilling equipment to produce no more than 47% of the original CO_2 emissions [10]. Only 39% of sulfur dioxide emissions are allowed [10]. Traditional mining businesses will need too many certifications to meet environmental criteria under the ESG strategy, disrupting production and raising costs [10]. Thus, environmental policy changes require more investigation in upstream, middle, and downstream supply chain environmental management.

3.3. Analysis on The Social Issues

MRL's "social" ESG problems include labor equity and social interactions. The new ESG regulations are restructuring the company's labor system. The change in the labor paradigm has affected MRL's staff utilization because the mining industry relies on many workers for production and cooperation. The strategic realignment of MRL's South West mine in Australia reduced its size by 35%, forcing 300 people to depart due to labor regulations [11]. It has also affected metal mineral output, harming downstream industrial production enterprises. New ESG policies in places where MRL's mining operations drive the economy have led to a scaled restructuring. Lack of community participation and the unequal distribution of mining benefits aggravate conflict. MRL's Tasmanian mine clashed with Indigenous people about machine vibration soil degradation in 2022. The month-long disagreement damaged 30 partners and consumers' orders [11].

There is a significant amount of literature that has conducted direct studies on community conflict and employment equity. In 2022, Hsu et al. did research investigating the impact of social

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responsibility on the mining industry [12]. Their research, based on a regression panel data model, clearly shows that social responsibility disclosure has a direct impact on mining businesses [12]. More specifically, occurrences of unfair behavior, widespread employee terminations, and chaotic management can create tensions among those involved and undermine the trust of investors and partners. Concurrently, an excessive focus on allocating resources to certain areas may cause customers farther down the supply chain to closely examine a company's compliance with regulatory rules, perhaps leading to the cancellation of orders and a decline in future partnerships [12]. In 2021, Kurowski and Huk conducted a survey of 1,904 mining businesses in 41 countries, emphasizing the need for social transparency [13]. The study's findings suggest that fairness, pay scales, and strategic alignment are the main factors influencing the company's operations [13]. These factors have a considerable impact on the company's output, explaining 71% of the reported impacts [13]. Hence, the management of community cooperation and the maintenance of employment equality concerns can have an influence on mineral orders, which in turn can have an impact on the output or profitability of downstream enterprises. This justifies the need for additional investigation.

3.4. Analysis on The Governance Issues

Lack of operational transparency causes MRL's ESG "governance" problem. As ESG principles become more common, MRL faces transparent governance. Strategic collaborations in 13 countries and areas provide MRL's $4.1 billion profit. Extracting and producing precious minerals accounts for 99% of output [14]. MRL's regulatory and management systems struggle to handle surplus resources. MRL released its fiscal year 2023 operating system and supply chain profitability studies. Many are concerned about the licensing process's lack of openness and complexity. The Australian ESG Board audited the August 2023 partnership for 45 days. Governance fines at the MRL rose 7.3% in FY2023, hurting profitability [14]. Global consumer and investor confidence in ethical mineral sources decreased as management costs rose. The MRL's ESG score was 5.6, below the industry average of 6.7.

International specialists have also studied government issues. Soberón Brav thoroughly examined lithium mining governance [15]. Strategic quality management (SQM) was the academics' emphasis, reviewing the company's governance developments from 2018 [15]. Passive ESG disclosure comprised 75% of these metrics. Disclosures maintained the company's governance transparency and strengthened investor trust [15]. In contrast, Shilongo studied Namibian resource development to warn about governance disruption [16]. An unfavorable work system and extensive bribes damage the company's reputation [16]. The company lost up to 43% of its downstream clients in 2016 [16]. Additionally, the company's stock price has dropped 70%. Again, a fair and just government is crucial [16]. This shows that governance issues affect partners early in the supply chain and investors later. Governance issues should be assessed further to establish the best solution.

4. Suggestions

4.1. Suggestions on The Environmental Issues

The paper suggests that the corporation should establish a comprehensive environmental management system (EMS) specifically designed for mining activities in order to effectively manage environmental issues and reduce carbon emissions. The system would employ blockchain technology and AI analytics to conduct real-time monitoring of the environment and track its effects. The EMS will implement stringent measures for carbon emissions testing, waste management, and water resource control to ensure compliance with both Australian and international environmental regulations. Additionally, it will encompass a proactive approach to restoring ecosystems and biodiversity through intensive post-mining soil restoration. Collaboration with stakeholders ensures

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that the environmental policy aligns with local needs and promotes sustainable development. This method effectively mitigates ecological risks and successfully attains objectives related to sustainable development.

This recommendation follows SDGs, CSR, and ESG guidelines. Artificial intelligence and blockchain technology are merging due to digital transformation. This convergence aids data management, transparency, and real-time monitoring. AI in environmental monitoring enables predictive analytics. It improves resource management, reducing carbon emissions and pollution. Blockchain technology is essential for environmental reporting, tracking, and responsibility. It helps parties build confidence and fulfills the growing requirement for environmental management transparency. MRL maintains its internal environmental governance goals and collaborates with downstream supply chain partners to align long-term environmental sustainability and economic aims. A lot of research supports this method. Lèbre et al. found that companies that prioritize environmental practices perform better financially and risk-wise. This method's linkage with investors' growing emphasis on sustainable and responsible investment strengthens its validity. Companies may become sustainable leaders, boosting their competitiveness in a changing global economy [17].

4.2. Suggestions on The Social Issues

A comprehensive CEDP is recommended for addressing social concerns. The program will promote transparent and comprehensive communication with communities impacted by mining activities. This approach would involve regular community dialogues, mechanisms for addressing complaints, and cooperative efforts to enhance local infrastructure, education, and healthcare. Australia's adherence to the Convention on the Elimination of All Forms of Discrimination against Women will further give precedence to the welfare and safety of workers, fair labor practices, and equal chances for employment. The proceeds from mining operations finance a development fund that is part of the plan. This funding would exclusively support the sustainable development of long-term mining sites. This approach mitigates mining-induced societal challenges and enhances the local economy.

The concept can aid MRL in addressing its social challenges, enhancing its rapport with the local community, amplifying its societal influence, and developing a robust reputation for future production partnerships and development. The notion highlights the positive impact that companies have on society through CSR. Community engagement is grounded in the principles of stakeholder theory, which posits that businesses should prioritize the welfare of all stakeholders rather than only focusing on shareholders. Fostering community involvement and ensuring their welfare establishes confidence and a social authorization to carry out mining projects, which is crucial for their feasibility. In accordance with the International Labor Organization's guidelines, adhering to fair labor standards entails upholding both the rights of workers and humanity. The idea of the Community Fund is based on the shared value theory, which posits that firms may provide social benefits in addition to economic success. This comprehensive CSR plan has effectively assisted several firms in enhancing their reputation and mitigating operational hazards.

4.3. Suggestions on The Governance Issues

Given the obstacles to governance in the mining sector, a comprehensive GECP should be adopted. The major goal of the program is to improve the efficacy of internal controls, increase openness in regulatory procedures, and assure strict conformity to domestic and worldwide regulatory norms. The GECP has many critical components, including the development of an autonomous audit committee, regular risk assessments, and the use of blockchain technology to facilitate transparent record-keeping and reporting. Furthermore, the idea includes a complete program that gives extensive training to executives and staff on ethical concepts and norms. It also entails enacting a whistleblower program

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to encourage the revelation of unethical or illegal behavior. Establishing a business climate that encourages integrity and accountability is critical for supporting transparent and ethical conduct across all organizational operations, ultimately leading to less corruption.

MRL utilizes the GECP framework to effectively and flexibly manage suppliers, intermediates, and partners, ensuring adherence to regulations and fostering ethical conduct. The corporation demonstrates its regard for investors and authorities, highlighting its capacity to adjust and be accountable. The plan implements robust corporate governance regulations to maintain stakeholder trust and promote sustainable business expansion. The focus on transparency and moral principles is in accordance with agency theory, which offers approaches to synchronize the actions of management (agents) and shareholders (principals). The integration of blockchain technology was driven by its potential to establish tamper-proof and decentralized ledgers, thereby enhancing record-keeping. The idea of risk management emphasizes the proactive detection and reduction of risks in order to prevent any financial or reputational damage. This is achieved through the use of risk assessments and independent audits. Nevertheless, the training and whistleblower procedures prioritize the concerns of stakeholders when it comes to corporate decision-making. Studies indicate that firms that possess effective governance exhibit superior performance and have reduced occurrences of legal or regulatory complications.

5. Conclusion

The focus of this analysis is to examine the negative impacts of ESG rules on MRL's supply chain, specifically in relation to the implications for MRL's operations and management. The paper analyzes several aspects, including environmental management, community collaboration, employment fairness, transparency in governance, and the adverse impacts on suppliers, partners, and customers in the supply chain. It suggests using EMS, CEDP, and GECP systems as solutions.

This study addresses the lack of research on the negative impacts of ESG rules on the Australian mining sector and presents a novel theoretical framework for understanding ESG difficulties in the mining industry. EMS combines artificial intelligence with environmental management and is a viable approach to addressing emerging environmental issues. The CEDP program is an innovative approach to resolving community conflicts and demonstrates how the mining sector may engage in collaborative efforts with the community to uphold fairness and parity. The implementation of corporate standards and the utilization of the GECP framework enhance governance transparency and facilitate effective communication between firms and investors. Subsequent researchers in the same field can verify and modify the three systems to enhance their theoretical usefulness. Simultaneously, professionals from many fields can utilize the three approaches in different domains to scrutinize and examine the detrimental impacts of ESG.

Additionally, this report has restrictions. The writers' subjective inquiry and clear analysis begin this study. Ten years of academic research on ESG concerns inform the study. This approach prioritizes negative ESG issues. It also covers supply chain negative effects. The report includes MRL's management data and five years of Australian mining statistics. These limits include chronological, geographic, and corporate/industry-specific considerations. The study does not adequately cover five-year ESG challenges in the mining sector outside of Australia. ESG's good effects are ignored while the study examines difficult subjects and provides practical reasons.

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