

MASTER THESIS

Social Life Cycle Impact Assessment of PEM and Alkaline Electrocatalysts Used to Generate Hydrogen

Thesis

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Abstract

In the realm of entrepreneurship, innovation stands as a pivotal factor driving business success, especially in the renewable energy sector where addressing climate change is imperative. The global shift towards sustainable practices has brought hydrogen generation to the forefront, with electrolysis emerging as a favoured method due to its efficiency, scalability, and compatibility with renewable sources. This study delves into the unexplored dimension of social sustainability within Responsible Innovation, utilizing the Social Life Cycle Assessment (SLCA) framework developed by the United Nations Environment Programme (UNEP) to evaluate the social impacts of metals used in Alkaline (Ni, Ni-Fe) and Proton Exchange Membrane (PEM) (Pt, Ir) electrocatalysts for hydrogen production.

By employing a comprehensive life cycle approach and knowing that the mining represents a crucial supplier of key materials to manufacture electrocatalytic systems that generate Hydrogen, this research assesses the compliance of mining companies with international best practices, shedding light on the social sustainability of hydrogen generation technologies. Through the development of a dedicated Excel tool incorporating recommended practices, a checklist methodology is employed, enabling a binary assessment of companies' implementation of and commitment to these practices.

The findings demonstrate a distinct contrast between Nickel and Nickel-Iron and Platinum and Iridium, highlighting varying degrees of social responsibility. Nickel and Nickel-Iron showcase higher compliance with international practices, suggesting a potential for more positive social impacts compared to Platinum and Iridium. This divergence is attributed to geographical factors and the unique dynamics within each mining operation's location.

The study's significance lies in its contribution to Responsible Innovation by incorporating Social Sustainability within its scope. It underscores the importance of using frameworks like SLCA to assess social impacts and drive responsible practices in the hydrogen generation sector. Additionally, the developed tool holds promise for future research and practical applications, aiding innovators in making socially responsible choices and material selections for sustainable development.

Acknowledging certain limitations, such as data collection methodologies and interpretation of assessment criteria, the study maintains a strong foundation for further enhancement and refinement of the tool. Future research directions include broader applications of the tool, comparisons of metals' social responsibility scores across various organizations, and the exploration of a wider range of metals for a more comprehensive understanding of their social implications.

In conclusion, this thesis unveils the intricate relationship between innovation, sustainability, and social responsibility within the evolving landscape of hydrogen generation. By adopting a holistic approach and leveraging the SLCA framework, it highlights the role of Responsible Innovation in shaping a more sustainable future and presents a tool with potential to guide responsible choices in material selection and innovation practices.

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1. Introduction

This section explores how innovation drives business success in tackling climate change, with a focus on hydrogen generation as a promising renewable energy source. Three types of hydrogen generation processes are outlined: brown/grey, blue, and green hydrogen, with water splitting as the most effective process for green hydrogen. Three electrolysis methods are discussed: alkaline, PEM, and SOEC, with PEM electrolysis as a promising alternative due to its efficiency and design, but high cost of materials. The section goes on to emphasize on hydrogen generation as a key focus for innovation in addressing climate change. The section identifies the use of an integrated risk-benefit assessment to consider the product side of innovation in the RI or RRI framework. It highlights the need to focus on a social perspective rather than an economic perspective in evaluating the balance between advantages and disadvantages of a technology or innovation. The concept of social sustainability is introduced, and the Social Life Cycle Assessment (SLCA) is identified as a significant tool for assessing the social dimension of sustainability. The section concludes by discussing the problem statement of the study, which aims to assess the life cycle sustainability implications of integrating PEM electrolysis as an energy source in the Netherlands. The research objective and research question are also outlined, along with sub-questions that aim to identify the social impacts of specific electrocatalysts used to generate hydrogen.

1.1 Background

The past three decades has seen a surge of interest in innovation to establish and sustain competitive advantages. Innovation is widely viewed as a crucial aspect of entrepreneurship and a vital driver of business success (Johannessen et al., 2001). West et al., 2014 defines Innovation as "The process of creating, developing, and implementing new ideas or concepts that provide value to individuals, organizations, or society."

The Current focus of innovation globally is directed towards tackling climate change and is only set to increase in the coming years (*2021: The Mainstreaming Of Climate Finance And Innovation*, n.d.) (*Global Risks Report 2021 | World Economic Forum | World Economic Forum*, n.d.). The spotlight of innovation is on renewable energy as one of the frontrunners in tackling climate change (*Global Risks Report 2021 | World Economic Forum | World Economic Forum*, n.d.).

1.1.1 Hydrogen Generation

As the world seeks to transition to a low-carbon energy system, increasing attention is being paid to hydrogen generation as a viable source of renewable energy (*Green Hydrogen, The Fuel Of The Future, Set For 50-Fold Expansion*, n.d.) (Gielen et al., 2019). There are three types of hydrogen generation processes based on source:

1. Brown/Grey Hydrogen: Produced by Fossil Fuels (natural gas) and generates the highest carbon emissions of the three. (*The Clean Hydrogen Future Has Already Begun – Analysis - IEA*, n.d.)
2. Blue Hydrogen: Utilizes a combination of grey hydrogen whose carbon emissions are captured, stored, and reused (*The Clean Hydrogen Future Has Already Begun – Analysis - IEA*, n.d.)
3. Green Hydrogen: Generated from renewable energy sources such as biomass or water and does not produce any carbon emissions in the process (*The Clean Hydrogen Future Has Already Begun – Analysis - IEA*, n.d.)

IRENA's report (2019) writes clean hydrogen is experiencing a surge in political and business interest, as evidenced by the growing number of policies and projects dedicated to its development worldwide. In the pursuit of clean energy, green hydrogen has emerged as a particularly promising option, given its capacity to produce energy without greenhouse gas emissions, and as a result, it is receiving significant attention (IRENA, 2019). Forbes estimates that by 2050, green hydrogen has the potential to provide a quarter of the world's energy demands and create a market opportunity worth up to 10 trillion US dollars. The two well-known processes used to generate green hydrogen based on source are Biomass and Water splitting (Nikolaidis & Poullikkas, 2016).

Water splitting is considered to be more effective than biomass due to its energy efficiency, scalability, zero carbon emissions and endless supply of raw material (water) (European Commission Joint Research Centre [JRC], 2018). Hydrogen generated from water splitting can be generated through three processes Electrolysis, Thermolysis and Photolysis (Nikolaidis & Poullikkas, 2016). Electrolysis is gaining a lot of attention as the best method for producing hydrogen when compared to thermolysis and photolysis, because of its high efficiency in converting energy, ability to use renewable sources, well-established technology, ability to be scaled up easily, and its cost-effectiveness (Accenture, n.d.) (European Commission Joint Research Centre [JRC], 2018). The three well known methods for electrolysis to generate hydrogen are:

- Alkaline Electrolysis: water is added to the cathode where it is divided into two components - hydrogen (H₂) and hydroxide ions (OH⁻). The hydrogen is then separated from the water, while the hydroxide ions move through the electrolyte to the anode where they combine to produce oxygen (O₂) (Nikolaidis & Poullikkas, 2016).
- Proton Exchange Membrane (PEM) Electrolysis: Water is brought to the anode, where it is separated into positively charged particles called protons (or hydrogen ions, H⁺). These protons then move through a membrane to the cathode, where they combine to form hydrogen gas (H₂). Meanwhile, oxygen is left behind and remains with the original water molecule (Nikolaidis & Poullikkas, 2016)
- Solid Oxide Electrolysis Cell (SOEC): Is a process that uses electricity and a solid oxide electrolyte to split water into hydrogen and oxygen gas at high temperatures and under high pressure. It allows for efficient separation of hydrogen and oxygen ions (Zheng et al., 2021).

The figure below (Figure 1) provides a basic overview of the working of each of these electrolysis processes for Hydrogen generation.

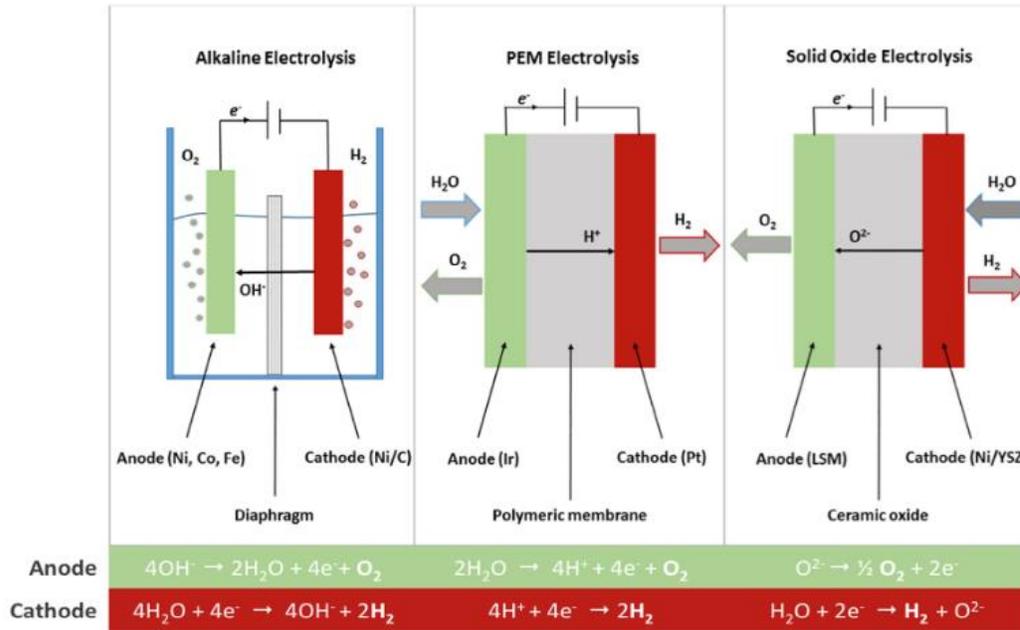


Figure 1: Overview of each electrolysis process used to generate Hydrogen. Image is obtained from (Sapountzi et al., 2017a)

Although alkaline water electrolysis is widely used for hydrogen generation, PEM water electrolysis is a promising alternative because it can be more efficient, produces purer hydrogen, has a more compact design, and offers faster start-up times. The main disadvantages of PEM are the high cost of membranes and catalysts (Sapountzi et al., 2017b). PEM is a highly promising technology for producing large amounts of hydrogen because it has a wide range of current densities that allow for efficient and flexible operation, even at high differential pressures. Its excellent dynamic response and high turndown ratios making it a key innovation focus for future sustainable energy systems (Minke et al., 2021). As one of potential innovations that could be integrated into the global energy system its impacts could have unforeseen consequences.

1.1.2 Responsible Innovation

Collingridge, 1979 introduces the idea of entrenchment of technology by writing when a technology is first being developed, it may be difficult to determine if it is harmful enough to justify stopping its development. However, if concerns about its impact arise later on, experience has shown that it becomes nearly impossible to control the spread of the technology if it is still being actively promoted. (Collingridge, 1979) further goes on elucidate that when a new technology is introduced, it causes adjustments in other related technologies, making it challenging to control. The process of controlling the new technology requires extensive and costly modifications to many other technologies. Thus, decisions made early on to develop the new technology are challenging to reverse, as it becomes deeply ingrained in existing technologies due to the interactions between them. He raises the dilemma on how do we assess the impacts of technology across the environment and society before integrating it into the world?

One system of thinking that emerged and could be considered is the concept of Responsible Innovation (RI) or Responsible Research and Innovation (RRI). Although questions of scientific responsibility and social control of technology have been discussed and dealt with in the period following WWII, there is presently a growing emphasis on the concept of RI and its related terms, such as RRI (Fisher & Rip, 2013). The concept of RRI was brought into the spotlight by the United States (USA) and the European Union (EU) to tackle the ethical implications of technologies such as Genetically Modified Organisms (GMO) or Nanotechnology (Owen et al., 2012).

Owen et al., 2012 uses the RI definition “a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society).” RI or RRI has four main tenets or focus which are anticipation, reflection, deliberation and responsiveness (Thorstensen & Forsberg, 2016).

(Thorstensen & Forsberg, 2016) further elaborates that the concept of RRI encompasses both the process and product aspects of innovation, although these perspectives are distinct. The process side deals with how to anticipate and involve stakeholders, among other things, and has been extensively studied in fields like Technology Assessment (TA) and Science and Technology Studies (STS), which have helped to lay the foundation for RRI. In contrast, the product side focuses on the specific outcomes of innovation and has been more closely examined in fields like economics and environmental science but is less frequently discussed in the context of RRI.

According to Stilgoe et al. 2013, to consider the product side of innovation in the RI or RRI framework, an integrated risk-benefit assessment can be useful. This type of analysis would consider the potential risks and benefits associated with a particular technology or innovation. However, it should differ from traditional risk-cost benefit analyses in its methodology. Von Schomberg, 2013 highlights that the focus should be on a social perspective rather than an economical perspective. RRI methods do not have explicit guidelines for evaluating the balance between advantages and disadvantages of a technology or innovation. Nevertheless, the sustainability discipline may provide techniques to address this (Thorstensen & Forsberg, 2016). The Social Perspective in the sustainability field or Social Sustainability that holds an important yet not well explored dimension in RRI (Thorstensen & Forsberg, 2016).

1.1.3 Social Sustainability

The World Economic Forum (WEF) defines Social Sustainability as “the institutions, policies, and factors that enable all members of society to experience the best possible health, participation, and security; and that maximize their potential to contribute to and benefit from the economic prosperity of the country in which they live.” (*Global Competitiveness Report 2020 | World Economic Forum*, n.d.). Social Life Cycle Assessment (SLCA), developed by the United Nations Environment Program, is a significant tool for assessing the social dimension of sustainability (*Sustainable Development*, n.d.-a) (Thorstensen & Forsberg, 2016).

SLCA as defined by the UNEP is a method used to evaluate the potential social and socio-economic impacts, both positive and negative, that a product may have throughout its entire life

cycle. This assessment includes all stages, from the extraction of raw materials to final disposal, and covers aspects such as manufacturing, distribution, use, re-use, and recycling (*Sustainable Development*, n.d.-a). (Benoît Norris & Revéret, 2015) further highlights SLCA as a useful tool for evaluating Social Responsibility because it offers a detailed analysis of a product's social impact. Taking a product life cycle perspective helps prevent the transfer of negative impacts from one stage of the cycle to another or from one social issue to another. This makes S-LCA a valuable addition to social responsibility evaluations. SLCA has been gaining a lot attention throughout the world especially as a great tool for RRI since it complements Environment Life Cycle Assessment (ELCA) (*Sustainable Development*, n.d.-a) (Thorstensen & Forsberg, 2016).

1.2 Problem Statement

The development of PEM electrolysis as a hydrogen generation technology offers numerous advantages over traditional Alkaline Electrolysis. However, its reliance on rare and expensive metals like Iridium and Platinum raises concerns about the social impact of these metals in the production process. This study aims to assess the life cycle sustainability implications of integrating PEM electrolysis as an energy source in the Netherlands and provide the results for responsible and sustainable technology adoption.

1.3 Research Objective

1. To establish a framework of social indicators for assessing the impact of electrochemical catalysts (specifically iridium, platinum, nickel, and nickel iron) on human rights throughout the supply chain, from cradle to gate.
2. To collect evidence for each social indicator identified in the framework and quantify the impact on human rights using the established standard.

1.4 Research Question

What social impacts from a sustainability perspective can be identified using Social Life Cycle Assessment on electrocatalysts used to generate hydrogen?

Sub Research Questions:

1. What are the Social Impacts of Iridium Catalyst?
2. What are the Social Impacts of Platinum Catalyst?
3. What are the Social Impacts of Nickel Catalyst?
4. What are the Social Impacts of Nickel Iron Catalyst?
5. Comparison of the social impacts through Scenarios?

2. Theoretical Framework

Social Life Cycle Assessment (SLCA) is defined by UNEP as “a technique/method that evaluates the social and socio-economic impacts of a product throughout its entire life cycle, including extraction, manufacturing, use, and disposal. SLCA can be used alone or combined with ELCA to provide a complete evaluation of a product's impact”(Sustainable Development, n.d.-a). UNEP further goes on to state that SLCA does not aim to determine whether a product should be manufactured or not, and it does not claim to provide guidance at that level. Its purpose is to record the usefulness of the product, but it does not have the capacity or role to advise on decision-making at that level. While data on the social circumstances of production, usage, and disposal may contribute to deliberation on the subject, it is unlikely to be enough to serve as a basis for decision-making (Sustainable Development, n.d.-a).

SLCA's methodology draws from or is similar to Environment Life Cycle Assessment (ELCA). For a successful SLCA the key parameters are functional unit, geographic location of each process, Stakeholders, uncertainty & subjectivity and Impact assessment (Sustainable Development, n.d.-a)

Functional unit: They both require a functional unit they differ when it comes to presenting results, ELCA always showcases results in the form of functional units whereas SLCA cannot do so because since this process utilizes information regarding the features or qualities of processes or companies that cannot be measured in terms of the output of a single unit of the process (Sustainable Development, n.d.-a).

Geographic location of Individual Process: Knowledge about the exact geographic location of unit processes is crucial or at least highly desirable. While generic hotspot evaluations can be done at a country level, conducting case-specific S-LCA requires more precise and detailed geographic information (Sustainable Development, n.d.-a).

Stakeholders: This plays a huge role since it helps us identify the social impact categories of each stakeholder at every step of the products life cycle (Sustainable Development, n.d.-a).

Uncertainty and Subjectivity: SLCA like ELCA targets to minimize uncertainty in the output generated from the assessment. Since ELCA deals with physical quantities uncertainty can be kept to a minimum. But in the case of S-LCA, subjective data may be more suitable and relevant in certain cases. For instance, data related to worker reports on how much control they have over their working conditions and schedules may be inherently subjective but empirically linked to social outcomes of interest. In such cases, using objective data like variability in observed worker arrival times or other proxies for perceived control over their work environment would increase uncertainty in the results rather than reducing it (Sustainable Development, n.d.-a).

Impact Assessment: S-LCA deals with both favourable and unfavourable effects of the product life cycle, and it does so for two reasons. Firstly, favourable impacts are often significant. Secondly, it encourages performance beyond mere compliance with regulations, international agreements, certification standards, and other requirements (Sustainable Development, n.d.-a).

There are three important steps that the UNEP highlights an important process to follow that is essential for conducting the assessment which is identifying the indicators (This is a part of the scope phase in SLCA) for the SLCA framework:

1. Defining the Social Impact:

UNEP defines social impacts as the results of positive or negative pressures on the well-being of stakeholders. These impacts arise from social relationships and interactions that occur in the context of an activity, such as production, consumption, or disposal, as well as from actions taken by stakeholders to prevent or reinforce them, such as enforcing safety measures(*Sustainable Development*, n.d.-a).

2. Classification of Social and Socio-Economic Indicators:

S-LCA assessment requires subcategories as they form the foundation for determining what should be included or excluded. These subcategories (as shown in figure 2 below) are socially relevant characteristics or themes and are classified based on impact categories and stakeholders. The evaluation of subcategories involves the use of inventory indicators that are quantifiable by units of measurement or variables (*Sustainable Development*, n.d.-a).

Stakeholder categories	Subcategories
Stakeholder “worker”	Freedom of Association and Collective Bargaining Child Labour Fair Salary Working Hours Forced Labour Equal opportunities/Discrimination Health and Safety Social Benefits/Social Security
Stakeholder “consumer”	Health & Safety Feedback Mechanism Consumer Privacy Transparency End of life responsibility
Stakeholder “local community”	Access to material resources Access to immaterial resources Delocalization and Migration Cultural Heritage Safe & healthy living conditions Respect of indigenous rights Community engagement Local employment Secure living conditions
Stakeholder “society”	Public commitments to sustainability issues Contribution to economic development Prevention & mitigation of armed conflicts Technology development Corruption
Value chain actors* not including consumers	Fair competition Promoting social responsibility Supplier relationships Respect of intellectual property rights

Figure 2: Stakeholder categories and Subcategories as defined by UNEP. Image taken from (Sustainable Development, n.d.-a)

3. The development of subcategories for social and socio-economic impacts assessment of products:

UNEP advises SLCA users to identify relevant international instruments as a reference to define categories, subcategories, and inventory indicators in S-LCA. International conventions, such as those on Human Rights and Workers' Rights, can serve as a suitable basis for establishing a framework of S-LCA indicators. These conventions are important instruments that have been developed through negotiations between countries and represent a universal set of social criteria. By referencing them, S-LCA can ensure a comprehensive and globally recognized approach to assessing social impacts (*Sustainable Development*, n.d.-a)

Using the steps mentioned above the table represented in figure 2 showcases the assessment system that will be followed according to the UNEP.

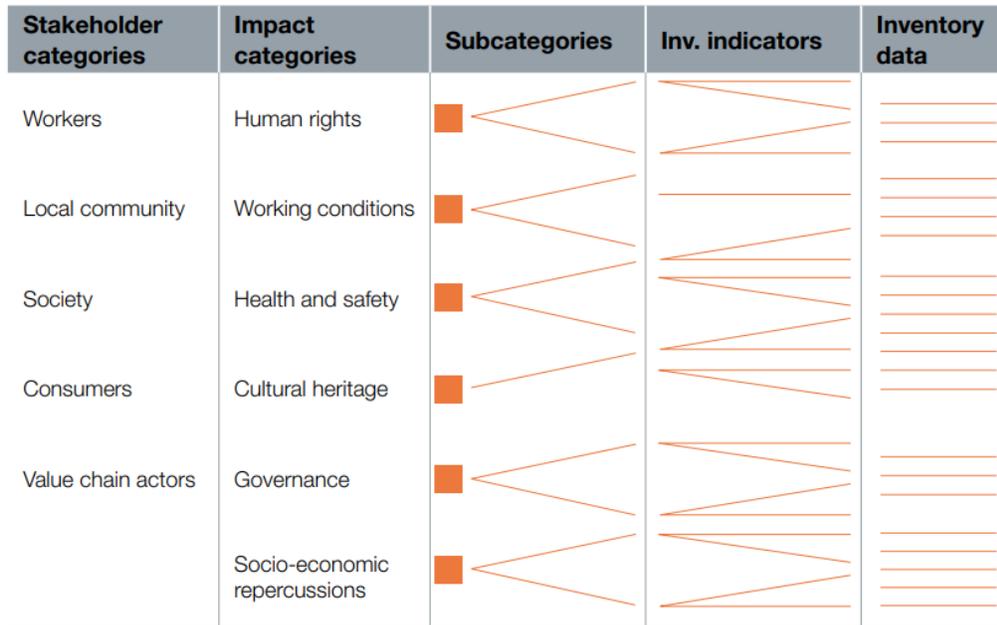


Figure 3: Assessment system as per UNEP from categories to unit of measurement. Image taken from (Sustainable Development, n.d.-a)

The methodology as provided by the UNEP for SLCA is divided into 4 parts goal and scope of the study, inventory analysis, impact assessment, and interpretation (Sustainable Development, n.d.-b). Figure 4 taken from the UNEP provides a brief explanation of each of these parts while highlighting the differences the key variations between ELCA and SLCA.

Phase of the study	Characteristics
Goal and scope	<p>The product utility is required to be described in functional terms, both in E-LCA and S-LCA. S-LCA goes further by also requiring that practitioners consider the social impacts of the product use phase and function.</p> <p>Whereas E-LCA encourages involvement of stakeholders (beyond the commissioners) in the peer review of the study, S-LCA encourages that such "external" stakeholders be involved in providing input on impacts, within the assessment itself.</p> <p>In S-LCA, justification needs to be presented when a subcategory is not included in the study. In E-LCA this is not a requirement.</p> <p>The subcategories are classified both by stakeholder categories and by impact categories in S-LCA. In E-LCA they are classified only by impacts categories.</p> <p>Whereas both E-LCA and S-LCA impact assessment methods may be sensitive to location, no E-LCA LCIA methods are site-specific, and E-LCA methods often define and use categories of location types that depend on physical factors such as geography type or population density. S-LCA may require site-specific LCIA in some cases, and may also need information about "political" attributes, such as the country and its laws.</p>
Life Cycle Inventory	<p>The activity variables²⁹ data is collected and used more often in S-LCA than in E-LCA (e.g. number of working hours for estimating the share of each unit process in the product system). In E-LCA, activity variables are used when data about impacts is not available.</p> <p>The subjective data is sometimes in S-LCA the most appropriate information to use. Bypassing subjective data in favor of more "objective" data would introduce greater uncertainty in the results, not less.</p> <p>The balance between quantitative, qualitative and semi-quantitative data will generally be different.</p> <p>The data sources will differ (coming from stakeholders).</p> <p>The data collection steps and methods vary (e.g. the irrelevance of mass balances).</p>
Life Cycle Impact	<p>The characterization models are different.</p> <p>The use of performance reference points is specific to S-LCA, e.g. thresholds.</p> <p>S-LCA encounters both positive and negative impacts of the product life cycle, beneficial impacts in E-LCA seldom occur.</p>
Interpretation	<p>The significant issues will differ.</p> <p>The addition of information on the level of engagement of stakeholders in S-LCA.</p>

Figure 4: Summary and Key differences between Environment LCA and Social LCA. Image taken from (Sustainable Development, n.d.-b)

3. Research Methodology

The Social Life Cycle Assessment (SLCA) Framework developed by the United Nations Environment Programme (UNEP) is the chosen framework for this research (*Sustainable Development*, n.d.-b). Its purpose is to evaluate and compare the social impacts of different metals used in hydrogen catalysts. Specifically, the study will compare the social impacts of Iridium and Platinum versus Nickel and Nickel Iron. To address the sub research questions, a brief methodology (outlined in Table 1) will be used.

Table 1: Brief methodology approach towards answering the sub questions.

Research Sub Question	Data/Information to answer the question	Sources of Data	Accessing Data
What are the Social Impacts of Iridium Catalyst?	Measuring Social Impacts on Stakeholders in the Supply Chain	Secondary Data from Literature Reviews, Annual Reports, News Articles and Policy Documents	Secondary Data published articles, reports and policy documents
What are the Social Impacts of Platinum Catalyst?	Measuring Social Impacts on Stakeholders in the Supply Chain	Secondary Data from Literature Reviews, Annual Reports, News Articles and Policy Documents	Secondary Data published articles, reports and policy documents
What are the Social Impacts of Nickel Catalyst?	Measuring Social Impacts on Stakeholders in the Supply Chain	Secondary Data from Literature Reviews, Annual Reports, News Articles and Policy Documents	Secondary Data published articles, reports and policy documents
What are the Social Impacts of Nickel Iron Catalyst?	Measuring Social Impacts on Stakeholders in the Supply Chain	Secondary Data from Literature Reviews, Annual Reports, News Articles and Policy Documents	Secondary Data published articles, reports and policy documents

The research sub-questions in this table aim to investigate the social impacts of different types of catalysts used in various industries. Specifically, the sub-questions focus on measuring the social impacts on stakeholders in the supply chain. To answer these questions, secondary data from literature reviews, annual reports, news articles, and policy documents will be accessed. The sources of data for all sub-questions are the same, and the data will be collected from published articles, reports, and policy documents. Overall, the aim is to identify and evaluate the social impacts of different types of catalysts, and to determine any potential social implications that may arise from their use in the supply chain.

The SLCA framework developed by UNEP comprises four main stages: goal and scope, inventory analysis, impact assessment, and interpretation (*Sustainable Development*, n.d.-b). This section

will focus on the first two stages: goal and scope, and inventory analysis. The subsequent sections, which covers results and discussion, will address the third and fourth stages, namely impact assessment and interpretation. The subsequent diagram (Figure 5) illustrates the workflow guiding this thesis development, with each step elaborated in the following sections.

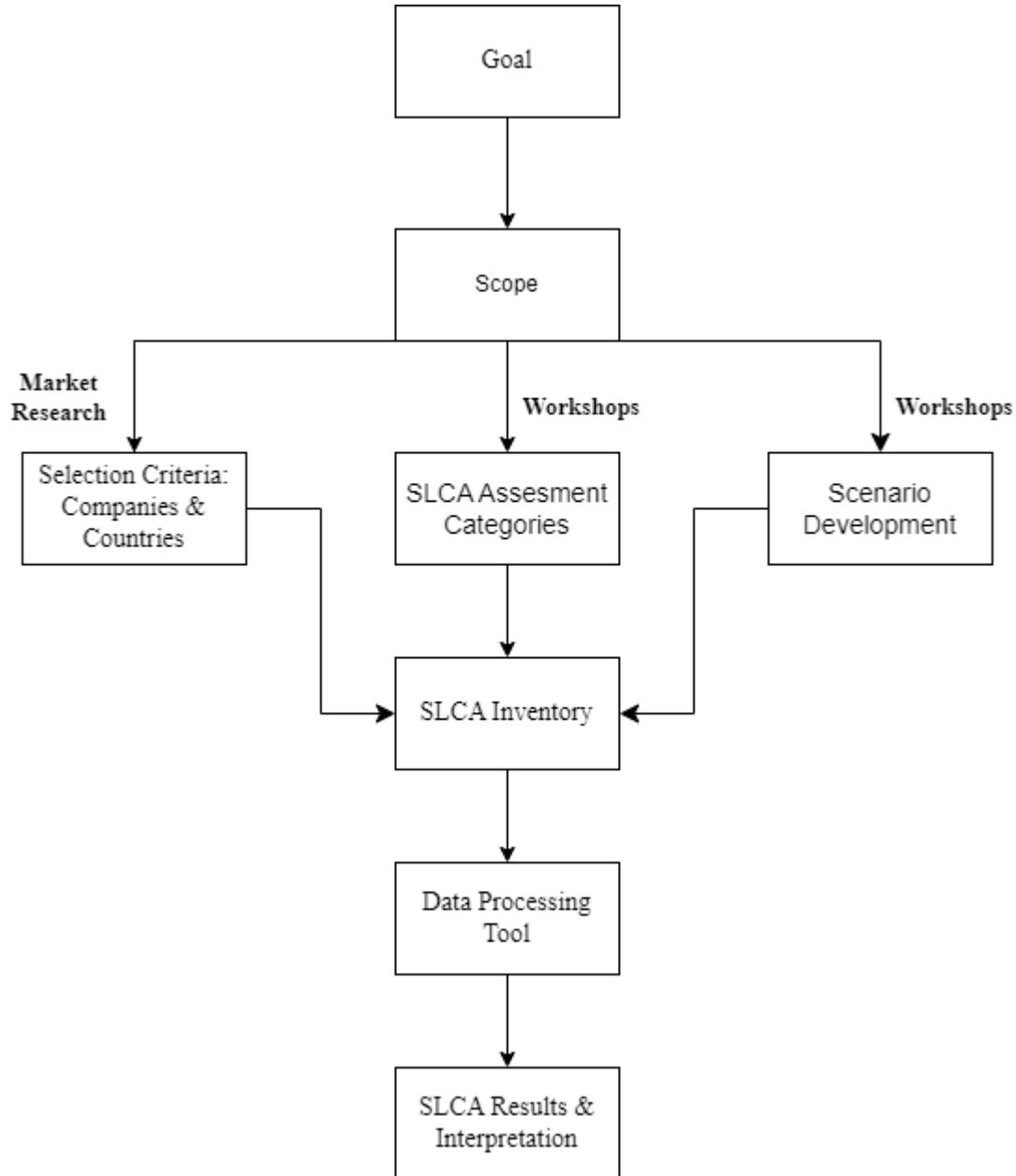


Figure 5: Schematic workflow of Research methodology

3.1 Goal and Scope of Social LCA

As outlined in the theoretical framework, this SLCA study adopts UNEP's defined goal and scope parameters for sustainable development (Sustainable Development, n.d.-b).

3.1.1 Goal

The goal of this SLCA is to identify and present the social impacts (positive and negative) of the metals used in PEM Electrolysis, specifically Iridium and Platinum, and Alkaline Electrolysis, namely Nickel Iron and Nickel to electrochemists. The impacts are used in comparison to assess the social sustainability of each hydrogen generation technology, with Iridium compared to Nickel Iron and Platinum compared to Nickel. To achieve this goal, the study will focus on the metals used to manufacture the Anodes (Iridium and Nickel Iron) and Cathodes (Platinum and Nickel) in PEM and Alkaline Electrolysis, respectively (Sapountzi et al., 2017b). The functional unit for this SLCA is defined as the amount of catalyst (measured in milligrams) required to produce one kilogram of hydrogen. The catalysts considered are Nickel, Nickel Iron, Platinum, and Iridium.

3.1.2 Scope

The essential component of the scope is setting the boundary of the system to be assessed (Sustainable Development, n.d.-b). The boundary of the SLCA to be conducted for each of the catalyst metals is cradle to gate (Sustainable Development, n.d.-b). This boundary is defined because there is no full-scale commercial hydrogen generation plant using PEM electrolysis in the world that can be used to assess the consumer and end of life (grave) phase of the PEM catalyst. Since the goal of this SLCA is to compare the catalysts of PEM and Alkaline electrolysis it is important to choose commercially developed processes. The boundary of the supply chain is highlighted in figure 6

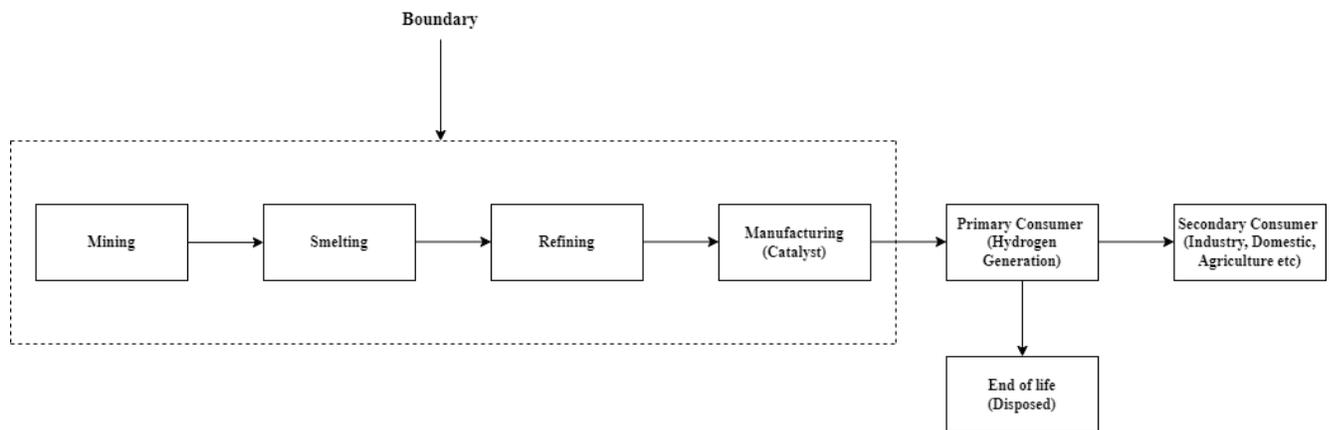


Figure 6: Boundary of the system for each catalyst.

Now that the boundaries are defined the second step is to identify the country for each unit process (unit process example: mining of Platinum) and top 3 companies in that country for each unit process that the SLCA will be focused on. To identify the country and top 3 companies the following criteria needs to be assessed while conducting a literature review. This literature review will utilize grey literature that consists of international reports on location of raw materials globally, market reports, annual reports, and scientific literature of the catalysts to identify countries and companies that meet the criteria. Table 2 defines the criteria used for choosing the

country and top 3 companies below. A literature review elaborates on why the country and the companies were chosen.

Table 2: The Criteria used to identify the country and 3 companies for each unit process from cradle to gate.

Catalyst	Unit Process	Criteria for country	Country	Criteria for Company	Top 3 Companies	
Platinum	Mining	Highest Production in tons globally		Highest market Share		
				A minimum of 3 years of annual reports must be available		
				Global Supplier		
	Smelting & Refining	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
	Manufacturing (PEM Catalyst)	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
Iridium	Mining	Highest Production in tons globally		Highest market Share		
				A minimum of 3 years of annual reports must be available		
				Global Supplier		
	Smelting & Refining	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
	Manufacturing (PEM Catalyst)	Highest Production in tons globally			Highest market Share	

				A minimum of 3 years of annual reports must be available		
				Global Supplier		
Nickel	Mining	Highest Production in tons globally		Highest market Share		
				A minimum of 3 years of annual reports must be available		
				Global Supplier		
	Smelting & Refining	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
	Manufacturing (Alkaline Electrocatalyst)	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
Iron	Mining	Highest Production in tons globally		Highest market Share		
				A minimum of 3 years of annual reports must be available		
				Global Supplier		
	Smelting & Refining	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual reports must be available	
					Global Supplier	
	Manufacturing* (Alkaline Electrocatalyst)	Highest Production in tons globally			Highest market Share	
					A minimum of 3 years of annual	

				reports must be available	
				Global Supplier	

*Represents Nickel Iron Alloy

Now that the location of each unit process to be assessed in the SLCA will be identified the next step as defined by UNEP is to identify the stakeholders' categories, subcategories, indicators, and the unit of measurement for the indicator (*Sustainable Development*, n.d.-b). The relationship between stakeholders' categories, subcategories and indicators is explained in the theoretical framework section. For this SLCA, I will be using the predefined Stakeholder categories and subcategories identified by the UNEP and PSILCA (*Sustainable Development*, n.d.-b), (*PSILCA v.3 Database Documentation*, n.d.). Table 3 show cases the Stakeholder categories and subcategories

Table 3: Stakeholder Categories and subcategories

Stakeholder Categories	Subcategories
Workers	Child Labour
	Forced Labour
	Fair Salary
	Working Time
	Discrimination
	Health and Safety
	Social Benefits, Legal Issues
	Workers' Rights
Value Chain Actors	Fair Competition
	Corruption
	Promoting Social Responsibility
Society	Contribution to economic development
	Health and Safety
	Prevention and mitigation of conflicts
	Health and Safety
Local Community	Safe and healthy living conditions

	Local employment
	Migration
	GHG Footprints
	Environmental Footprints
	Labour Footprints

From this list of subcategories in table 3, 10 subcategories are defined. The subcategories are already defined since this thesis contributes the data obtained from the SLCA to a larger research project.

The project is titled “Socio-technical pathways and material choices for a responsible electrification of the production of chemicals and fuels”. The aim of this research is This research project aims to develop innovative electrochemical processes and electrolyzers for sustainable production of "green" chemicals using renewable electricity. It explores socio-technical configurations for applications like bio-oil upgrading and chemical synthesis, evaluating their environmental and societal impacts. By integrating constructive technology assessment and lifecycle thinking, the study involves stakeholders and anticipates future pathways. The research seeks to align with ongoing electrochemical investigations and contribute to environmentally responsible chemical industry advancements (socio-technical pathways and material choices for a responsible electrification of the production of chemicals and fuels | nwo, n.d.).

This thesis centres on the social dimension of the research project. The parameters presented below have been curated from a series of workshops attended by an interdisciplinary team. This team collectively established the parameters for the thesis project. The predefined subcategories include:

1. Fair Competition
2. Promoting Social Responsibility
3. Prevention and mitigation of armed conflicts
4. Discrimination
5. Public commitments to sustainability issues
6. Corruption
7. End-of-life responsibility
8. Safe and healthy living conditions
9. Local employment
10. Health and safety

Using this predefined set of subcategories an assessment table (Table 10) is developed using the framework stated by UNEP and PSILCA database (*Sustainable Development*, n.d.-b), (*PSILCA v.3 Database Documentation*, n.d.). Table 4 constitutes Stakeholder categories, Subcategories, Indicators, and unit of measurements for the indicators.

Table 4: Assessment Table

Stakeholder Categories	Subcategories	Indicators
Worker	Discrimination	Women in Workforce
		Gender Equity
		Historically Disadvantaged People (HDP)
	Health and Safety	Accident Rate at Workplace
		Fatal Accidents at Workplace
		Health an Safety Measures
Value Chain Actors	Fair Competition	Presence of anti-competitive behaviour and Fair Competition
	Corruption	Business Ethics, Anti Corruption and Transparency
	End of life Responsibility	Mine Closure and Post Closure Viability

	Promoting Social Responsibility	Responsible Contracting and Sourcing
	Public commitments to sustainability issues	CSR commitments and Social Development
Society	Prevention and mitigation of conflicts	Prevention of Conflict and Mitigation
Local Community	Safe and healthy living conditions	Community Engagement and Wellbeing
		Local Employment

With the assessment table defined the next step is to integrate predefined scenarios into the SLCA to understand the social impacts for each catalyst and the variations in impact with each scenario. The scenarios like the subcategories have already been defined by the larger research project. The three defined scenarios are:

1. Current status of the PEM and Alkaline Electrolysis technology
2. Improved efficiency (lesser milligrams of catalyst required to generate 1 kg of Hydrogen) of PEM and Alkaline Electrocatalysts in the future.
3. Integrating Recycling as source of Raw materials; figure 7 illustrates the new boundary of the system below.

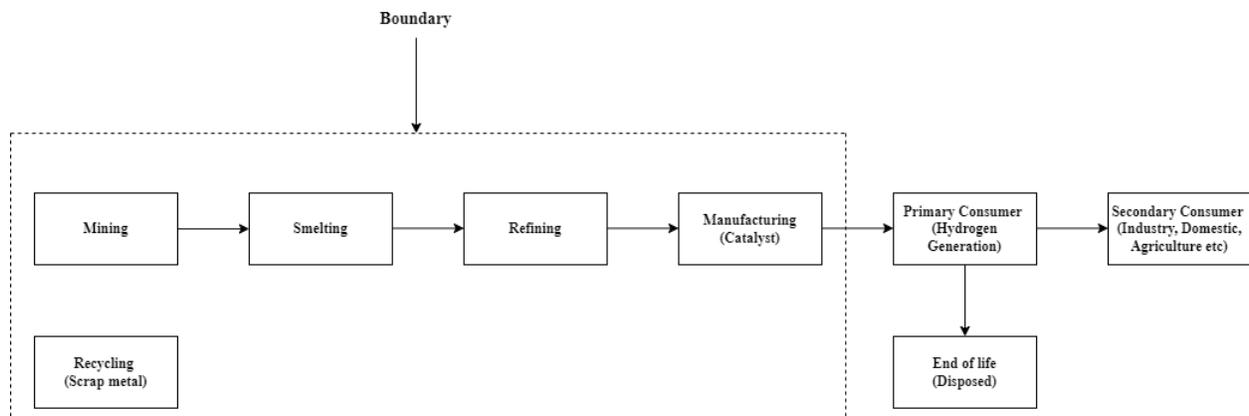


Figure 7: Recycling as part of the system Boundary

The final step of the scope is to design a score card using the format stated by the UNEP (Sustainable Development, n.d.-b). Table 5 showcases a score card ranging from -2 to +2, with 0 as the baseline or the bare minimum that needs to be achieved by the company. This score card as per UNEP SLCA framework translates the data obtained in assessment table (table 10) to quantifiable comparable social impacts of each of the catalysts(Sustainable Development, n.d.-b).

Table 5: Scorecard Format

Score	Practice
+2	Best practices in the industry or best practices stated by relevant International Organization
+1	Regular Audits and Reporting
0	Policies in place that met the criteria stated by the National Government
-1	Policies in place cases identified or reported
-2	No policies in place

3.2 Social Life Cycle Inventory

Now that the scope of the SLCA has been outlined, data collection of relevant information required as mentioned in the assessment table (Table 10). The inventory of data that needs to be collected constitutes of Annual Reports, company press release, ESG Index, National Policies, News articles from national and international news stations to name a few. Since all the data collected is expected to be secondary data, the quality of the data needs to be assessed using a suitable data quality criterion, relevant quality matrix that will be used is identified from SLCA pilot projects conducted by life cycle initiative that utilized GRI foundation’s standards for sustainable reporting such as transparency, balance, accuracy etc (*Pilot Projects on Guidelines for SOCIAL LIFE CYCLE ASSESSMENT OF PRODUCTS AND ORGANIZATIONS 2022*, n.d.).

3.3 Data Processing

The data processing stage will involve using Excel to convert qualitative data into quantitative data in the form of the scorecard presented in Table 5. A set of Excel formulas will be employed to transform the inventory data input into an output representing the scorecard range of -2 to +2. Additionally, Excel formulas will generate graphs illustrating the quantified social impacts for each indicator, enabling a comparison of social impacts between the catalysts. To ensure the software's usability and useful features, a focus group comprising electrochemists from the University of Twente will test the set of Excel formulas. The focus group's feedback will be used to improve the Excel process before retesting the refined process with the focus group for validation. The data processing stage will not proceed until ethical approval has been obtained.

3.4 Social Life Cycle Impacts and Interpretation

As per UNEP guidelines for SLCA Once the data quality is assessed as per the assessment table (table 4) is filled using the units of measurements stated (Sustainable Development, n.d.-b). The table 5 (scorecard) is used to translate the data into quantifiable social impacts that showcases positive or negative social impacts of the system assessed within the defined boundary for each catalyst. The assessment will utilize the three scenarios mentioned in the scope to compare PEM catalysts (Iridium and Platinum) with Alkaline catalysts (Nickel and Nickel Iron) to identify which technology has the least social impacts for each scenario.

3.5 Limitations

The primary limitation identified comes from the broad spectrum of the of the catalysts assessed and the industries assessed it is difficult to use primary data (interviews, surveys, and site visits) to understand the situation on the ground. Therefore, this research is limited to reported data (secondary data) from companies, countries, and international organizations, that will provide a macroscopic view rather than a microscopic view. The second limitation identified is the difficulty in identifying countries and companies that are the leading players in manufacturing PEM and Alkaline countries. This is highlighted Appendix I with respect to not being able to find 3 companies that meet the criteria set in table 2 due to market recency of this technology. The third limitation identified is the boundary of the life cycle to be assessed, usually LCA for Environment or Social conducts a cradle to grave assessment. This is not possible in this case due to the fact that PEM hydrogen generation technology is in its development phase and has no scaled up commercial projects as of yet. Thus, there is no data available to assess the social impacts of the consumption and end of life phase. This has led to the scope of the LCA limited to “Cradle to Gate” assessment.

4. Results

The Results section of this research provides a comprehensive overview of the findings derived from the investigation into the social impacts of various metals used in hydrogen catalysts. The selection of companies for the Social Life Cycle Assessment (SLCA) is outlined, highlighting the criteria and rationale behind the choice of countries and companies. The study delves into the literature review of catalysts, focusing on Platinum and Iridium as integral components of Platinum Group Metals (PGM), which have gained prominence in technology development, particularly hydrogen generation. The global production landscape of these metals is discussed, emphasizing South Africa's significance in Platinum and PGM production, with companies like Northam Platinum Limited, Anglo American Platinum Limited, and Impala Platinum Holdings Limited emerging as key players. Meanwhile, the burgeoning field of PEM Electrocatalysts spotlights the United Kingdom, led by ITM Power, as a hub for their production.

The pivotal role of Nickel (Ni) is underscored, as it finds widespread use in modern infrastructure and technology, and Indonesia emerges as the largest global producer. Noteworthy companies in Nickel production, such as Sumitomo Metal Mining, PT Vale Indonesia Tbk, and PT ANTAM, are examined. The prominence of Iron in various industries is elucidated, with Australia standing out as the world's largest producer. Leading producers of Iron in Australia, including Rio Tinto, Broken Hill Proprietary (BHP), and Fortescue Metals Group, are highlighted.

The section progresses to detail the development of a dedicated Excel processing tool, collaboratively created with a focus group, for assessing the social responsibility of the selected companies. This tool incorporates a checklist aligned with international best practices and indicators. The social responsibility scores computed through this tool for the mining companies are presented, with individual scores per indicator provided. The resultant average social responsibility scores for Platinum, Iridium, Iron, and Nickel mining companies are depicted through tables and graphs, shedding light on their respective compliance with standard requirements and best practices.

Comparative graphs elucidate the social responsibility scores for Platinum, Iridium, Nickel, and Iron mining companies. These graphs underscore trends in social responsibility performance across different indicators. Notably, the average social responsibility score for Nickel mining companies remains consistently above the baseline, indicating strong compliance with standards. In contrast, Platinum and Iridium mining companies demonstrate varying levels of compliance across indicators. The impact of geographical locations and industry regulations on these scores is discussed.

4.1 Selection of Companies

Using the criteria stated from table 2, countries and companies have been selected for the Social Life Cycle Assessment. This section will give a brief understanding of how each company was selected.

Table 6: The Criteria used to identify the country and 3 companies for each unit process from cradle to gate.

Catalyst	Unit Process	Criteria for country	Country	Criteria for Company	Top 3 Companies
Platinum	Mining	Highest Production in tons globally	South Africa	Highest market Share	-Northam Platinum Limited -Anglo American Platinum Limited -Impala Platinum Holdings Limited
				A minimum of 3 years of annual reports must be available	
				Global Supplier	
	Smelting & Refining	Highest Production in tons globally	South Africa	Highest market Share	-Northam Platinum Limited -Anglo American Platinum Limited -Impala Platinum Holdings Limited
				A minimum of 3 years of annual reports must be available	
				Global Supplier	
A minimum of 3 years of annual reports must be available					
Iridium	Mining	Highest Production in tons globally	South Africa	Highest market Share	-Northam Platinum Limited -Anglo American
				A minimum of 3 years of annual reports must be available	
				Global Supplier	

					Platinum Limited -Impala Platinum Holdings Limited
	Smelting & Refining	Highest Production in tons globally	South Africa	Highest market Share	-Northam Platinum Limited
A minimum of 3 years of annual reports must be available				-Anglo American Platinum Limited	
Global Supplier				-Impala Platinum Holdings Limited	
A minimum of 3 years of annual reports must be available					
Global Supplier					
Nickel	Mining	Highest Production in tons globally	Indonesia	Highest market Share	-Sumitomo Metal Mining,
				A minimum of 3 years of annual reports must be available	-PT Vale Indonesia Tbk
				Global Supplier	-PT ANTAM
	Smelting & Refining	Highest Production in tons globally	Indonesia	Highest market Share	-Sumitomo Metal Mining,
				A minimum of 3 years of annual reports must be available	-PT Vale Indonesia Tbk
				Global Supplier	

				A minimum of 3 years of annual reports must be available	-PT ANTAM
				Global Supplier	
Iron	Mining	Highest Production in tons globally	Australia	Highest market Share	-Rio Tinto
				A minimum of 3 years of annual reports must be available	-Broken Hill Proprietary
				Global Supplier	-Fortescue Metals Group
	Smelting & Refining	Highest Production in tons globally	Australia	Highest market Share	Rio Tinto
				A minimum of 3 years of annual reports must be available	-Broken Hill Proprietary
				Global Supplier	-Fortescue Metals Group

Literature Review of Catalyst Metals

Platinum and Iridium

Platinum and Iridium are members of Platinum Group Metals (PGM) which constitute of Platinum (Pt), Palladium (Pd), Rhodium (Rh), Ruthenium (Ru), Iridium (Ir) and osmium (Os). The PGM elements have received a lot of attention globally due to their growing application in technology development such as hydrogen generation (Rao & Reddi, 2000). As per British Geological Survey Report in 2020, South Africa is the world's largest producer of Platinum (Produced 111,993 kg of platinum in 2020) and platinum group metals (Produced 46,835kg of PGM in 2020), while Russia as per the report produced 23,500 kg of platinum and Zimbabwe produced in 2020 making it the second largest producer of platinum (BGS, 2016). As per Mordor Intelligence reports on global platinum company of the top players located in South Africa are Northam Platinum Limited, Anglo-American Platinum Limited and Impala Platinum Holdings

Limited(*Platinum Market Size & Share Analysis - Industry Research Report - Growth Trends*, n.d.). Each of the companies mentioned have published at least three annual reports. The table 7 below showcases what functions each of the company offers and the source. Table 8 shows company and links to their annual reports' repository.

Table 7: Companies and their operations

Companies	Unit Process	Insource (Y/N)	Source
Anglo American Platinum Limited	Mining	Yes	https://www.angloamericanplatinum.com/
	Smelting	Yes	https://www.angloamericanplatinum.com/
	Refining	Yes	https://www.angloamericanplatinum.com/
Impala Platinum Holdings Limited	Mining	Yes	https://www.implats.co.za/
	Smelting	Yes	https://www.implats.co.za/
	Refining	Yes	https://www.implats.co.za/
Northam Platinum Limited	Mining	Yes	https://www.northam.co.za/
	Smelting	Yes	https://www.northam.co.za/
	Refining	No*	https://www.northam.co.za/

*Northam platinum Limited has an outsourcing contract with another company for precious metal refining

Table 8: Annual Reports Repository

Companies	Annual Reports Repository
Anglo American Platinum Limited	https://www.angloamericanplatinum.com/investors/reports-archive/2022
Impala Platinum Holdings Limited	https://www.implats.co.za/corporate-reports-results-and-presentations.php
Northam Platinum Limited	https://www.northam.co.za/investors-and-media/publications/annual-reports

South Africa as mentioned before is the highest producer of Platinum and PGM and the companies with mines in South Africa namely Northam Platinum Limited, Anglo-American Platinum Limited and Impala Platinum Holdings Limited are global players and have a minimum of 3 years of Annual reports thus meeting the criteria set in Table 2.

Nickel and Nickel-Iron

(Mudd, 2010) highlights the importance of Nickel (Ni) writing about its essential integration in modern infrastructure and technology, primarily in stainless steel, nickel-based alloys, casting and alloy steels, electroplating, and rechargeable batteries. It is mostly commonly found in ores, in laterite ores(Mudd, 2010). As per British Geological Survey Report in 2020, Indonesia produced 816,700 kgs of nickel making it the largest producer and Russia produced 237,300 kgs of Nickel making it the second largest producer in the world(BGS, 2016). Mining Technology uses Global Data insights on the Nickel production industry to showcase the leading producers of Nickel in Indonesia which are Sumitomo Metal Mining, PT Vale Indonesia Tbk (Subsidiary of Vale) and PT ANTAM (*Nickel in Indonesia*, n.d.) .

Table 9: Companies and their operations

Companies	Unit Process	Insource (Y/N)	Source
Sumitomo Metal Mining	Mining	Yes	https://www.smm.co.jp/en/
	Smelting	Yes	https://www.smm.co.jp/en/
	Refining	Yes	https://www.smm.co.jp/en/
PT Vale Indonesia Tbk	Mining	Yes	https://www.vale.com/
	Smelting	Yes	https://www.vale.com/
	Refining	Yes	https://www.vale.com/
PT ANTAM	Mining	Yes	https://antam.com/en
	Smelting	Yes	https://antam.com/en
	Refining	Yes	https://antam.com/en

Iron as per British Geological Survey Report in 2020, Australia produced 918,063,223 kgs of Iron ore making it the largest producer of Iron ore in the world in 2020, China produced 845,000,000 kgs of Iron Ore making it the second largest producer in the world in 2020 (BGS, 2016). Mining Technology uses GlobalData insights on the Iron ore mining industry to showcase the leading producers of Iron in Australia which are Rio Tinto, Broken Hill Proprietary (BHP) and Fortescue Metals Group (*Iron Ore in Australia*, n.d.). Largest iron smelting and refining country and leading companies needs to be identified. The table 10 below showcases what functions each of the company offers and the source. Table 11 is the cumulative list of

companies identified for Nickel and Iron production with the links to their annual reports' repository.

Table 10: Companies and their operations

Companies	Unit Process	Insource (Y/N)	Source	Intext Citation
Rio Tinto	Mining	Yes	Company Website	(Rio Tinto About, n.d.)
	Smelting	Yes	Company Website	(Rio Tinto About, n.d.)
	Refining	Yes	Company Website	(Rio Tinto About, n.d.)
Broken Hill Proprietary	Mining	Yes	Company Website	(Iron Ore BHP, n.d.)
	Smelting	Yes	Company Website	(Iron Ore BHP, n.d.)
	Refining	Yes	Company Website	(Iron Ore BHP, n.d.)
Fortescue Metals Group	Mining	Yes	Company Website	(Our Operations Fortescue Metals Group Ltd, n.d.)
	Smelting	Yes	Company Website	(Our Operations Fortescue Metals Group Ltd, n.d.)
	Refining	Yes	Company Website	(Our Operations Fortescue Metals Group Ltd, n.d.)

Table 11: Annual Reports Repository

Companies	Annual Reports Repository
------------------	----------------------------------

Sumitomo Metal Mining	Integrated Report Investors Sumitomo Metal Mining Co., Ltd. (smm.co.jp)
PT Vale Indonesia Tbk	Annual and Sustainability Reports - Vale
PT ANTAM	PT ANTAM Tbk Annual Reports
Rio Tinto	Annual Report (riotinto.com)
Broken Hill Proprietary	Annual reporting BHP
Fortescue Metals Group	Announcements and Reports Fortescue Metals Group Ltd (fmg.com.au)

4.2 Data Processing Tool

As described in section 3.3, a dedicated Excel processing tool will be developed with the assistance of a focus group from the research project associated with this thesis. The Excel tool will consist of a checklist for each indicator presented in table 4, incorporating recommended practices from international organizations. Each checklist item will have a binary function (yes or no), where a "yes" indicates that the company has implemented these practices and publicly committed to following them. The checklist is based on the best practices outlined by various international organizations.:

International Labor Organization (ILO): Since 1919, ILO has been dedicated to setting worldwide labour standards to promote equitable and fruitful job prospects for men and women, ensuring freedom, equality, security, and dignity (Introduction to International Labour Standards, n.d.)

Responsible mining Foundation (RMF): is an independent research organization that supports the continuous improvement of ethical mining practices across the sector. They accomplish this by developing tools and frameworks, providing information of public interest, and fostering open and fruitful dialogue between mining corporations and other stakeholders. (RMI | Leading Practices | RMI Report 2022, n.d.)

International Council on Mining Metals (ICMM): The Mining Principles established by ICMM offer extensive guidance on environmental, social, and governance practices within the mining industry. Comprising 39 Performance Expectations and 9 position statements, these principles aim to align mining operations with global sustainability targets such as the UN Sustainable Development Goals and the Paris Agreement. Through rigorous site-level validation and credible sustainability reporting, the Mining Principles seek to optimize the positive impact on communities while effectively addressing societal concerns.(ICMM - Our Principles, n.d.)

Extractive Industries Transparencies Initiatives (EITI): EITI standards are based on the EITI principles that focus on the responsible utilization of natural resources can drive sustainable

economic growth and poverty reduction, but mismanagement can have adverse impacts. It is the responsibility of sovereign governments to manage resource wealth for the benefit of their citizens, while transparency in government revenues and expenditures can inform choices for sustainable development (The Global Standard for the Good Governance of Oil, Gas and Mineral Resources EITI STANDARD 2023 Part 1: Principles and Requirements, 2023).

The Organization for Economic Cooperation and Development (OECD): Is an international organization, they collaborate with governments, policymakers, and citizens to establish evidence-based international standards and address various social, economic, and environmental challenges. They provide a platform for data analysis, knowledge sharing, and best-practice exchange (About the OECD - OECD, n.d.)

Voluntary human rights and security: is a joint endeavor by governmental bodies, commercial enterprises, and non-governmental groups. It is intended to help mining, oil, and gas firms secure their operations while preserving human rights. To ensure that the security of corporate premises complies with human rights norms, the guiding principles emphasize completing extensive human rights risk assessments and collaborating with both public and private security services. (The Voluntary Principles on Security and Human Rights - United States Department of State, n.d.)

International Finance Corporation Performance Standards (IFC-PS): establishes minimal standards for projects that are largely located in emerging economies with regard to social, environmental, and corporate governance concerns in order to successfully manage associated risks. (International Finance Corporation (IFC), n.d.).

Sustainability Accounting Standards Board (SASB): The SASB Standards are developed to systematically identify and establish consistent reporting guidelines for sustainability concerns that hold the greatest significance for investors when making decisions. These standards are tailored to address industry-specific sustainability issues across 77 different sectors (Download SASB Standards - SASB, n.d.)

International Standards Organization (ISO): is an international organization charged with developing and disseminating standards. These standards provide generally agreed policies and requirements for disciplines including quality control, environmental management, and data security. They encourage global trade and collaboration while assisting firms in establishing consistency, efficiency, and safety in their operations (ISO - Standards, n.d.).

Global Reporting Initiative (GRI): The GRI Standards are internationally recognized as the leading approach for public reporting on economic, environmental, and social impacts. By adhering to these standards, organizations can provide transparent information about their role in sustainable development, including both positive and negative contributions. The Standards serve as a benchmark for disclosing sustainability-related information and promote accountability and awareness in reporting practices (GRI - Standards, n.d.).

United Nations Global Compact (UNGC): The cornerstone of corporate sustainability is the UN Global Compact's Ten Principles, which emphasize a values-driven approach to business operations. These recommendations, which deal with labor, the environment, and anti-corruption,

tell moral businesses to uphold these standards consistently across all of their operations. By implementing these values into their strategies, policies, and processes and creating an environment of integrity, businesses may fulfill their fundamental obligations to people and the environment while setting the groundwork for long-term success. (The Ten Principles | UN Global Compact, n.d.).

The above-mentioned organizations and initiatives were used to develop the checklists for each indicator as shown from table (12) to table (25). A brief description of the stakeholder subcategory, indicator (Refer table 4) and the checklist developed will be provided below:

Sub-category "Discrimination": The goal of the subcategory is to evaluate equal opportunity management practices and the existence of discrimination in the opportunities that firms provide to their employees as well as in the working environment (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicators that will be measured are Women in Workforce, Gender Equity and Historically Disadvantaged People (as mentioned in table 4).

Table 12: Women in Workforce checklist

Check List	Y/N	Keywords in the Report
"Establishing or enhancing diversity policies with clear targets for inclusion and results reporting"(Balcazar et al., n.d.)	No	Female Employees
"attaining gender equality in recruitment policies and processes"(Principle 6 UN Global Compact, n.d.)	Yes	Women, Training and Development
"implementing gender inclusive networks, career development and mentoring programmes"(GRI - Resource Center, n.d.)	Yes	Trainings
"Formal statement of following relevant international standards and Practices"(Balcazar et al., n.d.)	Yes	promote, Reporting, Approach

“Developing equitable promotion and retention policies”(GRI - Standards, n.d.)	Yes	Talent management, improving office environment
“Grievance Mechanisms for Gender Discrimination” (Balcazar et al., n.d.)	Yes	Grievance, Grievance mechanism
“Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels”(GRI - Standards, n.d.)	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors, Women in Management
External Audits and Review(Balcazar et al., n.d.)	Yes	External Auditor
“Has Information been shared to employees on the grievance mechanism need to combine this” (Balcazar et al., n.d.)	Yes	Grievance Mechanism
“Formal Statement: Gender Equality Policy” (Balcazar et al., n.d.)	Yes	Number of Employees Based on Employment Status and Gender
“Are the External suppliers aware of this grievance mechanism” (Balcazar et al., n.d.)	Yes	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	No	Cases
“Employee training on Gender Discrimination”(GRI - Standards, n.d.)	Yes	Trainings (promoting equality and awareness)

Table 13: Gender Equity Checklist

Check List	Y/N	Keywords in the Report
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“Performance review by international Organization Collaboration”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Bloomberg Index
Gender Equity commitment through International Organizations	Yes	Gender Equality Index (Bloomberg)
“Remuneration Committee addressing gender wage gap” (RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Remuneration, Wage Pay gap
External Audits and Review	Yes	External Audit
“Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women”(IFC <i>Performance Standards on Environmental and Social Sustainability</i> , 2012)	Yes	Gender, Women, Impact, Assessment (Social Way Toolkit)
Gender Wage Gap Reported to be 1:1	No	Gender Pay Gap
Gender Wage Gap Policy/Statement(<i>The Ten Principles</i> UN <i>Global Compact</i> , n.d.)	Yes	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination (RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Grievance Mechanism but for all including harassment and Discrimination (Gender Based Discrimination)
No cases of Gender Wage Pay Gap (External Source)	Yes	Cases

“Has Information been shared to employees on the grievance mechanism” (Balcazar et al., n.d.)	Yes	Grievance Mechanism
“Are the External suppliers aware of this grievance mechanism”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	No	Grievance Mechanism
“Employee training on Sexual Harassment” (GRI - <i>Standards</i> , n.d.)	Yes	Awareness Training

Table 14: Historically Disadvantaged People checklist

Check List	Y/N	Keywords in the Report
“Take specific measures to reflect its non-discrimination policies in their terms and conditions” (<i>The Text of the Declaration and Its Follow-up (DECLARATION)</i> , n.d.)	Yes	Discrimination
“Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace” (RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	Awareness Trainings
“Set targets regarding diversity and inclusivity in its recruitment and employment practices” (GRI - <i>Standards</i> , n.d.)	No	Targets

Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Inclusive, Diversity, International Labour Organization
“The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers”(International Finance Corporation (IFC), n.d.)	Yes	Collective Bargaining
“The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements”(IFC Performance Standards on Environmental and Social Sustainability, 2012)	Yes	Collective Bargaining
“The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site”(GRI - Resource Center, n.d.)	No	Collective Bargaining, Union

Subcategory “Worker Health and Safety”: This Subcategory aims to assess the frequency of occurrences as well as the efficiency of management strategies and preventative actions. In this context, any work-related event, regardless of severity, that led to or had the potential to lead to harm, disease, or death is referred to as an incident(Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicators used to asses this are Accidents at the Workplace, Fatal Accidents at the work place and Health and Safety at the Workplace.

Table 15: Accident Rate at Workplace checklist

Check List	Y/N	Keywords in the Report
"Accident Rate at Workplace total Reported"(GRI - Resource Center, n.d.)	Yes	Accident Rate, Lost Time Injuries (LTI)
"Discloses the number of mining-related injuries among its workforce, across successive time periods"(GRI - Resource Center, n.d.)	Yes	Accident Rate, Lost Time Injuries (LTI)
"Discloses such information on a site-disaggregated basis"(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Accident Rate, Lost Time Injuries (LTI)
"Confirms that its Accident Rate reporting includes Accidents of contract workers as well as employees"(RMI Leading Practices RMI Report 2022, n.d.)	No	Accident Rate, Lost Time Injuries (LTI)
"Evaluation on Accidents and how to prevent it"(RMI Leading Practices RMI Report 2022, n.d.)	No	Accident Rate, Lost Time Injuries (LTI), Accident

Table 16: Fatal Accidents at the workplace checklist

Check List	Y/N	Keywords in the Report
Fatal Accidents at Workplace total Reported(GRI - Standards, n.d.)	Yes	Fatal Accidents

“Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods”(GRI - Standards, n.d.)	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Fatal Accidents
“Confirms that its fatalities reporting includes fatalities of contract workers as well as employees”(RMI Leading Practices RMI Report 2022, n.d.)	No	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it(RMI Leading Practices RMI Report 2022, n.d.)	No	Fatal Accidents, Contractors

Table 17: Health and Safety at the Workplace Checklist

Check List	Y/N	Keywords in the Report
“Assigned senior management or board-level responsibilities and accountability for carrying out this commitment”(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Code of Conduct, Code
Monitoring Psychological Hazards(GRI - Standards, n.d.)	Yes	Code, Fatigue, Psychological, Hazard, Health (Look for strategies that show assessments), Mental Health
prevention of occupational diseases(GRI - Standards, n.d.)	Yes	Occupation, Occupational Hazard

health surveillance and risk-based monitoring programmes (<i>GRI - Standards, n.d.</i>)	Yes	Health monitoring, risk-based monitoring
“Identify and assess health and safety risks to the workforce”(<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	Yes	Occupational Risk Assessment
“Track the implementation of these strategies and plans”(<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	No	Need to share a detailed approach to track these strategies (will be given in depth in the risk assessment and risk management section in safety or Health)
“Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions”(<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	Yes	Code of Conduct, Safety Compliance, Accountability
“Develop strategies and plans to avoid, minimise and mitigate these risks”(<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	Yes	Risk Assessment and mitigation
External Audits and Review	Yes	
Required Safety Equipment (PPE)(<i>GRI - Standards, n.d.</i>)	Yes	Protective Equipment
Health and Safety Policy (<i>GRI - Standards, n.d.</i>)	Yes	Health and Safety management system, Health, and Safety Policies
Regular Health and Safety Training(<i>GRI - Standards, n.d.</i>)	Yes	Safety training

Gender Specific PPE on all mining Sites(<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	No	Protective, Gender Equipment (needs to specify gender-based PPE)
Reported cases of negligent safety rules leading to accidents(<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities (<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	No	Facilities, Sanitation, Provision
Health Services(<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	Yes	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	No	Incidents, accidents, negligence

Subcategory “Fair Competition”: This subcategory looks at whether the company's competitive attempts are carried out morally and in line with the laws that forbid monopolistic practices, anti-competitive activity, and anti-trust actions(Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is Presence of anti-Competitive Behavior and Fair Competition.

Table 18: Presence of Anti-competitive Behaviour and Fair competition

Check List	Y/N	Keywords in the Report
“Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small-Scale Mining ASM activities around its operations”(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Stakeholder engagement
“Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement	Yes	Stakeholder engagement

agreements where appropriate”(RMI <i>Leading Practices</i> <i>RMI Report 2022</i> , n.d.)		
“Systematically tracks the implementation of these strategies and plans” (<i>RMI Leading Practices</i> <i>RMI Report 2022</i> , n.d.)	Yes	Stakeholder engagement
“Policies against Anti competitive behaviour” (GRI 206 Anti competitive Behaviour) (<i>GRI - Standards</i> , n.d.)	Yes	anti - competitive
No cases of anti competitive behaviour in the past 3 years	Yes	Grievance, Incident, code of conduct
“Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners around their sites”(RMI <i>Leading Practices</i> <i>RMI Report 2022</i> , n.d.)	Yes	Community engagement
“Develop strategies and plans according to these assessments”(IFC <i>Performance Standards on Environmental and Social Sustainability</i> , 2012)	No	Community engagement
“Engage with ASM miners in these needs assessments and in the development of any strategies and plans”(GRI - <i>Resource Center</i> , n.d.)	No	Community engagement

Subcategory “Corruption”: This Subcategory examines any signs of an organization's involvement in corrupt activities and assesses if it has put in place enough safeguards to prevent corruption (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is Business Ethics, Anti-Corruption and Transparency.

Table 19: Business Ethics, Anti-Corruption and Transparency

Check List	Y/N	Keywords in the Report
<p>“Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption”. (<i>GRI - Resource Centre, n.d.</i>)(<i>The Ten Principles UN Global Compact, n.d.</i>)</p>	Yes	Corruption
<p>“Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project”.(<i>RMI Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Corruption, Extractive Industries Transparency Initiative
<p>“Assigned senior management or board-level responsibilities and accountability for carrying out this commitment”(RMI <i>Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Ethics Committee
<p>“Committed financial and staffing resources to implement this commitment”(RMI <i>Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Corruption, Bribery
<p>“Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response”(GRI - <i>Standards, n.d.</i>)</p>	Yes	Corruption
<p>“Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption”(RMI <i>Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Bribery, corruption, Audits, Compliance

No cases of Corruption or whistleblowing in the past 3 years	No	Corruption
“Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?” (<i>ICMM - Our Principles</i> , n.d.)	Yes	Corrective Action, Corruption
“Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in response” (<i>RMI Leading Practices RMI Report 2022</i> , n.d.)	Yes	Corruption
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	Yes	Bribery, corruption, Audits, Compliance
“Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms” (<i>RMI Leading Practices RMI Report 2022</i> , n.d.)	Yes	Audits, compliance, risk assessment
“Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g., those of subsidiary or branch entities) it is known in that place” (GRI 201) (<i>GRI - Resource Centre</i> , n.d.)	Yes	Tax and Economic Value, Economic Contribution

<p>“Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions” (<i>The Global Standard for the Good Governance of Oil, Gas and Mineral Resources EITI STANDARD 2023 Part 1: Principles and Requirements, 2023</i>)</p>	<p>Yes</p>	<p>Low Tax</p>
<p>“Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity” (<i>The Global Standard for the Good Governance of Oil, Gas and Mineral Resources EITI STANDARD 2023 Part 1: Principles and Requirements, 2023</i>)</p>	<p>No</p>	<p>Tax Benefits, Deductions</p>

Subcategory “End of Life Responsibility”: This Subcategory evaluates how well a company deals with the societal effects of a product or service's end-of-life. It entails giving customers precise and frank information about sensible end-of-life options. Producers might occasionally be in charge of waste reclamation, recycling, or safe disposal (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is Mine Closure and Post Viability.

Table 20: Mine Closure and Post Viability

<p>Check List</p>	<p>Y/N</p>	<p>Keywords in the Report</p>
<p>“Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities” (<i>RMI / Leading Practices RMI Report 2022, n.d.</i>)</p>	<p>Yes</p>	<p>mine closure</p>

“Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities”(RMI / Leading Practices RMI Report 2022, n.d.)	Yes	mine closure
“Consider post-mining land-use opportunities in the development of these management plans”(RMI / Leading Practices RMI Report 2022, n.d.)	Yes	mine closure
“Identify, from the earliest stage, the impacts their closure will have for workers”(GRI - Standards, n.d.)	Yes	mine closure
“Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers”(GRI - Standards, n.d.)	Yes	mine closure
“Develop partnerships with government, other industries or companies to address workers’ livelihood needs”(GRI - Standards, n.d.)	Yes	mine closure
“Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations”(RMI / Leading Practices RMI Report 2022, n.d.)	Yes	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	No	mine closure
“Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive	No	mine closure

mine rehabilitation”(RMI / Leading Practices / RMI Report 2022, n.d.)		
“Discloses financial surety arrangements for the closure of all its operations, related to workers and communities”(RMI / Leading Practices / RMI Report 2022, n.d.)	No	mine closure
“Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure”(RMI / Leading Practices / RMI Report 2022, n.d.)	No	mine closure
“Discloses this information on a project-disaggregated basis”(RMI / Leading Practices / RMI Report 2022, n.d.)	No	mine closure

Subcategory “Promoting Social Responsibility”: This Subcategory seeks to gauge the degree to which the business encourages social responsibility throughout its supplier chain and in its own operations. It evaluates how well the business manages its suppliers in a socially responsible manner, which includes monitoring, auditing, and offering training as needed. This category also looks at whether the business takes the necessary remedial actions with suppliers as necessary(Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to evaluate this is Responsible Contracting and Sourcing.

Table 21: Responsible Contracting and Sourcing

Check List	Y/N	Keywords in the Report
“Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues and Labour Issues” (UNGC Principle 2, VPs	Yes	Responsible procurement, procurement, supply chain

B7, GRI 308; 407; 412; 414) (<i>GRI - Standards</i> , n.d.), (<i>The Ten Principles UN Global Compact</i> , n.d.)		
“Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Environmental Issues”(GRI - Resource Centre, n.d.)	Yes	Responsible procurement, procurement, supply chain
“Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	Procurement, Local Procurement
“Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	Audit, Tax Audit
“Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	No	Review, Audit
“Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain”(GRI - <i>Standards</i> , n.d.)	Yes	Responsible procurement, procurement, supply chain

“Has systems in place to develop strategies and plans to address these identified risks”(GRI - Standards, n.d.)	Yes	Responsible procurement, procurement, supply chain
“Systematically tracks the implementation of these strategies and plans”(GRI - Standards, n.d.)	Yes	Responsible, Procurement, Supply chain
“Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities”(GRI - Standards, n.d.)	Yes	Local Procurement
“Has systems in place to ensure its operations actively include women in these strategies and plans”(GRI - Standards, n.d.)	No	Women, Local Procurement, Female
“Systematically tracks the implementation of these strategies and plans”(GRI - Standards, n.d.)	No	Women, Local Procurement, Female

Subcategory “Public commitments to sustainability issues”: This Subcategory assesses how committed a company is to reduce its environmental and social impact. When opposed to internal goals just, public pledges have higher relevance and accountability (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is CSR Commitments and Social Development.

Table 22: CSR Commitments and Social Development

Check List	Y/N	Keywords in the Report
“Formalised its commitment, that is endorsed by senior management, to take account of national and supranational socio-economic development plans in making its mining-	Yes	Socio-economic Development

related investment and business decisions in producing countries, with the aim of enhancing socio-economic development". (<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)		
"Assigned senior management or board-level responsibilities and accountability for carrying out this commitment" (<i>GRI - Resource Centre, n.d.</i>)	Yes	Socio-economic Development
"Committed financial and staffing resources to implement this commitment" (<i>GRI - Resource Centre, n.d.</i>)	Yes	Socio-economic Development
"Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role" (<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	Yes	Socio-economic Development, socio-economic, socio-economic benefits
"Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?" (<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	Yes	Socio-economic Development, socio-economic, socio-economic benefits
"Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments" (<i>RMI Leading Practices RMI Report 2022, n.d.</i>)	Yes	Regional Government, Government, Socio-economic

“Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities
“Develop R&D programmes to address these priorities”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities
“Track the implementation of these R&D programmes”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities
“Support STEM education among the wider population in collaboration with in-country institutions”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	School, Education, Academia
“Support technical/vocational skills development among the wider population in collaboration with in-country institutions”(GRI - <i>Standards</i> , n.d.)	Yes	School, Education, Academia, Student, Technical, Vocational
“Demonstrate alignment of their skills development efforts with the national skills development agenda”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Education, Vocational, National
“Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries”(RMI <i>Leading Practices</i> RMI Report 2022, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities
“Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries”(GRI - <i>Standards</i> , n.d.)	No	Manager, Managerial skill

“Systematically tracks the implementation of their skills development programmes”(GRI - Standards, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities
“Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses”(The Ten Principles / UN Global Compact, n.d.)	Yes	Businesses, Enterprises, Entrepreneurship
“Has systems in place to ensure its operations actively include women in these strategies and plans”(RMI Leading Practices / RMI Report 2022, n.d.)	Yes	Women, Female, Gender
“Systematically tracks the implementation of these strategies and plans”(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities

Subcategory “Prevention and Mitigation of Conflict”: This Subcategory assesses how much the organization is involved in actual or future disputes. It takes into account both the favorable and unfavorable effects that the organization may have on the escalation of conflicts(Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is Prevention of Conflict and Mitigation.

Table 23: Prevention of Conflict and Mitigation

Check List	Y/N	Keywords in the Report
“The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves and probable reserves that are located in or near areas of active conflict. Security and human rights” (Sustainability Accounting Standard Sustainable Industry Classification System ® (SICS ®) EM-MM Metals & Mining, 2023)	No	Conflict, areas of conflict

<p>“The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to: Use of free, prior, and informed consent (or consultation) processes”(GRI - Resource Centre, n.d.)</p>	<p>Yes</p>	<p>Indigenous people</p>
<p>“The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to: Upholding International Labour Organization (ILO) Convention No. 169”(The Text of the Declaration and Its Follow-up (DECLARATION), n.d.)</p>	<p>No</p>	<p>International Labour Organization</p>
<p>“The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to: The establishment of project grievance mechanisms”(IFC Performance Standards on Environmental and Social Sustainability, 2012)</p>	<p>Yes</p>	<p>Grievance mechanism, whistleblowing</p>
<p>“The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to: The establishment of formal community agreements”(The Ten Principles UN Global Compact, n.d.)</p>	<p>Yes</p>	<p>Lease agreements</p>

“Implementation of Voluntary Principles on Security and Human Rights”. (<i>The Voluntary Principles on Security and Human Rights - United States Department of State, n.d.</i>)	Yes	Voluntary Principles on Security and Human Rights
“Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas”(OECD, 2020)	No	Supply chain, Audit, third party audit
“Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management” (<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	No	Security
“Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management”(RMI <i>Leading Practices RMI Report 2022, n.d.</i>)	No	Security
“Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management”(RMI <i>Leading Practices RMI Report 2022, n.d.</i>)	No	Security

Subcategory “Safe and Healthy Living Conditions”: This Subcategory assesses how organizations affect public health and safety. It includes both the operational environment's general level of safety and its effect on public health (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is “Community Engagement and Wellbeing.”

Table 24: Community Engagement and wellbeing Checklist

Check List	Y/N	Keywords in the Report
<p>“Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs” (<i>The Ten Principles UN Global Compact, n.d.</i>)</p>	Yes	UNGC, Human Rights
<p>“Assigned senior management or board-level responsibilities and accountability for carrying out this commitment” (<i>RMI Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Committee, board member, Human Rights
<p>“Committed financial and staffing resources to implement this commitment” (<i>RMI Leading Practices RMI Report 2022, n.d.</i>)</p>	Yes	Committee, board member, Human Rights
<p>“Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights” (<i>Sustainability Accounting Standard Sustainable Industry Classification System[®] (SICS[®]) EM-MM Metals & Mining, 2023</i>)</p>	Yes	Gap Analysis, Risk Assessment, Impact assessment
<p>“Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts” (<i>Sustainability Accounting Standard Sustainable Industry Classification System[®] (SICS[®]) EM-MM Metals & Mining, 2023</i>)</p>	Yes	Risk Assessment, Gap Analysis

<p>“Systematically tracks the implementation of these strategies and plans”(Sustainability Accounting Standard Sustainable Industry Classification System ® (SICS ®) EM-MM Metals & Mining, 2023)</p>	<p>Yes</p>	<p>Risk Assessment, Gap Analysis</p>
<p>“Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes”(Sustainability Accounting Standard Sustainable Industry Classification System ® (SICS ®) EM-MM Metals & Mining, 2023)</p>	<p>No</p>	<p>mine-site, mine, human rights</p>
<p>Audits and/or reviews its performance on managing human rights issues(RMI Leading Practices RMI Report 2022, n.d.)</p>	<p>No</p>	<p>Audits, Reviews</p>
<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them”(RMI Leading Practices RMI Report 2022, n.d.)</p>	<p>No</p>	<p>Community Engagement</p>
<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them”(RMI Leading Practices RMI Report 2022, n.d.)</p>	<p>Yes</p>	<p>Youth</p>

<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them”(RMI <i>Leading Practices RMI Report 2022</i>, n.d.)</p>	<p>No</p>	<p>Community Engagement, Disability</p>
<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on women?”(RMI <i>Leading Practices RMI Report 2022</i>, n.d.)</p>	<p>No</p>	<p>Impact, Risk, Women</p>
<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on youth?”(RMI <i>Leading Practices RMI Report 2022</i>, n.d.)</p>	<p>No</p>	<p>Impact, Risk, Youth</p>
<p>“Can the company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?”(RMI <i>Leading Practices RMI Report 2022</i>, n.d.)</p>	<p>No</p>	<p>Impact, Risk, Children</p>
<p>“Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health”(IFC <i>Performance Standards on Environmental and Social Sustainability</i>, 2012)</p>	<p>Yes</p>	<p>Risk Assessment, Gap Analysis</p>

“Has systems in place to ensure its operations develop strategies and plans to address these impact”(<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	Yes	Risk Assessment, Gap Analysis
“Systematically tracks the implementation of these strategies and plans”(<i>IFC Performance Standards on Environmental and Social Sustainability, 2012</i>)	Yes	Risk Assessment, Gap Analysis
“Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities”(<i>The Ten Principles UN Global Compact, n.d.</i>)	Yes	Risk Assessment, Gap Analysis
“Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts”(<i>Sustainability Accounting Standard Sustainable Industry Classification System ® (SICS ®) EM-MM Metals & Mining, 2023</i>)	Yes	Risk Assessment, Gap Analysis
“Systematically tracks the implementation of these strategies and plans”(<i>Sustainability Accounting Standard Sustainable Industry Classification System ® (SICS ®) EM-MM Metals & Mining, 2023</i>)	Yes	Risk Assessment, Gap Analysis
“Develop and maintain emergency preparedness and response plans”(<i>GRI - Resource Centre, n.d.</i>)	Yes	Emergency Planning
“Systematically engage with local stakeholders (e.g., local authorities and communities) in the design of emergency response plans”(<i>GRI - Resource Centre, n.d.</i>)	Yes	Emergency Planning

“Systematically engage with local stakeholders in the testing of these response plans”(GRI - Resource Centre, n.d.)	No	Emergency Planning, Response
“Regularly assess, against baseline values, the noise and vibration levels generated by their activities”(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Noise
“Develop strategies and plans to limit the impacts of noise and vibration generated by their activities in the surrounding areas”(RMI Leading Practices RMI Report 2022, n.d.)	Yes	Noise
“Systematically engage with affected communities and other stakeholders in the development of these strategies”(RMI Leading Practices RMI Report 2022, n.d.)	No	Noise
“Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response”(RMI Leading Practices RMI Report 2022, n.d.)	No	Noise
“Audits and/or reviews, based on complainants’ perspective, the effectiveness of its grievance mechanisms for communities”(RMI Leading Practices RMI Report 2022, n.d.)	No	Noise
“Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities”(RMI Leading Practices RMI Report 2022, n.d.)	No	Noise

Subcategory “Local Employment”: This subcategory evaluates the involvement of an organization in influencing local employment either directly or indirectly (Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 - Life Cycle Initiative, n.d.). The indicator used to assess this is Local Employment

Table 25: Local Employment Checklist

Check List	Y/N	Keywords in the Report
“Does the company publicly disclose the number of its employees hired from local communities”(GRI - Standards, n.d.)	No	Employees, workers, Local workers, Local employees
“Does the company publicly disclose the number of its contract workers hired from local communities”(GRI - Standards, n.d.)	No	Employees, workers, Local workers, Local employees, contract employees, contract, contract workers
“Does the company publicly disclose the number of women workers hired from local communities”(RMI Leading Practices RMI Report 2022, n.d.)	No	Employees, workers, Local workers, Local employees, Women
“Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries”(The Ten Principles UN Global Compact, n.d.)	Yes	School, Education, Academia, Student, Technical, Vocational
“Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries”(The Ten Principles UN Global Compact, n.d.)	No	Manager, Managerial skill
“Systematically tracks the implementation of their skills development programmes”(The Ten Principles UN Global Compact, n.d.)	Yes	Socio-economic, NGO, Academia, Opportunities

“Support STEM education among the wider population in collaboration with in-country institutions”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	School, Education, Academia
“Support technical/vocational skills development among the wider population in collaboration with in-country institutions”(GRI - <i>Standards</i> , n.d.; RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	School, Education, Academia, Student, Technical, Vocational
“Demonstrate alignment of their skills development efforts with the national skills development agenda”(RMI <i>Leading Practices RMI Report 2022</i> , n.d.)	Yes	Education, Vocational, National
Local Employment Initiatives (ICMM - <i>Our Principles</i> , n.d.)	Yes	Local Employment, Employment, Job sites

4.2.1 Score Generator

The checklist in the Excel tool generates a score ranging from -2 to +2 based on the number of "yes" answers recorded in the respective columns. A score of -2 indicates the least compliance, while +2 signifies that the company demonstrates most of the best practices in their reports and formal statements. Conditional formatting in Excel was used to facilitate this process. For a more detailed explanation, refer to Figure (8) and Figure (9) which depict the score generator tool used for the Women in Workforce checklist in Table (12). Utilizing “Women in workforce” subcategory the no of practices (13) listed in Table (12), with an interval of 2.6 defining the score assigned for a set number of "yes" answer, as illustrated in Figure (9).

No of Yes for conditional formatting		
2	10,5	13
1	7,9	10,4
0	5,3	7,8
-1	2,7	5,2
-2	0	2,6

Figure 8: Number of Yes for Conditional Formatting

Number of "Yes" answers	Social Responsibility Score
11	2

Figure 9: Social Responsibility Score

4.3 Social Responsibility Scores

The Social Responsibility scores for the companies listed in Table (26) were computed using the aforementioned Excel tool. The checklists for individual companies and each indicator can be found in Appendix I. Utilizing the data from Table (26), Table (27) was created to present the average social responsibility of companies operating in the mining sectors of Platinum & Iridium, Iron, and Nickel.

Table 26: Social Responsibility Score per company

Stakeholder Categories	Sub-Categories	Indicators	Anglo American (Pt and Ir mining)	North Ham Platinum (Pt and Ir mining)	RioTinto (Fe mining)	Broken Hill Proprietary (Fe mining)	Vale (Ni Mining)	Sumitomo (Ni mining)
Worker	Equal Opportunity/Discrimination	Women in Work Force	2	1	2	1	1	1
		Gender Equity	2	0	0	1	1	-1
		Historically Disadvantaged People	1	2	1	1	2	2
Value Chain Actor	Health and Safety	Accidents at the Workplace	0	-1	1	1	1	2
		Fatalities in the Workplace	0	-1	0	1	1	2
		Health Safety measures	1	1	1	1	0	0
	Fair Competition	Presence of anti-competitive behaviour and Fair Competition	1	1	0	2	2	2
			2	-1	1	2	2	0
	Corruption	Business Ethics, Anti Corruption and Transparency	2	-1	1	2	2	0

	End of Life Responsibility	Mine Closure and Post Closure Viability	0	-1	0	1	2	-2
	Promoting Social Responsibility	Responsible Contracting and Sourcing	1	0	0	2	1	1
	Public Commitments to Society Welfare	CSR commitments and Social Development	2	2	1	2	0	1
Society	Prevention of Conflict and Mitigation	Prevention of Conflict and Mitigation	-1	-2	1	-1	1	-1
Local Community	Safe and Health Living Conditions	Community Health and Wellbeing	0	-1	1	1	1	0
	Local Employment	Local Employment	0	1	1	0	-1	1

Table 27: Average social Responsibility Score per metal

Stakeholder Categories	Sub-Categories	Indicators	Value Pt & Ir	Value Ni	Value Fe
Worker	Equal Opportunity/Discrimination	Women in Work Force	1.5	1	1,5
		Gender Equity	1	0	0.5
		Historically Disadvantaged People	1.5	2	1
Value Chain Actor	Health and Safety	Accidents at the Workplace	-0.5	1.5	1
		Fatalities in the Workplace	-0.5	1.5	0.5
		Health Safety measures	1	0	1
	Fair Competition	Presence of anti-competitive behaviour and Fair Competition	1	2	1

	Corruption	Business Ethics, Anti Corruption and Transparency	0.5	1	1.5
	End of Life Responsibility	Mine Closure and Post Closure Viability	-0.5	0	0.5
	Promoting Social Responsibility	Responsible Contracting and Sourcing	0.5	1	1
	Public Commitments to Society Welfare	CSR commitments and Social Development	2	0.5	1.5
Society	Prevention of Conflict and Mitigation	Prevention of Conflict and Mitigation	-1.5	0	0
Local Community	Safe and Health Living Conditions	Community Health and Wellbeing	-0.5	0.5	1
	Local Employment	Local Employment	0.5	0	0.5

The data from Table (27) was used to generate comparative graphs, presented below in Figure (10). These graphs depict the social responsibility scores for Platinum mining and Nickel mining, based on the average scores of companies operating in each respective metal category.

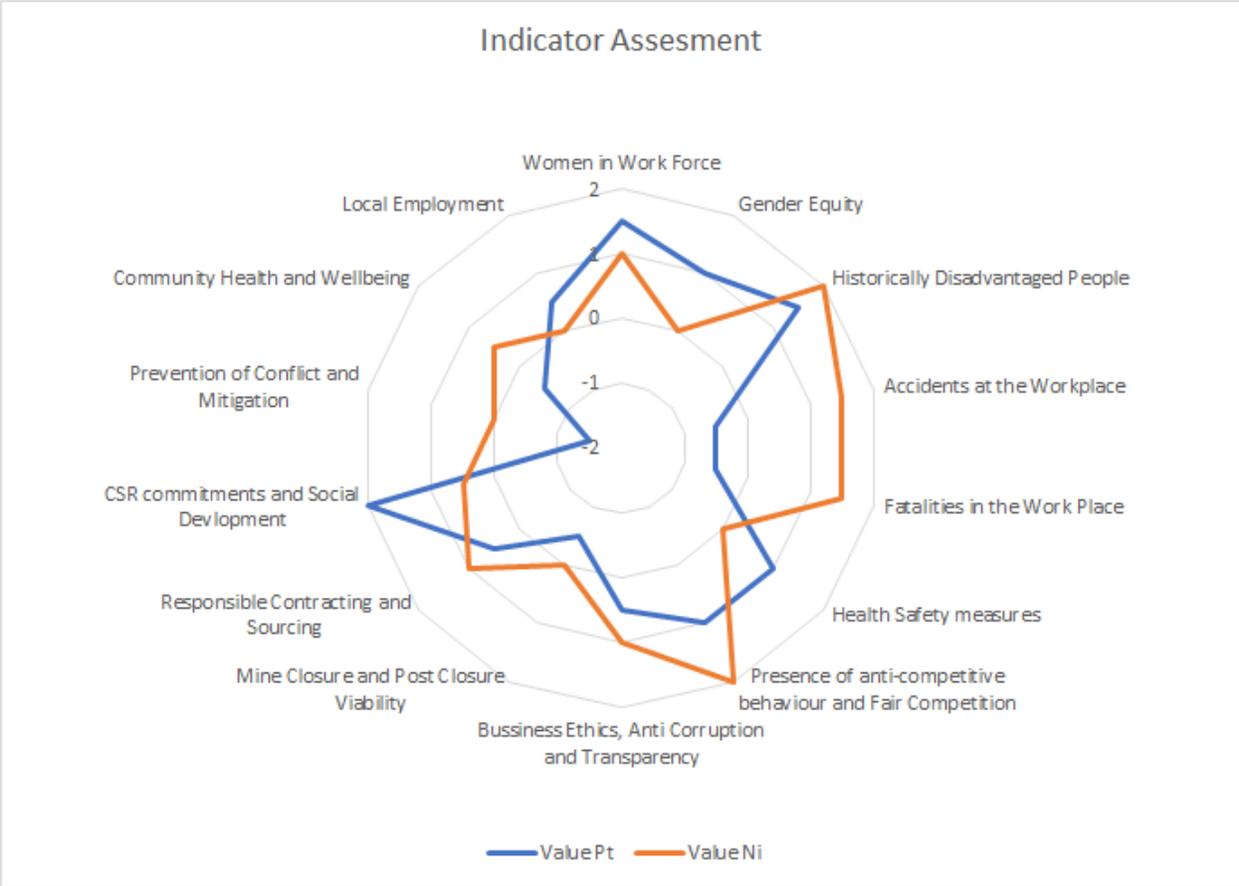


Figure 10: Indicator Assessment, Platinum vs Nickel

The figure above shows an overall trend where the average social responsibility score for Nickel mining companies remains above the baseline of “0”, indicating compliance with standard requirements outlined in Table 5 (Scorecard). However, the average social responsibility score for Platinum mining companies falls short of the baseline for five indicators, including workplace accidents, workplace fatalities, mine closure and post-closure viability, prevention of conflict and mitigation, and community health and wellbeing. Out these indicators, the score drops below “-1” for the indicator prevention of conflict and mitigation. Notably, Nickel mining companies achieve a “+2” social responsibility score for two indicators: Historically Disadvantaged people and Presence of Anti-Competitive behaviour and Fair Competition. On the other hand, Platinum mining companies achieve a “+2” score for only one indicator, which is CSR commitment and social development. Additionally, Nickel mining companies attain a “+1” score for five indicators, while Platinum mining companies receive a “+1” score for four indicators.

The data from Table (27) was used to generate comparative graphs presented below in Figure (11). These graphs illustrate the social responsibility scores for Iridium mining, as well as Nickel and Iron mining (since Nickel Iron alloy primarily consists of Nickel and Iron cite this). The scores are based on the averages of companies operating in each respective metal category.

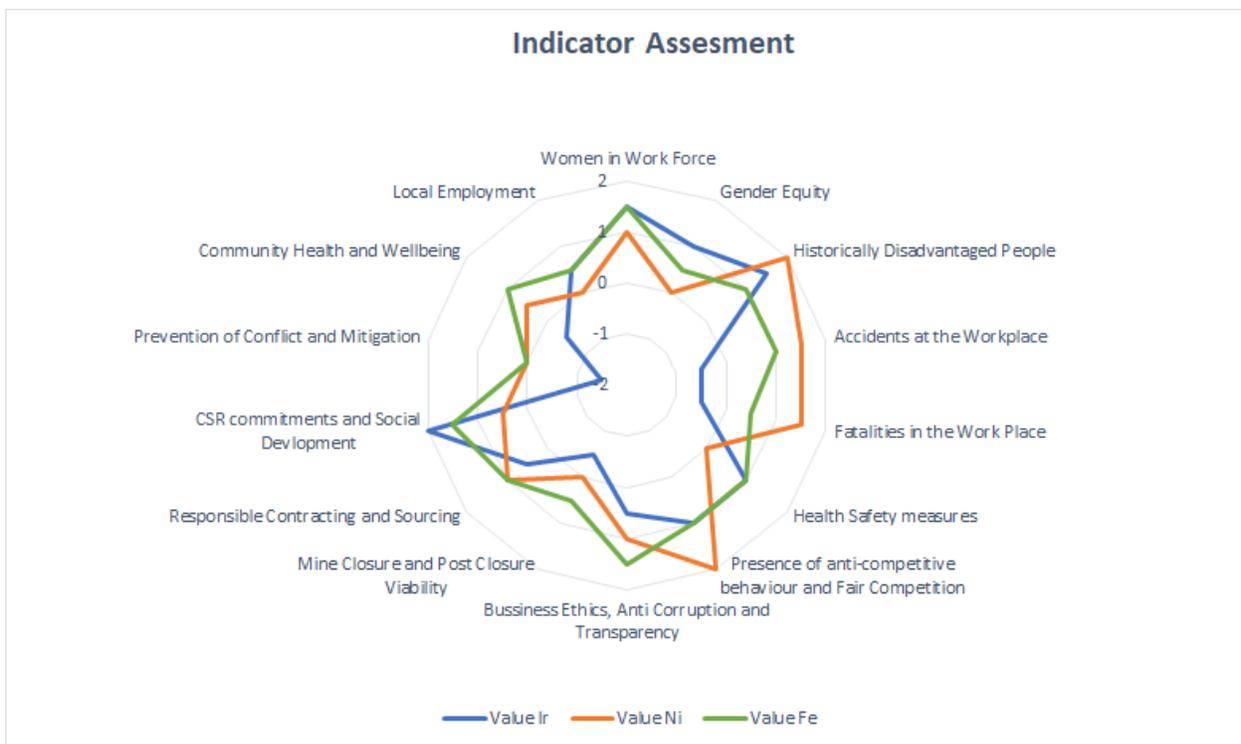


Figure 11: Indicator Assessment, Iridium vs Nickel-Iron

The figure above illustrates an overall trend where the average social responsibility scores for Nickel mining companies and Iron mining companies consistently meet or exceed the baseline requirement of "0" as specified in Table 5 (Scorecard). However, the average social responsibility

score for Iridium mining companies falls below the baseline for five indicators, including workplace accidents, workplace fatalities, mine closure and post-closure viability, prevention of conflict and mitigation, and community health and wellbeing. Notably, the prevention of conflict and mitigation indicator has a score below "-1" for Iridium mining. Furthermore, the graph reveals that Iron mining companies have consistently maintained a score above the baseline of "0" for most indicators, with the exception of prevention of conflict and mitigation. Interestingly, none of the indicators have achieved a "+2" score for Iron mining companies. On the other hand, Nickel mining companies obtain a "+2" social responsibility score for two indicators: Historically Disadvantaged people and Presence of Anti-Competitive behaviour and Fair Competition. In contrast, Iridium mining companies achieve a "+2" score for only one indicator, which is CSR commitment and social development. Additionally, Nickel mining companies obtain a "+1" score for five indicators, while Iridium mining companies receive a "+1" score for four indicators.

5. Discussion

In this section, we will investigate and answer the five sub-research questions, namely: "What are the Social Impacts of Iridium Catalyst?", "What are the Social Impacts of Platinum Catalyst?", "What are the Social Impacts of Nickel Catalyst?", "What are the Social Impacts of Nickel Iron Catalyst?", and "Comparison of the social impacts through Scenarios?". The first four research questions will be addressed by analysing the obtained social responsibility scores presented in the results section and providing insights into the observed trends. The fifth sub-research question will be approached by utilizing the social responsibility scores to gain understanding of the three selected scenarios for the Social Life Cycle Assessment, as described in section 3 methodology. These scenarios include:

1. Status of the PEM and Alkaline Electrolysis technology
2. Improved efficiency (lesser milligrams of catalyst required to generate 1 kg of Hydrogen) of PEM and Alkaline Electrocatalysts in the future.
3. Integrating Recycling as source of Raw materials.

In addition, this section will evaluate the methodology employed and the formulated checklist. Furthermore, it will explore and address any potential limitations that may arise from utilizing the Excel tool for assessing social responsibility scores.

It is important to note that the results and discussion for scenario 1 and scenario 2 will remain the same since we are doing type 1 SLCA which as state by UNEP that while both ELCA (Environmental Life Cycle Assessment) and SLCA (Social Life Cycle Assessment) require a functional unit, they differ in terms of presenting results. ELCA always presents results in the form of functional units since it focuses on quantifiable outputs. On the other hand, SLCA cannot adopt the same approach because it involves assessing information related to the characteristics or attributes of processes or companies that cannot be measured solely based on the output of a single unit (*Sustainable Development*, n.d.-a). This means that since ELCA's results are dependent on the functional unit (In our case it is milligrams of metal required to generate 1kg of Hydrogen) the results that would reflect the impact of reducing the number of milligrams of metal required to generate 1 kg of Hydrogen. Whereas Type I SLCA (used in the thesis) as mentioned by UNEP uses subjective data such as best practices of a company with respect to recruitment which will not reflect scenario 2. Type II SLCA could be used to identify the impacts of scenario 2 since the scope of type II encompasses indirect social impacts of the industry (*Sustainable Development*, n.d.-a) such as impact on the economy of the country.

5.1 Social Impacts of Platinum vs Nickel

In the analysis presented in Section 4, a significant trend emerges from Figure 10: Nickel consistently maintains a social responsibility score at or above the baseline score of "0" for all selected indicators, whereas Platinum's score falls below "0" for five indicators. One potential explanation for this trend in Nickel mining can be attributed to recent regulatory measures and governance practices implemented in Indonesia. Notably, the impact of a new amendment to Indonesia's Mining Act in 2020, as discussed in the article (*View of Indonesia Green Mining Industry*,

n.d.), highlights that mining businesses are now required to obtain permits for all operations, including sales, transportation, and mining. The amendment also introduces reclamation requirements aimed at enhancing environmental quality and community empowerment. Article 6 of the Mining Act empowers the Central Government to establish policies, regulations, conduct research, issue business regulations, provide guidance and supervision, and set policies for production, marketing, utilization, conservation, cooperation, partnership, and community empowerment, indicating increased government interventions that benefit the development and enforcement of environmental and social sustainability practices in the mining sector. Furthermore, Indonesia's membership with the EITI (*Indonesia / EITI*, n.d.) has played a role in improving transparency within the mining industry, potentially contributing to enhanced compliance with standard and best practices.

Platinum mining, in contrast, exhibits scores below the baseline of "0" for five indicators, with one indicator even reaching "-1.5," indicating minimal compliance with standard or best practices. This lower performance could potentially be attributed to less stringent regulations and enforcement in South Africa. The article by (Cronjé & Chenga, 2009) demonstrates the difficulties in bridging the gap between theory and practice in social responsibility and sustainable development. This disparity is attributed to a number of factors, including acculturation stress, power dynamics, communication, and competing objectives. It is difficult to execute a consistent strategy to social development in South Africa because of the many mining operations and distinctive histories of the communities. In contrast to quick fixes, the authors place a strong emphasis on the necessity for a process-oriented approach to corporate social responsibility and development. These elements might have played a role in the laxer regulations and enforcement seen in South Africa's platinum mining industry.

Surprisingly, two indicators related to workplace accidents and fatalities received scores below the baseline "0" for platinum, despite a positive score of "+1" for Health and Safety. On the other hand, the expected low scores were observed for indicators such as mine closure and post-viability and prevention and mitigation of conflict. This aligns with the Responsible Mining Index framework, which highlights the limited enforcement of best practices in these areas by international organizations (*RMI | Leading Practices | RMI Report 2022*, n.d.) The significance of addressing these issues is emphasized in a study by (Syahrir et al., 2021), which discusses the adverse impacts of abrupt mine closures on mining-dependent communities. However, the research also suggests that resilient communities and effective governance can help mitigate these impacts. To tackle these challenges, the author recommends that policymakers and mining companies prioritize interventions aimed at fostering resilience and creating robust mining communities.

Drawing upon the insights provided in the results from Figure (9) and the previous discussion comparing Platinum and Nickel, we can apply these findings to scenario one, which represents the present conditions. To evaluate the social impacts based on the generated social responsibility scores, we refer to Figure 3, which outlines stakeholder categories, impact categories subcategories, and indicators as defined by UNEP (Sustainable Development, n.d.-a). Assessing

the social impact categories, it becomes apparent that Nickel exhibits generally lower negative impacts on social sustainability in comparison to Platinum.

5.2 Social Impacts of Iridium vs Nickel-Iron

As discussed in Table 6 of the results section, the mining companies with the highest market share in platinum mining also hold the highest market share in platinum group metals (PGM), which includes iridium. Therefore, the trends observed for platinum can be applied to iridium, as they are both mined by the same companies listed in Table 6. Nickel-Iron (Ni-Fe) is an alloy primarily composed of nickel and iron (Hall, 1959). The social responsibilities of nickel have already been discussed in the previous section. Regarding iron mining industries, as shown in figure 10, their social responsibility scores consistently remain above the baseline of "0", indicating compliance with standard practices. This can be attributed to Australia's stringent regulations, strong emphasis on community engagement, and thorough impact assessment, which contribute to the importance of a social license and effective corporate social responsibility (Robinson et al., 2020).

In terms of the indicator for prevention of mine closure and post-viability, mining companies also received low scores due to the lack of best practices in mine closure and rehabilitation of closed mines. This issue was highlighted by previous research findings, which showed that regulatory regimes generally address social issues despite the absence of explicit language in legislation or policy directives. It was also found that regulators primarily rely on initial approval procedures to address social impacts, with stakeholder engagement taking precedence over impact management and evidence-based analysis once approval is granted. Consequently, mining businesses have relatively few restrictions, enabling them to enter indefinite care and maintenance mode or sell their assets, as stringent regulatory measures are not present in the later stages of the project life cycle. As a result, the costs associated with mine closure are often excluded from the planning processes throughout the mine's lifespan (Vivoda et al., 2019).

Utilizing the insights obtained from Figure (11) and the previous analysis comparing Iridium and Nickel-Iron, we can apply these findings to scenario one, representing the present conditions. To assess the social impacts based on the generated social responsibility scores, we refer to Figure 3, which delineates stakeholder categories, impact categories subcategories, and indicators according to UNEP (Sustainable Development, n.d.-a). Analysing the social impact categories, it becomes evident that Nickel generally exhibits lower negative impacts on social sustainability compared to Iridium. The same trend can be observed for Iron, suggesting that Nickel-Iron would likely have fewer social impacts based on the social responsibility score compared to Iridium.

Based on the data analysed in this thesis, Nickel and Nickel-Iron have demonstrated the least social impact compared to Platinum and Iridium in both scenarios outlined in the methodology section. This leads to the conclusion that metals used for Alkaline catalysts (Ni, Ni-Fe) may have a lower social impact in comparison to metals used for PEM catalysts (Pt, Ir).

6. Conclusion

In the realm of entrepreneurship, innovation is widely acknowledged as a crucial element that drives business success (Johannessen et al., 2001). With the global focus on addressing climate change, renewable energy has emerged as a prominent domain for innovation, with hydrogen generation gaining particular attention as a sustainable energy source (Global Risks Report 2021 | World Economic Forum | World Economic Forum, n.d.). Electrolysis has gained significant recognition as the preferred method for hydrogen production due to its high energy conversion efficiency, compatibility with renewable sources, scalability, and cost-effectiveness (Accenture, n.d.).

While Responsible Innovation is considered a potential approach to prevent carbon lock-in and promote sustainable practices, it does not offer explicit guidelines for assessing the trade-offs between the benefits and drawbacks of technological innovations (Collingridge, 1979). However, the field of sustainability provides potential approaches to address this challenge, with Social Sustainability being an important but relatively unexplored dimension in Responsible Innovation (Thorstensen & Forsberg, 2016).

To assess the social sustainability of electrocatalysts used in hydrogen generation, the study utilized the Social Life Cycle Assessment (SLCA) framework developed by UNEP (Sustainable Development, n.d.-a). The research aimed to identify the social impacts associated with the metals used in Alkaline electrocatalysts (Ni, Ni-Fe) and PEM electrocatalysts (Pt, Ir), employing the UNEP SLCA framework and developing an Excel tool based on international standards and best practices.

The results and discussion section evaluated the obtained data, leading to the conclusion that Nickel and Nickel-Iron demonstrated higher compliance with international best practices, suggesting a greater potential for positive social impacts compared to Platinum and Iridium. Consequently, it can be inferred that Alkaline Electrocatalysts currently exhibit higher social sustainability potential than PEM Electrocatalysts.

Overall, this study highlights the significance of innovation in addressing climate change and the role of sustainability frameworks, such as SLCA, in evaluating social impacts and promoting responsible practices in the hydrogen generation sector.

6.1 Reflections

An intriguing perspective that emerges from this research involves the impact of geographical location and its potential contribution to varying social responsibility scores. In the context of sustainability transitions, Environmental Innovation and Societal Transitions (Elsevier, n.d.) explore this idea, highlighting the role of niche development and geographical uniqueness in contrast to regime dynamics. This study underscores the importance of inter-organizational relationships and location specificity in sustainability transitions, presenting theoretical and empirical insights. This chapter's findings on the geography of inter-organizational linkages suggest a plausible explanation for the notable divergence in social responsibility scores between

companies mining Pt and Ir versus those mining Ni and Ni-Fe, potentially due to their respective locations (*Environmental Innovation and Societal Transitions* / *Journal* / *ScienceDirect.Com* by *Elsevier*, n.d.).

As mentioned initially by this paper the findings from this paper would be used by the larger research project mentioned in section 3 which focuses on Responsible Innovation. (Thorstensen & Forsberg, 2016) explains further that although these perspectives are different, the idea of RRI incorporates both the process and product components of innovation. The process side, which addresses, among other things, how to anticipate and involve stakeholders, has been thoroughly explored in disciplines like Technology Assessment (TA) and Science and Technology Studies (STS), which have contributed to the development of RRI. The product side, on the other hand, is more concerned with the precise results of innovation and has received greater attention in disciplines like economics and environmental science, although it is less commonly discussed in the context of RRI. He further goes on to specify Social Sustainability, often known as the Social Perspective in the sustainability area, is a significant yet underexamined feature in RRI. (Coffay et al., 2022) strengthens this stance by writing about the key challenges in forecasting and assessing sustainability impacts for new ventures include dealing with intractable uncertainties, addressing the wicked nature of sustainability challenges, and avoiding greenwashing or quick fixes. Traditional approaches to forecasting often assume a causal logic, which may not capture the effectuation processes at work in sustainability-focused innovation.

This research could shed some light on utilizing social life cycle assessment as an effective tool to assess and forecast potential social sustainability impacts that could rise in the supply chain. There has been growing support for utilizing SLCA as an effective assessment tool for assessing social impacts in RRI, because it provides a thorough examination of a product's social impact, (Benoît Norris & Revéret, 2015) further emphasizes the value of SLCA as a tool for assessing social responsibility. The transfer of harmful effects from one stage of the cycle to another or from one societal concern to another can be avoided by adopting a product life cycle viewpoint. As a result, S-LCA is a useful complement to assessments of social responsibility. Since it supports the Environment Life Cycle Assessment (ELCA) (Sustainable Development, n.d.-a) (Thorstensen & Forsberg, 2016), SLCA has been receiving a lot of attention internationally.

6.2 Limitations

It is crucial to acknowledge the limitations associated with this research concerning the method of data collection, the Excel tool used, and the validity of the obtained scores. The data collection methodology for Social Life Cycle Assessment, as described by the Methodological Sheets for Subcategories in Social Life Cycle Assessment (S-LCA) 2021 by the Life Cycle Initiative, incorporates a combination of data from company's open access documents such as sustainability reports, code of conducts, annual reports, etc., to assess the company's formal commitments and practices against international best practices recommended by organizations like GRI. Additionally, data is collected through interviews with employees and local communities in the company's operational area to understand the successful implementation of these practices and identify potential areas of concern. However, it is important to note that this research was limited

to desktop research, relying solely on open access documents, and did not provide insights into the actual on-ground realities of the company's actions.

The second limitation pertains to the Excel tool used for assessing the collected data. This limitation can be divided into two parts. Firstly, the interpretation of each checklist item may vary from person to person, as raised by the focus group involved in developing the Excel tool. To mitigate this issue, I incorporated keywords to reduce uncertainty caused by differing interpretations, although some variability may still persist. Secondly, the formal commitments required by the checklist, such as the "International Labour Organization Convention 169" for the indicator "Prevention of conflict and mitigation," (GRI - Resource Center, n.d.) were not found in the reports of the company under study. However, relevant commitments to similar standards and organizations, such as the United Nations Declaration of Rights of Indigenous People and IFC Performance Standard 7, were identified. In this case, Rio Tinto did not have a formal commitment to following ILO Convention 169 but had other pertinent commitments (GRI - Resource Center, n.d.). The question arises whether it is appropriate to allow some flexibility or adhere strictly to the established standards.

The final limitation identified in this research pertains to the validity of the tool and the obtained scores. To evaluate the validity, it is essential to crosscheck the scores with those obtained by other organizations, such as the Responsible Mining Index. This comparison helps determine whether the provided score aligns with others, thereby assessing the validity of the tool and the scores obtained.

6.2 Future Research

I strongly believe that the tool developed in this study has the potential for further improvement and can be valuable for researchers and product innovators seeking to gain a preliminary understanding of the social impacts associated with the materials they intend to use in product development or process improvement. It is my hope that this tool will guide them in making socially responsible choices by identifying materials with the least social impact. Furthermore, this tool can be utilized for additional research, enabling the assessment of other metals, and comparing their scores against social impact, social responsibility, or social compliance scores generated by various organizations. Such further investigation would contribute to a more comprehensive evaluation of social implications in material selection and decision-making processes.

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Annexure I: SLCA Tool checklist figures per company

This section constitutes of the figures of the checklist for each company and their compliance.

Anglo American (Pt and Ir):

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	No	Female Employees
attaining gender equality in recruitment policies and processes	Yes	Women, Training and Development
implementing gender inclusive networks, career development and mentoring programmes	Yes	Trainings
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach
developing equitable promotion and retention policies	Yes	Talent management, improving office environment
Grievance Mechanisms for Gender Discrimination	Yes	Grievance, Grievance mechanism
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of
External Audits and Review	Yes	External Auditor
Has Information been shared to employees on the grievance mechanism need to combine this	Yes	Grievance Mechanism
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	No	Cases
Employee training on Gender Discrimination	Yes	Trainings (promoting equality and awareness)

Figure 12: Women in Workforce

Gender Equity		
Check List	Y/N	Keywords in the Report
Performance review by international Organization Collaboration	Yes	Bloomberg Index
Gender Equity comittment through International Organizations	Yes	Gender Equality Index (Bloomberg)
Remuneration Committee addressing gender wage gap	Yes	Remunerati on, Wage Pay gap
External Audits and Review	Yes	External Aud
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	Yes	Gender, Women, Impact, Assesment (Social Way
Gender Wage Gap Reported to be 1:1	No	Gender Pay Gap
Gender Wage Gap Policy/Statement	Yes	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	Yes	Grievance Mechanism but for all including
No cases of Gender Wage Pay Gap (External Source)	Yes	Cases
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism
Are the External suppliers aware of this grievance mechanism	No	Grievance Mechanism
Employee training on Sexual Harassment	Yes	Awareness Training

Figure 13: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to reflect its non-discrimination policies in their terms and conditions	Yes	Discrimination
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	Yes	Awareness Trainings
Set targets regarding diversity and inclusivity in its recruitment and employment practices	No	Targets
Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Inclusive, Diversity, International Labour Organization
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	No	Collective Bargaining, Union

Figure 14: Historically Disadvantaged People

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	Yes	Accident Rate, Lost Time Injuries (LTI)
Confirms that its Accident Rate reporting includes Accidents of contract workers as well as employees	No	Accident Rate, Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	No	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 15: Accident Rate at Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Fatal Accidents at Workplace total Reported	Yes	Fatal Accidents
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	Yes	Fatal Accidents
	No	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it	No	Fatal Accidents, Contractors

Figure 16: Fatal Accidents at Workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Code of Conduct, Code
Monitoring Psychological Hazards	Yes	Code, fatigue, Psychological, Hazard, Health (Look for strategies that
in of occupational diseases	Yes	Occupation, Occupational Hazard
veillance and risk-based monitoring res	Yes	Health monitoring,risk based monitoring
Identify and assess health and safety risks to the workforce	Yes	Occupational Risk Assessment
Track the implementation of these strategies and plans	No	Need to share a detailed approach to track these strategies(will be
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	Code of Conduct, Safety Compliance, Accountability
Develop strategies and plans to avoid, minimise and mitigate these risks	Yes	Risk Assesment and mitigation
External Audits and Review	Yes	
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Health and Safety management system, Health and Safety Policies
Regular Health and Safety Training	Yes	Safety training
Gender Specific PPE on all mining Sites	No	Protective, Gender Equipment (needs to specify gender based PPE)
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	Yes	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	No	Incidents, accidents, negligence

Figure 17: Health and Safety at the Workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small Scale Mining ASM activities around its operations	Yes	Stakeholder engagement
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement
ematically tracks the implementation of these strategies and plans	Yes	Stakeholder engagement
Policies against Anti competitive behaviour (GRI 206 Anti competitive Behaviour)	Yes	anti - competitive
No cases of anti competitive behaviour in the past 3 years (GRI 206)	Yes	Grievance, Incident, code of conduct
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners around their sites	Yes	Community engagement
Develop strategies and plans according to these assessments	No	Community engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	No	Community engagement

Figure 18: Presence of Anti-Competitive Behaviour and Fair Competition

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption. (UNGC Principle 10 GRI 205)	Yes	Corruption
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	Yes	Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	Yes	Bribery, corruption, Audits, Compliance
No cases of Corruption or whistleblowing in the past 3 years	No	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	Yes	Corrective Action, Corruption
Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	Yes	Bribery, corruption, Audits, Compliance
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	Yes	Audits, compliance, risk assesment
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place (GRI 201)	Yes	Economic Value, Economic
Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	Yes	Low Tax
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	No	Tax Benefits, Deductions

Figure 19: Business Ethics, Anti-Corruption and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities	Yes	mine closure
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	Yes	mine closure
Consider post-mining land-use opportunities in the development of these management plans	Yes	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	Yes	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	Yes	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	Yes	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	Yes	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	No	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	No	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	No	mine closure
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	No	mine closure
Discloses this information on a project-disaggregated basis	No	mine closure

Figure 20: Mine closure and Post Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues and Labour Issues(UNGC Principle 2 • VPs B7 • GRI 308; 407; 412; 414)	Yes	Responsible procurement, procurement, supply chain
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Environmental Issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	Yes	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	Yes	Audit, Tax Audit
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	No	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	Responsible procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	Yes	Responsible , Procurement, Supply chain
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Local Procurement
Has systems in place to ensure its operations actively include women in these strategies and plans	No	Women, Local Procurement, Female
Systematically tracks the implementation of these strategies and plans	No	Women, Local Procurement, Female

Figure 21: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to take account of national and supranational socio-economic development plans in making its mining-related investment and business decisions in producing countries, with the aim of enhancing socio-economic development. (IFC PS 1.11)	Yes	Socio-economic Development
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role	Yes	Socio-economic Development, socio-economic, socio-economic benefits
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	Socio-economic Development, socio-economic, socio-economic benefits
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government, Government, Socio-economic
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	Yes	Socio-economic, NGO, Academia, Oppurtunities
Develop R&D programmes to address these priorities	Yes	Socio-economic, NGO, Academia, Oppurtunities
Track the implementation of these R&D programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
Collaboration with in-country institutions	Yes	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational, National
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Socio-economic, NGO, Academia, Oppurtunities
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	No	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses	Yes	Bussinesses, Enterprises, Entrepreneurship
Inclusion of women in these strategies and plans	Yes	Women, Female, Gender
Systematically tracks the implementation of these strategies and plans	Yes	Socio-economic, NGO, Academia, Oppurtunities

Figure 22: CSR Commitments and Social Development

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves and probable reserves that are located in or near areas of active conflict. Security and human rights (SASB)	No	Conflict, areas of conflict
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and informed consent (or consultation) processes	Yes	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Upholding International Labour Organization (ILO) Convention No. 169	No	International Labour Organization
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	Yes	Grievance mechanism, whistleblower
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	Yes	Lease agreements
Implementation of Voluntary Principles on Security and Human Rights.	Yes	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	No	Supply chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	No	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security

Figure 23: Risk of Conflicts and Mitigation

Community Engagement and Wellbeing		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs	Yes	UNGC, Human Rights
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Committee, board member, Human Rights
Committed financial and staffing resources to implement this commitment	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	Yes	Gap Analysis, Risk Assessment, Impact assessment
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	No	mine-site, mine, human rights
Audits and/or reviews its performance on managing human rights issues	No	Audits, Reviews
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them	No	Community Engagement
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	Yes	Youth
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	No	Community Engagement, Disability
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on women?	No	Impact, Risk, Women
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	No	Impact, Risk, Youth
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to address these impact	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Develop and maintain emergency preparedness and response plans	Yes	Emergency Planning
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning
Systematically engage with local stakeholders in the testing of these response plans	No	Emergency Planning, Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	Yes	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities	Yes	Noise
Systematically engage with affected communities and other stakeholders in the development of the	No	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	No	Noise
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	No	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	No	Noise

Figure 24: Community Engagement and wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
hired from local communities	No	Employees, workers, Local workers, Local employees
Does the company publicly disclose the number of its contract workers hired from local communities	No	workers, Local workers, Local employees, contract employees,
rs hired from local communities	No	Employees, workers, Local workers, Local employees, Women
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	School, Education, Academia, Student, Technical, Vocational
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	No	Manager, Managerial skill
ent programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
tion with in-country institutions	Yes	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational, National
	Yes	Local Employment, Employment, Job sites

Figure 25: Local Employment

Northam (Pt):

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	Yes	Female Employees (Find a target % they are trying to reach and search if they have a year they want to reach this by), Women (Check for target values and %)
attaining gender equality in recruitment policies and processes	Yes	Women, Training and Development (Check for Targets initiatives and Formal statements/policies),
implementing gender inclusive networks, career development and mentoring programmes	Yes	Trainings (promoting inclusivity and awareness), Women (Women focused career development courses), Inclusive
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach (Check the types of reporting standards they formally state that they adhere to)
developing equitable promotion and retention policies	Yes	Talent management, improving office environment (Practices to retain talent), promote (check if they mention that is in line with any national or internal
Grievance Mechanisms for Gender Discrimination	Yes	Grievance, Grievance mechanism (focused on women)
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors (Gender),
External Audits and Review	No	External Auditor
Has Information been shared to employees on the grievance mechanism need to combine this	No	Grievance Mechanism
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	No	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	Yes	Cases
Employee training on Gender Discrimination	Yes	Trainings (promoting equality and awareness)

Figure 26: Women in Workforce

Gender Equity		
Check List	Y/N	Keywords in the Report
Gender Equity commitment through International Organizations	No	Bloomberg Index
Remuneration Committee addressing gender wage gap	Yes	Gender Equality Index (Bloomberg)
External Audits and Review	No	Remuneration, Wage Pay gap
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	No	External Aud
Gender Wage Gap Reported to be 1:1	No	Gender, Women, Impact, Assessment (Social Way Toolkit)
Gender Wage Gap Policy/Statement	No	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	No	Gender Pay Gap
No cases of Gender Wage Pay Gap (External Source)	Yes	Mechanism but for all including
Has information been shared to employees on the grievance mechanism	Yes	Cases
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
Employee training on Sexual Harassment	No	Grievance Mechanism
	Yes	Awareness Training

Figure 27: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	Yes	Awareness Trainings
Set targets regarding diversity and inclusivity in its recruitment and employment practices	Yes	Targets
Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Inclusive, Diversity, International Labour Organization
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining, South African Law
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	Yes	Collective Bargaining, Union

Figure 28: Historically Disadvantaged People

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	No	Accident Rate, Lost Time Injuries (LTI)
Confirms that its Accident Rate reporting includes Accidents of contract workers as well as employees	No	Accident Rate, Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	No	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 29: Accident Rate at the Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	No	Fatal Accidents
Workers as	No	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it	No	Fatal Accidents, Contractors

Figure 30: Fatal Accidents at the Workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Monitoring Psychological Hazards	Yes	Code, Fatigue, Psychological, Hazard, Health (Look for strategies that show assessments)
Prevention of occupational diseases	Yes	Occupation, Occupational Hazard
Surveillance and risk-based monitoring programmes	Yes	Health monitoring, risk based monitoring
Identify and assess health and safety risks to the workforce	Yes	Occupational Risk Assessment
Track the implementation of these strategies and plans	No	Need to share a detailed approach to track these strategies (will be given in depth in the risk Code of Conduct, Safety Compliance,
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	Risk Assessment and mitigation
Develop strategies and plans to avoid, minimise and mitigate these risks	No	
External Audits and Review	No	
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Health and Safety management system, Health and Safety Policies
Regular Health and Safety Training	Yes	Safety training
Gender Specific PPE on all mining Sites	No	Protective, Gender
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	Yes	Services, awareness, incidents,
Reported cases of negligent safety rules leading to accidents	Yes	accidents,

Figure 31: Health and Safety at the Workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement, Community engagement
Systematically tracks the implementation of these strategies and plans	Yes	Stakeholder engagement, Community Engagement
Policies against Anti competitive behaviour (GRI 206 Anti competitive Behaviour)	Yes	anti - competitive
No cases of anti competitive behaviour in the past 3 years (GRI 206)	Yes	Grievance, Incident, code of conduct
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners around their sites	Yes	Community engagement
Develop strategies and plans according to these assessments	Yes	Community engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	No	Community engagement

Figure 32: Presence of Anti-Competitive Behaviour and Fair Competition

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	No	Corruption, Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee, Ethics
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	No	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	No	Bribery, corruption, Audits, Compliance
No cases of Corruption or whistleblowing in the past 3 years	Yes	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	No	Corrective Action, Corruption
Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in response	No	Corruption Bribery, corruption,
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	No	
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	No	Audits, compliance, risk assesment
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place (GRI Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	Yes	Tax and Economic
	No	Low Tax
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	No	Tax Benefits, Deductions

Figure 33: Business Ethics, Anti-Corruption and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	No	mine closure, Closure, Rehabilitation
Consider post-mining land-use opportunities in the development of these management plans	No	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	Yes	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	No	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	No	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	No	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	No	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	No	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	Yes	mine closure
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	Yes	mine closure
Discloses this information on a project-disaggregated basis	Yes	mine closure

Figure 34: Mine closure and Post Closure Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Environmental issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	No	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	No	Audit, Tax Audit
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	No	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	Responsible procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	No	Responsible , Procurement, Supply chain
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Local Procurement
Has systems in place to ensure its operations actively include women in these strategies and plans	No	Women, Local Procurement,
Systematically tracks the implementation of these strategies and plans	No	Women, Local Procurement, Female

Figure 35: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role	Yes	Socio-economic Development, socio-economic benefits
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	Socio-economic Development, socio-economic, socio-economic
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government, Government, Socio-economic
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	No	Socio-economic, NGO, Academia,
Develop R&D programmes to address these priorities	No	Socio-economic, NGO, Academia, Oppurtunities
Track the implementation of these R&D programmes	No	Socio-economic, NGO, Academia, Oppurtunities
Collaboration with in-country institutions	Yes	School, Education,
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational,
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Socio-economic,
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia,
Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses	Yes	Enterprises, Entrepreneurship, Women,
Include women in these strategies and plans	Yes	Female,
Systematically tracks the implementation of these strategies and plans	Yes	Socio-economic, NGO,

Figure 36: CSR Commitments and Social Development

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and informed consent (or consultation) processes	No	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Upholding International Labour Organization (ILO) Convention No. 169	No	International Labour Organization
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	No	Grievance mechanism, whistleblower
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	No	Lease agreements
Implementation of Voluntary Principles on Security and Human Rights.	No	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	No	Supply chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	No	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its	No	Security

Figure 37: Risk of Conflicts and Mitigation

Community Engagement and Wellbeing		
Statement	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Committee, board member, Human Rights
Allocated financial and staffing resources to implement this commitment	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	No	Gap Analysis, Risk Assessment, Impact assessment
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	No	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	No	Risk Assessment, Gap Analysis
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	No	mine-site, mine, human rights
Conducts audits and/or reviews its performance on managing human rights issues	No	Audits, Reviews
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them	No	Community Engagement
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	No	Youth
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	No	Community Engagement, Disability
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Impact, Risk, Women
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	No	Impact, Risk, Youth
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	No	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to address these impacts	No	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	No	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	No	Gap Analysis, land use
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	No	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	No	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop and maintain emergency preparedness and response plans	Yes	Emergency
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	No	Emergency Planning
Systematically engage with local stakeholders in the testing of these response plans	No	Emergency Planning, Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	Yes	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities in the surrounding areas	Yes	Noise
Systematically engage with affected communities and other stakeholders in the development of these strategies	No	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	No	Noise
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	No	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	No	Noise

Figure 38: Community Engagement and Wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
Does the company publicly disclose the number of its contract workers hired from local communities	No	Employees, workers, Local workers, Local employees, contract employees, contract, workers, Local workers, Local employees, Women
Does the company publicly disclose the number of women workers hired from local communities	No	Women
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	School, Education, Academia, Student, Technical, Vocational
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Opportunities
Support STEM education among the wider population in collaboration with in-country institutions	No	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agency	Yes	Education, Vocational, National
Local Employment Initiatives	Yes	Local Employment

Figure 39: Local Employment

Vale (Nickel)

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	Yes	Female Employees, Target (Find a target % they are trying to reach and search if they have a year they want to reach this by), Women (Check for target values and %)
attaining gender equality in recruitment policies and processes	Yes	Recruitment (In line with ILO)
implementing gender inclusive networks, career development and mentoring programmes	No	inclusivity and awareness), Women
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach (Check the types of reporting standards they formally state that they adhere to) International Labour Organization
developing equitable promotion and retention policies	No	Talent management, improving office environment (Practices to retain talent), promote (check if they mention that is in line with any national or internal bodies criteria)
Grievance Mechanisms for Gender Discrimination	No	Grievance, Grievance mechanism (focused on women)
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors (Gender), Women in Management
External Audits and Review	Yes	External Auditor
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism, Whistle Blower
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	No	Cases
Employee training on Gender Discrimination	No	Trainings (promoting equality and awareness)

Figure 40: Women in Workforce

Gender Equity		
Check List	V/N	Keywords in the Report
Performance review by international Organization Collaboration	Yes	
Gender Equity commitment through international Organizations	No	Gender Equality Index (Bloomberg)
Remuneration Committee addressing gender wage gap	No	Remuneration, Wage Pay gap,
External Audits and Review	Yes	External Audit
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	No	Gender, Women, Impact, Assessment (Social Way Toolkit)
Gender Wage Gap Reported to be 1:1	Yes	Gender Pay Gap
Gender Wage Gap Policy/Statement	Yes	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	Yes	Grievance Mechanism but for all including harassment and Discrimination
No cases of Gender Wage Pay Gap (External Source)	Yes	Cases
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
Employee training on Sexual Harassment	No	Awareness Training

Figure 41: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to reflect its non-discrimination policies in their terms and conditions	Yes	Discrimination,
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	No	Awareness Trainings
Set targets regarding diversity and inclusivity in its recruitment and employment practices	Yes	Targets
Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Diversity, International
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining,
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	Yes	Collective Bargaining, Union

Figure 42: Historically Disadvantaged People

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Accident Rate, Lost Time
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses that its fatalities reporting includes fatalities of contract workers as well as employees	Yes	Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	No	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 43: Accident Rate at the Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Fatal Accidents
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	Yes	Fatal Accidents
irms that its fatalities reporting includes fatalities of contract workers as employees	Yes	Accidents, Contractors
Evaluation on Accidents and how to prevent it	No	Fatal Accidents, Contractors

Figure 44: Fatal Accidents at the Workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Code of Conduct,
Monitoring Psychological Hazards	No	Fatigue, Psychological, Hazard, Health (Look for strategies that show assessments), Mental
Prevention of occupational diseases	No	Occupational Hazard
Surveillance and risk-based monitoring times	Yes	monitoring, risk based
Identify and assess health and safety risks to the workforce	No	Occupational Risk Assessment
Track the implementation of these strategies and plans	No	share a detailed approach to track these strategies(will be given in depth in the risk assessment and risk
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	Conduct, Safety Compliance,
Develop strategies and plans to avoid, minimise and mitigate these risks	No	Risk Assessment and mitigation
External Audits and Review	Yes	
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Health and Safety management system,
Regular Health and Safety Training	Yes	Safety training
Gender Specific PPE on all mining Sites	No	Gender Equipment
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	Yes	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	No	Incidents, accidents, negligence

Figure 45: Health and Safety at the Workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small Scale Mining ASM activities around its operations	Yes	Stakeholder engagement
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement
Are policies implemented and practices to prevent bribery, corruption and to publicly disclose facilitation payments.	Yes	Stakeholder engagement
Systematically tracks the implementation of these strategies and plans	Yes	anti - competitive
Policies against Anti competitive behaviour	Yes	Grievance, Incident, code of conduct
No cases of anti competitive behaviour in the past 3 years	Yes	Community engagement
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners	Yes	Community engagement
Develop strategies and plans according to these assessments	Yes	Community engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	Yes	

Figure 46: Presence of Anti-Competitive Behaviour and Fair Competition

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption	Yes	Corruption
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	Yes	Corruption, Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	Yes	Bribery, corruption, Audits, Compliance
No cases of Corruption or whistleblowing in the past 3 years	Yes	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	Yes	Corrective Action, Corruption
Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in	Yes	Corruption
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	Yes	Bribery, corruption, Audits, Compliance
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	Yes	Audits, compliance, risk assesment
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place	Yes	Economic Value, Economic
Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	Yes	Low Tax
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	Yes	Tax Benefits, Deductions

Figure 47: Business Ethics, Anti-Corruption and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities	Yes	mine closure
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	Yes	mine closure
Consider post-mining land-use opportunities in the development of these management plans	Yes	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	Yes	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	Yes	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	Yes	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	Yes	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	Yes	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	Yes	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	Yes	mine closure
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	Yes	mine closure
Discloses this information on a project-disaggregated basis	Yes	mine closure
place to ensure its due diligence on mergers, acquisitions and disposals covers: Salient environmental issues	Yes	mine closure
Can the company demonstrate at the corporate level that it has systems in place to ensure its due diligence on mergers, acquisitions and disposals covers: Salient social and human rights issues	Yes	mine closure
Can the company demonstrate at the corporate level that it has systems in place to ensure its due diligence on mergers, acquisitions and disposals covers: Salient governance issues	Yes	mine closure

Figure 48: Mine closure and Post Closure Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues	Yes	Responsible procurement,
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Labour Issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	Yes	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	Yes	Audit, Tax Audit
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	Yes	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	Yes	Responsible , Procurement, Supply chain
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Local Procurement
Has systems in place to ensure its operations actively include women in these strategies and plans	Yes	Women, Local Procurment, Female
Systematically tracks the implementation of these strategies and plans	Yes	Women, Local Procurment, Female

Figure 49: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	V/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to take account of national and supranational socio-economic development plans in making its mining-related investment	Yes	Socio-economic
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
governments to identify socio-economic development priorities where they can play a collaborative role	Yes	economic Development
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	Socio-economic Development , socio-economic, socio-economic benefits
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government , Government , Socio-economic
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	Yes	economic, NGO, Academia,
Develop R&D programmes to address these priorities	Yes	Socio-economic, NGO, Academia, Oppurtunities
Track the implementation of these R&D programmes	Yes	Socio-economic,
collaboration with in-country institutions	Yes	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student,
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational, National
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	economic, NGO,
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	economic, NGO, Academia, Bussinesses, Enterprises, Entrepreneurship
Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses	Yes	Women, Female, Gender
Include women in these strategies and plans	Yes	Socio-economic, NGO, Academia, Oppurtunities
Systematically tracks the implementation of these strategies and plans	Yes	

Figure 50: Responsible Sourcing and Contracting

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves that are located in or near areas of active conflict.	Yes	Conflict, areas of
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and informed consent (or consultation) processes	Yes	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to :	Yes	International Labour Organization
rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	Yes	mechanism, whistleblow
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	Yes	Lease agreements
ation of Voluntary Principles on Security and Human Rights.	Yes	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	Yes	chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	Yes	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	Yes	Security
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	Yes	Security

Figure 51: Risk of Conflict and Mitigation

Community Engagement and Wellbeing		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs	Yes	UNGC, Human Rights
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Committee, board member, Human Rights
Committed financial and staffing resources to implement this commitment	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	Yes	Risk Assessment, Impact
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	Yes	mine-site, mine, human rights
Audits and/or reviews its performance on managing human rights issues	Yes	Audits, Reviews
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and	Yes	Community Engagement
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	Yes	Youth
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	Yes	Community Engagement, Disability
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on women?	Yes	Impact, Risk, Women
operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	Yes	Impact, Risk, Youth
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	Yes	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to address these impact	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Develop and maintain emergency preparedness and response plans	Yes	Emergency Planning
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning
Systematically engage with local stakeholders in the testing of these response plans	Yes	Emergency Planning, Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	Yes	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities	Yes	Noise
Systematically engage with affected communities and other stakeholders in the development of these strategies and plans	Yes	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	Yes	Noise
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	Yes	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	Yes	Noise

Figure 52: Community Engagement and Wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
Does the company publicly disclose the number of its employees hired from local communities	Yes	workers, Local workers,
Does the company publicly disclose the number of its contract workers hired from local communities	Yes	workers, Local workers, Local employees, contract employees, contract, contract workers
Does the company publicly disclose the number of women workers hired from local communities	Yes	Employees, workers, Local
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Education, Academia,
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Opportunities
Support STEM education among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational,
Local Employment Initiatives	Yes	Local Employment, Employment, Job sites

Figure 53: Local Employment

Sumitomo (Nickel)

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	No	Female Employees (Find a target % they are trying to reach and search if they have a year they want to reach this by), Women (Check for target values and %)
attaining gender equality in recruitment policies and processes	Yes	Women, Training and Development (Check for Targets initiatives and Formal statements/ policies),
Implementing gender inclusive networks, career development and mentoring programmes	Yes	Trainings (promoting inclusivity and awareness), Women (Women focused career development courses), Inclusive
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach (Check the types of reporting standards they formally state that they adhere to) (ILO tripartite)
developing equitable promotion and retention policies	Yes	Talent management, Improving office environment (Practices to retain talent), promote (check if they mention that is in line with any national or internal bodies criteria)
Grievance Mechanisms for Gender Discrimination	No	Grievance, Grievance mechanism (focused on women)
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors (Gender), Women in Management
External Audits and Review	Yes	External Auditor
Has Information been shared to employees on the grievance mechanism	No	Grievance Mechanism
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	No	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	Yes	Cases
Employee training on Gender Discrimination	No	Trainings (promoting equality and awareness)

Figure 54: Women in the Workforce

Gender Equity		
Check List	Y/N	Keywords in the Report
Performance review by international Organization Collaboration	Yes	Bloomberg Index, EITI
Gender Equity comittment through International Organizations	Yes	Gender Equality Index (Bloomberg)
Remuneration Committee addressing gender wage gap	Yes	Remuneration, Wage Pay gap
External Audits and Review	No	External Aud
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	No	Gender, Women, Impact, Assesment (Social Way Toolkit)
Gender Wage Gap Reported to be 1:1	No	Gender Pay Gap
Gender Wage Gap Policy/Statement	No	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	No	Grievance Mechanism but for all including harassment and Discriminati
No cases of Gender Wage Pay Gap (External Source)	Yes	Cases
Has Information been shared to employees on the grievance mechanism	No	Grievance Mechanism
Are the External suppliers aware of this grievance mechanism	No	Grievance Mechanism
Employee training on Sexual Harassment	No	Awareness Training

Figure 55: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to reflect its non-discrimination policies in their terms and conditions	Yes	
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	Yes	Discrimination, Your Voice grievance mechanism, continual monitoring of ethnicity and disability applicants and population in company
Set targets regarding diversity and inclusivity in its recruitment and employment practices	No	Awareness Trainings
Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Targets
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Inclusive, Diversity, International Labour Organization
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	Yes	Collective Bargaining, South African Law

Figure 56: Historically Disadvantaged people

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Lost Time Injuries (LTI)
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	Yes	Accident Rate, Lost Time Injuries (LTI)
	Yes	Accident Rate, Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	Yes	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 57: Accident Rate at the Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Fatal Accidents
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	Yes	Fatal Accidents
Reporting includes fatalities of contract workers as	Yes	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it	Yes	Fatal Accidents, Contractors

Figure 58: Fatal Accidents at the workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Conduct, Code
Monitoring Psychological Hazards	No	Code, Fatigue, Psychological, Hazard, Health (Look for strategies that show assessments), Mental Health
	Yes	Occupation, Occupational Hazard
Monitoring	Yes	Health monitoring, risk based monitoring
Identify and assess health and safety risks to the workforce	No	Occupational Risk Assessment
Track the implementation of these strategies and plans	No	Need to share a detailed approach to track these strategies (will be given in depth in the risk assessment)
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	Code of Conduct, Safety Compliance, Accountability
Develop strategies and plans to avoid, minimise and mitigate these risks	No	Risk Assessment and mitigation
External Audits and Review	Yes	
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Health and Safety management system, Health and Safety Policies
Regular Health and Safety Training	Yes	Safety training, protective, Gender Equipment
Gender Specific PPE on all mining Sites	No	
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	No	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	Yes	Incidents, accidents, negligence

Figure 59: Health and Safety at the workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small Scale Mining ASM activities around its operations	Yes	Stakeholder engagement
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement
Are policies implemented and practices to prevent bribery, corruption and to publicly disclose facilitation payments.	Yes	corruption
Systematically tracks the implementation of these strategies and plans	Yes	Corruption, Risk
Policies against Anti competitive behaviour	Yes	Competitive
No cases of anti competitive behaviour in the past 3 years	Yes	Grievance, Incident, code of conduct
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners	Yes	Artisanal Scale Mining, ASM, Community Engagement
Develop strategies and plans according to these assessments	Yes	Artisanal Scale Mining, ASM, Community Engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	Yes	Artisanal Scale Mining, ASM,

Figure 60: Presence of Anti - Competitive Behaviour and Fair Competition

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption	Yes	Corruption
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	Yes	Corruption, Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee, Ethics
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	No	Bribery, corruption, Audits, Compliance
No cases of Corruption reported in the past 3 years	Yes	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	No	Corrective Action, Corruption
Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in	Yes	Whistleblow, grievance, corruption, Audits,
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	No	Audits, compliance, risk assessment
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	No	Economic Value, Economic
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place	No	Low Tax, Low-Tax
Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	No	Tax Benefits, Deductions, Tax incentives
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	No	

Figure 61: Business Ethics, Anti-Corruption and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities	No	mine closure
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	No	mine closure
Consider post-mining land-use opportunities in the development of these management plans	No	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	No	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	No	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	No	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	No	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	No	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	No	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	No	closure, De characterizat
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	No	mine closure
Discloses this information on a project-disaggregated basis	No	mine closure

Figure 62: Mine Closure and Post Closure Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues	Yes	procurement, procurement,
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Labour Issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	Yes	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	Yes	Audit, Tax Audit, Responsible Sourcing
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	No	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	Responsible procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	Yes	Responsible , Procurement, Supply chain
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Local Procurement,
Has systems in place to ensure its operations actively include women in these strategies and plans	No	Procurement, Female
Systematically tracks the implementation of these strategies and plans	No	Women, Local Procurement, Female

Figure 63: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	Y/N	Keywords in the Report
and supranational socio-economic development plans in making its mining-related investment and business decisions in producing countries, with the aim of enhancing socio-economic	No	economic Development
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role	Yes	economic Development , socio-economic, socio-economic benefits
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	Socio-economic Development , socio-economic, socio-economic benefits
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government , Government , Socio-economic
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	Yes	Socio-economic, NGO, Academia, Oppurtunities
Develop R&D programmes to address these priorities	Yes	Socio-economic, NGO, Academia, Oppurtunities
Track the implementation of these R&D programmes	Yes	Socio-economic,
Support STEM education among the wider population in collaboration with in-country institutions	No	Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational, National
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Socio-economic, NGO,

Figure 64: CSR Commitments and Social Development

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves that are located in or near areas of active conflict.	No	areas of conflict
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and Informed consent (or consultation) processes	Yes	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Upholding International Labour Organization (ILO) Convention No. 169	No	International Labour Organization
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	No	Grievance mechanism, whistleblower
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	No	Lease agreements, Community agreements
Implementation of Voluntary Principles on Security and Human Rights.	Yes	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	Yes	Supply chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	No	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security
the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security

Figure 65: Risk of Conflicts and Mitigation

Community Engagement and Wellbeing		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs	No	UNGC, Human Rights
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	No	Committee, board member, Human Rights
Committed financial and staffing resources to implement this commitment	No	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	Yes	Gap Analysis, Risk Assessment, Impact assessment
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Risk Assessment, Gap Analysis, Due Diligence
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	No	mine-site, mine, human rights
Audits and/or reviews its performance on managing human rights issues	No	Audits, Reviews
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them	No	Community Engagement
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	No	Youth
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	No	Community Engagement, Disability
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on women?	No	Impact, Risk, Women
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	No	Impact, Risk, Youth
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to address these impact	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Systematically tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Develop and maintain emergency preparedness and response plans	Yes	Emergency Planning
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning
Systematically engage with local stakeholders in the testing of these response plans	Yes	Emergency Planning, Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	No	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities	No	Noise
Systematically engage with affected communities and other stakeholders in the development of th	No	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	No	Grievance Mechanism
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	No	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	No	Noise

Figure 66: Community Engagement and Wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
Does the company publicly disclose the number of its employees hired from local communities	Yes	Employees, v
Does the company publicly disclose the number of its contract workers hired from local communities	No	Employees, v
Does the company publicly disclose the number of women workers hired from local communities	No	Employees, v
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	School, Education, Academia, Student, Technical, Vocational
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
Support STEM education among the wider population in collaboration with in-country institutions	No	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agency	Yes	Education, Vocational,
Local Employment Initiatives	Yes	Employment,

Figure 67: Local Employment

Rio Tinto (Iron)

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	Yes	Female Employees,
attaining gender equality in recruitment policies and processes	Yes	Recruitment (In line with ILO)
implementing gender inclusive networks, career development and mentoring programmes	No	Trainings , Women, Inclusive
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach, International Labour Organization
developing equitable promotion and retention policies	Yes	Talent management, improving office environment (Practices to retain talent), promote (check if they mention that is in line with any national or internal bodies criteria)
Grievance Mechanisms for Gender Discrimination	Yes	Grievance, Grievance mechanism
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors (Gender), Women in
External Audits and Review	Yes	External Auditor
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism, Whistle Blower
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	No	Cases
Employee training on Gender Discrimination	Yes	Trainings (promoting equality and awareness)

Figure 68: Women in the Workforce

Gender Equity		
Check List	Y/N	Keywords in the Report
Performance review by international Organization Collaboration	No	Bloomberg Index
Gender Equity comittment through International Organizations	Yes	Gender Equality Index (Bloomberg)
Remuneration Committee addressing gender wage gap	Yes	Remunerati on, Wage Pay gap
External Audits and Review	No	External Audit
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	No	Gender, Women, Impact, Assesment
Gender Wage Gap Reported to be 1:1	Yes	Gender Pay Gap
Gender Wage Gap Policy/Statement	Yes	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	Yes	Grievance Mechanism but for all including harassment and
No cases of Gender Wage Pay Gap (External Source)	No	Cases
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
Employee training on Sexual Harassment	No	Awareness Training

Figure 69: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to reflect its non-discrimination policies in their terms and conditions	Yes	Discrimination,
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	No	Awareness Trainings
Set targets regarding diversity and inclusivity in its recruitment and employment practices	No	Targets
Upholding the fundamental ILO convention on discrimination (No. 111)	Yes	Diversity, International Labour
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining,
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	Yes	Collective Bargaining, Union

Figure 70: Historically Disadvantaged People

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis for workers as	Yes	Accident Rate, Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	No	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 71: Accident Rate at the Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Fatal Accidents
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	Yes	Fatal Accidents
	No	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it	No	Fatal Accidents, Contractors

Figure 72: Fatal Accidents at the Workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Code of Conduct, Code
Monitoring Psychological Hazards	Yes	Code, Fatigue, Psychological, Hazard, Health (Look
	Yes	Occupation, Occupational Hazard
	Yes	monitoring, risk based monitoring
Identify and assess health and safety risks to the workforce	Yes	Occupational Risk Assessment
Track the implementation of these strategies and plans	Yes	Need to share a detailed approach to track these strategies(will be given in depth in the risk assessment
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	Code of Conduct, Safety Compliance,
Develop strategies and plans to avoid, minimise and mitigate these risks	No	Risk Assessment and mitigation
External Audits and Review	No	Assurance, Review
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Health and Safety management system,
Regular Health and Safety Training	Yes	Safety training
Gender Specific PPE on all mining Sites	No	Protective, Gender
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	Yes	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	Yes	Incidents, accidents, negligence

Figure 73: Health and Safety at the Workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small Scale Mining ASM activities around its operations	No	Stakeholder engagement
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement
Are policies implemented and practices to prevent bribery, corruption and to publicly disclose facilitation payments.	Yes	corruption
Systematically tracks the implementation of these strategies and plans	Yes	Corruption, Risk
Policies against Anti competitive behaviour	Yes	Grievance, Incident, code of conduct
No cases of anti competitive behaviour in the past 3 years	Yes	Anti-Competitive
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners	No	Artisanal Scale Mining, ASM, Community Engagement
Develop strategies and plans according to these assessments	No	Artisanal Scale Mining, ASM, Community Engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	No	Mining, ASM, Community

Figure 74: Presence of Anti-competitive Behaviour

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption	Yes	Corruption
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	Yes	Corruption, Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee, Ethics
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	Yes	Bribery, corruption, Audits, Compliance
No cases of Corruption reported in the past 3 years	Yes	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	No	Corrective Action, Corruption
whistleblowing mechanisms, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	No	corruption, Audits, Compliance
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	No	Audits, compliance, risk assessment
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place	Yes	Economic Value, Low Tax
Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	No	Low-Tax
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	Yes	Benefits, Deductions, Tax

Figure 75: Business Ethics, Anti-Competition and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities	Yes	mine closure
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	Yes	mine closure
Consider post-mining land-use opportunities in the development of these management plans	Yes	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	Yes	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	Yes	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	Yes	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	Yes	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	No	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	No	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	No	closure, De characterization
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	No	mine closure
Discloses this information on a project-disaggregated basis	No	mine closure

Figure 76: Mine Closure and Post Closure Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues	Yes	procurement, procurement, supply chain
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Labour Issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	No	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	No	Audit, Responsible Sourcing
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	No	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	Responsible procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	Yes	Responsible, Procurement, Supply chain
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Procurement, local supplier
Has systems in place to ensure its operations actively include women in these strategies and plans	No	Women, Local Procurement, Female
Systematically tracks the implementation of these strategies and plans	No	Women, Local Procurement, Female

Figure 77: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	Y/N	Keywords in the Report
and supranational socio-economic development plans in making its mining-related investment and business decisions in producing countries, with the aim of enhancing socio-economic development	Yes	Socio-economic Development
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role	Yes	economic Development, socio-Socio-economic Development, socio-economic,
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government, Government, Socio-economic Socio-economic, NGO, Academia,
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	Yes	Socio-economic, NGO, Academia, Oppurtunities
Develop R&D programmes to address these priorities	Yes	
Track the implementation of these R&D programmes	Yes	economic, NGO,
in-country institutions	No	School, Education, Academia School, Education, Academia, Student,
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	Vocational, National
Demonstrate alignment of their skills development efforts with the national skills development agenda	No	Socio-economic,
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Socio-economic, NGO, Academia,
Systematically tracks the implementation of their skills development programmes	Yes	
Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses	Yes	Bussinesses, Enterprises, Entrepreneurship Women, Female, Gender
Use strategies and plans	No	
Systematically tracks the implementation of these strategies and plans	No	Socio-economic, NGO, Academia, Oppurtunities

Figure 78: CSR Commitments and Social Development

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves that are located in or near areas of active conflict.	Yes	Conflict, areas of conflict
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and informed consent (or consultation) processes	Yes	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Upholding International Labour Organization (ILO) Convention No. 169	No	International Labour Organization
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	Yes	Grievance mechanism, whistleblower
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	Yes	Lease agreements, Community agreements
Implementation of Voluntary Principles on Security and Human Rights.	Yes	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	No	Supply chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	Yes	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	Yes	Security
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	Yes	Security

Figure 79: Risk of Conflicts and Mitigation

Community Engagement and Wellbeing		
	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs	Yes	UNGC, Human Rights
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Committee, board member, Human Rights
Allocated financial and staffing resources to implement this commitment	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	Yes	Risk Assessment, Impact assessment
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Risk Assessment, Gap Analysis, Due Diligence
Regularly tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	Yes	mine-site, mine, human rights
Conducts audits and/or reviews its performance on managing human rights issues	No	Audits, Reviews
Operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them	No	Community Engagement
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	No	Youth
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	No	Community Engagement, Disability
Operations: Conduct and disclose regular assessment of the impacts of their activities on women?	No	Impact, Risk, Women
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	No	Impact, Risk, Youth
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to address these impacts	Yes	Risk Assessment, Gap Analysis
Regularly tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Regularly tracks the implementation of these strategies and plans	Yes	Risk Assessment, Gap Analysis
Identify and maintain emergency preparedness and response plans	Yes	Emergency Planning
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning
Regularly engage with local stakeholders in the testing of these response plans	Yes	Emergency Planning, Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	Yes	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities in the surrounding areas	Yes	Noise
Systematically engage with affected communities and other stakeholders in the development of these strategies	No	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	No	Noise
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	No	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	No	Noise

Figure 80: Community Engagement and Wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
Does the company publicly disclose the number of its employees hired from local communities	Yes	Employees, v
Does the company publicly disclose the number of its contract workers hired from local communities	No	Employees, v
Does the company publicly disclose the number of women workers hired from local communities	Yes	Employees, v
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	Education, Academia, Student,
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
Support STEM education among the wider population in collaboration with in-country institutions	No	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational
Demonstrate alignment of their skills development efforts with the national skills development agenda	No	Vocational, National
Local Employment Initiatives	Yes	Employment, Employment

Figure 81:: Local Employment

Broken Hill Proprietary (Iron)

Women in Work Force		
Check List	Y/N	Keywords in the Report
Establishing or enhancing diversity policies with clear targets for inclusion and results reporting	Yes	Female Employees (Find a target % they are trying to reach and search if they have a year they want to reach this by), Women (Check for target values and %)
attaining gender equality in recruitment policies and processes	Yes	Women, Training and Development (Check for Targets initiatives and Formal statements/ policies),
implementing gender inclusive networks, career development and mentoring programmes	No	Trainings (promoting inclusivity and awareness), Women (Women focused career development courses), Inclusive
Formal statement of following relevant international standards and Practices	Yes	promote, Reporting, Approach (Check the types of reporting standards they formally state that they adhere to) (ILO tripartite)
developing equitable promotion and retention policies	Yes	Talent management, improving office environment (Practices to retain talent), promote (check if they mention that is in line with any
Grievance Mechanisms for Gender Discrimination	Yes	Grievance, Grievance mechanism (focused on women)
Tracks and discloses data, against targets and across successive time periods, on the percentage of women at board and senior management levels?	Yes	Number of Employees Based on Employment Status and Gender, Board of Directors (Gender), Women in Management
External Audits and Review	No	External Auditor
Has Information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism
Formal Statement: Gender Equality Policy	Yes	Number of Employees Based on Employment Status and Gender
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
No cases of of gender discrimination/Harassment in past 5 years	No	Cases
Employee training on Gender Discrimination	Yes	Trainings (promoting equality and awareness)

Figure 82: Women in Workforce

Gender Equity		
Check List	Y/N	Keywords in the Report
Performance review by international Organization Collaboration	No	Bloomberg Index, EITI
Gender Equity commitment through International Organizations	Yes	Gender Equality Index (Bloomberg)
Remuneration Committee addressing gender wage gap	Yes	Remuneration, Wage Pay gap
External Audits and Review	No	External Aud
Tracks and discloses data, across successive time periods, on its performance on managing the impacts of its activities on women	Yes	Gender, Women, Impact, Assessment (Social Way Toolkit)
Gender Wage Gap Reported to be 1:1	No	Gender Pay Gap
Gender Wage Gap Policy/Statement	Yes	Gender Pay Gap
Grievance Mechanisms for Harassment/Discrimination	Yes	Mechanism but for all including harassment and Discrimination (Gender
No cases of Gender Wage Pay Gap (External Source)	Yes	Cases
Has information been shared to employees on the grievance mechanism	Yes	Grievance Mechanism
Are the External suppliers aware of this grievance mechanism	Yes	Grievance Mechanism
Employee training on Sexual Harassment	Yes	Awareness Training

Figure 83: Gender Equity

Historically Disadvantaged People		
Check List	Y/N	Keywords in the Report
Take specific measures to reflect its non-discrimination policies in their terms and conditions	Yes	Discrimination
Take specific measures to implement trainings to raise awareness of discrimination among management staff and workers or take other actions aiming at preventing and addressing issues of discrimination in the workplace	Yes	Discrimination, Your Voice grievance mechanism, continual monitoring of ethnicity and disability applicants
Set targets regarding diversity and inclusivity in its recruitment and employment practices	No	Awareness Trainings
Upholding the fundamental ILO convention on discrimination (No. 111)	No	Targets
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Organise, including by granting access to designated areas for labour organisers to meet with workers	Yes	Inclusive, Diversity, International Labour Organization
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Collective bargaining, including by developing formal collective bargaining agreements	Yes	Collective Bargaining
The company has systems in place to ensure its operations actively respect the rights of workers to organise, collective bargaining and freedom of association needs to Provide: Freedom of association, including by allowing union meetings on site	Yes	Collective Bargaining

Figure 84: Historically Disadvantaged people

Accident Rate at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Accident Rate, Lost Time
Discloses the number of mining-related injuries among its workforce, across successive time periods	Yes	Accident Rate, Lost Time Injuries (LTI)
Discloses such information on a site-disaggregated basis	No	Accident Rate, Lost Time Injuries (LTI)
Discloses that its fatalities reporting includes fatalities of contract workers as well as employees	Yes	Accident Rate, Lost Time Injuries (LTI)
Evaluation on Accidents and how to prevent it	Yes	Accident Rate, Lost Time Injuries (LTI), Accident

Figure 85: Accident Rate at Workplace

Fatal Accidents at Workplace		
Check List	Y/N	Keywords in the Report
Accident Rate at Workplace total Reported	Yes	Fatal Accidents
Discloses the number of mining-related high potential incidents, serious injuries and fatalities among its workforce, across successive time periods	Yes	Fatal Accidents
Discloses such information on a site-disaggregated basis	No	Fatal Accidents
Discloses that its fatalities reporting includes fatalities of contract workers as well as employees	Yes	Fatal Accidents, Contractors
Evaluation on Accidents and how to prevent it	Yes	Fatal Accidents, Contractors

Figure 86: Fatal Accidents at Workplace

Health and Safety at the work place		
Check List	Y/N	Keywords in the Report
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Code of Conduct, Code, Fatigue, Psychological, Hazard, Health (Look for strategies that show assessments)
Monitoring Psychological Hazards	Yes	
Prevention of occupational diseases	Yes	Occupation, Occupational Hazard
Surveillance and risk-based monitoring schemes	Yes	Health monitoring, risk based monitoring
Identify and assess health and safety risks to the workforce	Yes	Occupational Risk Assessment
Track the implementation of these strategies and plans	Yes	Need to share a detailed approach to track these strategies(will be given in depth in Code of Conduct, Safety Compliance, Accountabili
Formalised its commitment, that is endorsed by senior management, to ensure safe and healthy working conditions	Yes	
Develop strategies and plans to avoid, minimise and mitigate these risks	No	Risk Assessment and mitigation
External Audits and Review	Yes	Audit
Required Safety Equipments (PPE)	Yes	Protective Equipment
Health and Safety Policy	Yes	Safety management system, Health and
Regular Health and Safety Training	Yes	Safety training
Gender Specific PPE on all mining Sites	No	Gender Equipment
Reported cases of negligent safety rules leading to accidents	Yes	Accident, negligence, incidents
Gender Appropriate Sanitation Facilities	No	Facilities, Sanitation, Provision
Health Services	No	Health Services, awareness, initiatives
Reported cases of negligent safety rules leading to accidents	Yes	Incidents, accidents, negligence

Figure 87: Health and safety at the Workplace

Presence of anti-competitive behaviour and Fair Competition		
Check List	Y/N	Keywords in the Report
Has systems in place to ensure its operations identify and map stakeholders operating in Artisanal Small Scale Mining ASM activities around its operations	Yes	Stakeholder engagement
Has systems in place to ensure its operations develop strategies and plans to engage with identified stakeholders, including through the establishment of engagement agreements where appropriate	Yes	Stakeholder engagement
Are policies implemented and practices to prevent bribery, corruption and to publicly disclose facilitation payments.	Yes	corruption
Systematically tracks the implementation of these strategies and plans	Yes	Corruption, Risk
Policies against Anti competitive behaviour	Yes	Competitive
No cases of anti competitive behaviour in the past 3 years	No	Grievance, Incident, code of conduct
Assess the need for, and feasibility of, providing technical and/or livelihood support to ASM miners	Yes	Artisanal Scale Mining, ASM, Community Engagement
Develop strategies and plans according to these assessments	Yes	Artisanal Scale Mining, ASM, Community Engagement
Engage with ASM miners in these needs assessments and in the development of any strategies and plans	Yes	Artisanal Scale Mining, ASM, Community

Figure 88: Presence of anti competitive behaviour and fair competition

Business Ethics, Anti Corruption and Transparency		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to prevent all direct and indirect forms of bribery and corruption	Yes	Corruption
Publicly support the implementation of the Extractive Industries Transparency Initiative (EITI) and compile information on all material payments, at the appropriate levels of government, by country and by project.	Yes	Corruption, Extractive Industries Transparency Initiative
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Ethics Committee, Ethics
Committed financial and staffing resources to implement this commitment	Yes	Corruption, Bribery
Tracks and discloses data, across successive time periods, on its prevention of bribery and corruption, including number and nature of incidents and actions taken in response	Yes	Corruption
Audits and/or reviews the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption	Yes	Bribery, corruption, Audits, Compliance
No cases of Corruption reported in the past 3 years	No	Corruption
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent all direct and indirect forms of bribery and corruption?	Yes	Corrective Action, Corruption
Tracks and discloses data, across successive time periods, on the functioning and uptake of its whistleblowing mechanisms, including number and nature of incidents and actions taken in response	Yes	Whistleblow, grievance
Audits and/or reviews the effectiveness of its whistleblowing mechanisms	Yes	corruption, Audits,
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve the effectiveness of its whistleblowing mechanisms	Yes	Audits, compliance, risk assesment
Discloses its corporate structure mentioning all tax jurisdictions where it has registered entity(ies) and under what names (e.g. those of subsidiary or branch entities) it is known in that place	Yes	Tax and Economic
Reports on its approach to tax transparency, including its strategy relating to its presence in any low-tax jurisdictions	Yes	Low Tax, Low-Tax
Discloses all tax benefits and tax holidays received at local and national levels in all tax jurisdictions where it has registered entity(ies)	Yes	Benefits, Deductions, Tax

Figure 89: Business Ethics, Anti-Corruption and Transparency

Mine Closure and Post Closure Viability		
Check List	Y/N	Keywords in the Report
Identify, from the earliest stage and in consultation with local stakeholders, the impacts their closure will have on affected communities	Yes	mine closure
Develop post-closure transition management plans from the earliest stage and in consultation with local stakeholders, aimed at ensuring continued livelihood viability for affected communities	Yes	mine closure
Consider post-mining land-use opportunities in the development of these management plans	Yes	mine closure
Identify, from the earliest stage, the impacts their closure will have for workers	Yes	mine closure
Develop post-closure transition management plans, from the earliest stage, ensuring continued livelihood viability for workers	Yes	mine closure
Develop partnerships with government, other industries or companies to address workers' livelihood needs	No	mine closure
Tracks and discloses data, across successive time periods, on its implementation of progressive rehabilitation plans throughout its operations	Yes	mine closure
Audits and/or reviews its performance on progressive mine rehabilitation	Yes	mine closure
Takes responsive action, on the basis of the findings of these audits and/ or reviews, to seek to improve its performance on progressive mine rehabilitation	Yes	mine closure
Discloses financial surety arrangements for the closure of all its operations, related to workers and communities	No	closure, De characterizat
Discloses financial arrangements to ensure coverage of longer-term socio-economic aspects of post-closure	No	mine closure
Discloses this information on a project-disaggregated basis	No	mine closure

Figure 90: Mine Closure and Post Closure Viability

Responsible Contracting and Sourcing		
Check List	Y/N	Keywords in the Report
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Human rights issues	Yes	Responsible procurement,
Can the company demonstrate at the corporate level that it has systems in place to identify and assess risks related to its suppliers and contractors on: Labour Issues	Yes	Responsible procurement, procurement, supply chain
Tracks and discloses data, against targets and across successive time periods, on its national and supranational procurement, showing proportions and amounts spent	Yes	Procurement, Local Procurement
Audits and/or reviews the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels?	Yes	Audit, Tax Audit, Responsible Sourcing
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to develop procurement opportunities for suppliers at national and/or supranational levels	Yes	Review, Audit
Has systems in place to identify and assess potential risks of all forms of forced, compulsory, trafficked and child labour in its areas of operations and entire supply chain	Yes	Responsible procurement, procurement, supply chain
Has systems in place to develop strategies and plans to address these identified risks	Yes	Responsible procurement, procurement, supply chain
Systematically tracks the implementation of these strategies and plans	Yes	Responsible , Procurement, Supply chain Local
Has systems in place to ensure its operations develop strategies and plans to develop local procurement opportunities	Yes	Procurement, local supplier
Has systems in place to ensure its operations actively include women in these strategies and plans	No	Procurment, Female
Systematically tracks the implementation of these strategies and plans	No	Women, Local Procurment, Female

Figure 91: Responsible Contracting and Sourcing

CSR commitments and Social Development		
Check List	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to take account of national and supranational socio-economic development plans in making its mining-related investment	Yes	Socio-economic
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Socio-economic Development
Committed financial and staffing resources to implement this commitment	Yes	Socio-economic Development
Has systems in place to ensure its operations work with sub-national producing country governments to identify socio-economic development priorities where they can play a collaborative role	Yes	Socio-economic Development , socio-economic, socio-economic benefits
Has systems in place to ensure its operations develop strategies and plans to address these development priorities in collaboration with the sub-national governments?	Yes	economic Development , socio-economic, socio-economic benefits
Systematically tracks the implementation of these strategies and plans, collaboratively with the sub-national governments	Yes	Regional Government , Government , Socio-economic
Identify R&D priorities to address socio-economic and environmental impacts of mining within producing countries	Yes	socio-economic, NGO, Academia, Oppurtunitt
Develop R&D programmes to address these priorities	Yes	Socio-economic, NGO, Academia, Oppurtunittes
Track the implementation of these R&D programmes	Yes	Socio-economic, NGO, ,
Support STEM education among the wider population in collaboration with in-country institutions	No	Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	Education, Academia, Student, Technical,
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Education, Vocational,
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	economic, NGO,
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Bussinesses,
Has systems in place to ensure its operations develop strategies and plans to develop local entrepreneurship and businesses	Yes	Enterprises, Entrepreneurship
Has systems in place to ensure its operations actively include women in these strategies and plans	Yes	Women, Female, Gender
Systematically tracks the implementation of these strategies and plans	No	Socio-economic, NGO, Academia, Oppurtunittes

Figure 92: CSR Commitments and Social Development

Risk of Conflicts and Mitigation		
Check List	Y/N	Keywords in the Report
The entity shall disclose the percentage and grade (in percentage metal content) of proved reserves that are located in or near areas of active conflict.	No	Conflict, areas of
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Use of free, prior, and informed consent (or consultation) processes	Yes	Indigenous people
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : Upholding International Labour Organization (ILO) Convention No. 169	No	International Labour Organization
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of project grievance mechanisms	Yes	Grievance mechanism, whistleblower
The entity shall describe its due diligence practices and procedures with respect to indigenous rights of communities in which it operates or intends to operate, with Respect to : The establishment of formal community agreements	No	Lease agreements, Community agreements
Security and Human Rights.	Yes	Voluntary Principles on Security and Human Rights
Describing its approach according to the Five-Step Framework outlined in the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.	Yes	Supply chain, Audit, third party audit
Tracks and discloses data, across successive time periods, on its performance on preventing and remedying human rights abuses related to its security management	No	Security
Audits and/or reviews the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security
Takes responsive action, based on the findings of these audits and/ or reviews, to seek to improve the effectiveness of its measures taken to prevent and remedy human rights abuses related to its security management	No	Security

Figure 93: Risk of Conflict and Mitigation

Community Engagement and Wellbeing		
	Y/N	Keywords in the Report
Formalised its commitment, that is endorsed by senior management, to respect human rights in accordance with the UNGCs	Yes	UNGC, Human Rights
Assigned senior management or board-level responsibilities and accountability for carrying out this commitment	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations identify and assess salient impacts of their activities on human rights	Yes	Committee, board member, Human Rights
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Gap Analysis, Risk Assessment, Impact assessment
Has systems in place to ensure its operations develop strategies and plans to prevent, mitigate and account for how they address these identified impacts	Yes	Risk Assessment, Gap Analysis, Due Diligence
Tracks and discloses data, across successive time periods, on its performance on managing human rights issues, including mine-site-disaggregated data on the implementation of human rights due diligence processes	No	Risk Assessment, Gap Analysis
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Women in discussions and decision-making on matters that may impact them	No	Risk Assessment, Gap Analysis
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Youth in discussions and decision-making on matters that may impact them	No	mine-site, mine, human rights
Can the company demonstrate at the corporate level that it has systems in place to ensure its operations take specific measures to enable the participation of Persons with disabilities in discussions and decision-making on matters that may impact them	No	Audits, Reviews
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on operations: Conduct and disclose regular assessment of the impacts of their activities on youth?	Yes	Community Engagement
Can your company demonstrate at the corporate level that it has systems in place to ensure its operations: Conduct and disclose regular assessment of the impacts of their activities on children?	No	Youth
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	No	Community Engagement, Disability
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Impact, Risk, Women
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Impact, Risk, Youth
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Impact, Risk, Children
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations conduct and disclose regular assessments of their impacts on community health	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations identify and assess their adverse impacts on land use and access to land by affected communities	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Has systems in place to ensure its operations develop strategies and plans to minimise and mitigate these adverse impacts	Yes	Risk Assessment, Gap Analysis
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	Yes	Emergency Planning, Emergency Response
Systematically engage with local stakeholders (e.g. local authorities and communities) in the design of emergency response plans	No	Emergency Planning, Emergency Response
Regularly assess, against baseline values, the noise and vibration levels generated by their activities	Yes	Noise
Develop strategies and plans to limit the impacts of noise and vibration generated by their activities in the surrounding areas	No	Noise
Systematically engage with affected communities and other stakeholders in the development of these strategies	No	Noise
Tracks and discloses data, across successive time periods, on the functioning and uptake of its grievance mechanisms for communities, including number and nature of complaints and actions taken in response	Yes	Grievance Mechanism
Audits and/or reviews, based on complainants' perspective, the effectiveness of its grievance mechanisms for communities	No	Noise
Takes responsive action, based on the findings of these audits and/or reviews, to seek to improve the effectiveness of its grievance mechanisms for communities	No	Noise

Figure 94: Community Engagement and Wellbeing

Local Employment		
Check List	Y/N	Keywords in the Report
Does the company publicly disclose the number of its employees hired from local communities	No	Employees, v
Does the company publicly disclose the number of its contract workers hired from local communities	No	Employees, v
Does the company publicly disclose the number of women workers hired from local communities	No	Employees, v
Has systems in place to ensure its operations support technical skills development of its local workforces in producing countries	Yes	School, Education, Academia, Student, Technical, Vocational
Has systems in place to ensure its operations support managerial skills development of its local workforces in producing countries	Yes	Manager, Managerial skill
Systematically tracks the implementation of their skills development programmes	Yes	Socio-economic, NGO, Academia, Oppurtunities
Support STEM education among the wider population in collaboration with in-country institutions	No	School, Education, Academia
Support technical/vocational skills development among the wider population in collaboration with in-country institutions	Yes	School, Education, Academia, Student, Technical, Vocational Education, Vocational, National
Demonstrate alignment of their skills development efforts with the national skills development agenda	Yes	Employment, Employment
Local Employment Initiatives	Yes	Employment, Employment

Figure 95: Local Employment