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Environmental Reporting in the ESG Disclosures of Kazakhstani Companies from the Resources Extraction Industry

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ABSTRACT OF THESIS submitted by:
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This thesis examines the environmental reporting in the ESG disclosures of large Kazakhstani companies from the resources extraction industry, including oil and gas, mining and metallurgy sectors. The study analyzes the extent of adherence to global ESG standards and frameworks and the prioritization of key environmental issues within climate change, natural capital, and pollution and waste themes. The study used simplified MSCI ESG Ratings Methodology and WAKIS Metric to provide insights into current environmental reporting practices, identify trends, and recommend improvements for enhanced ESG disclosures in Kazakhstan. The research findings contribute to the ongoing discourse surrounding the development of ESG practices in Kazakhstan.

Keywords: ESG, environmental pillar, environmental reporting, disclosures, GRI, SASB, TCFD, MSCI, oil and gas, mining and metallurgy

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1. Introduction

In recent years, Environmental, Social, and Governance (ESG) considerations have emerged as crucial elements in the corporate landscape, reflecting a growing awareness of sustainable practices and responsible business conduct. According to Bloomberg Sustainable Future Study (2022), ESG assets will reach 50 trillion USD by 2025, which is more than a third of the total global assets. The integration of ESG principles has garnered global attention, with organizations worldwide recognizing the significance of environmental stewardship, social responsibility, and sound governance in achieving long-term value creation and resilience.

In the context of the resources extraction industry, encompassing sectors such as oil and gas, mining and metallurgy, ESG has assumed paramount importance due to the sector's inherent impact on the environment and local communities. The disclosure of ESG-related information has become a pivotal means for companies to communicate their environmental performance, social initiatives, and governance practices, enabling stakeholders to make informed decisions and assess the companies' commitment to sustainability.

As a nation rich in natural resources, Kazakhstan plays a significant role in the global resources extraction industry. As companies in the Kazakhstani resources extraction industry continue to expand their operations, it becomes imperative for them to embrace ESG principles to address environmental challenges, foster social inclusivity, and ensure robust governance frameworks. As such, environmental reporting within the ESG disclosures of Kazakhstani companies assumes considerable importance in understanding their commitment to sustainable practices and evaluating the efficacy of their ESG implementation strategies.

This thesis aims to examine the extent and quality of environmental reporting in the ESG disclosures of Kazakhstani companies operating in the resources extraction industry. By critically analyzing the reported ESG data and practices, this research seeks to explore the

current state of environmental transparency and performance within the oil and gas, mining and metallurgy sectors.

By illuminating the strengths and weaknesses of environmental reporting practices, this study aims to advocate for enhanced ESG disclosures, which can serve as catalysts for positive environmental impact and social progress within the resources extraction industry in Kazakhstan.

1.2 Research Questions and Design

The thesis will focus on addressing the following research questions:

1. Do Kazakhstani oil and gas, mining and metallurgy companies adhere to the global ESG standards and frameworks, and to what extent?
2. How do companies prioritize and report on different environmental factors, such as climate change and carbon emissions, pollution and waste, water use, biodiversity conservation and land use?
3. What are the recommendations for Kazakhstani companies to improve their environmental reporting in ESG standards?

The research design is based on the desk research method that involves collecting and analyzing existing data, information, and sources to gain insights and answer research questions. The research mainly relies on published ESG reports and materials from selected Kazakhstani companies. It does not involve primary data collection through surveys, interviews, or experiments. At the same time, the desk method allows exploring a wide range of existing data and information, providing a comprehensive understanding of the research topic.

The desk research method can identify gaps in existing knowledge that may require additional research and serve as a foundation for further primary studies (Stewart and Kamins, 1993). The research contributes to understanding environmental reporting practices and

identifies general trends and gaps in the environmental pillar of ESG disclosures that can be improved.

1.2 Limitations of Research

The research is aimed to analyze the [E] Environmental pillar within ESG reporting and does not include [S] Social and [G] Governance pillars. The research evaluates the availability of environmental information from companies based on the methodology presented below. However, it does not verify the reliability and accuracy of the information provided by these companies.

It is important to highlight the common fallacy that companies with high environmental scores from different ESG rating organizations have a lower environmental impact than companies with lower scores. On the contrary, one study indicates that companies with a larger generation of hazardous and non-hazardous waste have received a higher environmental score depending on various data providers (Boffo, Marshall, and Patalano 2020). So, companies with a high environmental score does not always mean high environmental performance or low impact, it means that they provide more detailed information and data. It should also be noted that depending on the ESG rating provider, ESG and environmental score may differ for the same company (Tanaka 2023).

Within the framework of this research, will be reviewed the ESG reports of companies from the following two sectors: oil and gas, mining and metallurgy sectors. The focus on these two sectors is made due to their main contribution and forming the economy of Kazakhstan (IEA 2020). Also, in Kazakhstan, oil and gas and mining companies are flagships in promoting ESG practices and reporting (KASE 2022). Therefore, the environmental information and data provided by companies from these sectors represent general trends and directions of ESG development in Kazakhstan.

2. An Overview of ESG: From Terminology to Global Frameworks and its Development in Kazakhstan

2.1 ESG Terminology

The Environmental, Social and Governance (ESG) is the broad term combines three pillars used to evaluate the sustainability and societal impact of a company or investment (Câmara 2022). The environmental pillar implies assessing a company's impact on the environment, including resource use, pollution, and climate change. The social pillar considers a company's relationships with its employees, customers, communities, and other stakeholders. Finally, the governance pillar focus on the internal structure, policies, and practices that guide a company's decision-making and accountability. These three pillars are interconnected and can impact the financial performance, risk management, and long-term sustainability of companies. Besides financial performance and sustainability issues, companies also disclose ESG information to improve corporate reputation, increase brand value, and motivate employees (Leung and Xiang 2022). The risk management includes environmental risks, such as negative impacts on air, land, water, ecosystems and human health, and social risks associated with human rights, safety and health (Shimizu 2020).

Despite the long existence of the ESG concept in one form or another, the term *"Environmental, Social and Governance"* was first mentioned in the UN Report "Who Cares Wins: Connecting Financial Markets to a Changing World" published in 2004 (Gao et al. 2021). The report highlights the growing recognition of ESG principles as critical considerations for financial decision-making. It emphasizes that integrating sustainability into financial markets is not only important for addressing global challenges such as climate change, inequality, and poverty but also for generating financial returns and long-term value. The report argues that by

considering ESG factors, financial institutions can identify and manage risks, access new opportunities, and contribute to sustainable development (UN 2004).

2.2 Emergence of the ESG Concept

The ESG concept emerged from Socially Responsible Investments (SRI), which has its roots in the 1960s and had great momentum during the 1970s to 1990s (Gao et al. 2021). The civil rights movement in the 1960s raised awareness about social justice, equality, and human rights issues. It influenced investors and led to the consideration of social factors in investment decisions, laying the groundwork for the broader concept of SRI (Townsend 2020). The anti-apartheid movement in South Africa during the 1980s drew international attention to the social and ethical implications of investing in companies operating in oppressive regimes and thereby discouraging engagement with such companies and initiating the momentum toward greater transparency (Townsend 2020; Renneboog, Ter Horst, and Zhang 2008; Hill 2020).

In the environmental sphere, catalyzers were the explosion of the Chernobyl nuclear power plant in 1986 in the Soviet Union and the Exxon Valdez spillover of 11 million gallons of oil in Alaska, United States, in 1989 (Renneboog, Ter Horst, and Zhang 2008). These and other environmental disasters forced investors to pay attention to the environmental impacts of industrial operational activities. Another important factor was public pressure with the interrelated growth of activism, and the strengthening of existing and new environmental movements in 1990s, such as climate change movement, rainforest conservation, and ozone depletion movements (Rootes 2007). In this way, SRI increased the number of investors who started considering social, ethical, and environmental factors alongside financial performance in their investment decisions and portfolio (Renneboog, Ter Horst, and Zhang 2008).

In the 2000s, there was interest in revisiting the SRI concept and incorporating corporate governance in addition to financial, social, ethical and environmental factors (Fulton, Kahn, and Sharples 2012). It should also be noted here the difference between the SRI concept

and the Corporate Social Responsibility (CSR), which is also often mistaken for the ESG concept (Derwall 2007; Fulton, Kahn, and Sharples 2012; Cini and Ricci 2018; Hill 2020). The SRI, CSR, and ESG are related but distinct concepts that focus on different aspects of sustainable and responsible business practices (Townsend 2020). Primarily, SRI is an investment approach that considers abovementioned factors, while CSR focuses on a company's voluntary actions and initiatives to address social and environmental issues of society (Park et al. 2023). Both SRI and CSR do not incorporate corporate governance factors as a core pillar of analysis, unlike ESG (Cini and Ricci 2018).

As a result, in 2006 were adopted the United Nations Principles for Responsible Investment (UN PRI). Responsible investment here refers to a strategy for integrating corporate governance along with environmental, social (ESG) factors in investment decision-making and ownership practices (PRI Association 2023). Overall, these six adopted principles outline the commitment of 4,902 signatories[1] to integrate ESG factors into investment practices, engage as responsible owners, collaborate, and promote transparency and disclosure on ESG issues (PRI Association 2022). The UN PRI has become a milestone in ESG development and growth by mainstreaming ESG integration, promoting transparency, and driving the transformation of the investment industry toward more sustainable and responsible practices (Bauckloh et al. 2021).

2.3 Generational Theory and Growth of ESG Research and Disclosures

In recent years, we can observe significant increase in ESG-related publications and literature (Gao et al. 2021; Saini et al. 2022; Tsang, Frost, and Cao 2023). Based on bibliometric analysis (Gao et al. 2021) of ESG research, after 2010 there is an upward trend in ESG-related

[1] As of March 31, 2022 (PRI Association 2022)

publications. If in 2016 the number of academic articles was 42, then in 2020 there were 243 of them (Gao et al. 2021). Academic interest is directly related to the increase in the number of companies disclosing ESG information. During the period from 2010 to 2021, the share of S&P 500 companies publishing voluntary ESG disclosures increased from 35% to 86% (Rouen, Sachdeva, and Yoon 2022). It should also be noted that there has been an increase in the number of UN PRI signatories, for whom, since 2018, reporting on ESG principles implementation became mandatory (Bauckloh et al. 2021). Companies have come under intense public pressure to report on non-financial aspects covering ESG, which in turn increases stakeholder awareness (Saini et al. 2022).

From a sociological point of view, the growth and development of ESG principles and disclosures can be explained through the intergenerational wealth-transfer and connection with a particular generation (Ruggie and Middleton 2019). After the 2010s and especially after the 2020s, the so-called millennial generation or millennials, people born between the 1980s and 1990s, became financially active (Barzuza, Curtis, and Webber 2019). Their value system is primarily based on the principles associated with ESG, such as environmental stewardship, social equality and inclusion, ethical and transparent governance (Ruggie and Middleton 2019). For millennials, it is important to have moral satisfaction from the positive impact of their investments on society and the environment (Morgan Stanley 2017). In other words, the purpose of business is not solely to make money for them, it is important to take care of the environment and the health of the community in the process. According to Morgan Stanley (2017), 86% of millennials are interested in sustainable investing and believe in positive impact from them. Millennials will inherit over $30 trillion of wealth, so the demand for sustainable investments will continue to rise (Formánková et al. 2019).

In recent Deloitte survey (2023) were interviewed 14,483 Gen Zs and 8,373 millennials across 44 countries. Gen Zs is the next generation after millennials, born between 1995-2012

and who are entering the workforce (Gabrielova and Buchko 2021). Gen Zs shares many similar values with millennials, especially when it comes to sustainability (Prayag et al. 2022). The results of the survey (Deloitte 2023) showed that climate change is a major stressor for Gen Zs and millennials, and six in ten felt anxiety about the state of the environment in the past month. In addition, both generations continue to demand more action on climate change from their employers and feel that some have lost the prioritization of sustainability strategies in recent years (Deloitte 2023).

2.4 Greenwashing in the Context of ESG

However, companies that practice greenwashing methods have emerged due to the growing call for companies and investors to incorporate ESG principles and sustainability practices into their operations. Generally, greenwashes refer to companies that misleadingly portray their environmental or social practices as more sustainable or responsible than they actually are (Dumitrescu, Gil-Bazo, and Zhou 2022). Some researchers (Dumitrescu, Gil-Bazo, and Zhou 2022; Yu, Luu, and Chen 2020; De Silva Lokuwaduge and De Silva 2022) consider greenwashing as a barrier to ESG integration into investment decisions, and besides misleading investors and damage to reputation, it can negatively affect the allocation of capital. If companies misrepresent their ESG efforts, the capital and resources can be wasted on superficial or cosmetic changes instead of directed towards genuine sustainability initiatives (Dumitrescu, Gil-Bazo, and Zhou 2022).

Companies engage in greenwashing for several reasons, such as protection or enhancement of their reputation, competitive advantage in the market, or financial incentives of investments from sustainable funds or investors (Lee and Raschke 2023). Greenwashing is possible primarily due to unaudited ESG data and sustainability information from companies (Yu, Luu, and Chen 2020). De Silva Lokuwaduge and De Silva (2022) draws a parallel with traditional financial reporting, where reports are regulated, they are mandatory, and have to

meet the qualitative criteria. But when it comes to ESG disclosures, ESG information can be too complex and technical, require specialized knowledge to understand and measure (Dumitrescu, Gil-Bazo, and Zhou 2022). This complexity can be exploited by companies to present their efforts in a positive light without providing sufficient evidence or context. In order to mitigate these risks, Alvis et al. (2023) suggest the need for institutional changes by establishing the Office for Climate and Environmental Targets within the UK's context. The proposed office will help businesses in setting decarbonization targets and plans, and make sure that they contribute to the national net zero target. It should take an oversight role and *"regularly reviewing climate and environment targets and progress against them"* (Alvis et al. 2023, 19). If the companies fail to meet certain standards, they will be blacklisted and unable to have government contracts or take advantage of reduced green taxes (Alvis et al. 2023).

Some scholars (Yu, Luu, and Chen 2020; Gatti, Seele, and Rademacher 2019) agree on the importance of establishing regulating bodies and regulatory guidelines to ensure ESG reporting information's accuracy. Gatti et al. (2019) suggest that stricter regulations and guidelines should be implemented to prevent and penalize greenwashing. Transparency and accountability should be prioritized to differentiate between genuine sustainability efforts and deceptive practices. At the same time, Yu et al. (2020) acknowledge the significant role of global guidelines and frameworks, such as UN PRI, Sustainability Accounting Standards Board (SASB), and Global Reporting Initiative (GRI), however, each country should develop mandatory and voluntary ESG disclosure instruments, which will follow the above-mentioned global ESG frameworks. The result of their research (Yu, Luu, and Chen 2020) showed that companies that experience increased scrutiny from stakeholders are less likely to engage in ESG greenwashing. Gatti et al. (2019) highlight the role of NGOs and activists in watchdogging and detecting greenwashing.

Yu et al. (2020) also provided practical recommendations for reviewing ESG disclosures. First, companies practicing greenwashing usually provide a large amount of unnecessary information in their reporting and try to bury real indicators under this amount of data. Therefore, it is more likely that these companies will have a higher ESG disclosure score than an ESG performance score, meaning that these companies hide their low ESG performance by disclosing a large amount of information (Yu, Luu, and Chen 2020).

2.5 Main Global ESG Disclosure Frameworks and Standards

Global Reporting Initiative (GRI) and Sustainability Accounting Standards Board (SASB) are the two ESG industry leaders and the most commonly used frameworks and standards (Gamsjäger and Ray 2021). This statement is consistent with the results of the US survey (Probert 2021), where out of 150 respondents, 33% used GRI, 32% used SASB, and 25% used Task Force on Climate-Related Financial Disclosures (TCFD). Big Four consulting firms expect Kazakhstani companies interested in foreign markets or investments to adhere to one of these standards and frameworks (KPMG 2022; PwC 2022). According to PricewaterhouseCoopers Kazakhstan (PwC 2022), in their 2022 rating of the Top 50 ESG Disclosure Companies, 33 companies prepared reports in accordance with GRI standards, 2 – using TCFD, and the rest did not use any international standards or frameworks. However, PwC experts predict a wider application of the TCFD recommendations in Kazakhstan in the next few years (PwC 2022).

TCFD recommendations are narrowly focused on climate-related financial risks and opportunities, while GRI standards provide a comprehensive framework for reporting on ESG issues, and it is widely used by all sectors (Singer 2018). SASB in turn provides a set of 77 industry-specific standards that help companies report on financially material ESG issues.

In terms of the target audience of the information prepared with the help of these standards and frameworks, SASB is primarily focused on US investors, TCFD on UK and EU

investors and lenders, while GRI is for a global and broader range of stakeholders, including investors, customers, suppliers, employees, and local communities (Singer 2018; O'Dwyer and Unerman 2020). Thus, when a company uses a particular framework or standard, we can assume who is the target audience for that company.

2.5.1 Environmental Pillar in GRI standards

The system of GRI standards is structured into three categories: universal standards, sector standards, and topic standards. The universal standards are used by all companies, sector standards based on sectors they are working in, and topic standards in accordance with identified company's list of material topics (GRI 1 2022). Material topics represent the company's most significant impacts on the economy, environment, humans and their rights (GRI 3 2022). Material topics are tested against the topics in the sector standards (GRI 3 2022). Environmental standards comprised within code GRI 300 and divided into six categories: materials, energy, water and effluents, biodiversity, emissions and waste (Tab. 1).

Table 1. GRI Standards

GRI Standards		
Universal Standards	Sector Standards	Topic Standards (GRI 300: Environmental Standards)
GRI 1: Foundation	40 sectors, including oil and gas, mining, and renewable energy	**GRI 301: Materials**. Disclosure on materials used by weight or volume, recycled input materials used, and reclaimed products and their packaging materials
GRI 2: General Disclosures		**GRI 302: Energy**. Disclosure on energy consumption, energy intensity, and reduction measures
GRI 3: Material Topics		**GRI 303: Water and Effluents**. Disclosure on water withdrawal and consumption, water sources, and water discharge or effluents

Source: Global Reporting Initiative (GRI 2023)

2.5.2 Environmental Pillar in SASB

In SASB, the environmental pillar is a part of the "sustainability dimensions" along with human and social capital, business model and innovation, leadership and governance. The specific environmental metrics within SASB's framework may vary depending on the industry (Tab. 2). Mining and metallurgy, and oil and gas sectors fall under the following SASB's

industry classification: metals & mining (extractives and minerals processing sector), oil & gas – exploration & production.

Table 2. SASB Environmental Topics and Accounting Metrics for Metals & Mining, and Oil & Gas Sectors

Metals & Mining		**Oil & Gas**	
Topic	Accounting metric	Topic	Accounting metric
GHG Emissions	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	**GHG Emissions**	Gross global Scope 1 emissions, percentage methane, percentage covered under emissions-limiting regulations
	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets		Amount of gross global Scope 1 emissions from: (1) flared hydrocarbons, (2) other combustion, (3) process emissions, (4) other vented emissions, and (5) fugitive emissions
Air Quality	Air emissions of the following pollutants: (1) CO, (2) NOx (excluding N2O), (3) SOx, (4) particulate matter (PM10), (5) mercury (Hg), (6) lead (Pb), and (7) volatile organic compounds (VOCs)		Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets
Energy Management	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable	**Air Quality**	Air emissions of the following pollutants: (1) NOx (excluding N2O), (2) SOx, (3) volatile organic compounds (VOCs), and (4) particulate matter (PM10)
Water Management	(1) Total fresh water withdrawn, (2) total fresh water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	**Water Management**	(1) Total fresh water withdrawn, (2) total fresh water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress
	Number of incidents of non-compliance associated with water quality permits, standards, and regulations		Volume of produced water and flowback generated; percentage (1) discharged, (2) injected, (3) recycled; hydrocarbon content in discharged water
Waste & Hazardous Materials Management	Total weight of non-mineral waste generated		Percentage of hydraulically fractured wells for which there is public disclosure of all fracturing fluid chemicals used
	Total weight of tailings produced		Percentage of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline
	Total weight of waste rock generated	**Biodiversity Impacts**	Description of environmental management policies and practices for active sites
	Total weight of hazardous waste generated		Number and aggregate volume of hydrocarbon spills, volume in Arctic, volume impacting shorelines with ESI rankings 8-10, and volume recovered
	Total weight of hazardous waste recycled		Percentage of (1) proved and (2) probable reserves in or near sites with protected conservation status or endangered species habitat
	Number of significant incidents associated with hazardous materials and waste management		
	Description of waste and hazardous materials management policies and procedures for active and inactive operations		

Biodiversity Impacts	Description of environmental management policies and practices for active sites		
	Percentage of mine sites where acid rock drainage is: (1) predicted to occur, (2) actively mitigated, and (3) under treatment or remediation		

Source: SASB Standards Board (SASB 2018b; 2021; 2018a)

2.5.3 Environmental Pillar in TCFD

TCFDs were established in 2015 by the Financial Stability Board (FSB) to develop recommendations for voluntary climate-related financial disclosures. TCFD consists of 11 recommendations within the following core elements: governance, strategy, risk management, metrics and targets. Task Force with the use of artificial intelligence (AI) technology reviewed the 2021 reports of over 1400 public companies worldwide, 80% of companies disclosed in line with at least one of the 11 recommendations, and around 40% disclosed in line with at least five, and only 4% disclosed in line with all 11 recommendations (TCFD 2022). In addition to the AI reports review process, a survey was conducted that indicated a challenge for companies to implement climate-related scenario analysis, including SBTi (TCFD 2022). Therefore, the inclusion of SBTi in the third stage and adding an extra point, if established, is reasonable due to the complexity of this activity and the fact that many companies need assistance with their setting.

While TCFD focuses primarily on climate-related disclosures, it recognizes the interconnectedness between climate and environmental factors. The environmental pillar within TCFD's recommendations encompasses several aspects related to environmental risks and opportunities (Tab. 3).

Table 3. Key components of the environmental pillar in TCFD recommendations

Component	Description
GHG Emissions	Disclosure of the company's GHG emissions, including both direct (Scope 1) and indirect (Scope 2 and Scope 3) emissions. This information helps investors and stakeholders understand a company's carbon footprint and assess climate-related risks.
Environmental Targets	Disclosure of the company's environmental targets information, such as emissions reduction goals or energy efficiency targets. These targets

	provide insights into a company's commitment to environmental sustainability and its progress in achieving those goals.
Physical Risks	Information about the company's exposure to physical risks associated with climate change, such as extreme weather events, sea-level rise, or changes in temperature patterns. This includes assessing how these risks may impact a company's operations, supply chain, or assets.
Transition Risks	Information about transition risks related to the transition to a low-carbon economy. These risks can include policy changes, evolving regulations, technological advancements, or shifts in consumer preferences that may affect a company's operations, profitability, or asset values.
Opportunities	Information about environmental opportunities, such as renewable energy investments, energy efficiency improvements, or sustainable product innovations. Reporting on these opportunities provides insights into a company's ability to capitalize on the transition to a more sustainable economy.
Scenario Analysis	Incorporation of scenario analysis to assess the potential impacts of different climate-related scenarios on a company's strategy, operations, and financial performance. This analysis helps identify vulnerabilities and opportunities in different future climate scenarios.

Source: Task Force on Climate-related Financial Disclosures (TCFD 2017)

2.5.4 Common and Overlapping Environmental Metrics of GRI, SASB, TCFD

Although GRI, SASB, and TCFD are different reporting frameworks and standards, and the specific indicators they use may differ, there is still some overlap in the environmental indicators they cover. They all encourage to disclose direct and indirect GHG emissions, including Scope 1, Scope 2, and Scope 3 emissions. In addition, all of them address reporting on energy consumption and use. In energy topic, GRI also covers energy intensity and reduction measures, while TCFD focuses on disclosure of energy management practices.

Another overlapping topic is water management. GRI standards cover reporting on water use, water sources, and water discharge or effluents. SASB standards include metrics related to water withdrawal, water use efficiency, and water discharge. TCFD recognizes the importance of water-related risks and encourages disclosing water-related information.

Regarding waste management, GRI standards provide metrics for reporting waste generation, recycling, and disposal practices. SASB standards may include metrics related to waste generation, recycling rates, or hazardous waste management. While TCFD primarily focuses on climate-related disclosures, it does not specifically address waste management metrics.

2.6 Development of ESG in Kazakhstan

In Kazakhstan, ESG principles are less widespread than in Western countries, but they are already being gradually introduced into business, and ESG information disclosure has just started to develop intensively in recent years (Isataeva, Aubakirova, and Mausymbayeva 2022). Nevertheless, it can be stated that there is still a lack of research and scientific literature in this area. Buşa et al. (2021) in their bibliometric analysis of research interest in ESG listed Kazakhstan among the countries with the lowest level of interest and scientific contribution in the field of ESG. Azretbergenova et al. (2023) note the shortage of ESG transparency studies in Kazakhstan, which play a vital role in the development of international relations. Because of this, there is a shortage of reliable and accessible ESG data on the financial market. The immaturity of ESG disclosures in Kazakhstan is directly related to the absence of close ties with the foreign markets and investments (Azretbergenova, Yessymkhanova, and Yessenali 2023).

Some researchers (Kalabin 2020; Varavin, Kozlova, and Makovetskiy 2022; Azretbergenova, Yessymkhanova, and Yessenali 2023) link the start of ESG development in Kazakhstan with a “green economy” and “green transition” processes. According to Varavin et al. (2022), developing a green economy is impossible without forming a special financial system that envisage attraction of green investments and implementing the principles of responsible investment (PRI), which in turn includes ESG. Mishulina (2019) argues that green investments are considered as an integral part of responsible investments and involve long-term financial investments directed to introducing green technologies.

In 2013 Kazakhstan adopted the Concept for the transition to a "green economy”. The concept aimed to foster sustainable development by balancing economic growth with environmental protection and social well-being (GoK 2013). In 2016 the country signed the OECD Declaration on Green Growth, which stipulates promotion of green investments,

sustainable management of natural resources, and green growth strategies (OECD 2009). In 2018 green economy and environmental protection were identified as priority areas in the National Development Plan of the Republic of Kazakhstan until 2025. This economic transition and establishment of "green" legislative framework laid a solid foundation for shaping the development of ESG legislation and disclosures.

In Kazakhstan, the main participants of ESG market are the following institutions: government agencies, stock exchanges, rating agencies, banking and business associations (Azretbergenova, Yessymkhanova, and Yessenali 2023). From governmental agencies, the Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market (ARDFM RK) act as a regulator for ESG legislation and the whole financial system, while the Ministry of Ecology, Geology and Natural Resources and the Ministry of Energy are responsible for environmental protection (Azretbergenova, Yessymkhanova, and Yessenali 2023). In March 2023, ARDFM RK adopted a roadmap for the implementation of ESG principles in the regulation of the financial market. It is noteworthy that in the roadmap is planned to introduce mandatory ESG disclosure for financial institutions in 2024 (ARDFM RK 2023a). In April 2023, ARDFM RK developed a guidance for ESG Disclosure for banks and financial institutions, based on experience and recommendations of global standards and frameworks, such as Global Reporting Initiative (GRI); Sustainability Accounting Standards Board (SASB); Task Force on Climate-Related Financial Disclosures (TCFD) and others (ARDFM RK 2023b). In the guidance, the environmental pillar identified six key performance indicators in the environment and climate change topic (ARDFM RK 2023b).

The ARDFM guidance indicators includes: 1) GHG emissions (Scope 1,2,3), including emissions deviation from a carbon neutral scenario by 2060 under the Paris Agreement; 2) Internal targets used to manage climate change risks and opportunities and performance against targets; 3) Impact of climate change adaptation measures on profitability, products and

services; 4) Climate change risks and opportunities that could lead to significant changes in activities, income or expenses; 5) Environmental management policy (including waste reduction, reuse, recycling, composting); and 6) Environmentally friendly activities (sustainable and electric transport, solar panels, energy efficiency of the organization's buildings, etc) (ARDFM RK 2023b).

The peculiarity of Kazakhstani legislation and ESG development is that government regulates the financial sector, while the non-financial sector, including the oil and gas and mining industries, which are leaders in ESG disclosure (Azretbergenova, Yessymkhanova, and Yessenali 2023), provides it voluntarily. To compare approaches, in the UK, which considered as a country with a well-developed ESG framework (Singhania and Saini 2022), mandatory ESG disclosure was introduced to the largest companies with over 500 employees and £500 million turnover from both financial and non-financial sectors (Seago and Ruiz 2023). The specifics of the Kazakhstani situation are that the largest companies with high revenue and capitalization are in the non-financial sector, specifically in the resources extraction sphere, which is not regulated. The companies in the resources extraction sphere represent high industrial threats to the environment (Oznobikhina and Pirunova 2021). That’s why assessing environmental pillar in their ESG reporting is essential.

2.7 Theoretical Framework

The theoretical framework of this research is comprised from the following theories: compliance and alignment theory, and innovation and transition theory. The compliance and alignment theory is a conceptual framework used to analyze and understand companies' adoption and implementation of sustainability standards, frameworks, and guidelines (Pollman 2019). It focuses on how companies comply with and align their practices with these sustainability initiatives. The theory explores compliance and alignment's motivations, drivers,

and outcomes, identifying factors influencing companies' sustainability practices (Pollman 2019).

In this theory, compliance refers to the extent to which companies adhere to and meet the requirements of sustainability standards and framework. It involves companies following the prescribed reporting guidelines, disclosure practices, and performance metrics set forth by these standards. Compliance is often driven by external pressures such as regulatory requirements, market expectations, and stakeholder demands (Foerstl et al. 2015). As regards to alignment, it refers to the strategic integration and incorporation of sustainability practices within a company's operations, strategies, and decision-making processes (Sheehan et al. 2023). It goes beyond mere compliance and involves companies adopting sustainability as a core value and embedding it into their business models (Sheehan et al. 2023). Alignment reflects a company's proactive approach towards sustainable development and its commitment to addressing ESG issues. Overall, this theory recognizes that companies may show different levels of compliance and alignment depending on various factors like stakeholder influence, market dynamics, organizational culture and others (Pollman 2019). It provides a framework for analyzing drivers, barriers, and outcomes related to companies' sustainability practices (Pollman 2019). This theory tested the extent of compliance with GRI, SASB, and TCFD frameworks and standards among Kazakhstani companies and analyzed the level of alignment with the recommended indicators and reporting guidelines. It also allowed to identify companies' priorities for reporting on various environmental factors.

The innovation and transition theory reviews the opportunities and challenges companies face when transitioning to a more sustainable and low-carbon economy (Twomey and Gaziulusoy 2016). This theory focuses on an examination of the role of innovation in stimulating the sustainability transition. It explores how technological, organizational, and societal innovations can lead to changes in economic systems, industrial practices, and societal

norms, ultimately promoting sustainability and addressing environmental challenges (Gaziulusoy and Brezet 2015). The particular interest lies in technological and organizational innovations, how companies enhance environmental reporting, and what advanced monitoring technologies, data analytics, or reporting platforms they use.

The theory allows to understand the dynamics of innovation, adoption, and diffusion processes that facilitate the transition to more sustainable pathways. It was used to investigate the innovative practices and strategies adopted by Kazakhstani companies in response to environmental challenges and their integration into ESG reporting frameworks. As well as to assess the presence and impact of Science-Based Targets (SBTi) on the environmental pillar score and analyze how companies' commitment in reducing GHG emissions and transitioning to a low-carbon economy influences their environmental disclosures.

By incorporating compliance and alignment theory, and innovation and transition theory into the research, it gains a comprehensive understanding of the drivers, challenges, and potential solutions related to environmental reporting in Kazakhstani companies within the context of ESG standards. Both theories provided a nuanced analysis of the current state of environmental reporting in Kazakhstan and offer insights into how companies from resources extraction industry can enhance their sustainability practices and reporting in the future.

3. Methodology

The methodology is based on three stages (Figure 1). At the first stage, it is necessary to check if a company complies with and uses one of the main global ESG disclosure frameworks and standards, such as the Global Reporting Initiative (GRI); Sustainability Accounting Standards Board (SASB); or Task Force on Climate-Related Financial Disclosures (TCFD). This stage determined the alignment of the report with one of these frameworks, the level of disclosure, the clarity and relevance of the reported indicators, the coverage of material environmental issues, and the presence of environmental targets and performance against those targets.

In the second stage, the Morgan Stanley Capital International (MSCI) ESG Ratings Methodology was used to evaluate the completeness of the selected companies' environmental information, performance, and risks. Each environmental theme was scored, after which a final score for the environmental pillar was calculated.

The final third stage verified the availability of the Science-Based Targets (SBTi), demonstrating the company's commitment to reducing GHG emissions, long-term resilience, and transition to a sustainable, low-carbon economy. If a company has established SBTi, an additional point was added to its overall environmental pillar score.

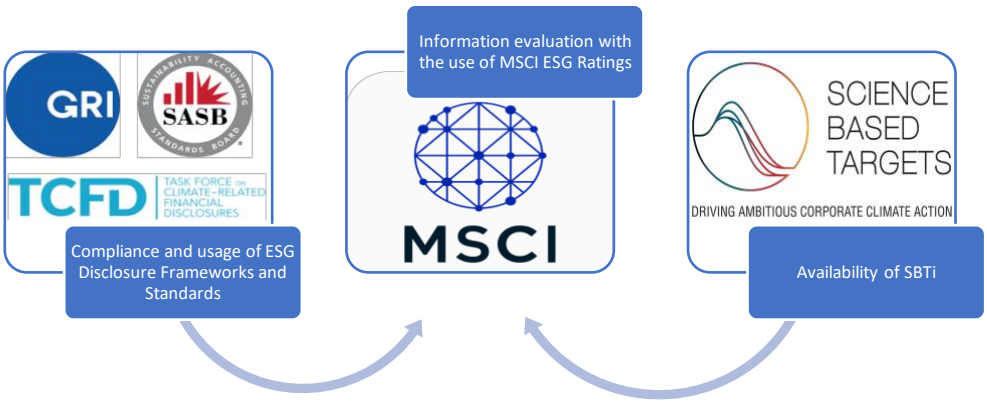

Figure 1. Research Methodology Stages

3.1 MSCI ESG Ratings Methodology of Environmental Pillar

MSCI ESG Ratings incorporates data from various sources, including company disclosures, public information, and sector-specific standards, including GRI, SASB, and TCFD, among others, to assess companies' ESG performance. The environmental pillar includes 4 themes with 13 key issues or subthemes (Table 4).

Table 4. Environmental Pillar in MSCI ESG Ratings

Pillar	Themes	[E] Key Issues
Environmental	Climate Change	Carbon Emissions
		Climate Change Vulnerability
		Financing Environmental Impact
		Product Carbon Footprint
	Natural Capital	Biodiversity & Land Use
		Raw Material Sourcing
		Water Stress
	Pollution & Waste	Electronic Waste
		Packaging Material & Waste
		Toxic Emissions & Waste
	Environmental Opportunities	Opportunities in Clean Tech
		Opportunities in Green Building
		Opportunities in Renewable Energy

Source: MSCI ESG Research LLC (MSCI 2023)

In the full MSCI ESG Ratings assessment, two to seven environmental and social key issues (out of 33) are identified for each company. Since this study specifically covers the environmental pillar, four key issues were reviewed in three themes of [E] pillar. Key issues were determined based on common and overlapping environmental metrics of GRI, SASB, and TCFD, as well as the Global Industry Classification Standard (GICS), which was developed by MSCI and S&P indices to help with classification and understanding companies' key business activities and their greatest impact on issues in four themes (Table 4).

In the climate change theme, carbon emissions are a key issue for both sectors. Selected companies were assessed regarding the carbon intensity of their operations and activities and how they manage climate-related risks and opportunities.

For natural capital, biodiversity and land use, and water stress were identified as two key issues. Biodiversity and land use include the company's efforts to protect and conserve biodiversity and ecosystems in places of activities and minimize the impact on habitats, species,

and flora. Water stress in company's operations, including water intensity and water-related risks and opportunities.

With regard to pollution and waste it is toxic emissions and waste. This includes assessment of potential environmental contamination and toxic emissions from the company's operations and the general functioning of environmental management systems.

Even though were determined key environmental issues for oil and gas, mining and metallurgy sectors, not all of these issues have equal importance in the scoring process. Some are more important than others, and to calculate a final environmental score, MSCI suggests using the Weighted Average Key Issue Score (WAKIS). The WAKIS metric assigns specific weights to each key issue score within a theme and then takes the weighted average to calculate the theme score. This metric reflects the sector-specific and cross-sectoral priorities and considerations, providing a more tailored assessment.

Table 5. WAKIS Metric for Oil & Gas and Metallurgy & Mining Sectors

Theme	Key [E] Issue	Oil & Gas Sector	Metallurgy & Mining Sector	Comments
Climate Change	Carbon Emissions	35%	25%	Carbon emissions are a significant concern in the O&G sector. It is also important for the M&M sector, but not as prominent as in the O&G
Natural Capital	Biodiversity & Land Use	25%	25%	Equal importance and weights
	Water Stress	20%	30%	Water stress is a more significant concern in the M&M sector, justifying a higher weight of 30%. It is relevant to the O&G sector due to its water-intensive operations, but it may not be as critical as carbon emissions. Hence, it is assigned a weight of 20%
Pollution & Waste	Toxic Emissions & Waste	20%	20%	Equal importance and weights

Source: MSCI ESG Research LLC (MSCI 2023)

The scoring mechanism consists of the following steps: at first, each key issue is evaluated through environmental exposure and management. Environmental exposure means a company's exposure to environmental risks and opportunities. It evaluates the company's environmental footprint, including GHG emissions, biodiversity and land conservation, water

consumption, waste generation, and other relevant environmental indicators. Environmental management refers to how effectively a company manages its environmental impacts and implements sustainable practices. It assesses the company's environmental management systems, policies, and initiatives to mitigate environmental risks and improve performance, including environmental targets, resource efficiency, waste management practices, environmental certifications, etc.

The company receives scores from 0 to 10, where 10 is the highest performance, and 0 is the lowest /or no information for environmental exposure and management (Table 6). A weighted average of exposure and management is then calculated, and a score for the key issue is derived. After that, using WAKIS metric (Table 5) all key issues and themes are calculated for the final environmental score. If a company has developed Science-Based Targets (SBTi), an additional 1-point score will be added to the final environmental score.

Table 6. Key Environmental Issues and Scores Gradation

Key [E] Issues		**Scores Range (0 to 10)**		
		10	**5**	**0**
Carbon Emissions (CE)	**Exposure Score**	Detailed and comprehensive data on company's direct (Scope 1) and indirect (Scope 2 and 3) carbon emissions	Some level of disclosure on its carbon emissions, but the data might be limited or not as	No information on carbon emissions
	Mgmt Score	Well-defined strategies and clear policies to manage and reduce carbon emissions	Some emission reduction initiatives, but they are limited in scope	No any emission reduction initiatives or plans
Biodiversity & Land Use (B&LU)	**Exposure Score**	Transparent reporting on biodiversity conservation efforts and land use impacts, including protection of natural habitats.	Limited information on biodiversity conservation and impacts	No information
	Mgmt Score	Well-developed strategies and practices to conserve biodiversity, minimize impacts, and promote sustainable land use	Some initiatives related to biodiversity conservation and land use, but they are not fully comprehensive	No any biodiversity conservation or land use initiatives
Water Stress (WS)	**Exposure Score**	Transparent reporting on water usage, including water withdrawal, discharge, and consumption. Water stress assessment	Some information on water usage and water stress, but the data may be limited or not as detailed	No water usage information
	Mgmt Score	Robust water management and risk mitigation strategies. Water-related stakeholder engagement (local	Some water management initiatives, but they are not comprehensive or well-defined	No water-related strategies or initiatives

		communities, specialized authorities, etc.)		
Toxic Emissions & Waste (TE&W)	**Exposure Score**	Transparent reporting on toxic emissions and waste generation, waste diverted or directed to disposal, description of waste-related impacts. Waste and emissions intensity (volume per unit of production or revenue)	Limited information on toxic emissions and waste	No information on toxic emissions and waste
	Mgmt Score	Well-defined strategies and practices to manage toxic emissions and waste, including waste reduction, recycling, and disposal methods. Regulatory compliance	Some initiatives to manage toxic emissions and waste, but they are not fully implemented	No initiates or policies on toxic emissions and waste management

Source: Global Reporting Initiative, Sustainability Accounting Standards Board, Task Force on Climate-Related Financial Disclosures (GRI 2023; SASB 2021; 2018a; TCFD 2017)

Formula:

EPS = Criteria 1+ Criteria 2 + Criteria 3 + Criteria 4

Calculation for both sectors:

EPS = (CE score x criterion weight, %) + (B&LU score x criterion weight, %) + (WS score x criterion weight, %) + (TE&W x criterion weight, %) + A,

Where x - multiplication sign,

A = 1, if the company determined SBTi; A = 0, if the company does not have SBTi

3.2 Science-Based Targets (SBTi)

The Science-Based Targets (SBTi) aims to encourage and support companies in setting ambitious, credible, and verifiable targets that are in line with climate science and the goals of the Paris Agreement. By adopting SBTi, companies demonstrate their commitment to mitigating climate change and aligning their business strategies with a low-carbon future. The introduction of SBTi accelerates innovations and improves the company's environmental performance (Tuhkanen and Vulturius 2022). Nowadays, more and more companies are setting SBTi. In 2021 the number of new companies with SBTi doubled to 2253 worldwide (SBTi 2022). The majority of these companies are from Europe, United States and Japan, with a few numbers from Asia, Africa and Latin America (SBTi 2022).

In order to set SBTi, companies go through the process that includes defining a baseline year, setting target boundaries, and determining the level of ambition in reducing GHG emissions. The targets are then submitted to SBTi Initiative for assessment and approval. Once approved, companies are listed on the SBTis website, showcasing their commitment to science-based targets.

Given that SBTi are a new phenomenon in Kazakhstan and not all declared targets have been verified by the SBTi Initiative, their presence is a sufficient condition for an additional score to the environmental pillar.

3.3 Research Sample Size

The research is based on a non-probability sampling, including non-random selection of reviewed companies. In total were reviewed the ESG disclosures of 10 companies (5 from each sector). In order to mitigate risks of sampling bias, the following selection criteria were taken into account: geographical (regional) diversity, size and revenue, ESG ratings and historical data. The geographical diversity allows to identify potential regional variations and more comprehensive analysis of ESG disclosure practices. The size and revenue criteria will consider large-size companies based on number of employees (full-time) and high revenue in the resources extraction industry since they are leaders of ESG disclosure in Kazakhstan. ESG ratings and historical data includes the review of existing local ESG ratings and indices, such as ESG disclosure rating of PwC Kazakhstan and the QRA rating agency, as well as companies with a track record of ESG disclosure to observe changes and trends over time. This longitudinal perspective can provide insights into the evolution of ESG reporting practices within the selected sectors.

The oil and gas, mining and metallurgy sectors were chosen due to their importance for the economy of Kazakhstan. The oil and gas sector are the basis for the development of the economy and largely determines the country's economic independence. In terms of proven oil

reserves, Kazakhstan is among the 15 leading countries in the world, having 3% of the world's oil reserves (Niyazbekova and Nazarenko 2018). The largest oil development and production projects are Tengizchevroil LLP with 31%, North Caspian Operating Company B.V. – 19%, and Karachaganak Petroleum Operating B.V – 13% (Jusan Analytics 2022).

Table 7. Selected Companies in the Oil & Gas Sector

#	Name of the company	Short description	Size	Location of operating sites	ESG ratings and indices
1	Tengizchevroil LLP (TCO)	Largest oil production enterprise in Kazakhstan	Revenue for 2021 – 15.9 billion USD; Number of employees: 4,000	West Kazakhstan region	N/A
2	North Caspian Operating Company B.V. (NCOC)	First offshore oil and gas field development project in Kazakhstan	Revenue for 2022 – 320 million USD; Number of employees: 3,000	Kashagan, Kairan and Aktoty	N/A
3	Karachaganak Petroleum Operating B.V. (KPO)	Consortium of companies implementing the Karachaganak project, one of the largest oil and gas condensate fields in the world	No information on the revenue; Number of employees: 4,000	West Kazakhstan region	Listed in the PwC ESG disclosure rating
4	KazMunayGas JSC (KMG)	Kazakhstani national company engaged in oil and gas production, processing and transportation	Revenue for 2022 – 18.9 million USD; Number of employees: 47,000	Mangistau and Atyrau regions	Listed in the PwC ESG disclosure rating
5	QazaqGaz JSC	Portfolio company of Samruk-Kazyna JSC, operates the largest network of main gas pipelines in KZ	Revenue for 2021 – 2 billion USD; Number of employees: 13,000	Almaty, Nur-Sultan, Zhambyl region	Listed in the PwC ESG disclosure rating

Source: Companies' Annual Reports

Kazakhstan is among the top ten leading countries in the world in terms of confirmed reserves of most types of minerals (Isataeva, Aubakirova, and Mausymbayeva 2022). As of 2021, the share of mining and metallurgy in Kazakhstan's GDP is 14.1% and 17.5% of the country's exports come from the mining industry, which is about $10.5 billion (Kazakh Invest 2022). According to Kazakh Invest (2022), the production volume of metallurgical industry products by region in January-December 2021: 37.5% from Karaganda region; 19% from East

Kazakhstan region; and 14.9% from Pavlodar region. Therefore, at least one company from each of these regions was selected.

Table 8. Selected Companies in the Metallurgy & Mining Sector

#	Name of the company	Short description	Size	Location of operating sites	ESG ratings and indices
1	Eurasian Resources Group (ERG)	World's largest ferrochrome producer, Kazakhstan's largest iron ore miner and processor, one of the largest iron ore exporters	Revenue for 2020 – 36 billion USD; Number of employees: 85,000	Astana, Almaty, Shymkent, Pavlodar, Karaganda, Aksu, Aktobe, Khromtau, Rudny, Lisakovsk, Ekibastuz	Listed in the PwC ESG disclosure rating
2	Kazakhmys Copper JSC	Vertically integrated holding company with key assets concentrated in mining and non-ferrous metallurgy.	Revenue for 2022 – 3 billion USD; Number of employees: 37,000	Balkhash, Zhezkazgan, Karaganda regions	Listed in the PwC ESG disclosure rating
3	KAZ Minerals	Mining company with assets in Kazakhstan and Kyrgyzstan, specializes in copper mining	Revenue for 2021 – 2.55 billion USD; Number of employees: 10,200	Bozshakol, East Region, Aktogay, Bozymchak (KRG)	Listed the QRA's ESG rating
4	Kazchrome JSC	One of the largest producers of chrome raw materials and ferroalloys in the world	Revenue for 2020 – 2.5 billion USD; Number of employees: 19,000	Aktobe, Pavlodar and Karaganda regions	Listed in the PwC ESG disclosure rating and in the QRA's ESG rating
5	Kazatomprom JSC	National nuclear company, the world's largest producer of natural uranium	Revenue for 2022 – 2.28 billion USD; Number of employees: 20,000	Kyzylorda, Turkestan and South Kazakhstan region, Nur-Sultan, Shymkent, Almaty	Listed the QRA's ESG rating

Source: Companies' Annual Reports

4. Results and Discussion

Initially, it is imperative to note that six[2] out of the nine companies reviewed within the oil and gas, and mining and metallurgy sector, demonstrate adherence to GRI standards. However, three companies[3] did not explicitly specify their adherence to any particular ESG frameworks or standards. It is noteworthy that some of the companies which are already adhering to GRI standards have expressed their intention to incorporate climate-related reporting following TCFD recommendations. For instance, KazMunayGas JSC and Kazatomprom have claimed their intent to introduce climate-related reporting based on TCFD recommendations, while Eurasian Resources Group has expressed its willingness to transition from GRI to TCFD. These cases align with the forecast of PwC's experts that in the next few years, an increasing number of Kazakhstani companies will report in accordance with the TCFD recommendations (PwC 2022).

This integration or shifting to another standard raises notable interest and potential for further research, particularly in investigating the underlying motivations of companies for such actions. For example, the Kazatomprom report (2022), mentions that introducing TCFD recommendations is a mandatory requirement of the London Stock Exchange, where the company is listed now. In addition, the company is planning to introduce SASB standards due to: *"the demands of the times, the desire to improve sustainable development disclosure practices, as well as in accordance with the expectations of stakeholders and the investment community."* (Kazatomprom 2022, 24–25)

[2] GRI Standards in companies in Oil & Gas sector: KazMunayGas JSC (KMG); Karachaganak Petroleum Operating B.V. (KPO); QazaqGaz JSC. In Mining & Metallurgy sector: Eurasian Resources Group (ERG); KAZ Minerals; Kazatomprom JSC.

[3] Companies with no information on ESG frameworks and standards: Tengizchevroil LLP (TCO); North Caspian Operating Company B.V. (NCOC)

In most cases, companies tend to integrate ESG information into their Sustainability Reports or Corporate Responsibility Reports. However, some companies[4] choose to include ESG considerations within their Annual Reports, where both non-financial and financial information are provided. Due to the large amount of information in such reports, it is more difficult to navigate them. Both GRI (2022) and TCFD (2017) recommends to companies to develop a separate Sustainability Report, which provides detailed information on ESG performance and impacts, in addition to the Annual Report that focuses on financial performance.

Almost all companies are making their reports and ESG information available in Kazakh, Russian, and English, except for KAZ Minerals, which is provided only in Russian and English. In Kazakhstan, there are two main languages; Kazakh is a state language, while Russian has status as the official language. At the same time, about 80% of the population fluently knows Kazakh; among Kazakh speakers, only about 69% know Russian (Talapuly 2023). It is crucial to provide information in Kazakh and do not exclude the big part of stakeholders.

Nine of ten selected companies have uploaded ESG information and reports on their websites and made them and archives publicly available, except for Kazakhmys Copper from the mining and metallurgy sector. Kazakhmys Copper is featured in PwC's Top-50 ESG disclosure companies rating in Kazakhstan. Nonetheless, the company's website does not feature any disclosures of environmental or ESG-related data and reports. Additionally, despite a request for this information via email, the company failed to respond, rendering an analysis of the company unfeasible due to the lack of accessible data. This situation appears paradoxical, given that transparency is considered an essential principle of ESG practices, and it plays a

[4] QazaqGaz JSC, Kazchrome JSC, and Kazatomprom JSC

crucial role in bolstering trust among local communities in a company's operations (Litvinenko et al. 2022).

To maintain a balanced representation of mining and metallurgy companies reviewed with the oil and gas ones, JSC National Mining Company Tau-Ken Samruk was selected as a substitute, as it is also listed in PwC's Top-50 ESG disclosure rating and came next after Kazakhmys Copper in terms of financial performance. However, like Kazakhmys Copper, Tau-Ken Samruk has not made ESG-related information and reports publicly available, and it did not respond to an email request to share this information.

Despite the limited representation of four companies from the mining and metallurgy sector, their environmental pillar score and overall environmental reporting exhibit comparatively lower performance than any four selected companies operating in the oil and gas sector (Figure 2). The correlation of scores between companies in the oil and gas sector is negligible compared to companies in the mining and metallurgy sector. The difference between the leading (KPO) and the lowest-performing company (TCO) in the oil and gas sector is about 2 points, which indicates the relative stability of the sector in environmental reporting based on the selected companies. Moreover, we can reasonably extrapolate this higher performance to the entire oil and gas sector, asserting its superiority over the mining and metallurgy sector and overall ESG implementation in Kazakhstan. This is reinforced by scholars (Azretbergenova, Yessymkhanova, and Yessenali 2023), who states that leading companies in both the oil and gas and mining and metallurgy sectors are frontrunners in ESG disclosure and development in Kazakhstan.

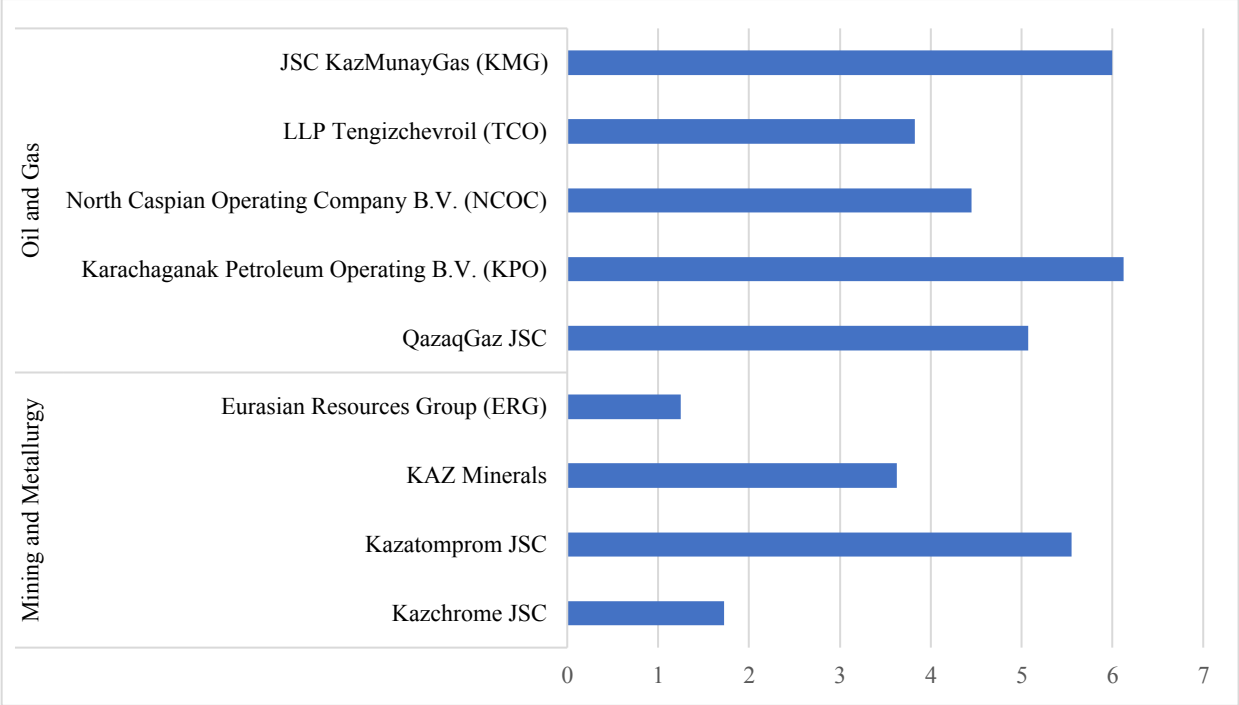

Figure 2. Environmental Pillar Scores of the Selected Companies in the Oil & Gas and the Mining & Metallurgy Sectors

4.1 Oil and Gas Sector

Karachaganak Petroleum Operating B.V. (KPO) is leading in environmental reporting among the reviewed companies, scoring relatively higher in most key environmental issues (Figure 3). KPO demonstrated superior performance compared to KazMunayGas JSC (KMG), which secured the second position. This leadership position can be attributed to KPO's more comprehensive and transparent information disclosure in the area of biodiversity and land use. In turn, KMG's notable performance can be attributed to its rigorous Scope 3 reporting and its extension, robust decarbonization initiatives, and well-defined management practices in carbon emissions. In contrast, Tengizchevroil LLP and North Caspian Operating Company B.V. demonstrate potential areas for enhancement in their environmental reporting and performance, suggesting opportunities for further improvement. Similarly, QazaqGaz JSC exhibits mixed scores, signifying the need to focus on specific key environmental issues to enhance its overall environmental performance and disclosure practices.

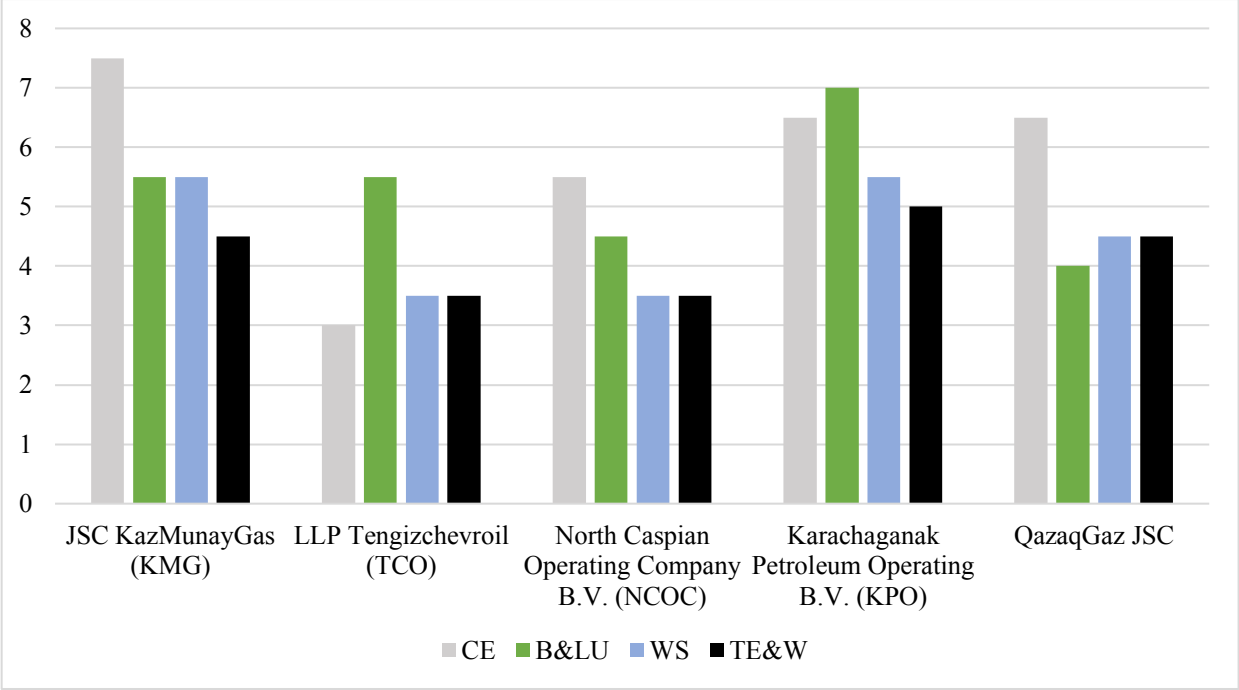

Figure 3. Key Environmental Issues Scores of the Selected Companies in the Oil and Gas Sector (Where: CE – Carbon Emissions; B&LU – Biodiversity & Land Use; WS – Water Stress; TE&W – Toxic Emissions & Waste)

4.1.1 KazMunayGas JSC (KMG)

About the ESG disclosure: The ESG is integrated into the Sustainability Reports. The last available Sustainability Report is for 2022, which was prepared on July 5th, 2023. The report is available at the company's website on Kazakh, Russian and English. The company indicates that it is started publish Sustainability Reports from 2008 and from 2012 in accordance with GRI standards. However, on the website, it is possible to download reports from the period of 2015-2022. The report consists of 5 main chapters: corporate governance; employees and development of the regions of presence; health, safety and environment; low-carbon development; and economic performance (KazMunayGas 2023).

ESG Disclosure Frameworks or Standards: GRI Standards, GRI 11: Oil and Gas Sector 2021. The company also used and fulfilled the GRI Content Index template, which helps stakeholders navigate reported disclosures (Annex 4 in the report). In addition, in 2022 within the framework of Carbon Disclosure Project (CDP) the company developed a Climate

Questionnaire, which includes data on direct and indirect data on GHG emissions across all assets, including subsidiaries in Romania and Georgia. The KMG announced that with support from EBRD in 2023, it plans to introduce climate reporting following TCFD recommendations and including SBTi (KazMunayGas 2023).

Table 9. Environmental Pillar and Key Issues Scores of KazMunayGas JSC (KMG)

Environmental Pillar Score: 6							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (35%)		Biodiversity & Land Use (25%)		Water Stress (20%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
7	8	5	6	6	5	5	4

EPS = (7.5 x 0.35) + (5.5 x 0.25) + (5.5 x 0.2) + (4.5 x 0.2) = 2.625 + 1.375 + 1.1 + 0.9 = 6

Carbon Emissions: The KMG (2023) reports on direct (Scope 1) and indirect (Scope 2 and 3) GHG emissions. In direct emissions, KMG provides a breakdown by three areas of activity: production, refining, and transportation. Breakdown by countries: Kazakhstan and subsidiary companies in Romania and Georgia. As well as breakdown by GHG types: carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).

In indirect, Scope 2 company uses the market method that counts emissions based on the electricity company has chosen to buy (WRI 2015). In Scope 3, KMG discloses (2023) information only on category 11: use of sold products (out of 15 existing). It indicates GHG emissions numbers for 2020-2022 period to show dynamic of change. However, 2022 data for Scope 2 and 3 will be disclosed in September 2023 in CDP's Climate Questionnaire. Therefore, exposure score is 7 for carbon emissions issue in climate change.

In terms of GHG emissions management practices and reduction policies, the company developed a Low-Carbon Development Program (LCDP) for 2022–2031, envisaged a reduction of carbon footprint by 1.6 mln tons CO2 and building of renewable energy sources (RES) facilities with a total capacity of at least 300 MW (KazMunayGas 2023). In order to

implement this program, was created a special body, the Department of Low-Carbon Development and approved an action plan for program implementation. Within the framework of this program, the KMG is planning to expand the Scope 3 disclosure to 12 categories: 1) purchased goods and services; 2) capital goods; 3) fuel-and energy-related activities; 4) upstream transportation and distribution; 5) waste generated in operations; 6) business travel; 7) employee commuting; 8) upstream leased assets; 9) downstream transportation and distribution; 10) processing of sold products; 12) end-of-life treatment of sold products; 13) downstream leased assets (KazMunayGas 2023).

The KMG is practicing various energy efficiency and energy saving measures, as well as RES project of wind-power plant in Zhambyl with 1 GW capacity. Besides of that there are feasibility studies on decarbonization projects on Carbon Capture, Utilisation and Storage (CCUS) and climate offset projects. In general, the level of ambition is high, so the management score is 8.

Biodiversity & Land Use: As recommended by GRI standards, the KMG (2023) provided descriptive information about operational sites, protected areas, areas of high biodiversity value, and list of species, including the International Union for Conservation of Nature (IUCN) Red List species. However, there is shortage of information regarding impact of their activities on land, biodiversity and flora description. Exposure score for biodiversity and land use is 5.

In a management, the company referring to their environmental policy, where are some biodiversity conservation provisions, such as no activities in natural protected areas, inclusion prevention, minimization, restoration and compensation measures on biodiversity during planning phase, participation in research programs in the sphere of biodiversity protection, and prevention of illegal hunting and fishing and other use of objects of flora and fauna (KazMunayGas 2023). Management score is 6.

Water Stress: The KMG (2023) discloses information on water withdrawal by source types: surface and underground sources, urban water supply, sea, and wastewater from other facilities. Also gives a breakdown of water use by types of activities in downstream and upstream sectors. The KMG (2023) accounts wastewater and states that there is no discharge to surface water bodies or terrain. Facilities without storage ponds transfer wastewater to specialized companies for discharging. The company has the Corporate Water Resources Management Standard and, since 2020, has been using CDP Water Security Questionnaire and uploading it to the CDP website. However, the company needs more information about water stress regions of operations and how it minimizes this issue. The exposure score is 6 and 5 for management.

Toxic Emissions and Waste: In waste generation, KMG (2023) provides information on three types of waste: hazardous, non-hazardous, and waste from drilling (mud and sludge). The company also provides numbers on waste transferred for recovery and removal. However, there is no information on significant waste-related impacts and clear waste management system and policy. Thus, 5 score for exposure and 4 for management.

4.1.2 Tengizchevroil LLP (TCO)

About the ESG disclosure: The ESG information is incorporated into the Corporate Responsibly Report (CRR), Environmental Activities and Performance Overview, and Biotopes Handbook. The latest available CRR and Overview reports is 2022. Previous reports are not available for download and review. Similarly to KMG, all reports and information are available in Kazakh, Russian, and English. Environmental issues are also covered in a separate report: An Overview of 2022 environmental activities and performance. In addition, there is a handbook on biotopes, key species, flora and fauna in TCO partnership territory.

ESG Disclosure Frameworks or Standards: There is no available data regarding the company's alignment with any particular ESG frameworks or standards.

Table 10. Environmental Pillar and Key Issues Scores of Tengizchevroil LLP (TCO)

Environmental Pillar Score: 3.8							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (35%)		Biodiversity & Land Use (25%)		Water Stress (20%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
3	3	6	5	3	4	3	4

EPS = (3 x 0.35) + (5.5 x 0.25) + (3.5 x 0.2) + (3.5 x 0.2) = 1.05 + 1.375 + 0.7 + 0.7 = 3.825

Carbon Emissions: The TCO (2022b) discloses cumulative information on carbon emissions without a breakdown by GHG types. It didn't segregate direct and indirect emissions or disclose information by scopes 1, 2, and 3. In their report (2022b), TCO mentioned two implemented decarbonization projects at the crude tank farm and power and steam generator. However, the company does not seem to have a clear emissions management system and policy in this area. The exposure and management score are 3.

Biodiversity & Land Use: In a separate handbook (Tengizchevroil 2022a) were identified and explicitly described seven biotopes in the TCO partnership territory. In these biotopes were recorded: *"203 species of vascular plants, 1 species of amphibians, 12 species of reptiles, 198 species of birds and 34 species of mammals"* (Tengizchevroil 2022a, 6). The company uses monitoring practices in land use and soil conservation at the 55 sampling points on the TCO production facilities (Tengizchevroil 2022c). In 2022 it implemented a recultivation project of disturbed lands with a total area of 1.64 ha in the Tengiz field. Nevertheless, similar to carbon emissions, there is no systematic approach or definitive management. The company focuses on success stories rather than quantitative indicators in their reports (Tengizchevroil 2022b; 2022c).

Water Stress: The TCO (2022c) provides data on total water consumption (fresh and reused) and total fresh water intake. There is no information on water discharge and discharge-related impacts, water shortage in the region, and water consumption by types of activities. In

the report stated that the company promotes rational use of water resources and that 49% of water is reused at TCO facilities. The TCO conducts monitoring on wastewater and groundwater. Overall, water-related information is on one page, half of which is occupied by infographics and awareness poster on rational water use (Tengizchevroil 2022c, 11).

Toxic emissions and Waste: According to TCO in 2022 it *"managed 63 types of waste generated as part of production activities and associated infrastructure. More than 35 of these waste types underwent additional waste processing by both the company and third parties."* (Tengizchevroil 2022b, 28). However, it didn't name these waste types and provide their amount. The company has the waste reduction, reuse, and recycling program and 63% of waste is recycled. But it is the waste from plastic, paper, spent tires, glass, and concrete. There needs to be more information on the treatment of waste oil products.

4.1.3 North Caspian Operating Company B.V. (NCOC)

About the ESG disclosure: The NCOC has integrated ESG matters into its Sustainability reports, spanning the years 2015 to 2021, and made accessible to the public through their website in Kazakh, Russian, and English languages. Furthermore, in addition to these reports, the company has compiled a dedicated handbook on biodiversity in the north-eastern Caspian region and an Environmental Monitoring report covering the period from 2006 to 2016.

ESG Disclosure Frameworks or Standards: NCOC does not explicitly specify its adherence to any specific ESG frameworks or established standards in its disclosures.

Table 11. Environmental Pillar and Key Issues Scores of North Caspian Operating Company B.V. (NCOC)

Environmental Pillar Score: 4.4							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (35%)		Biodiversity & Land Use (25%)		Water Stress (20%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
5	6	5	4	4	3	4	3

EPS = (5.5 x 0.35) + (4.5 x 0.25) + (3.5 x 0.2) + (3.5 x 0.2) = 1.925 + 1.125 + 0.7 + 0.7 = 4.45

Carbon Emissions: The NCOC (2021) reports on direct (Scope 1) and indirect (only Scope 2) GHG emissions. According to NCOC (2021), the share of Scope 3 emissions is insignificant, so it is not considered. In Scope 1 and 2, it provides data by gas types: carbon dioxide, methane, and nitrous oxide. The production facilities are self-sufficient in power, but for supporting facilities company purchases electricity, which is the source of indirect emissions. The company has Greenhouse Gas Emission and Energy Efficiency Management Strategy, which was approved in 2020. The Strategy envisages a 15% reduction in specific GHG emissions by 2030 against 2019 levels, implementation of an Energy Management System (EMS) compliance with ISO 50001 requirements, and assessment of the usage of Renewable Energy Sources (RES) technologies in the project design phase (NCOC 2021).

Biodiversity & Land Use: The Biodiversity of the North East Caspian Region brochure (NCOC 2020) describes a biodiversity management and environmental protection plan, which includes projects on the scientific study of the Caspian seal population, sturgeon population, and bird monitoring. There is information about operational sites at the Caspian Sea, endangered flora and fauna species, offshore and onshore environmental survey processes, and environmental sensitivity maps, which are used in coastal zone management and can be incorporated into local or regional development policies. However, there remains a demand for a more comprehensive assessment of the company's activities and their impact on the environment and related areas.

Water Stress: The NCOC (2021) acknowledges the presence of water stress and scarcity within the region, characterized by constrained reserves of fresh surface water. The company's economic operations are heavily reliant on externally sourced water resources. In its disclosure, NCOC (2021) provides information concerning the aggregate volume of

freshwater intake and consumption, primarily supplied via the Astrakhan-Mangyshlak pipeline, serving as the principal source of fresh water for its industrial purposes. The report (NCOC 2021) reveals a notable shortage of comprehensive information pertaining to the water management system, conspicuous by the absence of well-defined policies and strategic frameworks within this domain.

Toxic Emissions and Waste: The NCOC (2021) presents a total volume of generated waste, including waste classified as hazardous according to Kazakhstan's regulations. The company affirms its commitment to a zero-waste discharge policy, notably abstaining from releasing any waste into surface water bodies, including the Caspian Sea. Waste generated at offshore facilities is conveyed to onshore facilities, where specialized companies undertake the collection, transportation, preparation for reuse or proper disposal of such waste. Despite these efforts, the company's disclosure regarding waste-related impacts and establishment of well-defined waste management policies and strategies remains lacking.

4.1.4 Karachaganak Petroleum Operating B.V. (KPO)

About the ESG disclosure: ESG considerations have been incorporated into the KPO's sustainability reports, with the company publishing them since 2007. The most recent accessible reports for download pertain to the years 2008-2022, and they are accessible in Kazakh, Russian, and English languages.

ESG Disclosure Frameworks or Standards: GRI Standards, GRI 11: Oil and Gas Sector 2021. The KPO also provided a GRI Content Index template in the 2022 report as an annex.

Table 12. Environmental Pillar and Key Issues Scores of Karachaganak Petroleum Operating B.V. (KPO)

Environmental Pillar Score: 6.1							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (35%)		Biodiversity & Land Use (25%)		Water Stress (20%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
6	7	7	7	6	5	5	5

EPS = (6.5 x 0.35) + (7 x 0.25) + (5.5 x 0.2) + (5 x 0.2) = 2.275 + 1.75 + 1.1 + 1 = 6.125

Carbon Emissions: The KPO (2022) discloses information on direct (Scope 1) and indirect (Scope 2) GHG emissions. Accounting for GHG emissions includes carbon dioxide, methane, and nitrous oxide and is calculated based on data on the enterprise's activities. Similarly to the NCOC, the Scope 3 emissions are insignificant (0.1%) and result from the consumption of imported electricity, so these emissions are not subject to accounting and are not included in the reporting. The KPO has an environmental management system (EMS), certified by international standards for EMS (ISO 14001:2015), as well as the Environmental Protection Policy (EPP). The EPP includes the following objectives: prevention of environmental pollution, reduction of GHG emissions, preservation of biodiversity and ecosystems, protection of natural resources. Within the framework of EPP, the company disclosed the Environment Action Plan for 2022 and reported on implementing the plan's activities.

Biodiversity & Land Use: The KPO (2022) reports that since 2012 it has been monitoring the state of biodiversity and determining the potential risks from its production activities. They published an action plan for biodiversity conservation for 2022, the status of tasks implementation, and planned activities for 2023. Within the framework of this plan, evaluates four key factors: emissions of pollutants, physical impact (noise, light, vibration), livestock grazing on the territory, mechanical impact (construction, quarries, roads). Following GRI 304-1 recommendation, KPO (2022) determined the main ecosystems in its operational sites: agricultural ecosystems, steppe ecosystems, and aquatic and riverine ecosystems. During the research period from 1990 to 2022, they identified important representatives of flora and fauna, including species listed in the IUCN Red List. The company states that the main impact of its activities on ecosystems is the mechanical impact due to construction (KPO 2022). Many species of fauna adapt to physical factors, and interconnection between the state of the soil and

vegetation cover and pollutant emissions has not been identified. And according to KPO (2022), all their operational activities are within the acceptable risk limits for biodiversity.

Water Stress: The KPO (2022) discloses information on water consumption by sources, the total volume of discharges with an indication of wastewater category, and the reuse of treated wastewater and groundwater. However, notable gaps exist within the company's practices, as evidenced by the absence of a comprehensive water stress assessment and a failure to account for the potential impacts of water stress within the region of its operations. Furthermore, the company's disclosed efforts toward minimizing water pollution and engaging with water-related stakeholders are noticeably lacking.

Toxic Emissions & Waste: The KPO (2022) provides statistics on generated hazardous, non-hazardous, and recycled waste. It practices the following methods of waste management: reuse at the enterprise, recycle at the enterprise's facilities, incineration in the furnace, burring at the solid industrial waste landfill, and transferring to specialized contractors**.** However, measures to minimize waste generation are not disclosed. The company claims to have completed all the planned activities for 2022 under the Waste Management Program, but they didn't list and share the details of these activities.

4.1.5 QazaqGaz JSC

About the ESG disclosure: ESG considerations are integrated into the company's annual reports. The most recent accessible report is for the year 2021. These annual reports, covering the period from 2012 to 2021, are made accessible to stakeholders in Kazakh, Russian, and English languages.

ESG Disclosure Frameworks or Standards: The company adheres to GRI Standards.

Table 13. Environmental Pillar and Key Issues Scores of QazaqGaz JSC

Environmental Pillar Score: 5			
Climate Change	Natural Capital		Pollution & Waste
Carbon Emissions (35%)	Biodiversity & Land Use (25%)	Water Stress (20%)	Toxic Emissions & Waste (20%)

Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
6	7	4	4	5	4	5	4

EPS = (6.5 x 0.35) + (4 x 0.25) + (4.5 x 0.2) + (4.5 x 0.2) = 2.275 + 1 + 0.9 + 0.9 = 5.075

Carbon Emissions: The QazaqGaz reports on direct (Scope 1) and indirect (Scope 2) GHG emission with breakdown by gas types: methane, carbon dioxide, nitrous oxide. The company has adopted an environmental policy with the primary objectives of mitigating adverse environmental impacts, enhancing energy efficiency, and promoting biodiversity conservation. Additionally, it implements an Environmental Management System that fulfills the requirements of internationally recognized environmental and energy management standards, namely ISO 14001 and ISO 50001 (QazaqGaz 2021). Besides that, to support Kazakhstan in its commitments under the Paris Agreement, the company set an ambitious long-term goal: to reduce GHG emissions by 10–12% by 2030 and achieve complete carbon neutrality by 2060, where 2023 will be used as the base year (QazaqGaz 2021).

Biodiversity & Land Use: The company provides a list of protected species of flora and fauna living in the areas of production activities and mentions that some of the company's enterprises are located in protected natural areas and areas adjacent to the protected areas. The QazaqGaz enumerates several activities pertaining to biodiversity conservation (QazaqGaz 2021). Nevertheless, the disclosed information lacks a systematic sequence of activities or a comprehensive approach to the matter. Additionally, there is a notable absence of data concerning the impact of the company's operational activities on biodiversity and land.

Water Stress: The QazaqGaz provides statistics on total water withdrawal by source and region type, as well as the total volume of wastewater discharges and dynamics of water consumption between 2019-2021 (QazaqGaz 2021). The company's disclosures do not include any information pertaining to a water stress assessment. The QazaqGaz has delineated eight

key principles of water management, encompassing aspects such as recognizing the significance of water and its judicious utilization, pursuing comprehensive water intake metering reaching 100% coverage, evaluating the origins of water abstraction, and others (QazaqGaz 2021). However, beyond these declarative principles, there is a lack of a discernible policy and systematic approach to water management.

Toxic Emissions & Waste: The company offers annual data on pollutant emissions into the atmosphere, encompassing nitrogen oxides, volatile organic compounds, sulfur oxides, and particulate matter. Additionally, data on the total waste generated, differentiating between hazardous and non-hazardous waste, and the aggregate volume of waste disposed under each category (QazaqGaz 2021). The company states that all waste generated is contractually transferred to specialized licensed organizations for either disposal or burial. In general, it follows a 4-staged waste management process, which includes waste generation at facilities, classification of waste types, separate waste collection at each facility, and temporary storage of waste at production sites (QazaqGaz 2021). However, the provided information lacks in-depth details regarding each stage employed by the company.

4.2 Mining and Metallurgy

Among the reviewed companies in the mining and metallurgy sector, Kazatomprom JSC demonstrates the highest environmental disclosure, scoring relatively well across all key environmental issues (Figure 4). The company achieved a remarkable score in carbon emissions, reflecting its strong commitment to managing and reducing its carbon footprint. Moreover, Kazatomprom JSC displays commendable efforts in biodiversity and land use preservation, as well as water stress management, demonstrating a comprehensive approach to environmental stewardship.

KAZ Minerals showcases competitive environmental reporting, particularly in carbon emissions and toxic emissions and waste management. However, the company receives a zero

score in biodiversity and land use due to not prioritizing this key environmental issue and disclosing any related information. Nevertheless, Kazatomprom JSC and KAZ Minerals lead environmental reporting within the mining and metallurgy sector, displaying strong performance in specific key issues. On the other hand, Kazchrome JSC and Eurasian Resources Group (ERG) demonstrate lower environmental scores, signaling issues requiring attention and improvements in their environmental practices and disclosures.

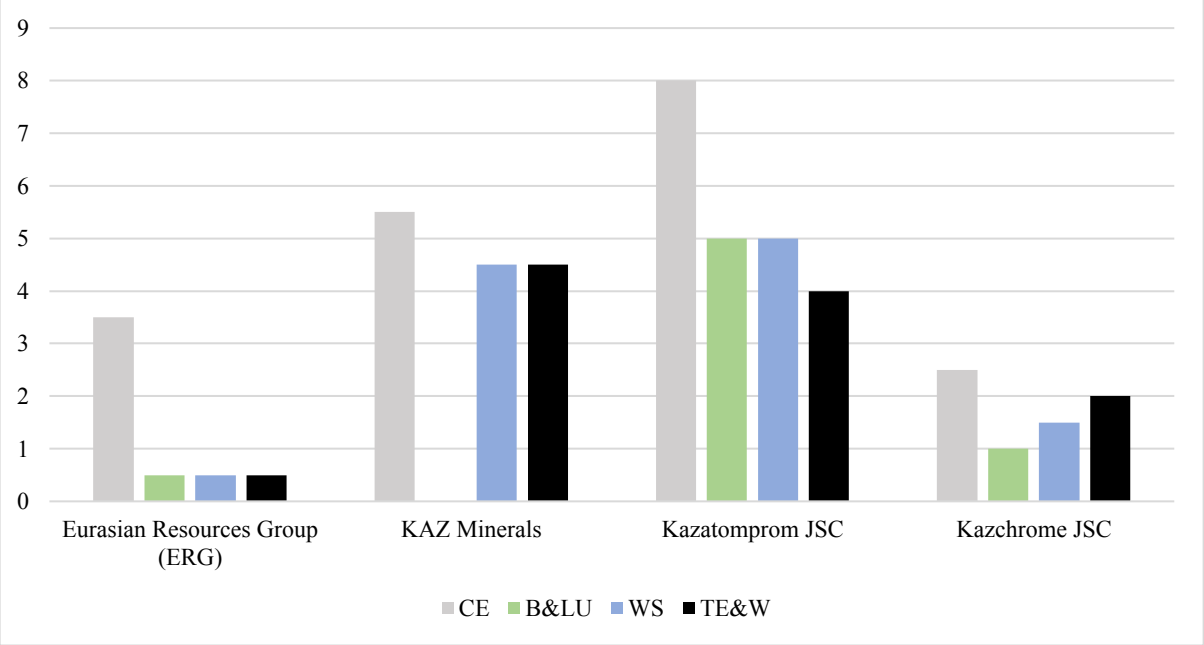

Figure 4. Key Environmental Issues Scores of the Selected Companies in the Mining and Metallurgy Sector (Where: CE – Carbon Emissions; B&LU – Biodiversity & Land Use; WS – Water Stress; TE&W – Toxic Emissions & Waste)

4.2.1 Eurasian Resources Group (ERG)

About the ESG disclosure: The ESG factors have been incorporated into the company's Sustainability Report. The most recent available report pertains to the year 2021 and is accessible in multiple languages, including English, Kazakh, Russian, and Chinese, with the English version report is prevailing.

ESG Disclosure Frameworks or Standards: GRI Standards. However, the report (ERG 2021) notes that after 2022 it is planned to disclose information following the TCFD recommendations.

Table 14. Environmental Pillar and Key Issues Scores of Eurasian Resources Group (ERG)

Environmental Pillar Score: 1.2							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (25%)		Biodiversity & Land Use (25%)		Water Stress (30%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
3	4	0	1	0	1	0	1

EPS = (3.5 x 0.25) + (0.5 x 0.25) + (0.5 x 0.3) + (0.5 x 0.2) = 0.875 + 0.125 + 0.15 + 0.1 = 1.25

Carbon Emissions: The ERG (2021) provides aggregated information on total direct (Scope 1) and indirect (Scope 2) GHG emissions. Nevertheless, the disclosure lacks specificity regarding the breakdown of emissions by gas types or subsidiaries involved. The report lists projects and initiatives on decarbonization, RES, and energy efficiency but does not mention the management system or policy governing these specific endeavors.

Biodiversity & Land Use: The company has not identified biodiversity and land use as essential aspects for consideration. Therefore 0 points for exposure due to the absence of information. In terms of management, the ERG (2021) highlights that it has the Environmental Strategy till 2025, which includes: emission reduction, conservation of water resources, restoration of disturbed lands, waste management, preservation of biodiversity, and improvement of environmental monitoring efficiency. But besides this statement, there is no quantitative data or clear description of this strategy.

Water Stress: The report (ERG 2021) lacks pertinent data concerning water withdrawal, discharge, and consumption. The sole information presented pertains to two projects at the Aktobe Ferroalloy Plant, focused on water usage optimization. These projects involve the installation of water meters and the transition from using drinking water to technical

water for cooling smoke exhausters. Consequently, the company receives a score of 0 for exposure and a score of 1 for management, attributing to its inclusion of water resource conservation within its Environmental Strategy.

Toxic Emissions & Waste: The ERG (2021) does not disclose the volume of generated emissions and waste or how much waste they recycle or dispose of. Within the report (ERG 2021), the company presents several projects and initiatives focused on waste recycling. However, it lacks a comprehensive and organized management approach to address these efforts cohesively.

4.2.2 KAZ Minerals

About the ESG disclosure: The sustainability report integrates ESG principles. The most recent available report is 2021, accessible in Russian and English. From 2011 to 2020, sustainable development was a chapter in an Annual Report.

ESG Disclosure Frameworks or Standards: GRI Standards. In addition, at the company's website (KAZ Minerals 2023), it also discloses information in accordance with the TCFD recommendations.

Table 15. Environmental Pillar and Key Issues Scores of KAZ Minerals

Environmental Pillar Score: 3.6							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (25%)		Biodiversity & Land Use (25%)		Water Stress (30%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
5	6	0	0	5	4	5	4

EPS = (5.5 x 0.25) + 0 + (4.5 x 0.3) + (4.5 x 0.2) = 1.375 + 1.35 + 0.9 = 3.625

Carbon Emissions: The KAZ Minerals (2022) reports on direct (Scope 1) and indirect (Scope 2) CO2 emissions, including the following intensity metrics: CO2 per unit of ore processed, per unit of copper, per unit of million USD of revenue. The KAZ Minerals (2022) states that within the framework of environmental protection policy, company achieved a decrease in specific CO2 emissions in recent years. Nevertheless, the report (KAZ Minerals

2022) does not provide specific data regarding the exact volume or quantity of the emission reductions. In accordance with TCFD recommendations, the company has identified several climate-related risks and opportunities, as well as a risk management approach that identifies, assesses, and prioritizes key risks. The company has set a 6-year target to reduce CO2 emission intensity by 5% compared to the 2018 base year.

Biodiversity & Land Use: The company's disclosures lacked any substantive information pertaining to its efforts in biodiversity conservation, the assessment of land use impacts, the protection of natural habitats, or comprehensive descriptions of the local flora and fauna (KAZ Minerals 2022). Moreover, no specific details were provided regarding management practices in these critical areas. Therefore 0 points for exposure and management.

Water Stress: KAZ Minerals (2022) presents information on total water intake, offering a breakdown based on the source type, encompassing surface sources such as rivers and public water supplies. Moreover, the company provides data concerning water utilization, specifically at four discrete mining sites: Aktogay, Bozshakol, Eastern region, and Bozymchak (KAZ Minerals 2022). The company asserts that all its mining and processing facilities are strategically situated in proximity to abundant freshwater sources, capable of meeting the design capacity requirements. Furthermore, it highlights that none of these sites are located within water-stressed regions, signifying the availability of ample water resources to support the operations without jeopardizing local water scarcity conditions. Notwithstanding, the company refrained from disclosing specific details regarding its water management system or any implemented water-saving practices (KAZ Minerals 2022).

Toxic Emissions & Waste: KAZ Minerals (2022) provides data on waste generation, specifically measured in thousand tons per thousand tons of copper production, with a detailed breakdown for four abovementioned distinct mining sites. The company highlights that it is *"generates waste rock from the mining, mainly at the open pit mines at Aktogay, Bozshakol and*

Bozymchak. The generation of waste rock at Aktogay and Bozshakol is not considered to be a significant stakeholder issue due to the remote locations of the mines, their low strip ratios and their distances from local communities." (KAZ Minerals 2022, 11). Notwithstanding, the company has omitted any reference to the potential impact of waste rock on biodiversity and land in its disclosures. Regarding waste management practices, the company provides information concerning its waste management program at the Bozshakol mining site, albeit without delving extensively into the specifics (KAZ Minerals 2022).

4.2.3 Kazchrome JSC

About the ESG disclosure: ESG considerations are incorporated into the company's annual reports. The most recent available report pertains to the year 2021, and the reports spanning the period from 2018 to 2021 are accessible in multiple languages, including Kazakh, Russian, and English.

ESG Disclosure Frameworks or Standards: The company's disclosures lack any information pertaining to its adherence to specific ESG frameworks or established standards.

Table 16. Environmental Pillar and Key Issues Scores of Kazchrome JSC

Environmental Pillar Score: 1.7							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (25%)		Biodiversity & Land Use (25%)		Water Stress (30%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
3	2	2	0	3	0	4	0

EPS = (2.5 x 0.25) + (1 x 0.25) + (1.5 x 0.3) + (2 x 0.2) = 0.625 + 0.25 + 0.45 + 0.4 = 1.725

Carbon Emissions: The Kazchrome's reports (2020; 2021) include data on total carbon dioxide (CO2) and pollutant emissions, categorized into direct (Scope 1) and indirect (Scope 2) emissions. However, the specific types of pollutants are not explicitly specified in the reports. Within the key risks chapter (Kazchrome 2021), the company identifies risks associated with the environment and climate change. To address these risks, Kazchrome (2021)

aims to implement management systems that will undergo certification for ISO 14001 and ISO 50001, and initiate projects focused on renewable energy development and the integration of carbon footprint assessment practices. Even so, the company's disclosures need a description of the current system, practices, and policies pertaining to climate change and decarbonization efforts.

Biodiversity & Land Use: According to Kazchrome (2021) in its operational sites and facilities: *"there are no natural reserves and specially protected natural areas… no unique, rare or especially valuable species in Karaganda region. Approximately 20 rare, endemic and relict species listed in the Red Book of Kazakhstan dwell in the Aktobe region but none are close to Kazchrome's operating assets. Wildlife in areas adjacent to the Pavlodar region live in groups in open terrain"* (Kazchrome 2021, 46). The provided excerpt constitutes a significant portion of the information offered in the biodiversity section. The company asserts that the impact of its activities on flora and fauna is deemed acceptable; however, no explicit references to specific studies or supplemental documentation supporting this claim are included.

Water Stress: The company presents information on the total fresh water consumption, including surface and groundwater sources, and discloses the total volume of wastewater produced (Kazchrome 2021). There is no breakdown by regions or operation activities, as well as any information on water stress, water management, water saving practices, water policies. However, the information does not offer any regional or operational activity breakdown. Furthermore, there is an absence of details pertaining to water stress assessments, water management practices, water-saving initiatives, and the formulation of water policies within the company's disclosures.

Toxic Emissions & Waste: The Kazchrome (2021) discloses information regarding the overall volume of pollutant emissions into the environment emanating from its two

subdivisions ("RU Kazmarganets" and "Donskoy"). Nevertheless, the company does not specify the types of these pollutants or provide a total count of all its subdivisions. With regard to waste, the company provides data on the total amount of generated waste, as well as the amount transferred to subcontractors responsible for various operations such as collection, transportation, utilization, and disposal (Kazchrome 2021). Moreover, the company reports on the amount of waste recycled and disposed of at its industrial site and the overall volume of buried waste. However, the disclosed information does not encompass any strategies or practices employed by the company to manage and reduce toxic emissions and waste.

4.2.4 Kazatomprom JSC

About the ESG disclosure: ESG considerations are integrated into the company's annual reports, which are accessible for the period spanning from 2010 to 2022 in Kazakh, Russian, and English.

ESG Disclosure Frameworks or Standards: The company has adhered to GRI Standards since 2011, and for the first time, ESG information passed an independent review in 2020. In addition, the company has developed a Decarbonization Strategy in accordance with TCFD recommendations and uses SASB's indicators scorecard for navigation through the report.

Table 17. Environmental Pillar and Key Issues Scores of Kazatomprom JSC

Environmental Pillar Score: 5.5							
Climate Change		Natural Capital				Pollution & Waste	
Carbon Emissions (25%)		Biodiversity & Land Use (25%)		Water Stress (30%)		Toxic Emissions & Waste (20%)	
Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score	Exposure Score	Mgmt Score
8	8	4	6	5	5	3	5

EPS = (8 x 0.25) + (5 x 0.25) + (5 x 0.3) + (4 x 0.2) = 2 + 1.25 + 1.5 + 0.8 = 5.55

Carbon Emissions: Kazatomprom (2022) discloses information on direct (Scope 1) and indirect (both Scope 2 and 3) GHG emissions by three main activities: mining and processing of uranium, nuclear fuel cycle and metallurgy, and ancillary activities. In Scope 3,

company includes emissions from goods and materials, and transportation. It is noteworthy that until 2021, the company did not calculate GHG Scope 2 and Scope 3 emissions. In 2021, the company developed a Decarbonization Strategy, which envisages achieving carbon neutrality by 2060. Within this strategy, the company has delineated three principal development scenarios: a pessimistic, realistic, and optimistic scenario, each complemented by target indicators in the short, medium, and long term (Kazatomprom 2022).

Biodiversity & Land Use: The report (Kazatomprom 2022) states that the company has no direct material impact on biodiversity, nature reserves, and other specially protected lands located on the territory of or bordering the company's uranium deposits. Furthermore, the company's operations do not present any significant risks to the animal and plant species listed in the IUCN's endangered red list. The report (Kazatomprom 2022) highlights that the company consistently implements measures to restore lands that have been disrupted due to mining activities, specifically through recultivation efforts. It also outlines an action plan for 2023 and the medium term. However, the report (Kazatomprom 2022) lacks comprehensive information concerning policies, procedures, and management practices in this particular sphere.

Water Stress: The company provides the total amount of water withdrawn by source type (surface water, groundwater, municipal and other water supply systems), as well as the total wastewater discharges. Kazatomprom (2022) notes that in some regions, it provides the local population and industry with a water supply. However, the company has not specified these regions, nor has it explicitly indicated the regions experiencing water-stress conditions. Notably, the report lacks crucial information concerning water management practices and strategies for risk mitigation.

Toxic Emissions & Waste: The company identified the main types of waste but did not provide information on their volume, except for solid low-level radioactive waste and its

contribution to the total volume of radioactive waste. Regarding waste management, Kazatomprom cooperates with specialized organizations that carry out operations for collecting, recovering, or disposing of low-level radioactive, solid, and industrial waste. As per the company's plans for the year 2023, one of the objectives involves the development of a Radioactive Waste Management Strategy, and within the framework of Zero Waste Programme, company plans to *"develop proposals on the introduction of technologies for processing and recycling production and consumption waste, and to develop science-based regulatory documents in the field of waste management."* (Kazatomprom 2022, 80).

5. Conclusion

This thesis investigated the environmental reporting practices of Kazakhstani companies in the resources extraction industry through the lens of ESG disclosures. The analysis of nine companies from the oil and gas, mining and metallurgy sectors sheds light on their adherence to global ESG standards and frameworks.

The findings reveal that six out of the nine companies reviewed demonstrated adherence to GRI standards, while three companies did not explicitly specify their alignment with any particular ESG frameworks. Notably, some companies currently adhering to GRI standards expressed their intention to incorporate climate-related reporting following TCFD recommendations, indicating a potential shift towards greater alignment with TCFD standards in the future. This shift raises interesting research prospects to explore the underlying motivations for companies' preference for particular standards.

However, the thesis also identified some limitations in the research process, particularly related to data availability and transparency. Two companies, Kazakhmys Copper and JSC National Mining Company Tau-Ken Samruk, featured in the Top-50 ESG disclosure rating by PwC, failed to provide publicly available ESG-related information despite requests for access. This lack of transparency poses challenges to conducting comprehensive analyses and can hinder trust-building efforts among local communities and stakeholders.

The comparison between the oil and gas sector and the mining and metallurgy sector regarding environmental reporting reveals a notable performance difference. Companies in the oil and gas sector demonstrated better environmental reporting, with relatively higher scores across most key environmental issues. Conversely, the mining and metallurgy sector exhibited comparatively lower environmental reporting scores, suggesting potential areas for improvement and further attention to key environmental issues.

In addition to the above-mentioned findings, it is evident from the analysis that companies in the resources extraction industry do not have a complete understanding of Science-Based Targets (SBTi). SBTi is an essential aspect of climate-related reporting and involves setting emission reduction targets in line with the scientific imperative to limit global warming to well below 2 degrees Celsius above pre-industrial levels, as per the Paris Agreement.

However, among the reviewed companies, QazaqGaz JSC and KAZ Minerals stand out as the closest to forming Science-Based Targets. QazaqGaz JSC has demonstrated its commitment to supporting Kazakhstan's obligations under the Paris Agreement by setting an ambitious long-term goal of reducing greenhouse gas emissions by 10-12% by 2030 and achieving complete carbon neutrality by 2060, using 2023 as the base year. This indicates their willingness to align their emission reduction targets with the scientific consensus for mitigating climate change.

Similarly, KAZ Minerals has set a specific target to reduce CO2 emission intensity by 5% over six years compared to the 2018 base year. This commitment suggests a step towards incorporating science-based approaches in their climate-related actions.

However, it is essential to note that despite these efforts, there is still room for improvement and a deeper understanding of SBTi among the reviewed companies. Achieving science-based targets requires a comprehensive understanding of the emissions pathways and reduction trajectories required to align with climate goals. As such, companies in the resources extraction industry could benefit from further exploring and embracing SBTi principles to ensure their emission reduction goals are scientifically robust and in line with global climate ambitions.

Final significant observation is that Kazakhstani companies do not currently report on Scope 2 and Scope 3 emissions. This is due to the absence of mandatory requirements for such

reporting in the current Kazakhstani legislation. The limited scope of environmental reporting undermines the comprehensive assessment of a company's overall environmental impact and carbon footprint.

Not reporting on Scope 2 and Scope 3 emissions can lead to a distorted representation of a company's environmental performance. These indirect emissions, which arise from electricity consumption and other activities in the value chain, can be significant contributors to a company's overall carbon footprint. Ignoring such emissions in reporting could result in an incomplete understanding of the company's environmental impact, hindering stakeholders from making informed decisions and assessments about the company's sustainability practices.

Furthermore, not reporting on Scope 2 and Scope 3 emissions may prevent companies from fully understanding their supply chain's environmental impacts. Supply chains play a crucial role in influencing a company's overall carbon footprint, and addressing emissions in the value chain can lead to substantial emission reduction opportunities. By neglecting this aspect in reporting, companies may miss opportunities to implement more effective sustainability strategies and fail to identify potential risks related to their suppliers' emissions.

It is essential for Kazakhstani government to consider updating their legislation to mandate the reporting of Scope 2 and Scope 3 emissions. Such a step would encourage companies to adopt more comprehensive environmental reporting practices and enable stakeholders to make more informed decisions based on accurate and complete data. In conclusion, the continuous improvement of environmental reporting practices and legislation will play a vital role in driving sustainable development and responsible business practices in Kazakhstan's resources extraction industry.

6. Bibliography

Alvis, Sam, Luke Murphy, Lucía Chocarro Martínez, Joshua Emden, and Carsten Jung. 2023. "The End of Greenwashing? Driving Decarbonisation in the Real Economy."

ARDFM RK. 2023a. "Roadmap for the Implementation of ESG Principles in the Regulation of the Financial Market." Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market. https://www.gov.kz/memleket/entities/ardfm/documents/details/444135?lang=ru.

———. 2023b. "Guidance for ESG Disclosure for Banks and Financial Institutions." Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market. https://www.gov.kz/memleket/entities/ardfm/documents/details/479159?lang=ru.

Azretbergenova, Gulmira, Zeinegul Yessymkhanova, and Alina Yessenali. 2023. "Development of ESG-Transparency in the Financial Market of Kazakhstan." *Memlekettik Audit - State Audit* 59 (2): 43–52.

Barzuza, Michal, Quinn Curtis, and David H. Webber. 2019. "Shareholder Value (s): Index Fund ESG Activism and the New Millennial Corporate Governance." *S. Cal. L. Rev.* 93: 1243.

Bauckloh, Tobias, Stefan Schaltegger, Sebastian Utz, Sebastian Zeile, and Bernhard Zwergel. 2021. "Active First Movers vs. Late Free-Riders? An Empirical Analysis of Un Pri Signatories' Commitment." *Journal of Business Ethics*, 1–35.

Bloomberg. 2022. "Sustainable Future Study: Insights on Where ESG Investing Is Headed." https://assets.contentstack.io/v3/assets/blt57caa63e0368f6e8/blt38cb3a5e9fa0d665/62d85c311ec3551025a1b04a/Bloomberg_Media_Studios_Sustainable_Future_Study_sponsored_by_Mubadala.pdf.

Boffo, Riccardo, Catriona Marshall, and Robert Patalano. 2020. "ESG Investing: Environmental Pillar Scoring and Reporting." *Retrived* 14: 2021.

Buşa, Ioana Isabel, Komalpreet Kaur, Diana Semedo, Maria Petronela Aron, and Lavinia Denisia Cuc. 2021. "Changing Perspective: ESG, A Deeper Connection between Fundamental Needs and Environment Protection." *Agricultural Management/Lucrari Stiintifice Seria I, Management Agricol* 23 (3).

Câmara, Paulo. 2022. "The Systemic Interaction Between Corporate Governance and ESG." In *The Palgrave Handbook of ESG and Corporate Governance*, edited by Paulo Câmara and Filipe Morais, 3–40. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-99468-6_1.

Cini, Andrea Cincinnati, and Chiara Ricci. 2018. "CSR as a Driver Where ESG Performance Will Ultimately Matter." *Symphonya. Emerging Issues in Management*, no. 1 (July): 68–75. https://doi.org/10.4468/2018.1.05cini.ricci.

De Silva Lokuwaduge, Chitra S, and Keshara M De Silva. 2022. "ESG Risk Disclosure and the Risk of Green Washing." *Australasian Business, Accounting and Finance Journal* 16 (1): 146–59. https://doi.org/10.14453/aabfj.v16i1.10.

Deloitte. 2023. "2023 Gen Z and Millennial Survey. Waves of Change: Acknowledging Progress, Confronting Setbacks." https://www.deloitte.com/global/en/issues/work/content/genzmillennialsurvey.html.

Derwall, Jeroen Maurits Maarten. 2007. *The Economic Virtues of SRI and CSR*.

Dumitrescu, Ariadna, Javier Gil-Bazo, and Feng Zhou. 2022. "Defining Greenwashing." *Available at SSRN 4098411*.

ERG. 2021. "Sustainable Development Report 2021: Supporting Key Aspects of Modern Life." Eurasian Resources Group. https://erg.kz/files/ERG_SDR_2021_ENG.pdf.

Foerstl, Kai, Arash Azadegan, Thomas Leppelt, and Evi Hartmann. 2015. "Drivers of Supplier Sustainability: Moving beyond Compliance to Commitment." *Journal of Supply Chain Management* 51 (1): 67–92.

Formánková, Sylvie, Oldřich Trenz, Oldřich Faldík, Jan Kolomazník, and Jitka Sládková. 2019. "Millennials' Awareness and Approach to Social Responsibility and Investment—Case Study of the Czech Republic." *Sustainability* 11 (2): 504. https://doi.org/10.3390/su11020504.

Fulton, Mark, Bruce M. Kahn, and Camilla Sharples. 2012. "Sustainable Investing: Establishing Long-Term Value and Performance." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2222740.

Gabrielova, Karina, and Aaron A. Buchko. 2021. "Here Comes Generation Z: Millennials as Managers." *Business Horizons* 64 (4): 489–99. https://doi.org/10.1016/j.bushor.2021.02.013.

Gamsjäger, Lea, and David Ray. 2021. "GRI, SASB, CDP – Making Sense of Overlapping Sustainability and Climate Disclosures." Nordea. May 10, 2021. https://www.nordea.com/en/news/gri-sasb-cdp-making-sense-of-overlapping-sustainability-and-climate-disclosures.

Gao, Shang, Fanchen Meng, Zhouyang Gu, Zhiyuan Liu, and Muhammad Farrukh. 2021. "Mapping and Clustering Analysis on Environmental, Social and Governance Field a Bibliometric Analysis Using Scopus." *Sustainability* 13 (13): 7304. https://doi.org/10.3390/su13137304.

Gatti, Lucia, Peter Seele, and Lars Rademacher. 2019. "Grey Zone in – Greenwash out. A Review of Greenwashing Research and Implications for the Voluntary-Mandatory Transition of CSR." *International Journal of Corporate Social Responsibility* 4 (1): 6. https://doi.org/10.1186/s40991-019-0044-9.

Gaziulusoy, A. Idil, and Han Brezet. 2015. "Design for System Innovations and Transitions: A Conceptual Framework Integrating Insights from Sustainablity Science and Theories of System Innovations and Transitions." *Journal of Cleaner Production* 108 (December): 558–68. https://doi.org/10.1016/j.jclepro.2015.06.066.

GoK. 2013. "Concept for the Transition of the Republic of Kazakhstan to a 'Green Economy.'" Government of Kazakhstan.

https://www.akorda.kz/upload/%D0%96%20%E2%84%96577%20%D1%80%D1%83%D1%81.pdf.

GRI. 2023. “Consolidated Set of the GRI Standards.” https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/.

GRI 1. 2022. “GRI 1: Foundation 2021. Universal Standard.” Global Sustainability Standards Board.

GRI 3. 2022. “GRI 3: Material Topics 2021. Universal Standard.” Global Sustainability Standards Board.

Hill, John. 2020. *Environmental, Social, and Governance (ESG) Investing: A Balanced Analysis of the Theory and Practice of a Sustainable Portfolio*. Amsterdam: Academic Press, is an imprint of Elsevier.

IEA. 2020. “Kazakhstan Energy Profile.” International Energy Agency. https://iea.blob.core.windows.net/assets/a398cfb3-4f0b-4b8f-b82e-47b8d7b93d52/KazakhstanEnergyProfile.pdf.

Isataeva, Farida, Gulnara Aubakirova, and Aliya Mausymbayeva. 2022. “Transformation of the Mining Complex of Kazakhstan: International Aspect.” *European Science*, no. sge14-02 (November): 90–104. https://doi.org/10.30890/2709-2313.2022-14-02-001.

Jusan Analytics. 2022. “Review of the Oil And Gas Industry of Kazakhstan.” https://jusananalytics.kz/wp-content/uploads/2022/08/obzor-neftegazovoj-otrasli-rk.pdf.

Kalabin, Vasily. 2020. “ESG in Kazakhstan: Who Discloses Information and How?” *Ekonomist.Kz*, 2020. https://ekonomist.kz/kalabin/esg-v-kazakhstane-kto-i-kak-raskryvaet-informaciyu/.

KASE. 2022. “International Conference ‘ESG - a New Paradigm for the Development of the Financial Market.’” In .

KAZ Minerals. 2022. “Sustainability Report 2021.” https://www.kazminerals.com/media/22616/sustainability-report-2021.pdf.

———. 2023. “Climate Change: TCFD.” *Environment* (blog). 2023. https://www.kazminerals.com/sustainability/environment/climate-change/tcfd/.

Kazakh Invest. 2022. “Mining and Metallurgical Complex.” Company website. *Investment Opportunities* (blog). 2022. https://invest.gov.kz/ru/doing-business-here/regulated-sectors/mmc/.

Kazatomprom. 2022. “Integrated Annual Report 2022.” https://www.kazatomprom.kz/storage/07/eng_annual_report_110523_fin4wbwrex2_y2ndvd6cvxnc.pdf.

Kazchrome. 2020. “2020 Annual Report: From Resilience to Sustainability.” https://www.kazchrome.com/files/pdf/Kazchrome_Annual_Report_2020_EN.pdf.

———. 2021. “2021 Annual Report: Responding to Global Challenges in a Sustainable Manner.” https://www.kazchrome.com/files/pdf/Kazchrom_ARA_2021_EN_updated.pdf.

KazMunayGas. 2023. “Sustainable Development Report 2022: Humanizing Energy.” KazMunayGas. https://www.kmg.kz/upload/iblock/69d/xf3nnrr9pbbjmmf3ckzlysknxq80hagx/KMG_EN_2022.pdf.

KPMG. 2022. “Services in the Field of ESG.” https://assets.kpmg.com/content/dam/kpmg/kz/pdf/2022/11/ESG-broshure.pdf.

KPO. 2022. “Sustainability Report 2022.” https://www.kpo.kz/fileadmin/user_upload/2022/KPO_2022_Sustainability_Report_RU.pdf.

Lee, Michael T., and Robyn L. Raschke. 2023. “Stakeholder Legitimacy in Firm Greening and Financial Performance: What about Greenwashing Temptations?☆.” *Journal of Business Research* 155 (January): 113393. https://doi.org/10.1016/j.jbusres.2022.113393.

Leung, Tiffany Cheng-Han, and You Shi Xiang. 2022. “The General Overview of Environmental, Social, and Governance (ESG) Guidelines in Hong Kong.” In *Comparative CSR and Sustainability*, by Carlos Noronha and Gabriel Donleavy, 1st ed., 345–63. London: Routledge. https://doi.org/10.4324/9781003274575-24.

Litvinenko, Vladimir, Ian Bowbrick, Igor Naumov, and Zoya Zaitseva. 2022. “Global Guidelines and Requirements for Professional Competencies of Natural Resource Extraction Engineers: Implications for ESG Principles and Sustainable Development Goals.” *Journal of Cleaner Production* 338: 130530.

Mishulina, SI. 2019. “‘Green’ Investments as an Element of the Mechanism of Greening the Regional Economy.” *Sochi Journal of Economy* 13 (2): 155.

Morgan Stanley. 2017. “Sustainable Signals: New Data from the Individual Investor.” Morgan Stanley, Institute for Sustainable Investing. https://www.morganstanley.com/pub/content/dam/msdotcom/ideas/sustainable-signals/pdf/Sustainable_Signals_Whitepaper.pdf.

MSCI. 2023. “ESG Ratings Methodology.”

NCOC. 2020. “Biodiversity of the North East Caspian Region.” https://www.ncoc.kz/Documents/NCOC_Biodiversity_en.pdf.

———. 2021. “Sustainability Report 2021.” https://www.ncoc.kz/en/sustainability/2021.

Niyazbekova, S. U., and O. V. Nazarenko. 2018. “Modern Condition and Prospects of the Republic of Kazakhstan Oil and Gas Sector Development.” *Bulletin of the Moscow University Named S U Vitte Series 1 Economics and Management*, 7–14. https://doi.org/10.21777/2587-554X-2018-4-7-14.

O'Dwyer, Brendan, and Jeffrey Unerman. 2020. "Shifting the Focus of Sustainability Accounting from Impacts to Risks and Dependencies: Researching the Transformative Potential of TCFD Reporting." *Accounting, Auditing & Accountability Journal* 33 (5): 1113–41. https://doi.org/10.1108/AAAJ-02-2020-4445.

OECD. 2009. "Declaration on Green Growth. Adopted at the Meeting of the Council at Ministerial Level on 25 June 2009." https://www.oecd.org/env/44077822.pdf.

Oznobikhina, L A, and E V Pirunova. 2021. "Enterprises of the Fuel and Energy Complex - the Sphere of High Risks and Objects of Increased Industrial Danger." *IOP Conference Series: Earth and Environmental Science* 808 (1): 012051. https://doi.org/10.1088/1755-1315/808/1/012051.

Park, Jong Gyu, Kijung Park, Heena Noh, and Yong Geun Kim. 2023. "Characterization of CSR, ESG, and Corporate Citizenship through a Text Mining-Based Review of Literature." *Sustainability* 15 (5): 3892. https://doi.org/10.3390/su15053892.

Pollman, Elizabeth. 2019. "Corporate Social Responsibility, ESG, and Compliance." *Forthcoming, Cambridge Handbook of Compliance (D. Daniel Sokol & Benjamin van Rooij Eds.), Loyola Law School, Los Angeles Legal Studies Research Paper*, no. 2019–35.

Prayag, Girish, Richard S. Aquino, C. Michael Hall, Ning (Chris) Chen, and Peter Fieger. 2022. "Is Gen Z Really That Different? Environmental Attitudes, Travel Behaviours and Sustainability Practices of International Tourists to Canterbury, New Zealand." *Journal of Sustainable Tourism*, October, 1–22. https://doi.org/10.1080/09669582.2022.2131795.

PRI Association. 2022. "PRI 2021-22 Annual Report." PRI.

———. 2023. "Principles for Responsible Investment: An Investor Initiative in Partnership with UNEP Finance Initiative and the UN Global Compact." https://www.unpri.org/download?ac=10948.

Probert, Andrew. 2021. "Lack of Standardized ESG Reporting System Biggest Threat to Effective ESG Disclosures." *Kroll* (blog). July 13, 2021. https://www.kroll.com/en/about-us/news/esg-reporting-system-effective-esg-disclosures.

PwC. 2022. "Top 50 ESG Disclosure Companies. Third Edition (Based on 2021 Reports)." PricewaterhouseCoopers Kazakhstan. https://www.pwc.com/kz/en/assets/top-50-report-rus.pdf.

QazaqGaz. 2021. "Integrated Annual Report 2021." https://www.qazaqgaz.kz/report.

Renneboog, Luc, Jenke Ter Horst, and Chendi Zhang. 2008. "Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behavior." *Journal of Banking & Finance* 32 (9): 1723–42. https://doi.org/10.1016/j.jbankfin.2007.12.039.

Rootes, Christopher. 2007. "Environmental Movements." In *The Blackwell Companion to Social Movements*, edited by David A. Snow, Sarah A. Soule, and Hanspeter Kriesi,

608–40. Oxford, UK: Blackwell Publishing Ltd. https://doi.org/10.1002/9780470999103.ch26.

Rouen, Ethan, Kunal Sachdeva, and Aaron Yoon. 2022. "The Evolution of ESG Reports and the Role of Voluntary Standards," October. https://deliverypdf.ssrn.com/delivery.php?ID=288029089119123076068078024007025091103043056088031004087023087093071126089004104068017098101006051012034018075001121066017009122090028033029000093118011102073098015084017084101121000107031103069087125096083068081122124085071065076107127002001112100002&EXT=pdf&INDEX=TRUE.

Ruggie, John Gerard, and Emily K. Middleton. 2019. "Money, Millennials and Human Rights: Sustaining 'Sustainable Investing.'" *Global Policy* 10 (1): 144–50. https://doi.org/10.1111/1758-5899.12645.

Saini, Neha, Monica Singhania, Morshadul Hasan, Miklesh Prasad Yadav, and Mohammad Zoynul Abedin. 2022. "Non-Financial Disclosures and Sustainable Development: A Scientometric Analysis." *Journal of Cleaner Production* 381 (December): 135173. https://doi.org/10.1016/j.jclepro.2022.135173.

SASB. 2018a. "SASB Standards. Extractives & Minerals Processing Sector: Oil & Gas – Exploration & Production. Sustainability Accounting Standard." Version 2018-10.

———. 2018b. "SASB Standards. Infrastructure Sector: Electric Utilities & Power Generators. Sustainability Accounting Standard." Version 2018-10.

———. 2021. "SASB Standards. Extractives & Minerals Processing Sector: Metals & Mining. Sustainability Accounting Standard." Version 2021-12.

SBTi. 2022. "Science-Based Net-Zero: Scaling Urgent Corporate Climate Action Worldwide. Science Based Targets Initiative Annual Progress Report, 2021." Version 1.2. Science Based Targets. https://sciencebasedtargets.org/resources/files/SBTiProgressReport2021.pdf.

Seago, Emily, and Rafael Ruiz. 2023. "UK: ESG Reporting Requirements." January 24, 2023. https://www.mondaq.com/uk/corporate-governance/1274550/esg-reporting-requirements.

Sheehan, Norman T, Ganesh Vaidyanathan, Kenneth A Fox, and Mark Klassen. 2023. "Making the Invisible, Visible: Overcoming Barriers to ESG Performance with an ESG Mindset." *Business Horizons* 66 (2): 265–76.

Shimizu, Kazuyuki. 2020. "Digital Transformation of Work and ESG: Perspectives on Monopoly and Fair Trade." *Risk Governance and Control: Financial Markets and Institutions* 10 (3): 75–82. https://doi.org/10.22495/rgcv10i3p6.

Singer, Thomas. 2018. "Navigating Sustainability Reporting Frameworks." *The Conference Board* (blog). November 28, 2018. https://www.conference-board.org/blog/sustainability/Sustainability-Reporting-Frameworks.

Singhania, Monica, and Neha Saini. 2022. “Quantification of ESG Regulations: A Cross-Country Benchmarking Analysis.” *Vision: The Journal of Business Perspective* 26 (2): 163–71. https://doi.org/10.1177/09722629211054173.

Stewart, David, and Michael Kamins. 1993. *Secondary Research*. 2455 Teller Road, Thousand Oaks California 91320 United States of America: SAGE Publications, Inc. https://doi.org/10.4135/9781412985802.

Talapuly, Ahmet. 2023. “Does the Russian language have a future in Kazakhstan - experts.” Media portal. June 6, 2023. https://www.caravan.kz/news/est-li-budushhee-u-russkogo-yazyka-v-kazakhstane-ehksperty-937181/.

Tanaka, Yutaro. 2023. “Reporting Frameworks for the Environmental Pillar of Environmental, Social, and Governance (ESG) Business Strategy Alignment: Case Study of Kanetomo, a Commercial Fishery Company in Fujieda City in Shizuoka, Japan.”

TCFD. 2017. “Recommendations of the Task Force on Climate-Related Financial Disclosures. Final Report.”

———. 2022. “Task Force on Climate-Related Financial Disclosures: 2022 Status Report.” Status Report.

Tengizchevroil. 2022a. “Biotopes, Key Species Flora And Fauna in TCO Partnership Territory.” https://tengizchevroil.com/docs/default-source/tcodocuments/sustainability-page/biotopes/en/tengiz-biotopes-field-handbook.pdf?sfvrsn=80e2c55c_2.

———. 2022b. “Corporate Responsibility Report 2022.” https://tengizchevroil.com/docs/default-source/tcodocuments/publications/en/verstka_eng_min.pdf?sfvrsn=68e4c55c_2.

———. 2022c. “Overview of 2022 Environmental Activities and Performance.” https://tengizchevroil.com/docs/default-source/tcodocuments/sustainability-page/en/%D1%82%D1%88%D0%BE-%D1%8D%D0%BA%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%B0%D1%8F-%D0%B1%D1%80%D0%BE%D1%88%D1%8E%D1%80%D0%B0-2022%D0%B3_en_new.pdf?sfvrsn=c8e7c55c_2.

Townsend, Blaine. 2020. “From SRI to ESG: *The Origins of Socially Responsible and Sustainable Investing*.” *The Journal of Impact and ESG Investing* 1 (1): 10–25. https://doi.org/10.3905/jesg.2020.1.1.010.

Tsang, Albert, Tracie Frost, and Huijuan Cao. 2023. “Environmental, Social, and Governance (ESG) Disclosure: A Literature Review.” *The British Accounting Review* 55 (1): 101149. https://doi.org/10.1016/j.bar.2022.101149.

Tuhkanen, Heidi, and Gregor Vulturius. 2022. “Are Green Bonds Funding the Transition? Investigating the Link between Companies’ Climate Targets and Green Debt Financing.” *Journal of Sustainable Finance & Investment* 12 (4): 1194–1216. https://doi.org/10.1080/20430795.2020.1857634.

Twomey, Paul, and A. Idil Gaziulusoy. 2016. “Review of System Innovation and Transition Theories.”

UN. 2004. “Who Cares Wins: Connecting Financial Markets to a Changing World.” The Global Compact. https://www.unepfi.org/fileadmin/events/2004/stocks/who_cares_wins_global_compact_2004.pdf.

Varavin, Ye. V., M. V. Kozlova, and M. Yu. Makovetskiy. 2022. “Development of Environmentally Responsible Investment: Implementation of Foreign Experience for Kazakhstan.” *Central Asian Economic Review*, no. 4 (February): 52–63. https://doi.org/10.52821/2789-4401-2021-4-52-63.

WRI. 2015. “GHG Protocol Scope 2 Guidance: Executive Summary.” World Resources Institute. https://ghgprotocol.org/sites/default/files/2022-12/Scope2_ExecSum_Final.pdf.

Yu, Ellen Pei-yi, Bac Van Luu, and Catherine Huirong Chen. 2020. “Greenwashing in Environmental, Social and Governance Disclosures.” *Research in International Business and Finance* 52 (April): 101192. https://doi.org/10.1016/j.ribaf.2020.101192.