Mimmi Eskelä

Corporate social responsibility in cobalt mining supply chains

Case: Democratic Republic of Congo

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Author: Mimmi Eskelä
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ABSTRACT:
Kandidaattitutkielmassa tutkitaan yritysvastuuta ja analysoidaan sen toteutumista kobolttikaivostoiminnan toimitusketjuissa, katsannon kohteena Kongon demokraattinen tasavalta. Tutkielmassa perehdytään koboltin kaivostuotannossa ilmeneviin sosiaalisen kestävyyden ongelmiin ja yritysvastuun toteutumiseen. Lisäksi tutkielmassa käsitellään mahdollisia ratkaisuja yritysvastuun ja sosiaalisen kestävyyden parantamiseksi Kongon demokraattisessa tasavallassa.

Koboltti on keskeinen raaka-aine teollisuudessa sekä yhä enenevissä määrin sähköistyvässä yhteiskunnassa. Maailman suurimmat kobolttiesiintymät sijaitsevat Kongon demokraattisessa tasavallassa, joka on myös sen suurin tuottajamaa. Koboltin tuotantoon Kongossa liittyy kuitenkin useita sosiaaliseen kestävyyteen liittyviä ongelmia kuten lapsityövoiman käyttöä, pakkohäätöjä, taloudellista hyväksikäyttöä, terveyshaittoja sekä vaarallisia työoloja. Ongelmien analysoimista pohjustetaan luomalla katsanto Kongon historialliseen kehitykseen sekä kobolttiteollisuuden rakenteeseen. Sosiaalisen kestävyyden ongelmia eritellään lähdeaineistoissa raportoitujen ongelmakohtien ja konkretian kautta. Tämän jälkeen paneudutaan yritysvastuun käsitteeseen pyramidi-, sidosryhmä- ja osakkeenomistajateorioiden kautta. Tutkielmassa pyritään tarkastelemaan näiden teorioiden toteutumista yritysten, kansainvälisten organisaatioiden ja paikallisen hallituksen näkökulmasta. Yritykset ovat tietoisia kaivostoiminnan sosiaalisen kestävyyden ongelmista, mutta yritysten toimiin ongelmien parantamiseksi vaikuttaa yrityksen sijoittuminen tuotantoketjussa. Loppupään yrityksille, kuten autonvalmistajille on tärkeää positiivisen tuotekuvan ylläpitäminen toisin kuin alkupään yrityksille, kuten kaivosyhtiöille. Kuitenkin loppupään yritykset ovat vastuussa myös siitä, että heidän tavarantoimittajansa huolehtivat sosiaalisen kestävyyden ongelmien ratkaisemisesta omassa toiminnassaan. Kansainväliset järjestöt taas vaikuttavat yritysten yhteiskuntavastuuseen, koska ne laativat standardeja ja ohjeita, jotka ohjaavat yrityksiä vastuullisten käytäntöjen kehittämisessä.

Tutkielmassa eritellään, käsitellään ja arvioidaan tehtyjä toimia ja hankkeita yritysvastuun kehittämiseksi Kongon kobolttiteollisuudessa. Osana ratkaisujen ja vaihtoehtojen erittelyä tarkastellaan niiden tehokkuutta, toimivuutta sekä luodaan tulevaisuutta varten käsitys tehokkaimmista toimista. Tehokkaimmat keinot yritysten sosiaalisen kestävyyden parantamiseksi yhdistelevät eri toimijoiden tekemiä toimenpiteitä ja yhteistyötä. Tärkeimmäksi keinoksi nostetaan pienimuotoiseen käsityöperusteiseen kaivostoiminnan virallistaminen tietyille alueille. Kun taas kierrätetyn koboltin käyttäminen tai vaihtoehtoisten mineraalien hyödyntäminen nähdään yksinään riittämättöminä keinoina sosiaalisen kestävyyden ongelmakohtien ratkaisemiseksi kobolttikaivostoiminnassa.

KEYWORDS: Mining, Supply Chains, Cobalt, Corporate social responsibility, Multinational companies, Democratic Republic of Congo, Human rights, International organizations

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Abbreviations

ASM Artisanal and small-scale mining

BASF Badische Anilin- und Soda-Fabrik

BHRRC Business & Human Rights Resource Centre

BMW Bayerische Motoren Werke

C4D Cobalt for Development

CCCMC China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters

CDM Congo Dongfang Mining

CLR Child Labor Remediation

CMOC China Molybdenum Company

COTECCO Combatting Child Labor in the Democratic Republic of the Congo's Cobalt Industry

CSR Corporate Social Responsibility

DDG Due Diligence Guideline

DRC Democratic Republic of Congo

EGC Entreprise Générale du Cobalt

EITI Congolese Extractive Industries Transparency Initiative

EU European Union

EV Electric Vehicle

FCA Fair Cobalt Alliance

FQM First Quantum Minerals

GALAB Global Accelerator Lab

GBA Global Battery Alliance

Gécamines La Générale des Carrières et des Mines

HRDD Human Rights Due Diligence

IFC International Finance Corporation

ILO The International Labour Organization

IRMA Initiative for Responsible Mining Assurance

LFP Lithium iron phosphate

LIB Lithium-ion battery

Li-ion Lithium-ion

LIP Lithium iron phosphate

LSM Large-scale mining

M23 March 23 Movement

MCP Mutoshi Cobalt Pilot

MIT Massachusetts Institute of Technology

MNC Multinational Company

NGO Non-governmental organization

OECD Organisation for Economic Co-operation and Development

RCI Responsible Cobalt Initiative

RMAP Responsible Minerals Assurance Process

RMC Responsible Mineral Credits

RMI Responsible Minerals Initiative

RRA Risk Readiness Assessment

TIF The Impact Facility

UN United Nations

UNGPs United Nations Guiding Principles on Business and Human Rights

US United States

USDOL US Department of Labor

ZEA Zones d'Exploitation Artisanales

1 Introduction

The introduction chapter starts by explaining the background and the relevancy of the study, including a compact walkthrough of the industry and field covered in the thesis. Then follows with providing the objectives and focus of the thesis, along with the research questions. Lastly, it goes through the structure of the thesis, defining the main parts of the thesis and different study areas.

1.1 Background of the study

Cobalt is a brittle and hard metallic element with a silvery gray appearance resembling iron (Haynes, 2017, section 4–10). Cobalt is obtained, for example, as a by-product of nickel or copper mining (Greenwood & Earnshaw, 1997, p. 1740; Haynes, 2017, section 4–10; Slack et al., 2017, F3).

Cobalt is an important part of rechargeable batteries used in electric vehicles (EV) and electronic devices such as phones and computers (Cobalt Institute, n.d.). It plays a key role in the manufacture of lithium-ion (Li-ion) batteries (LIBs) (Ngoy et al., 2025, p. 6; Zubi et al., 2018; Gourley et al., 2020). LIBs are crucial step in the transition away from fossil fuels towards EVs (Deberdt, 2021a). Cobalt has also many uses in numerous other sectors such as in chemical industries for pharmaceuticals, biogas refining, pigments, and catalysts for refining petroleum in addition to other chemical processes (Matos et al., 2020). Cobalt is also used in superalloys for aerospace, corrosion-resistant alloys, medical prosthetics, high-speed steels, hard metals for tools, and magnets (Matos et al., 2020).

According to the Cobalt Institute (2024a), seventy percent of cobalt demand is tied to LIBs, with EV batteries being the primary driver. EV sales are increasing rapidly, especially in China, which accounts for 61% of global sales. Updates to digital devices, such as computers and tablets, also contribute steadily to cobalt consumption in batteries (Cobalt

Institute, 2024a). Traditional industries, including high-temperature alloys and hard metals, account for 30% of cobalt demand, with their needs remaining stable. In 2023, traditional sectors represented 34% of the demand, while within Li-ion batteries, EV batteries accounted for 36% and digital batteries 30% (Cobalt Institute, 2024a).

Cobalt is not commonly found in large quantities within the Earth (Matos et al., 2020). It is found only in a few regions, mainly in Central Africa, with the largest share located in the Democratic Republic of Congo (DRC). The DRC holds 54.5% of the world's cobalt reserves, currently estimated at approximately 6 million tons (Cobalt Institute, 2024a). The DRC is also the largest cobalt producer in the world, producing approximately 73% of all the global cobalt (U.S. Geological Survey, 2024). According to the latest survey, the DRC produced 170,000 metric tons of cobalt in 2023, ten times more than the following country, Indonesia, which produced 17,000 metric tons, followed by Russia, which produced 8,800 metric tons (U.S. Geological Survey, 2024).

Cobalt extraction in the DRC is closely tied to serious human rights issues, which have been extensively reported (World Economic Forum, 2020). The challenges of cobalt mining in the DRC include human rights abuses, unsafe labor conditions, conflicts and an unstable political situation (Huisman et al., 2020). The price of cobalt has varied widely with the fluctuating markets easily affected by geopolitical disturbances. However, many large companies still need cobalt production and because it comes mainly from the DRC, the problems of production are relevant. The issue is closely related with sustainable development, but also geopolitics and Chinese influence in that area intertwined with international regulations (Congressional-Executive Commission on China, 2023; Gulley et al., 2019).

In 2021, the demand for cobalt was expected to rise greatly up to 2040 due to the increasing sales of battery raw materials for EVs and energy storage systems even with the efforts reducing cobalt content in LIBs (Huisman et al., 2020). In the third quarter of 2024, cobalt prices had reduced by 10% further than the previous quarter (Williams, 2024).

This was due to the decrease in demand for EV batteries, following the switch from LIBs to *lithium iron phosphate batteries* (LIPs). Another explanation is oversupply in the markets which is caused by the decrease in demand but also increased production capacity in other countries such as Australia and Angola (Williams, 2024). The relationship between raw cobalt supply and demand is represented in the figure 1, where the supply and the demand is in the right axis and the balance of these in the left axis. The balance is also represented with the red curve. As can be seen in the figure, both supply and demand have risen by years.

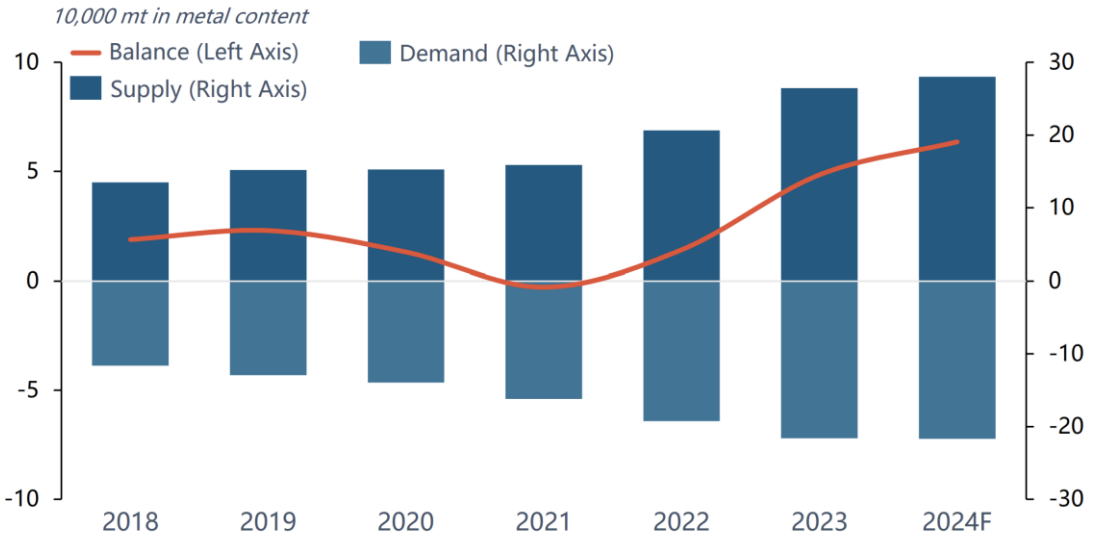

Figure 1. Representation of supply and demand of raw cobalt globally between 2018–2024 (Cobalt Institute, 2024a, p. 15).

Even though the growth of demand and therefore the price of cobalt has sunk in the past couple of years, the production capacity in the DRC has reached its highest levels historically and still most of the world's cobalt is extracted from there (Cobalt Institute, 2025a). Therefore, the social sustainability issues faced by the DRC can be considered as important as ever.

1.2 Objectives of the study and research questions

The purpose of the thesis is to define *corporate social responsibility* (CSR) in the context of the supply chains of cobalt mining in the DRC. The main research objectives of the study are to identify present social sustainability challenges and the historical context and analyze the application of CSR in the case of the DRC, and what actions have been taking place and their effectiveness and what would be the best combination of measures to take in the future.

The research questions addressed in this thesis are shaped to answer the following research objectives:

1. What are the social sustainability issues associated with cobalt mining in the DRC?
2. How can CSR be defined in the context of cobalt supply chains in the DRC?
3. What measures have been taken to improve CSR in the cobalt industry in the DRC, how effective have they been, and what could be done in the future?

Usually, *sustainability* is defined by three aspects: environmental, social, and economic (Purvis et al., 2019, pp. 681–685; Mensah, 2019, pp. 8–11; Hermosa Del Vasto, 2024, p. 4). But in this thesis, the focus is on the social sustainability aspects of the cobalt mining supply chains, rather than diving deep into environmental or economical sustainability issues, that have also an effect in the DRC's cobalt industry. However, this thesis takes into consideration the interconnection of these issues.

1.3 Structure of the study

The thesis is divided into five parts. Starting with the introduction which covers a compact approach to the main themes, the background, the objectives, and the research questions of the thesis. Then followed by chapters addressing these structures from various perspectives and classifications, as well as concrete examples. First, Chapter 2 reviews cobalt mining in the DRC, its historical context, structure, and the social

sustainability issues involved. Next, Chapter 3 takes a broader look at the concept of CSR through various definitions and examines it in the context of the DRC through the actions of companies, international organizations and the DRC's government. Chapter 4 outlines possible solutions for improving CSR in the DRC. In the final chapter, the conclusions are presented, and the thesis results are analyzed.

2 Cobalt mining in the Democratic Republic of Congo

Chapter 2 provides an overview and context of the operating environment of the cobalt industry and the challenges of social sustainability in the DRC, which are the key concepts for deepening the analysis of the challenges and solutions. This is done by first reviewing the historical context of the region, the structure of cobalt mining operations, and finally by analyzing concrete social sustainability issues in the DRC.

2.1 Historical background

The DRC is high on natural resources (Abdulwahab & Firmansyah, 2024, p. 47; Kabulo et al., 2023, p. 4). It has faced the exploitation of these minerals and other resources from the colonialization period till this day (Lowes & Montero, 2021). The history of exploitation, conflicts, and human rights problems in the DRC can be seen closely linked to the problems of the cobalt industry in the present day. Understanding the history of the country and region is important before addressing the current situation of sustainability issues more thoroughly.

Slavery existed in Congo even before the arrival of Europeans in the late 15th century (Heywood, 2009). King Lukeni lua Nimi, who founded the Kingdom of Kongo, enslaved people from the territories he conquered (Heywood, 2009). The colonization period of the DRC started in 1482 with the arrival of the Portuguese (Human Watch, 2009). Shortly after the Congo region was colonized, it was established to be an important place for the Atlantic slave trade and for other Europeans as well (Heywood, 2009). Congo's native population was exploited, showing how its resources, including people, were used during colonization by external forces (Federal Ministry for Economic Cooperation and Development, 2023).

The Scramble for Africa started in the 1860s, during which European powers formalized hundreds of agreements to divide the largely unexplored African continent into colonies,

free-trade zones, and protectorates (Michalopoulos & Papaioannou, 2016). The Berlin Conference, held under Otto von Bismarck's leadership between November 1884 and February 1885, was a defining event in this process (Michalopoulos & Papaioannou, 2016). The conference became the symbol of the partitioning of Africa and especially drawing the borders of Central Africa as the conference granted Leopold II international recognition for the establishment of the Congo Free State (Shepperson, 1985). The Berlin Conference is seen as a turning point that symbolized the legitimization of Africa's plunder and murder (Viaene, 2008). Borders of Africa were frequently drawn with minimal consideration for the realities of local communities or their circumstances (Michalopoulos & Papaioannou, 2016).

Leopold II was effectively given absolute power over the Congo Free State (Shepperson, 1985). During Leopold's reign from 1885 to 1908, it is estimated that the population decreased up to 50% from 20 million to 10 million (Hochschild, 1998). He ruled the territory as his personal property, exploiting its natural resources cruelly and ruthlessly (Shepperson, 1985). Leopold's main objective was to exploit Congo's rubber resources and to capitalize it on the demand for rubber in tire industry (United Nations, 2020). His own personal army used methods such as kidnappings of families, forcing men to work, burning down villages, slaughtering of families, and, famously, mutilation of the people when not meeting the daily assigned rubber quotas (Encyclopedia Britannica, 2025.). The Congo Free State represented colonial exploitation and violence (Viaene, 2008). Belgium took control of the Congo Free State in 1908 as international pressure grew, as the atrocities slowly came to light (Encyclopedia Britannica, 2025).

After the independence of African states, the borders established by Europeans became yet again significant, leading to ethnic tensions and conflicts as ethnic groups were divided across different territories (Herbst, 2014, p. 94). In the case of the DRC, there are more than 200 ethnic groups (Central Intelligence Agency, 2025; International Fund for Agricultural Development, 2022, chapter 1.1.). After the independence, it has been politically divided in relation to ethnic identity and resource distribution, with some

supporting the central government and others not, which has partly led to the emergence of several *armed groups* (Akamo, 2021).

After gaining independence in 1960, the DRC has faced decades of instability and conflict. Mobutu Sese Seko (1965–1997), the longest-running president, had an ideology of Pan-Africanism and nationalism, which led him naming the state Zaire and nationalizing resources. His reign started as a coup and strongly became authoritarian with political opposition suppressed (Jefferson, 2023). According to Amnesty International's report (1980), during his term, human rights issues included political prisoners, cases of torture, and extrajudicial executions. Key industries such as the mining industry were nationalized, corruption was rampant in leadership and a lot of wealth accumulated to him and to his inner circle rather than for the nation and its people (Ndikumana & Boyce, 1998).

Sese Seko's reign ended in 1997 when Laurent-Désiré Kabila seized power in a coup. (Kisangani, 2003). Shortly after, civil war broke out in 1998, involving Kabila's former supporters Rwanda and Uganda. Kabila decided to send foreign troops away, prompting Rwanda and Uganda to form a new alliance to maintain their influence and interests in Congo. Rwanda sought to counter Hutu rebels near its borders, while Uganda aimed to expand its regional power and access Congo's resources (Kisangani, 2003). According to Coghlan et al. (2006), the death toll of the conflict from 1998–2004 is based on smallest estimates 3.5 million and in largest estimates 4.4 million, being the most killed conflict in the world after the World War II. The conflict was full of violence, brutality, and rape, but the biggest killers were various diseases such as malaria, diarrhea, and malnutrition (Coghlan et al., 2006). The conflict has caused further serious economic instability and systematic exploitation of natural resources.

Rwanda and Uganda supported rebel groups that exploited Congo's natural resources, to finance their activities. According to report by the United Nations Security Council (2001), both countries have benefited financially from illegal trade, and Uganda became a major diamond exporter without producing any diamonds itself. This exploitation has

increased corruption and led to serious human rights violations (United Nations Security Council, 2001). The war primarily benefited elite networks made of government officials, military leaders, and businesspeople from Congo, Rwanda, and Uganda (United Nations Security Council, 2002). These networks used military and political power, as well as covert operations, to gain illegal profits from Congo's natural resources such as cobalt, diamonds, and coltan. The *Tremalt Ltd.'s* (a large mining company) contract included a secret profit-sharing arrangement with the Zimbabwean army, and the company also supplied military equipment to both the Congolese and Zimbabwean armies. According to United Nations Security Council (2002), Tremalt Ltd.'s activities exemplify how the exploitation of cobalt was used to fund war and enrich elite networks at the expense of ordinary Congolese people.

History of oppression and frequent inter-ethnic conflicts and terror against civilians have led to the DRC not having a strong system of governance and the exploitation of natural resources has continued since the colonial period through the actions of the local government, foreign states, and companies. This has fueled economic instability, weak governance, wars, and corruption, with much of the wealth ending up in the hands of private individuals. In addition, armed groups and unrests, whose history stretches far back into local history, continue to cause a part of the problems. All of this has resulted in widespread human rights abuses and challenges to social sustainability.

2.2 Structure

Today the mining industry in the DRC is composed of several elements such as miners in *artisanal and small-scale mining* (ASM) and *large-scale mining* (LSM), agents, armed groups, *multinational companies* (MNCs), governmental actors, and *non-governmental organizations* (NGOs).

The current development of the DRC cobalt industry has been strongly influenced by the state-owned mining company *La Générale des Carrières et des Mines* (Gécamines) and

its collapse in the 1990's after the president Sese Sekos' rein (OECD, 2019). After the Gécamines production collapsed, a new *Mining code* in 2002 was founded to draw in new private funding for the industry (International Monetary Fund, 2019).

The new mining law aimed at dismantling Gécamines' monopoly and creating more fair opportunities for all investors. Transitional provisions allowed Gécamines to keep control of its most valuable mining zones by converting them into exploitation licenses and this maintained its right to control the richest mineral sites (The Carter Center, 2017). The fairness and transparency of Gécamines' licensing practices can be critically examined as the United Nations Security Council's report (2002) specifically mentions. Tremalt Ltd., led by businessman John Bredenkamp, secured control over six cobalt and copper deposits from Gécamines for 25 years. After the mining code, Gécamines is acting as a gatekeeper of cobalt mining licenses and is involved in joint ventures in the most significant mines, and in addition there are considerable suspicions of corruption in its management (International Monetary Fund, 2019, p. 12).

Companies in the mineral supply chain can be divided into *upstream* and *downstream* sectors. Upstream companies operate in the early stages, including mining, smelting, and trading and downstream companies work in later stages, such as manufacturing, selling cobalt containing products (Amnesty, 2016). The supply chain of cobalt is represented in the figure 2. The figure divides the process of supply chain into upstream and downstream and represents all the different parts of it.

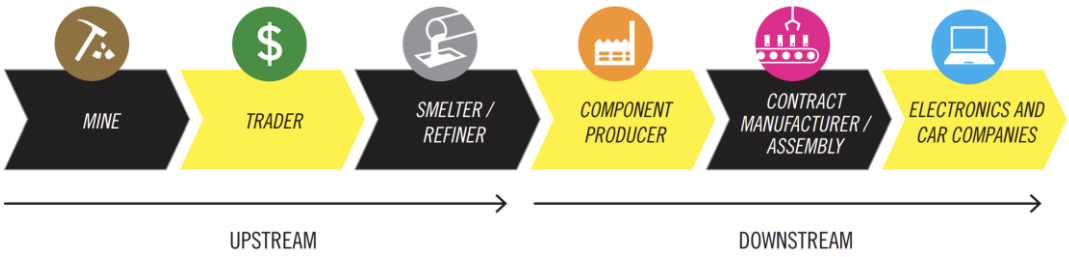

Figure 2. A flowchart representing the generic supply chain of cobalt (Amnesty, 2016, p. 42).

The upstream sector is then divided into the LSM and ASM activities (World Bank, 2020). LSM refers to mining operations that require significant capital investment, advanced technology, and are typically formal, regulated, and owned by multinational companies (World Bank, 2020). Cobalt is primarily produced as a by-product during the extraction of nickel and copper in large-scale mining (Matos et al., 2020).

LSM is done with heavy machinery, whereas ASM is done with simple tools such as shovels, picks, and hands without proper training or education (Schwartz et al., 2021). The work is physically demanding and dangerous and involves several health risks as well as social sustainability issues (Schwartz et al., 2021). The OECD report (2019) argues that the decline and reform of Gécamines contributed largely to the creation of ASM as the diminishing of the vital source of livelihood for many in places like the Katanga region, led people to find new ways to make a living.

Knowing the accurate volume of ASM in the DRC is difficult because it is disorganized and unregulated (Gulley, 2023). However, according to Baumann-Pauly (2023), 15–30% of cobalt production is estimated to come from ASM. Most of these mines work without legal permits or contracts and within the mining areas of LSM companies, creating a hard environment for authorities to control (OECD, 2019).

ASM contributes a lot more jobs in the DRC compared to LSM because LSM is done mostly by machines (Baumann-Pauly, 2023). Globally, 90% of all mining labor population

is in the ASM sector (Pact, 2022). It is an important job provider and often the only livelihood opportunity for those taking part in it (Baumann-Pauly, 2023). Approximately 2 million people in the DRC depend on it economically (Baumann-Pauly, 2023).

These ownership chains can also be multi-layered, such as one of the largest mining companies, Swiss-based *Glencore*, whose subsidiary Katanga Mining operates LSM mines in the DRC (Ashcroft, 2024; Katanga Mining, n.d.). It also owns 75% of Kamoto Mining, with the remaining 25% being owned by Gécamines (Kamoto Copper Company, n.d.).

According to the U.S. Congress (2023), 80 percent of cobalt from the DRC is controlled and refined in China. It is estimated, that only in South-Kivu region of the DRC there are 450 unauthorized Chinese mining companies, that don't follow the mining codes set by the government (Amani Matabaro, 2025). One of the biggest players is Chinese mining company *China Molybdenum Company* (CMOC), which owns some of the largest mines in the DRC, particularly in the Katanga region (Carmen, 2024).

According to Amani Matabaro (2025), foreign and local armed groups control illegal mining operations. Especially in remote and isolated areas (Ojewale, 2024). Many of the armed groups are backed by foreign states, but many of these groups receive support from the Congolese political and military elite as well (Human Rights Watch, 2022). With the help they control lucrative mineral areas and taxation of these areas.

According to OECD (2019), ASM supply chains after mining begin with transportation by miners or traders (négociants) to buying centers (dépôts) located in mining sites, villages, or bigger cities. In these centers, cobalt is weighed and priced. Négociants are an important part of the illegal supply chain of cobalt since they work as the middleman between ASM miners and buyers, bypassing official channels of regulation (OECD, 2019).
According to Posner (2023), ASM and LSM in cobalt production in the DRC often mix during the processing and trade stages. Often LSM and ASM are seen as separate but are

closely linked because LSM operations buy ASM-sourced materials, and without legal and formal regularity corporate transparency is not met (OECD, 2019). Despite these differences in extraction, the cobalt from both ASM and LSM is chemically identical, so when the ore is transported, bought by traders, and sent to refiners, the two flows are routinely combined (Posner, 2023).

According to Ojewale (2024), the government of the DRC has regulated cobalt mining and production through measures such as the updated Mining Code 2018, which requires ASM miners to be members of recognized mining cooperatives. The state-owned *Entreprise Générale du Cobalt* (EGC) was established in 2019 to legitimize ASM mining under its monopoly. In practice, however, supervision of these regulations has been challenging, and the sector continues to face significant problems, including the presence of armed groups, corruption, and illegal transportation to the neighboring countries (Ojewale, 2024).

According to the Carter Center's report (2017), Gécamines has faced many accusations of corruption, including one major corruption web concerning an Israeli businessman named Dan Gertler. The DRC's government took back in 2009 Kowelezi tailings facility from the Canadian firm *First Quantum Minerals* (FQM) and *International Finance Corporation* (IFC) and then sold it at a much lower price than FQM offered, to Getler's companies. Tailing cate storage mining waste materials, where small amounts of valuable materials are still found and therefore can have a significant economic value (Araujo et al., 2022).

Another instance was when Gécamines sold a 20 percent share of Mutanda Mining, one of the biggest cobalt producing companies, to Gertler's company for 138 million U.S. dollars shortly after Gertler's company sold it to another company, Glencore for 550 million U.S. dollars, profiting greatly from the transaction (The Carter Center, 2017).

Partnerships between MNCs and Gécamines exclude local communities from decision-making and reinforce the economic independence of authoritarians as they receive significant revenues without considering their citizens (Zeuner, 2018).

2.3 Social sustainability issues

Cobalt mining in the DRC has raised serious concerns about human rights violations and extremely poor working conditions (Mancini et al., 2021). Researchers have reported serious social sustainability issues in the mining sector in the DRC since at least2007 (Nordbrand & Bolme, 2007) and 2011 (Tsurukawa et al., 2011). In 2016, Amnesty International published a groundbreaking report, produced in collaboration with Afrewatch and highlighted human rights violations in the cobalt industry (Amnesty International, 2016). The report had a significant impact on raising awareness of the issues globally and had an impact on influencing large companies to respond to the concerns raised in it (Mancini et al., 2021).

These problems are particularly prevalent in ASM, which is an important part of the country's cobalt production but operates largely outside official regulations (Mancini et al., 2021). The lack of oversight and transparency has enabled continued exploitation of labor, economic inequality, and hazardous working conditions. Thus, cobalt mining contributes significantly to the global energy transition, but its local social impacts remain highly problematic. The following sections examine these challenges in more detail through three key dimensions: human rights violations, economic injustice, and health and safety risks. As mentioned earlier in the introduction chapters, we will discuss the three sustainability sections in a somewhat limited manner; while striving to take their combined impact into account (for example, we will not delve deeply into the environmental section of sustainability).

2.3.1 Human rights violations

One of the most pressing human rights concerns is the use of child labor in the cobalt mining sector and it's further intensified by rampant corruption (Human Rights Watch, 2022). Extreme poverty due to structural reasons forces many families to send their children to work in ASM mines (Baumann-Pauly, 2023). In the DRC, children as young as seven work in cobalt mines, and recent data indicates that an estimated 40,000 children are involved in cobalt mining in the DRC (Kamara & Bumba, 2025). Many children collect cobalt from mine waste, by-products of the enrichment process, or from the surface of the mine ore. Children also participate in washing and sorting ore in waterways near mining areas (Amnesty International, 2016). Because their small hands are useful for rinsing and sorting cobalt ore, children are often used more in cobalt mining than in other types of mining (Malpede, 2025).

Although most children work above ground, some are also involved in dangerous underground mining work. Working days are very long, usually more than 12 hours a day (Amnesty International, 2016, p. 6). They are paid only about one to two U.S. dollars per day. There are no safety measures, and children are constantly exposed to the dangers of collapsing tunnels, falling rocks, toxic dust, and contaminated water (Amnesty International, 2016). Children's mining is affecting greatly also their access to education as in villages where cobalt is extracted, children are more likely to engage in work outside their homes and attend school less frequently compared to children living in other areas (Malpede, 2025).

Equally alarming are acts of violence committed by armed factions and state forces targeting civilians, the suppression of freedom of expression and peaceful gatherings, and the prevailing lack of accountability for such violations (Human Rights Watch, 2022). In 2022, around 120 armed groups were operating in the eastern DRC, including fighters from neighboring countries, Allied Democratic Forces and Ugandan Islamist groups (Human Rights Watch, 2022). These groups, such as the Rwanda-supported M23 (March 23 Movement), were associated with serious human rights violations and war crimes,

including mass killings, sexual violence, child recruitment, and lootings (Human Rights Watch, 2022). Armed groups and certain units of the national army profit by forcing civilians, including children, to work in mines under dangerous and inhumane conditions, involving both forced labor and the exploitation of child labor (U.S. Department of State, 2023).

Armed groups and their rule have a long history in the region, as discussed earlier.
In the Lualaba province, the expansion of cobalt and copper mining, driven by the growing demand for minerals essential to the energy transition, has led to forced evictions of people from their homes and farmlands as multinational companies expand their operations (Amnesty, 2024). These actions have violated the rights of thousands, including their right to safe housing and protection from violence. The evictions have continued uninterrupted with authorities and multinational companies failing to implement the safeguards required by international and national laws (Amnesty, 2024). According to Amnesty (2024), the DRC has the highest number of internally displaced people in Africa, estimated at nearly 7 million, with most displacement caused by armed conflicts.

Already in Leopold's Congo free state women were raped in slavery from young age to provide new workers for the rubber industry (United Nations, 2020). There is still significantly high incidence of rape in the DRC, especially in the eastern parts of the country (Rustad et al., 2016; El Meouchi et al., 2023). In the cobalt industry, this is reflected, among other things, in the activities of armed groups, who use rape as a means of displacing the population and, as it were, seizing mineral-rich areas for mining (Rustad et al., 2016).

2.3.2 Economic injustice

According to the estimates of the World Bank (2024), around 73.5% of people in the DRC live on less than two and a half U.S. dollars and approximately 17% of the population are

in extreme poverty. Even though the DRC is very rich in natural resources such as cobalt, its population is one of the poorest countries in the world and this phenomenon is often referred to as the *resource curse* (Abdulwahab & Firmansyah, 2024). There are several reasons why citizens of the DRC haven't benefitted greatly from their naturally rich country such as history of exploitation, corruption, armed conflicts and injustice in lack of rule of law.

Prevalent corruption and the lack of strong institutions to prevent it has affected the DRC's economic development significantly (Abdulwahab & Firmansyah, 2024). Political elites' personal gain due to corruption has affected culminated monetary funds, those in power and inequality in income distribution (Abdulwahab & Firmansyah, 2024). According to Zallé (2022), the exploitation of natural resources, such as mining, is fundamentally prone to corruption due to complex licensing processes and the strong power given to authorities regarding it. This can lead to bribery and tax evasion. At the same time, natural resources can weaken institutions, as governments have fewer incentives to fight corruption and develop tax systems under pressure from interest groups seeking rents (Zallé, 2022).

In the case of the DRC, regulations governing cobalt production are economically unjust and inadequate to address income inequality, partly because the DRC has concluded agreements with several mining companies, that free them from any need to comply with the taxation of the DRC (Balyaminu, 2025). In addition to these conventions, the article mentions fiscal incentives to international companies leading them contributing minimally to the public treasure of the DRC.

In addition to corruption, exploitation by the elite, unfavorable laws, and weak institutions, the economic position of the DRC regarding cobalt is also affected by the conflicts troubling the country. Armed groups and certain units of the national army profit from controlling cobalt mining operations and imposing illegal taxes (U.S. Department of State, 2023). According to the DRC's Finance Minister Nicoals Kazadi, in 2023 the country lost

nearly 1 billion U.S. dollars a year in minerals that were illegally smuggled to Rwanda out of the DRC (Ojewale, 2024). Such illegal production and smuggling damages the DRC economy and represents a lost opportunity to enrich the state treasury, alleviate poverty, and improve development outcomes.

The ASM sector has been attempted to regulate, and the act of ASM miners entering into LSM sites and mining alongside big machinery has been illegalized with a possibility of jail (Balyaminu, 2025). Still, this is done by ASM miners very frequently because of limited livelihood opportunities, and the LSM sector is not employing large quantities of workers.

According to the interviews with ASM cobalt miners (Sovacool, 2021), they face multiple different forms of economic exploitation, as many miners are forced to sell cobalt below market prices, pay it as a "tax" to traders for free, or even face double taxation with mining police. In addition, LSMs artificially depress the price of cobalt, weakening the position of small-scale ASM miners. Fraudulent weighting of the products at the trading spots is also very prevalent and leads to unfair prices for the miners (OECD, 2019).

2.3.3 Health risks and lack of workplace safety

The cobalt industry in the DRC is characterized by numerous health hazards affecting workers and occupational safety deficiencies, which have been widely reported.

Amnesty International's report (2016) highlights exposure to cobalt through the airways as a major hazard, with both short- and long-term negative effects on human health. These risks include lung diseases and breathing problems for workers. Another major life-threatening hazard in ASM mines is the risk of accidents. Amnesty International's report (2016, pp. 23–25) mentions mine collapses as a common type of accident that has resulted in the deaths of many workers. The poorly marked mining bits that are outside the regulated areas have led to accidents of workers falling into 10–20 meters deep

holes (Mancini et al., 2021). According to Baumann-Pauly (2023), ASM hand-dug mines are often dangerous and prone to collapses. One example of dangerous working conditions recently is the accident that occurred in November 2025, in which more than 30 people died when a bridge collapsed at a mine site (Helsingin Sanomat, 2025).

The negative effects of the cobalt industry are not limited to mine workers but also affect other people living nearby. According to Banza Lubaba Nkulu et al. (2018), studies found alarming numbers of cobalt in the eastern DRC region of Katanga population's urine and blood. The population lives in neighborhoods, that have been slowly transformed to become ASM sites as the mines are located between or under the houses, many of the residents also working in them. Cobalt in the human body has several negative health effects such as DNA damage and mutations, a significant risk of cancer, and effects on the heart, lungs, etc. (Banza Lubaba Nkulu et al., 2018). According to studies, cobalt is a key toxic cause of hard metal lung disease and can cause lung disease that progresses to fibrosis (Nemery, 2001). Cobalt and copper contamination has also caused birth defects (Van Brusselen et al., 2020) and erectile dysfunctions among mineworkers (Musa Obadia et al., 2020).

In addition to adults, health hazards and occupational safety issues also affect children. Most of the children working in the DRC mining industry do not go into underground mines but do surface work such as collecting and washing ore and sorting minerals (Amnesty, 2016). However, a significant finding was that children had 9.3 times higher cobalt levels than controlling children (Banza Lubaba Nkulu et al., 2018).

Although information about the harmful effects of mining is available, safety deficiencies in mines have not been fully addressed. in ASM mines researched Kabamba Ngombe et al. (2016), there were notable absence of mine-dust protection despite the known long-term effects of dust on ASM miners. According to Amnesty's investigations (2016, p. 22), where they interviewed local people involved in cobalt mining, none of the people who were interviewed were using facemasks. Many people did not use any basic protective

equipment, e.g. gloves. Miners also told Amnesty that the mines are not well ventilated and the air inside the mines contains a lot of dust.

3 Corporate social responsibility

This chapter analyses corporate social responsibility in cobalt production in the DRC. First, it discusses the theoretical framework of CSR with so-called pyramid-definition and stakeholder theory and how it is implemented by companies operating in the DRC in a challenging environment characterized by corruption, armed groups, and poorly enforced laws. This leads us also to the regulations of international organizations and how they relate to corporate activities, their implementation and overall situation of CSR. The situation cannot be analyzed without specification touching on the measures that have already been taken. The actions taken and possible solutions are examined in more detail in Chapter 4.

3.1 Definition

Generally, corporate social responsibility can be defined as an abroad term used to describe actions that a company takes deliberately and purposefully to improve the social well-being of those affected by its activities (Frederick, 2018, p. 4; Argenti, 2016, pp. 28–29).

Carroll's (1991) definition of CSR is a four-step pyramid where different steps act as one section of corporate responsibility. The foundation, where other sections rest, is economic responsibility. According to Carroll (1991), no other responsibility could exist without profitability. Carroll (1991) argues that on top of economic responsibilities lie laws and regulations that society has set. They contain the concepts of fairness combined by society throughout history. Without this layer, companies can't legally operate.

In Friedman's essay (1970), he argues famously against the term of social responsibility of business and argues that the only purpose of a company is to create value for shareholders and increase its profits by operating in the context of laws particular to the country in which the company operates and no any other basis are there for CSR. This theory

is often referred to as the *shareholder theory* (Schaefer, 2008). The intellectual foundation of this theory reaches back centuries. According to Adam Smith's (1776/2015, p. 448) vision in 1776, the economy works most effectively with the help of an *invisible hand* guiding people's decisions, meaning that people pursuing their individual interests contribute more to the overall welfare of economy rather than when individuals are consciously doing so (Stiglitz, 1991, p. 1). The concept of invisible hand shows some similarities with the stakeholder theory.

Freeman's (1984) gives another perspective to shareholder theory introducing the *stakeholder theory*, where he emphasizes that companies' success is tied to their relationships to all the groups and individuals affected by the firm. Ideally, all stakeholders are treated equally and do not exceed each other's (Dmytriyev et al., 2021). The central definition of stakeholder theory is that a company's purpose is to create value for all stakeholders and not only the shareholders (Dmytriyev et al., 2021). In the context of stakeholder theory, companies can be defined as a set of relationships between its stakeholders (Dmytriyev et al., 2021). Therefore, companies consider economic value creation, ethics, and social dimensions, when managing relationships with stakeholders (Bridoux & Stoelhorst, 2022). The latter two have been largely excluded from companies' strategies until the 1990s, when traditional economic theory dominated organizations.

In Carroll's pyramid theory (1991), in addition to the economical and legal levels it introduced the ethical level of corporate responsibility and takes into consideration Freeman's stakeholder theory in it. He states that companies should be ethical and meet the norms and expectations of all their stakeholders. These expectations of stakeholders are not always included in laws but can predict future lawmaking by reflecting fundamental changes in society's values (Carroll, 1991). Companies are expected to follow these widely accepted values even though they don't yet have legal standing.

On the top of the pyramid are philanthropic responsibilities (Carroll, 1991). Philanthropical responsibilities are not seen as essential as ethical responsibilities but as a way for a

company to meet society's expectations to be seen as good corporate citizenship. These philanthropical responsibilities include funding fine and performing arts, sponsoring public and private schools, and involving their employees in local charities. These are seen as voluntary but at the same time expected from society to some degree. According to Carroll (1991), they are valued and desired but not seen as mandatory and as important as previous responsibilities.

Carroll emphasizes (1991) that these responsibilities do not work on their own or are mutually exclusive. Corporate social responsibility consists of all four aspects. The economic layer is often thought to be in conflict with other layers, but it is important that all layers are interrelated and that CRS cannot be implemented without each of them. The whole pyramid concept developed by Carroll is presented in the figure 3, where each of the parts of the definition are represented with descriptions.

Figure 3. Carroll's CSR pyramid (Carroll, 2016).

3.2 CSR in DRC's cobalt mining supply chains

CSR is especially important in the DRC's cobalt production because the cobalt supply chain involves serious social sustainability problems as discussed in the previous chapters. The current CSR situation in the DRC is complex, and various parties have an impact

on it. Generally, concrete actors that have stake in CSR can be divided into companies, such as MNCs, international organizations, and the DRC's government.

3.2.1 Companies' role

Companies have a clear impact and role when analyzing the current situation of CSR in the DRC. This concerns specifically MNCs that are large operators in the mining industry.

According to Amnesty International's (2016, p. 8) investigations, they identified 25 MNCs that might be connected to the human rights issues of DRC's cobalt industry. These MNCs contain for example Apple Inc., Dell, HP Inc., Microsoft, and Volkswagen. Amnesty takes critical view on *Congo Dongfang International Mining* (CDM) and *Huayou Cobalt* (a large Chinese corporation) who are large smelters of cobalt, that should know how their cobalt is mined, transported, and traded, and what problems exist in the supply chain, but they are turning a blind eye to it. According to Amnesty International (2016), companies operating at the beginning of the supply chain are particularly aware of the risks. Upstream companies are responsible for tracing minerals to their origin and managing human rights risks (Amnesty, 2016). Downstream companies are responsible for ensuring that their suppliers such as mining companies are following ethical practices and guidelines such as the OECD Due Diligence (Amnesty, 2016).

According to Cao et al. (2024), downstream companies such as EV manufacturers are already implementing several measures to increase responsibility in the cobalt production chain. One of the measures is the establishment of *certification systems* aimed at improving the transparency of the supply chains and ensure that suppliers comply with sustainable development measures and address child labor, human rights violations, health risks, etc. (Cao et al. (2024). However, Kshetri (2022) points out that the problem here is that suppliers may showcase inaccurate information to getting the certification of responsibility. Mining companies (upstream) are often committed to CSR at the level of documentation and reporting, but practical implementation is lacking (Ranängen,

2013). International CSR initiatives are not necessarily reflected in the day-to-day operations of companies and ethical responsibility that exceeds legal requirements is limited.

According to Jones et al. (2018), treating stakeholders ethically and building trust with them has a positive economic impact on a company's profits, as it improves coordination within the company, attracts high-quality stakeholders, and increases their motivation. However, this depends on the operating context of the company. For example, industries with high dynamics and constant change require rapid knowledge transfer between different actors, and the success of knowledge-intensive companies is linked to the knowledge of their stakeholders in different steps of supply chain (Jones et al., 2018). In the DRC context, ASM miners are in the most vulnerable situation regarding human rights violations and working conditions. They are at the end of the supply chain, and for many miners, mining is their only option for livelihood, so their work motivation is high. Their knowledge is not needed in the manufacture of end products, which means that their well-being is overlooked. According to Jones et al. (2018), there has not been sufficient research into the fact that profitability is affected to varying degrees by the treatment of stakeholders in different industrial sectors, some sectors not being affected as much. Downstream companies are more likely to be affected by brand image too because they sell for consumers directly as consumers are more and more aware of the shortcoming of companies in cobalt production as revelations of misconduct have come to light since 2017 (Zeuner, 2018).

According to Brahami et al. (2025), perceived CSR has a direct positive impact on customers' brand perceptions and *corporate reputation*. CSR initiatives significantly strengthen *brand image* and build competitive advantage. The study examined car manufacturers. However, according to Esau and Malone (2013), CSR in the mining industry in Sup-Saharan Africa is limited because of mining companies' low interest in brand image.

One can argue that as upstream companies do not operate in consumer markets, they can turn a blind eye to or even benefit financially from weak governance and instability and the resulting low prices. Dissatisfaction with upstream companies may still come up among the local population or the miners. For example, ASM miners in Kamilombe revolted against the Chinese company Congo Dongfang International Mining because they felt betrayed, and destroyed the company's equipment during the protest, leaving behind burnt excavators (Baumann-Pauly, 2023).

Downstream companies are also using *blockchain technology* to increase the transparency and traceability of the cobalt supply chain by storing production and life cycle data accessible to all stakeholders. Its effectiveness is based on how reliable the data that is entered into the blockchain (Cao et al., 2024).

One important aspect in the DRC's cobalt CSR is that many initiatives and certifications are based on international laws and proposals made by international organizations (Cao et al., 2024).

3.2.2 International organization's role

International organizations play important role in the field of CSR in the DRC's cobalt mining. According to Elkington (1997), regulation contributes to CSR by setting clear environmental and social requirements, which creates a level of playing ground and pushes companies towards more sustainable solutions. Effective regulation can contribute to sustainable development.

The 2011 *UN Guiding Principles on Business and Human Rights* (UNGPs), or just the *UN Guiding Principles*, committed states to protect human rights and businesses, to respect them and to provide remedies for human rights violations. The principles require companies to have a *Human Rights Due Diligence* (HRDD) process to identify and manage risks and impacts on human rights (United Nations, 2011).

According to McCorquodale and Nolan (2021), 176 international investors with 4.5 trillion U.S. dollars in assets called on 95 companies to improve their HRDD practices, yet only 16 made progress, while 79 remained non-compliant, and 70% of newly assessed companies also failed in this area. The research shows that most companies fail to implement HRDD as required by the UN Guiding Principles, with only a minority demonstrating commitment to human rights. The success of HRDD depends on a combination of state regulation but also involvement of all stakeholders.

The *Organization for Economic Co-operation and Development* (OECD) is an international organization aimed at promoting sustainable economic growth, employment, improved living standards, and financial stability in line with the principles of democracy and the market economy (OECD, n.d.). Membership is primarily focused on developed countries, with 26 of its 38 members located in Europe (European Commission, n.d.). The OECD also works closely with key partners such as China, which has a significant role in the global availability and production of cobalt (OECD, n.d.).

Due diligence is the process that companies take to identify, prevent, reduce, and report negative impacts on their operations, supply chains, and other business relationships. It is a preventive measure with the primary goal of preventing harmful effects but also managing harmful impacts on labor, human rights etc. (OECD, 2018). This process involves multiple steps, including the identification, prevention, and mitigation of risks, along with the monitoring of implemented measures and the communication of conclusions. Stakeholder engagement is emphasized as a fundamental element of the due diligence process (OECD, 2018).

The *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas* is a specific guideline aimed at companies working with mineral supply chains in high-risk areas such as companies sourcing cobalt from the DRC (OECD, 2016). The steps in the due diligence process include establishing a strong governance framework, identifying and assessing risks in the supply chain,

designing and implementing a strategy to address the identified risks, an independent third-party audit, and annual reporting on due diligence activities (OECD, 2016). The Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas has been developed in collaboration with multiple stakeholders, including governments, international organizations, industry, and civil society (OECD, 2016). Overall measures of the due diligence process are illustrated in the figure 4.

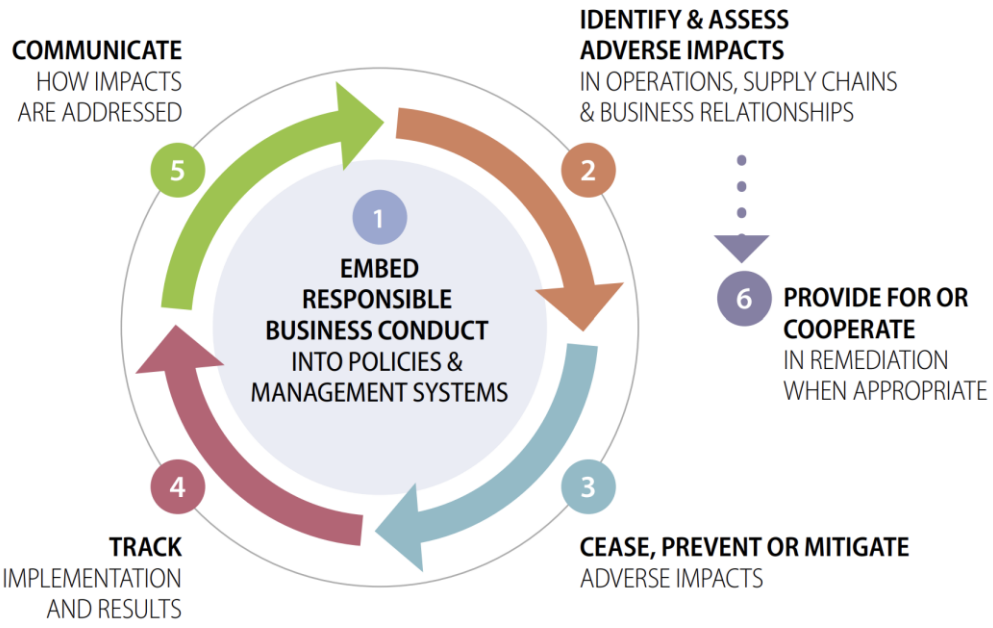

Figure 4. An illustration of the due diligence process and it's supporting measures (OECD, 2018, p. 21).

The Responsible Minerals Initiative (RMI) is an organization that focuses on promoting responsible sourcing of minerals like cobalt in line with OECD Due Diligence Guidelines (DDGs) (Responsible Minerals Initiative, n.d.). RMI provides tools such as the Risk Readiness Assessment (RRA) and the Responsible Minerals Assurance Process (RMAP), which support companies in evaluating the sustainability of cobalt supply chains. It also aids companies through training, consulting, and providing refiner assessments (Responsible Minerals Initiative, n.d.). RMI supports projects in the DRC, emphasizing the monitoring and improvement of ASM practices. Additionally, RMI offers financial

assistance to expand the oversight and responsibility of ASM operations (Responsible Minerals Initiative, n.d.). It also aims to promote a common understanding between governments and stakeholders on responsible business due diligence. RMI also helps Chinese companies comply with responsibility standards in the cobalt industry and other conflict minerals.

The *International Labour Organization* (ILO) has also a role in improving international labor practices by setting standards in labor conventions and monitoring its recommendations in member countries (Ministry of Social Affairs and Health, 2022).

The *Global Accelerator Lab* (GALAB) project by ILO funded by *the US Department of Labor* (USDOL) aims to stop child labor in cobalt mining in the DRC by helping the government and improving accountability in the supply chains (International Labour Organization, n.d., International Labour Organization, 2024). According to ILO (2024), it continues the work of the earlier *Combatting Child Labor in the Democratic Republic of the Congo's Cobalt Industry* (COTECCO) project (2018–2022) by bringing stakeholders together, increasing accountability of private and public sectors, supporting children and families, and helping parents find stable incomes.

According to the U.S. Department of Labor's final report (2022), the COTECCO project made some progress in addressing child labor in the cobalt industry but faced challenges. It improved awareness of child labor issues and provided useful research but the project struggled with poor coordination, delays in forming committees, and limited use of research in real life actions.

ILO functions as a tripartite meaning involving the participation of governments, employers, and employees equally in decision-making (International Labour Organization, 2024). The COTECCO project recognized the roles of the government, employers, and workers in addressing child labor in the cobalt industry. For the government's priority is to strengthen its capacity to prevent child labor and support forming up of provincial

councils (project CISTEMA). For employers, the project emphasizes providing support to monitoring to eliminate child labor for a long time. Recommendations also include promoting better work opportunities in mining regions. For workers, the project advocates targeted vocational training for older children in collaboration with the government and training institutions (U.S. Department of Labor, 2022).

These organizations have faced challenges in implementing their initiatives, but they are still a very important part of the development of the sustainability of cobalt mining in the DRC, as they highlight problems and create guidelines, certification, projects, and bring together stakeholders. Cao et al. (2024) however, raise the issue that initiatives based on international organizations' guidelines remain ineffective if audits of company's outcomes are not carried out through external parties.

3.2.3 Government's role

The DRC's government has affected the mining industry historically mainly through Gécamines national company and it has repeatedly concluded agreements to transfer its mining concessions and shares in its joint ventures to private investors without disclosing the terms of the agreements. *Congolese Extractive Industries Transparency Initiative* (EITI) reports have lacked key information on the sales, revenues, and expenditures of Gécamines' assets. It is unclear what Gécamines has done with the billions of dollars it has received from joint ventures and asset sales (The Carter Center, 2017).

Entreprise Générale du Cobalt SA (EGC) is a subsidiary of Gécamines, created in 2019, which has been granted a monopoly by the DRC to acquire cobalt from the ASM miners (Africanews, 2024). The EGC is 95 percent owned by Gécamines, while the remaining 5 percent is directly held by the DRC's government (Deberdt, 2021b). According to EGC (n.d.), it was established to ensure high standards of social and environmental responsibility and traceability. The EGC is not an isolated experiment but follows a historical trend

in which the state has sought to create monopolies to secure tax revenues from the ASM sector and respond to reputational risks in the sector (Deberdt, 2021b).

In 2020 *Trafigura*, which is one of the largest cobalt mining companies, signed a five-year contract with the, in cooperation with mining cooperatives, authorities, and NGOs. The EGC has had difficulties starting due to its lack of clarity of structure, the overproduction of cobalt, and its impact on the price (Clowes & Kavanagh, 2024). According to MiningMX (2024), EGC has been working to initiate its first project around the Kolwezi area, aiming to formalize ASM mines. Trafigura remains its key partner, supporting the project's development despite ongoing challenges (MiningMX, 2024).

Deberdt (2021b) argues that the EGC's responsibility standard may lead companies to over-rely on their responsibility or see it as only necessary to ensure sufficient accountability, failing to carry out their due diligence. The close cooperation between Trafigura and EGC has raised questions about EGC's independence (Deberdt, 2021b). The EGC will transfer part of the proceeds from cobalt sales to a fund, when the price of cobalt is high and pay additional compensation to miners if the price of cobalt falls low (Reid, 2021).

4 Possible solutions

The final section before the conclusion of the paper focuses on some of most important solutions that have been utilized, what has been achieved and what could still be done regarding improving social responsibility in the DRC. First, we analyze the formalization of ASMs as a key solution and discuss the improvement of CSR, primarily from the perspective of MNCs. Finally, we will examine alternative solutions for improving CSR in the DRC.

4.1 Formalizations of ASMs

Formalization means that miners and cooperatives are registered with the appropriate mining rights (Pact, 2022). Formalization is important because it provides miners with better market access, better working conditions, and better prices (Pact, 2022). According to Singo and Seguin (2018), formalization also reduces the vulnerability of informal miners to illicit or exploitative actors**.**

In 2018, an updated mining code acknowledged illegal ASM mines, and dedicated mining areas *Zones d'Exploitation Artisanales* (ZEAs) for ASM miners were established (OECD, 2019). Many companies have also launched pilot projects to improve working conditions in the cobalt supply chain. The aim is to ensure the safe and responsible delivery of cobalt to the market. These projects focus particularly on formalizing ASM, which includes enhancing safety regulations, improving access to healthcare, and eliminating child labor (World Economic Forum, 2020). The World Economic Forum's (2020) initiative in 2020 examined three different ASM formalization projects supported by major companies. These projects have achieved varying results.

According to World Economic Forum (2020), the Kisote project, titled "*Cobalt for Development*" (C4D), was launched with 5 million U.S. dollars in funding from companies like BMW, BASF, and Samsung. It was designed to improve working conditions in ASM by

addressing issues such as tunnel safety, air quality, and child labor, while enhancing community living standards. Although delays were encountered in establishing formal mining zones, activities have been continued with local stakeholders to support responsible mining practices (World Economic Forum, 2020). The Kasulo project, supported by Huayou Cobalt made some progress but faced issues, particularly with tunnel safety and discrimination against women (World Economic Forum, 2020).

Mancini et al. (2021) analyzed two ASM formalization pilot projects, the *Mutoshi Cobalt Pilot* (MCP) and the *Better Mining Kasulo* initiative. The former was a partnership between Trafigura Group, Chemaf, COMIAKOL, and Pact, while the latter was implemented by RCS Global, COM-IKU, and CDM. The main goal of both projects was to improve responsible cobalt production and reduce human rights and safety risks in line with OECD, CCCMC, and IFC standards.

According to Mancini et al. (2021), no child labor was detected in these pilot sites, because strict age verification systems were in place. Occupational health and safety conditions improved also significantly, with no deathly accidents reported during the year. The presence of armed forces in the mining areas also diminished considerably compared to the baseline situation. However, in the projects several shortcomings were identified. Miners perceived income levels and mineral pricing as unfair, given the limited number of buyers and lack of transparency in price determination. Gender equality progressed only partially, and the long-term health impacts of mining work such as dust exposure were not addressed.

Some studies mention potential *greenwashing*, and the risk of using these limited pilot projects to mask broader, less responsible company practices (Sovacool et al., 2020, p. 16; Mancini et al., 2021, p. 2). According to Mancini et al. (2021), the financial sustainability of these initiatives depends on global cobalt prices, making them very vulnerable to market downturns. In the study (Mancini et al., 2021), the authors recommend complementing these market-driven initiatives with public funding, community development, and social investment to ensure their long-term sustainability even with market prices shifting and profitability of the projects degreasing.

One factor complicating the situation is also that some mine workers may not necessarily want or feel the need to transfer to regulated mines. This is evident from the interviews conducted by VOA Africa (2022). According to Geenen (2012), miners may not necessarily feel they need the benefits of regulated mines or may not see any problems with their activities. Mine workers also lack sufficient financial incentives to move to formalized mines. The situation is further worsened by the fact that some state officials also benefit from unregulated and unofficial mines through extortion and collecting unofficial fees and payments from the miners (Amnesty, 2016).

4.2 Solutions for the MNCs

There are several options available to MNCs for improving social sustainability in the DRC. There are previously discussed acts such as compliance with international regulations, certification systems, improving transparency in supply chains using blockchain technology, audits. Cao et al. (2024) argues that companies only do thing to prevent risk for them but don't address root courses.

In the article (Cao et al. 2024) are highlighted deeper ways for downstream companies to interact with their stakeholders in cobalt supply chains such as having more important role in ASM formalizations, provide training for ASM workers about safety practices, alternative livelihoods and technical expertise, and create funding pools for ASM formalisations and support ASM associations.

Companies can invest in community-based programs that improve education, healthcare, and local infrastructure to address root causes of social issues in cobalt mining. This could be done by MNCs joining multi-stakeholder action platforms such as the *Fair Cobalt Alliance* (FCA) that connects companies, international organizations, local communities and governments (The Fair Cobalt Alliance, n.d.). It has done concrete work for by covering ASM mines and strengthening their structures, as well as taking part in the *Child Labor Remediation* (CLR) Hub program in Kolwezi in through which

child victims have been returned home, and they have given schooling opportunities (Fair Cobalt Alliance, 2024).

Fair Cobalt Alliance has partners from major companies such as Glencore, LG Energy Solution, Tesla, and Google (Fair Cobalt Alliance, 2025; Glencore, 2020, Mining Technology, 2020, LG Energy Solution, n.d.). This is part of the activities in which MNCs can improve labor conditions and safety practices and better track their supply chain fairness. The FCA's follows OECD due diligence in their work (Fair Cobalt Alliance, 2024, p.10).

One way for MNCs to improve social responsibility is to ensure transparency and trace the origins of ASM cobalt throughout the supply chain. This can be achieved by purchasing cobalt through official trading sites such as the FCA's official trading center *Musompo Trade Center* and its laboratory (Sturmes, 2023).

The *Responsible Mineral Credits* (RMC) mechanism is a financing model that enables companies to support the development of responsible ASM (Fair Cobalt Alliance, 2024, p.6). Companies pay 5,000 U.S. dollars per ton of cobalt, and the funds are then used to improve mining areas under the management of *The Impact Facility* (TIF) (Fair Cobalt Alliance, 2024, p.6). In a *Fairphone*-funded pilot project (12,000 U.S. dollars) in the Kamilombe mining area, the RMC mechanism has significantly improved working conditions and economic well-being (Jumwa, n.d.). Among other things, the project financed the purchase of eight dynamos and eight motors, which improved ventilation in 129 pits and benefited more than 5,000 miners, increasing safety and employment (Fair Cobalt Alliance, 2025, p. 25). In addition, a private changing room is being built for women, which will enhance their dignity at work. The RMC mechanism is represented in the figure 4, where the process is divided into steps.

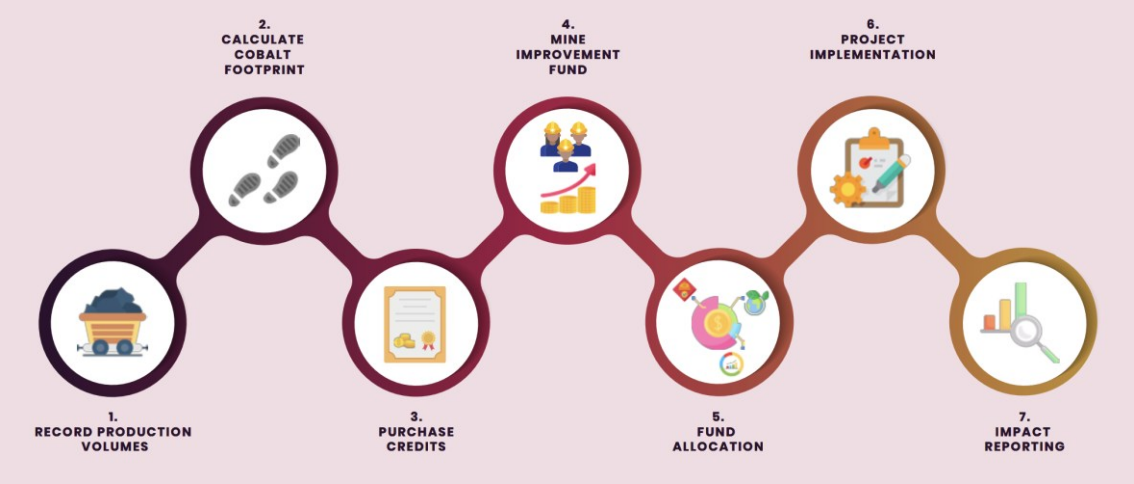

Figure 5. A process flow diagram representing the RMC mechanism (Fair Cobalt Alliance, 2025, p. 23).

MNCs can also support local governance through partnerships and participate in initiatives like the *Responsible Cobalt Initiative* (RCI) or the *Global Battery Alliance* (GBA) to align with global standards and share best practices (RESPECT International, 2016; Global Battery Alliance, 2025).

Ultimately, the best solution may not be based on individual strategies or actions, but rather on combining many different stakeholders and strategies. For example, Esau and Malone (2013) suggest that CSR initiatives should co-exist with effective legislation and regulation.

4.3 Alternative solutions

There are also alternative solutions to improve social responsibility in the DRC. These solutions are mostly implemented by MNCs and concern technical abilities of cobalt but are connected to other actors also.

One alternative solution is recycling cobalt already produced and preferring the usage of recycled materials. 22% of new cobalt-containing manufactured products are made from

recycled cobalt (Matos et al., 2020). The recycling rate for cobalt is still substantially higher than that of lithium, which is compared to a very minimal level. According to the OECD (2019), the recycling rate of cobalt has still a lot more potential, especially in smaller electronic devices. According to the Cobalt Institute (2024b), most of the recycled cobalt is from lithium-ion batteries (64%) and hard metal waste (24%). Cobalt-containing materials end up in landfills. It is difficult to assess the impact of this specifically on the DRC cobalt industry.

MNCs have also already started aiming to increase the amount of recycling. For example, in April 2023 Apple announced that by 2025 it plans to use 100% recycled cobalt in its batteries, increase from 25% in 2022 (Apple, 2023). According to Apple, this ambitious target will be achieved through new recycling technology and the use of new guidelines for their recycling partners. According to the 2024 environmental report (Apple, 2024), the use of recycled cobalt doubled in 2023 compared to the previous year. However, figures for 2024 are not mentioned (Apple, 2024). The widespread use of recycled cobalt is challenged by its availability. However, some estimates have been made regarding the future availability of recycled cobalt. According to Gregoir & Acker (2022), the supply of recycled cobalt will grow rapidly by 2040. The contrast with previous decades is enormous (as can be seen in the figure 5). One can argue that if it requires tens of years for the supply to meet the demand, this isn't very *efficient* in terms of time. For singular companies, the use of recycled cobalt can improve the rate of their responsibility but if Cobalt Institute (2025b, p. 32) graph (figure 5) will predict the supply correct, in the whole context this doesn't eliminate the problems in decades.

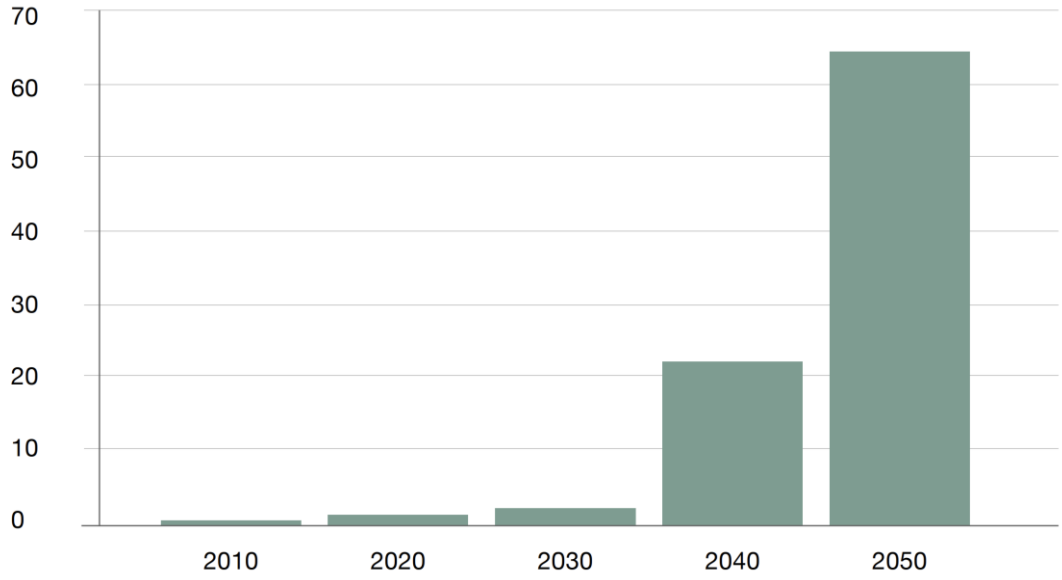

Figure 6. Availability of recycled cobalt in kilotons in Europe from 2010–2050 (Cobalt Institute, 2025b, p. 32).

Companies can also seek alternative materials to use instead of cobalt, and science is also constantly producing new information on this topic. This development is described, for example, in a study published by the Massachusetts Institute of Technology (MIT) in 2024, in which organic materials are used in the cathodes of LIBs instead of cobalt and nickel (Chen et al., 2024; MIT News, 2024). This would have an impact on the EV industry, among others, where LIBs are widely used. Similar technology-related studies have also been conducted elsewhere (see Darbar et al., 2022; Atlantic International University, 2024). Major EV manufacturer Tesla has also announced that it is researching alternative materials to cobalt (Forbes, 2020; Lu, 2020). However, in Tesla's 2023 Impact Report (2023, p. 36), the continuing use of cobalt was still mentioned. Although the report (Tesla, 2023, p. 118) mentions the use of alternatives, it places greater emphasis on cooperation for example with the FCA. This clearly shows that individual solutions are not necessarily effective in solving problems completely. Of course, Tesla's report also raises questions about why they have decided to emphasize different issues than they did a few years ago. According to a study (Graedel et al., 2015, p. 6298), where different metals and their "*substitute performance*" was analyzed, cobalt received 54 points out of 100. 0 was

excellent ("*exemplary substitutes exist for all major uses*") and 100 poor ("*no substitute with even adequate performance exists for any of the major uses*"). According to a table published by EU-funded project SCRREEN2 (2020, p. 22), most of the substitutes for cobalt have reduced performance compared to cobalt. This is represented in the table (figure 7).

Use	Substitutes	Sub share	Cost	Performance
Superalloys, hardfacing/HSS and other alloys	Composites	5%	Similar or lower costs	Reduced
	Titanium-aluminides	4%	Similar or lower costs	Similar
	Nickel-based alloys	5%	Similar or lower costs	Reduced
	Iron-based alloys	5%	Similar or lower costs	Reduced
	Ceramics	5%	Similar or lower costs	Reduced
	Hafnium	5%	Similar or lower costs	Similar
Hardmaterials (carbides and diamond tools)	Nickel	8%	Similar or lower costs	Reduced
	Nickel-Aluminium	8%	Similar or lower costs	Reduced
	Iron	5%	Similar or lower costs	Reduced
	Iron-copper	5%	Similar or lower costs	Reduced
Catalysts	Nickel	0%	Similar or lower costs	Reduced
	Rodium	0%	Very high costs (more than 2 times)	Reduced
Pigments and inks	Zinc	0%	Similar or lower costs	Reduced
	Magnesium	0%	Similar or lower costs	Reduced
Batteries	Lithium-nickel-manganese-cobalt-oxide (NMC)	5%	Similar or lower costs	Similar
	Lithium-manganese-oxide (LMO)	5%	Similar or lower costs	Reduced
	Lithium-iron-phosphate (LFP)	5%	Similar or lower costs	Similar
	Lithium-nickel-cobalt-aluminium-oxide (NCA)	5%	Similar or lower costs	Similar
	NiCd/NiMH	5%	Similar or lower costs	Reduced

Figure 7. Table of different substitution options (by application) for cobalt and their metrics (SCRREEN2, 2020, p. 22).

Although LIB usage is rising, cobalt's share in batteries is declining, and alternative battery solutions have been introduced. Manufacturers are shifting to cobalt-free *lithium iron phosphate* (LFP) batteries and high-nickel solutions, which could reduce cobalt's importance in battery technology in the long term (Cobalt Institute, 2024b). Tesla's 2023 report (2023, p. 117) also mentions the usage of LFP as an alternative to cobalt-based batteries. The impact of these individual initiatives remains to be seen in the large picture.

5 Conclusion

This thesis aimed to analyze and define the current situation of corporate social responsibility in the Democratic Republic of Congo's cobalt industry. The thesis' conclusion outlines several key findings to answer the research questions and objectives mentioned in the introduction. These include the overall representation of the social sustainability issues with cobalt mining in the DRC, definition of CSR in this context, and analyzation and suggestions based on the measures taken. After the analyzation of key findings, conclusions are discussed, with future research suggestions and some analysis on the thesis limitations.

5.1 Key findings

Cobalt mining is an important part of technology industry's supply chains, e.g. in electric vehicles and consumer electronics. Rich in natural resources, the DRC is the largest global miner of cobalt on the Earth. In recent years, demand has fallen slightly and prices have fluctuated, but in the long term, demand for cobalt will continue to exist and rise. The DRC's cobalt production is currently at an all-time high and the world increasingly electrifying, which makes the improvement of CSR more crucial than ever.

The DRC has historically faced exploitation of its people and its abundant resources. Due to colonization, the land was consulting the locals, and after independence, problems have continued in the form of armed conflicts creating weak government and unstable governance and rampant corruption. Mass killings, sexual violence, exploitation of natural resources, forced evictions and economic inequality date back far into the region's history.

The cobalt industry in the DRC today contains several human right issues: child labor, forced evictions, sexual violence, economic exploitation, occupational safety issues and serious health risks to especially ASM miners and the people living near mining areas.

There are several players in the cobalt mining industry in the DRC and in the cobalt supply chain: ASM miners, LSM companies and their subsidiaries, downstream producing companies engaged in cobalt mining and processing, MNCs specializing in EV manufacturing and consumer technology, the state-owned company Gécamines and armed groups.

CSR can be described as a pyramid consisting of four layers: economic sustainability of companies, legal compliance, social well-being of stakeholders, and philanthropy. There are different perspectives on CSR. According to stakeholder theory it is only necessary for companies to maximize shareholder profits, or according to shareholder theory, companies must take care of the welfare of all stakeholders who are affected by their activities.

MNCs are aware of the risks associated with DRC cobalt and are involved in sustainability issues. CSR also has positive effects on a company's profitability and brand image. However, profitability may vary between different sectors, and in upstream companies it does not necessarily correlate. Mining companies aren’t either concerned about brand image, but they have a great responsibility in solving the problems. In the case of Downstream, companies, violations have an impact on the brand image, as they operate often in consumer markets. They have made some improvements in transparency and trackability, but their task is to ensure that their suppliers also operate correctly and are dependent on their information on these matters.

International organizations have an impact on corporate CSR because they develop standards and guidelines that guide companies in developing their responsible practices, such as the OECD Due Diligence Guidance and the UN Guiding Principles on Business and Human Rights (UNGPs). The ILO, on the other hand, sets standards and participates in projects that monitor the use of child labor in the DRC. The DRC government has had the most impact through the state-owned Gécamines, which has accusation of corruption

against it. It's subsidiary EGC influences the working conditions of ASM miners, but there is no clear evidence of its activities, and its independence is questionable.

Solutions to these problems have been sought through the efforts of different international organizations. These efforts include e.g. formalization of ASMs, initiation of due diligence processes, and establishing a credit system. Formalized ASMs have resulted in concrete improvements in workplace safety (for example by providing protective equipment for the employees). However, formalized ASMs have not been a successful solution for every miner as some of the miners are not willing to transfer working in them, and they also lack the benefits provided to large companies by the local government.

At the technical level, MNCs have also sought solutions in the current market situation by looking for substitute materials for cobalt and improving recycling. However, substitute materials haven’t been able to replace cobalt in every use case, regardless of the promises made by some MNCs. The supply of recycled cobalt in the markets isn’t currently enough to satisfy the demand, but it is expected to grow substantially in the future.

NGOs and governments initiatives lack some of the possibilities to influence in the root level compared to MNCs. The range of different measures and solutions is wide. However, no consensus has been accomplished about how to address these issues among the MNCs, NGOs or governments. No singular form of human right issues has been eliminated. No singular form of improvement has turned out to be a *silver bullet* or a *panacea*.

5.2 Discussion

There are several findings of the study that point out that the best overall way to improve corporate social responsibility in the DRC compiles different measures from different actors. All the relevant actors in the field, governments, NGOs, MNCs need to be included. The most important measure to focus on the future is ASM formalization. It effectively results in cooperation of every different party and involves stakeholders from trough out

the supply chain. Formalizing ASMs produces concrete improvements in social sustainability that increases the overall status of CSR in the DRC. The use of alternatives and recycling can support these activities but when these conflict in the terms of resources, resources should be directed to other means to accomplish results in shorter terms of time (more *efficient* means). According to current estimates, it takes long time for the supply of recycled cobalt to meet the demand. Results of wide-use alternatives replacing the total use of cobalt haven't been achieved as many of the alternatives lose in performance to cobalt.

This thesis also contains some limitations. One major theme that this thesis didn't cover was the impacts on *nature* or *environment* of cobalt mining in the DRC. This is part of the sustainability theme but due to limitations of this study, this concept was not addressed more thoroughly. Other limitations are that the thesis does not consider the geopolitical dimension in more deeply, as cobalt in the DRC is especially influenced by Chinese companies and competition with the production of EV batteries in different countries is also relevant. The legal requirements for CSR implementation also vary between companies' countries of origin which affects companies' doings in the DRC. Due to the nature of this thesis, it is not possible to examine all the measures and phenomena affecting the DRC cobalt mining. Due to these reasons, there might also exist more efficient and cohesive measures and solutions that haven't been addressed in this thesis.

The findings of this thesis also raise questions and suggestions for future research. More information or estimations about the supply of recycled cobalt should be studied as there is currently little information available. Would it be possible to increase the supply of recycled cobalt to meet the demand in shorter terms of time? What concrete measures would it require by MNCs, NGOs, and governments? Also, more focus should be appointed to the role of the DRC's government. Even though if the sustainability issues related to economic injustice and workplace safety in the cobalt mines would disappear, there would still be a wide range of human rights abuses in the area due to history, armed conflicts and acts (or lack of acts) of the government. More studies need to

address *corruption*, armed groups, conflicts, the *state of democracy*, *freedom of speech* and *politics* and their effects in the cobalt mining industry. One clear aspect for future research would also be to focus more on business and profitable impacts of improving CSR for companies. Impacts should be studied on the aspect of different CSR theories and e.g. with different case companies in different industry sections (both upstream and downstream). For example, with stakeholder theory, more research about treatment of different stakeholders would be beneficial.

Although this thesis and the trends of studies usually justify themselves emphasizing increasing cobalt demand and the importance of the supply chains in large markets, the main thing behind all the produced cobalt is human beings working daily and trying to provide for themselves. From *humanitarian perspective*, no matter how big the industry currently is or what future trends look like, the importance of research will remain if even a small number of people must suffer from bad living conditions. For the Congolese people living in the DRC, it is crucial how their quality of life is and will be. After all, paradoxically or *cursed*, cobalt enables the employment of many people and promises a better life through this, it can simultaneously weaken the conditions for a good life in the DRC.

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Appendices

Appendix 1. The use of DeepL Translator

AI powered DeepL Translator (free version) was used in the thesis to translate some of writers own thoughts from Finnish to English, provide synonyms, correct grammar errors and sentences. The neural machine translator did not come up with ideas by itself or create text from nothing but all the ideas and texts entered were the contributions of the writer.