The Overlooked Side of the Green Transition: The EU's Ban on Forced Labour in the Cobalt Supply Chain for Electric Vehicles

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Abstract:

The usage of fossil fuels plays a crucial role in accelerating climate change. To address these emissions, the European Union has introduced a growth strategy aiming for net-zero greenhouse emissions across the Union by 2050.

The rapid rise in electric vehicle (EV) consumption has led to increased demand for critical minerals such as cobalt. 70% of the world's cobalt supply is mined in the Democratic Republic of Congo (DRC), a country rich in natural resources but often considered a geopolitical failed state. Cobalt mining companies operating in DRC have been accused of human rights violations in their mining operations.

In response, the European Union has adopted a regulation that prohibits products produced with forced labour at any stage of the supply chain from entering the Union market. The regulation will come into effect on December 14, 2027. This study aims to anticipate the effect of the regulation on cobalt mining for EV battery production, while also examining cobalt mining and refining practices in Finland.

This multi-method qualitative study combines expert interviews with document analysis to create a triangulation of data. According to the findings, monitoring cobalt supply chains remains challenging due to mining operations occurring in third countries. While the EU will monitor imported goods, EV manufacturers must take greater responsibility for their supply chains, as current oversight often only extends to Tier 1 or Tier 2 suppliers.

The study raises a critical question: can the green transition be truly green if it violates human rights?

Keywords: Supply chain, Forced labour, Child labour, Cobalt, Mining, Electric vehicle

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Sammandrag:

Användningen av fossila bränslen påskyndar klimatförändringen. Som svar har Europeiska unionen lanserat en tillväxtstrategi, vars mål är att uppnå nettonollutsläpp av växthusgaser inom unionen till år 2050.

Elbilsboomen har ökat behovet av kritiska mineraler, såsom kobolt. 70% av världens kobolt bryts i Kongo, ett land rikt på naturresurser men som ibland benämns som en geopolitiskt misslyckad stat. Gruvbolag som är verksamma i landet har anklagats för kränkningar av mänskliga rättigheter i samband med koboltbrytning.

För att motverka tvångsarbete i globala leveranskedjor har EU antagit en förordning som förbjuder import av produkter där tvångsarbete förekommit i något skede. Den träder i kraft 14 december 2027. Studien syftar till att analysera förordningens potentiella påverkan på koboltbrytning för elbilsbatterier, samt granska situationen i Finland.

Genom en kvalitativ multimetodstudie, med expertintervjuer och dokumentanalys, undersöks spårbarheten i försörjningskedjor. Resultaten visar att tillsynen försvåras av att brytningen sker i tredjeländer. EU kommer att övervaka importen, men ansvaret ligger i praktiken på elbilstillverkare, som ofta bara tar insyn till Tier 1- eller Tier 2-nivå på sina leveranskedjor.

Studien ställer en kritisk fråga: Kan den gröna omställningen verkligen kallas grön om den sker på bekostnad av mänskliga rättigheter.

Nyckelord: Försörjningskedja, tvångsarbete, barnarbete, kobolt, gruvdrift, elbil

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1 INTRODUCTION

Our planet and its residents are living in a time when we face several threats simultaneously. According to a survey released by the World Economic Forum (2025), armed conflict is, for the first time since the end of the Cold War, ranked as the top risk of 2025. Despite this, the report highlights extreme weather as the greatest threat, resulting from climate change, alongside the dangers of misinformation, disinformation and widespread societal and political polarization. The WEF survey describes these times as the most divided since the Cold War. (WEF, 2025)

Even though the report by WEF doesn't recognize climate change as the biggest threat of our time, we are still facing major issues because of it. The widely spread California wildfires that burned 57, 660 acres of land and killed at least 29 people in January 2025 can be seen a recent example of climate change because of increased high temperatures, drought conditions and extreme weather events like windstorms. (CAL Fire, 2025; Frazier & Li, 2025) According to a report by WMO (2025), 2024 was the warmest year on record in Europe, with annual temperatures reaching all-time highs in nearly half of the continent. This development led to extreme weather events, resulting in at least 335 deaths and affecting the lives of hundreds of thousands of Europeans. The record-breaking heat also had devastating economic consequences, with financial losses estimated at over 18 billion euros. (WMO, 2025) These events can be seen as consequences of man-made climate change.

One of the biggest emission sources, which plays a crucial role in climate change, is the use of fossil fuels in vehicles (UN, n.d. b). In 2019, the European Union introduced a growth strategy called the European Green Deal, which aims for net-zero greenhouse gas emissions across the Union by 2050 (EUR-Lex, 2023). The goal of the EU Green Deal is to contribute to the Paris Climate Agreement and reduce greenhouse emissions by half from 1990 by 2030 (Työ- ja elinkeinoministeriö, 2021, p. 12). Within the European Union (EU), transportation is responsible for one-quarter of all greenhouse emissions. Of these emissions, road transport accounts for 70% and primarily consist of emissions from gasoline and diesel cars. To reduce emissions, the EU, as a part of the Green Deal initiative, has set a standard that all new cars and vans sold in Europe must be zero-emission vehicles starting from 2035. (European Union, 2024)

As the demand for more sustainable alternatives increase in areas such as vehicles and solar power, so does the need for critical minerals used in the re-chargeable batteries. Most of battery powered vehicles run on lithium-ion batteries, that consist of several critical minerals; lithium, cobalt, manganese, nickel, and graphite. About 70% of the world's cobalt is mined in the

Democratic Republic of Congo (DRC), where companies such as Microsoft, Tesla and Apple procure their cobalt from. (Ochab, 2020; Congressional Research Service, 2022, p. 4) An electric vehicle requires six times more minerals than a conventional vehicle, and its battery alone needs in average over 13 kg of cobalt (IEA, 2021; Amnesty International, 2023). According to The World Bank (n.d.) it is estimated that the demand for cobalt will increase with 585% by 2050.

Within the mines, where these large companies procure their cobalt from, massive human rights abuses such as child labour, violence, sexual assault, low wages and long working hours are taking place. Miners in the DRC face such severe human rights violations that working in the mines is often considered a form of modern-day slavery. As the mines expand, Congolese people are forcibly evicted without notice, with just a small compensation or without anything at all. With no options, many are forced to choose between starvation or working in the mines for just a dollar a day. Parents are faced with the option of sending their children to school or eating that day. Therefore, parents often bring their children to the mines for extra pennies, while lost farmland is converted into mines and leaves communities without food sources. (Schleich, 2024)

Cobalt mining and processing are highly concentrated into two countries: the Democratic Republic of Congo (DRC) and China. This close interdependence creates strong ties between the countries, and because of this, cobalt supply chains are particularly vulnerable to regional disruptions in trade routes or policy shifts in either country. In addition, China has a significant influence on cobalt resources in DRC through foreign direct investment. According to estimates a third of the cobalt imported into China originates from mines that are owned by Chinese companies. (IEA, 2021, p. 150)

As the EU, alongside with the rest of the world, cuts emissions with battery-powered technology, it must also be ensured that the new energy systems are sustainable. As the existing security measures focus on supply risks related to oil, the increasing use of minerals in clean energy presents new challenges, including supply chain vulnerabilities. (IEA, 2021) As the need for the mining of minerals increases, workers' rights in mining countries must be protected. With the EU Regulation on Forced Labour comes into force December 14, 2027, companies and organizations are obligated to audit their whole supply chain.

1.1 Problem Description

As both lawmakers and consumers get increasingly more worried about climate change, low-carbon technologies are seen as the solution to fight climate change. The European Union regulation, the European Green Deal, demands that all new cars and vans registered to be zero-

emission by 2035 (European Commission, 2023). The European Union has also set a target which would make Europe a global leader in both sustainable battery production and use (European Commission, 2023b). Therefore, a European Battery Alliance has been created to increase and support the battery manufacturing industry in Europe (European Commission, 2018).

Even though electric vehicles produce less emissions, can the supply chains of electric cars withstand the light of day when looking at human rights and the mining for the critical minerals needed to produce the batteries? Can electric cars be called an ecological or green option, if their battery production supply chain violates human rights? This research focuses on the up stream of the supply chain and mining of cobalt in the DRC.

Climate Rights International (CRI) (2024) researched on how 19 electric vehicle companies take human rights into consideration during their transition mineral supply chains and during their due diligence practices. Out of the researched companies only seven provided answers. Four of the companies provided more detailed information on their human rights vigilance plans, raw-material assessments and other procedures. However, it is not always clear how the companies ensure that their suppliers meet the company expectations and what they will do if the supplier is not compliant. (CRI, 2024) This area needs a lot more research.

1.2 Aim and Research Questions

The aim of this research is to anticipate some key effects of the EU Regulation on Forced Labour on cobalt mining for battery production, with a focus on the electric vehicle supply chain. The regulation will take effect on 14 December 2027. This research will seek an answer for the following questions 1) Throw what kind of mechanisms can the electric vehicle industry ensure that their battery supply chains operate in compliance with the EU Forced Labor Regulation? 2) What are the expected key impacts on the operation of the electric vehicle supply chain?

1.3 Justification

This study is justified by the growing demand for batteries used with low-carbon technologies and by the growing need for minerals used in battery production as part of the transition to a low-carbon economy. As mineral extraction is a constantly growing sector, and there have been reports on human rights violations in the past, such as forced labour and child labour, it is necessary to ensure that the sector operates in accordance with ethical principles. Due to the EU Forced Labor Regulation and the dominance of Chinese companies in the DRC's cobalt mining sector, these companies are not strictly required by Chinese law to comply with human rights standards, companies sourcing cobalt must ensure due diligence in monitoring working

conditions upstream of their supply chain. While China has published voluntary guidelines, such as the CCCMC Standards for Responsible Mining and the Due Diligence Guidelines for Responsible Mineral Supply Chains, they are largely not followed, making compliance virtually optional. As a result, concerns persist about labour rights abuses, including forced and child labour, in these supply chains.

As the DRC holds about half of the world's cobalt reserves and approximately 70% of cobalt used globally is mined there, it is critical that human rights violations in the country are properly addressed in a way that benefits the Congolese communities, as many of them rely on cobalt mining. Encouraging companies to stop buying cobalt from the DRC would only worsen conditions for local communities. Therefore, the focus should be on improving working conditions and eliminating human rights violations. Umpula and Dummet (2024) argue that labelling cobalt as "blood cobalt" scares companies away from purchasing any cobalt that might originate from an artisanal mine in the DRC, which again would harm the Congolese economy. They also claim that those promoting this narrative, such as the fossil fuel industry and its lobbyists, are not genuinely concerned about the well-being of the miners, but instead they are motivated by their own interests. (Umpula & Dummet, 2024)

2 LITERATURE REVIEW

The electric vehicle industry claims, that electric cars are greener than traditional gasoline-powered cars. The industry promotes itself "as a key technology to curb oil use and fight climate change". (Tabuchi, H. et al., 2021) It is true, that most electric vehicles have lower emissions than gasoline-powered cars, but their carbon footprint is still a lot bigger than the industry would like consumers to understand. Emissions, for instance, depend on the method of electricity production (coal, wind, solar). As electric cars run mostly on lithium-ion batteries, they have been linked do human rights violations through raw materials such as cobalt, lithium, manganese, nickel and graphite used in battery manufacturing. Especially cobalt mining poses major human rights challenges. (Tabuchi, H. et al., 2021; Backhaus, R., 2021; Rouhana, F. et al., 2024) The industry itself represent an oxymoron, can something that causes high emissions and human rights issues be called green?

The literature review of this research is thematic and addresses key areas related to the ethical challenges of cobalt mining in DRC within the context of the green transition. It begins with a critical examination of the EV industry's sustainability claims, followed by an overview of the legal frameworks relevant to the study, including the EU Regulation on Forced Labour and the UN Guiding Principles. The review defines forced labour and offers an historical and socioeconomic context on DRC. It also outlines the global supply and value chains for cobalt, highlighting the roles of DRC, China and Finland. The section presents case-specific insights into working conditions in both industrial and artisanal cobalt mines in DRC, with attention to gender and child labour issues. Finally, the review explores the influence of foreign states and positions Finland as a key actor in cobalt refining.

It is indisputable, that the electric vehicles are the key to energy transition, but this transition needs to be done in a sustainable way. The rush to increase the minerals needed by the battery industry has led to the rapid expansion of mines, causing human rights abuses and environmental harm around the world. (Amnesty International, 2024a) Over 70% of the world's cobalt comes from the Democratic Republic of Congo, where cobalt is mostly mined as a side product of copper and nickel (van den Brink, et al., 2020). On January 19, 2016, Amnesty International revealed how cobalt is mined in the DRC by hand, by children and adults, in dangerous and exploitative conditions. (Amnesty International, 2016) Almost two years later, on November 15, 2017, Amnesty International revealed, that major electric vehicle and electronics companies are still not doing enough to stop human rights abuses, as these abuses continued within their supply chains (Amnesty International, 2017a). According to Amnesty International's (2024) human rights

ranking report on the electric vehicle industry, there are significant differences in how the world's leading electric vehicle companies address human rights risks within their battery manufacturing supply chains. Unfortunately, the investigated companies share one thing in common: none of the 13 investigated companies scored more that 51 out of 90 in the ranking. The company that scored the fewest points received only 11 out of 90. (Amnesty International, 2024b)

2.1 Global Supply Chain and Global Value Chain

A global supply chain (GSC) is a worldwide network, that is utilized to deliver products and services from raw materials to finished products for end consumers. A CSC consists of three key parts: 1) upstream supply network, 2) the manufacturing network and 3) the downstream distribution network. The supply chain includes sourcing, manufacturing, and distribution of products, which can all take place in different countries, before a product is sold and delivered to the final user. (Antrás & Chor, 2021; Drake, 2012, p.2-3) Drake (2012, p.3) highlights, that all activities done in a supply chain should be done with the customer's expectations in mind, as "supply chains ultimately exist to ensure that the customers are satisfied".

Suppliers in GSCs can be divided into; Tier 1, Tier 2 and Tier 3 suppliers. The lower the number, the closer the supplier is to the customer.

- **Tier 1** suppliers supply directly to the company
- **Tier 2** suppliers provide goods or services to Tier 1 suppliers
- **Tier 3** supplier supply materials or components to Tier 2 suppliers (Drake, 2012, p. 36-37)
- **Tier 4** mining and extraction (van den Brink, et al. 2020)

Figure 1 Tier hierarchy

A global value chain (GVC) adds value to the production process. For a supply chain to be considered global, work must be carried out in at least two countries. Antrás (2020) defines global value chains as a "series of stages involved in producing a product or service that is sold to consumers, with each stage adding value, and with at least two stages being produced in different

countries. A firm participates in a GVC if it produces at least one stage in a GVC". (Antrás, 2020, p.5)

According to research by Derick et al. (2011), high-value activities related to mobile phone GVC, such as R&D, market analysis, and product management tend to cluster close to the headquarters of the mobile phone companies, for example in the United States. Component manufacturing often takes place in South Korea and Japan, while assembling of the smartphones is typically conducted in China. However, this research does not include the procurement of minerals required to produce mobile phones.

GVCs are connected to the increasing use of foreign inputs in production, especially in the case of goods produced for export. Value may be added to the supply chain through international trade in raw materials such as aluminum and cobalt, intermediate goods such as car parts, or in the form of services such as back-office work. (Antrás, 2020, p.5) Baldwin and Venables (2013) divide GVCs in spiders and snakes. Spider GVCs are often complex, they involve various components from around the world that come together at an assembly plant, where they are assembled. The assembly does not need to follow a specific order. Snake GVCs follow a structured process in which the sequence of steps is determined technology. (Baldwin & Venables, 2013)

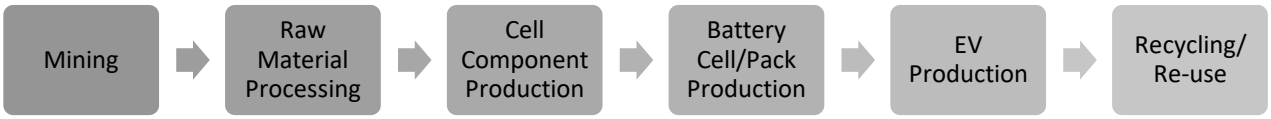

Figure 2 Supply chain of EV lithium-ion batteries

Source: IEA, n.d.

2.2 Cobalt Supply Chain

The DRC is the world's largest producer of cobalt, as approximately 70% of all cobalt used globally originates from the DRC. Cobalt is often mined as a byproduct to nickel and copper. (van den Brink et al., 2020) According to Idoine et al. (2024) cobalt is refined in 16 countries, but up to 78% of all cobalt mined is refined in China. Due to the dominance of cobalt processing, China has a considerable influence over the supply chains downstream.

As the global cobalt supply chain is heavily reliable on the DRC and China, it is highly vulnerable for disruptions (see table 3). Additionally, both countries face political instability, with regulatory and governance challenges, that could impact the production and trade. A disruption in mining operations in the DRC or refineries in China could severely impact the entire cobalt supply chain,

which would affect industries reliant on cobalt, such as electric vehicle and battery manufacturing. (van den Brink et al., 2020)

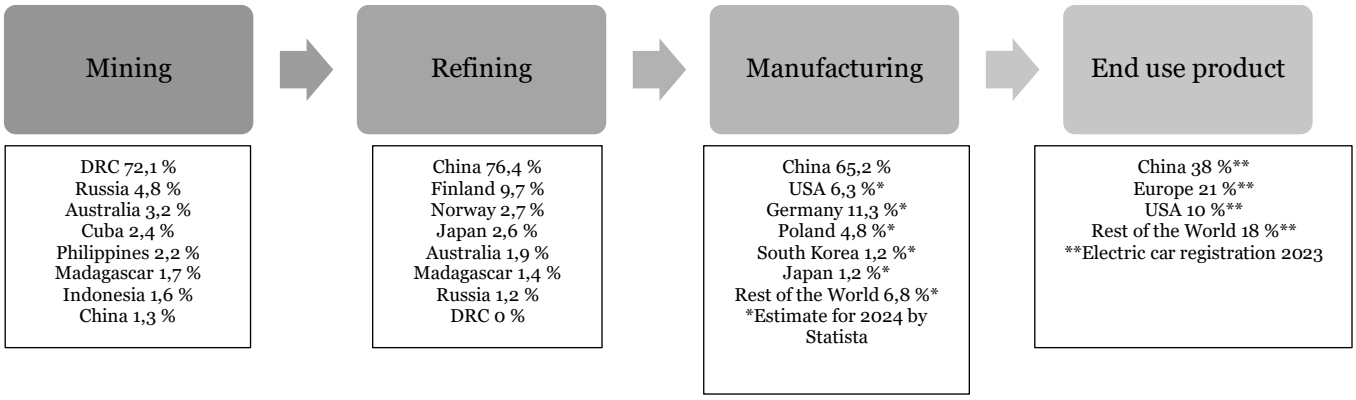

Figure 3 Global supply chain for cobalt

Source: Ritchie & Rosado, 2024; Statista, 2024; IEA, 2024

The value chain for cobalt is complex and contains several stages. The largest global producer of cobalt is the Swizz company Glencore, other large suppliers include the Chinese companies Jinchuan Group and CN Molybdenum. (IEA, n.d., p. 21-22) However, as discovered in the IEA (n.d., p. 27-29) research, China is dominating the entire downstream of the EV battery supply chain, as three-quarters of battery cell production capacity is in China. China also dominates the processing phase, as over half of global cobalt is processed in China. Batteries count for approximately 30-40 % of the entire value chain for EVs (IEA, n.d., p.2).

EV battery supply chains include four stages of Tiers. These are:

Table 1 Tiers and stages of the cobalt supply chain

Tier	Stage	Key Activities	Key Locations
Tier 1	Battery and EV Manufacturing	Battery cells and packs assembled. Integrated into EVs	China, Europe, USA
Tier 2	Component Manufacturing	Cobalt is used in both battery cathodes and components	China, South Korea, Japan
Tier 3	Processing and Refining	Cobalt is refined into battery-grade usable materials	China
Tier 4	Mining and Extraction	Cobalt is mined, often as a side product to other minerals	DRC

Source: IEA, 2022; Singh, et al., 2024; IEA, 2023; Home, 2025; van den Brink, et al., 2020

The cobalt supply chain also includes the end-of-life and recycling phase. However, due to a limited length of this research, this topic will not be covered in this paper.

2.3 EU Regulation on Forced Labour

To fight human rights violations in global supply chains, the European Parliament and Council has set a new regulation (2024/3015), which prohibits products made with forced labour to enter or be exported from the Union Market. The Forced Labor (FLR) obligation applies to all companies and product categories. With this regulation, the European Union tries to ban or destroy products made with forced labour and in this way force companies to act more responsibly and to be more transparent in their supply chains. The FLR requires due diligence processes in supply chains to ensure that products are free from forced labour throughout the supply chain, its enforcement strategy provides the necessary and needed support for these efforts. The regulation empowers the authorities of both the EU and the member states to carry out in-depth investigations of companies and their global supply chains. During an in-depth investigation, companies may be mandated to provide comprehensive information on their own risk management systems as well as their supply chains. (Cambout, et al.,2025, p.59 - 60)

The regulation establishes a necessary framework on which legal actions against products made with forced labour on the internal Union market may be taken. A database containing risk products and areas will be created to support the work of authorities assessing possible violations. Authorities will do random supply chain checks based on assessments of possible risks. If the

products have been produced outside the EU, the Commission will conduct the investigation to be sure that forced labour has not been used during any state of the supply chain. If the suspected violation has happened inside a member state territory, member state authorities will initiate an investigation. Failure to comply with FLR regulations can lead to large fines, market restrictions, product withdrawal and in some cases destruction of goods. National penalties must be strong enough to discourage violations and instead promote ethical supply chains. (European Council, 2024; Cambout, et al., 2025, p. 60) The Regulation will take effect on 14 December 2027.

2.4 UN Guiding Principles on Due Diligence

The UN Guiding Principles on due diligence processes requires that companies take proactive and ongoing steps to identify and respond to its potential or actual human rights impacts. This means that companies are obligated to implement a human rights due diligence process that identifies, prevents, mitigates and accounts for how companies address negative human rights impacts that they might cause or contribute in through their operations. (OHCHR, 2011)

Furthermore, it is essential that companies are transparent about their due diligence processes. The UN Guiding Principles state that "the responsibility to respect human rights requires that business enterprises have in place a policies and processes through which they can both know and show that they respect human rights in practice. Showing involves communication, providing a measure of transparency and accountability to individuals or groups who may be impacted and other relevant stakeholders." (OHCHR, 2011, p. 23-24)

2.5 Battery Passport

From February 2027 onwards, as a part of the EU Battery Regulation, a battery passport will be mandatory for all EVs sold in EU. The battery passport will offer visibility of the entire battery supply chain, showing where and how raw materials were sourced prior to manufacturing, along with post-manufacturing details, such as battery capacity and condition. The digital document will be revealed by using a QR code. (Carfrae, 2024; Battery Pass, n.d.)

Since many manufacturers are unable to trace their entire supply chain- especially in the mid-tier sections, where constant changes are driven by lower costs - a battery passport is necessary to ensure supply chain visibility and minimize the risk of forced labour at any stage of the process. (Carfrae, 2024)

2.6 What is Forced Labour?

Forced labour per se is nothing new. The International Labour Organization (ILO) defines forced labour as “all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily.” (ILO, 1930).

Forced labour has existed throughout history. According to Christopher M. Roberts (2024) the key elements often associated with forced labour are coercion, involuntariness and exploitation. This means, that employees are forced to work against their own will, they often face threats, violence and other forms of pressure to work against their own will and they are being unfairly treated, receive insufficient compensation, are forced to work for inhumanely long days without any rest days and/or in inhumane conditions. Roberts emphasizes, that the definition of forced labour has been throughout history continuously adapted to reflect the emerging forms of coercion and exploitation, which reflects changes in societal values and economic structures. (Roberts, 2024)

People living in extreme poverty, with limited opportunities of employment, are more likely to be forced into forced labour. (ILO, 2014) Regions with a high population density, forced labour is more prevalent due to the ease of exploitation. (Acemogulu et al., 2022) Also, regions with a history of slavery often have higher levels of poverty, lower levels of education, as well as land inequality, which all perpetuates vulnerability to forced labour. (Fogel & Engerman, 1974) Labour scarcity can both increase coercion by raising production prices - making forced labour more profitable - and reduce coercion by improving worker’s external options. (ILO, 2014) According to research on colonized regions by Acemoglu et al. (2002), European powers over the past 500 years have used coercive labour practices in areas with high population and abundant labour. These findings highlight the link between labour supply and coercion. (Acemoglu et al., 2022)

Research shows that victims of forced labour, especially those who are victims of violence, are often extremely poor and have limited opportunities. Although the effect of labour supply (abundance vs. scarcity) is still unclear, it significantly affects the risk of forced labour. Poverty, lack of options, and historical slavery contribute to persistent inequality, low education, and economic hardship. (Chwe, 1990; Acemoglu et al., 2012)

The ILO started collecting verifiable data on forced in early 2000s, laying the foundation for policies and actions against forced labour. Prior to this there was no solid data on forced labour existing on either global or national levels. (ILO, 2014)

On 15 June 2023, a law on the protection and responsibility of human rights defenders (HRDs) was adopted in DRC. The law defines the rights, duties, and protection for human rights defenders, including legal remedies for violations. The law guarantees freedom of association, assembly, and access to information, allows international funding, and provides specific protection for women human rights defenders. In addition, the law also outlines state obligations, such as ensuring the safety of defenders and their families. (Etong Kame, 2023)

However, even though DRC has adopted a law on the protection of HRDs, it does not guarantee their safety. According to Piccioli (2025), HRDs in the eastern parts of the country face significant challenges, including extreme risks of reprisals, targeted attacks by armed groups such as M23 rebels, and specific threats against women defenders, such as sexual violence. The security situation in DRC undermines the effectiveness of the human rights law and creates a hostile environment for HRDs, making their protection even more difficult.

2.7 A Brief Overview of the Democratic Republic of Congo

Several crises have shaped Congo into what it is today. The country is blessed to have enormous amounts of natural resources, but as history has shown, it has become a curse for Congo. (YLE, 2006) The history of the Democratic Republic of Congo (DRC) begins in the 1200s, with the rise of the Congo Empire. In 1600th-17000th Centuries the country is invaded by British, Dutch, Portuguese and French traders who trade slaves through Congolese brokers. On February 5, 1885, Belgian King Leopold II brutally turned the Congo Free State into personal property. The Congolese were forced to labour for valuable natural resources such as ivory and rubber, to enrich King Leopold personally. It is estimated that up to ten million people died during this time. By the help of international pressure, Leopold was forced to cede the Congo Free State to Belgium in 1908, Congo's name was changed to Belgian Congo. Congo remained a colony until it gained its independence in 1960. (BBC, 2025; National Geographic 2024)

Between 1996-2003 the country is faced with two wars, that has been called the First Congo War (1996-1997), the Second Congo War (1998-2003) and Africa's World War, as the violences spread to surrounding countries. It is estimated, that more than three million people died during this time. Even though the ware technically ended in 2003, the fighting continued in the east, as up to 20 rebel groups, including the March 23 Movement (M23), and the government forces constantly clashed. The situation in Congo today is still violent, as the country faces conflicts and humanitarian violations in the eastern parts of the country. These violations are intricately the legacy of the two Congo Wars, as they left the country in a fragmented state with deep political,

ethnic divisions and a weakened state infrastructure. The problems arising from these conflicts continue to fuel ongoing instabilities and violence. (Lemarchand & Cordell, 2025)

Armed groups in the eastern parts of the country, such as M23, are involved in controlling and profiting from the DRCs mineral resources. These groups exploit local communities and force people to mine minerals, such as cobalt. The income from these activities is used to finance their activities, which perpetuate the conflict. Due to the rising demand of cobalt in both technology and renewable energy sectors, armed groups have an interest in controlling mining areas in the future as well. The lack of transparency in supply chains further complicates efforts to address forced labour issues. (Lemarchand & Cordell, 2025)

2.8 Working Within Cobalt Mining in the DRC

There are two types of cobalt mines in the DRC, **large-scale industrial mines (LSM)** and **small-scale artisanal mines (ASM)**, although the distinction between them is blurred, as miners who work in artisanal mines, also work in industrial sites and sell their own mined cobalt to large scale mining companies, which leads to 'cross-contamination' between the two types of mines (Schleich, 2024, p. 138-139). Therefore, both large-scale and small-scaled mines contribute to the brutal working conditions of the Congolese miners. Around 80 % of cobalt mined in the DRC is extracted from large-scale mines, which are generally seen as more ethical and sustainable. However, the workers of large-scale mines, have commonly reported excessive hours, low wages, deficient safety conditions, inadequate health problems, discrimination, racism and degrading treatment, both physically and verbally. (Schleich, 2024, p. 138-139)

Glencore Kamoto Copper Company, which is a large-scale industrial mining company, that major companies like Tesla, Apple and Google source cobalt from have been accused of profiting from child labour and hazardous mining operations. Glencore has been accused of the most human rights violations in Africa. While they deny the allegations, researchers have found, that the company purchases cobalt from artisanal mines, where child labour is used. Industrial mining companies typically use subcontracting agreements rather than hiring the labour itself. This is done deliberately to mitigate liability for human rights abuses that occur. (Schleich, 2024, p. 139)

Small-scale artisanal mines (ASM) make up approximately 20 % of the DCR's cobalt production. Miners who work in these mines have reported on the same human rights violations that is occurring in industrial mines, and on top of these workers have reported on digging cobalt with their bare hands, an acceleration of health problems relating to cobalt and large amount of child labour working in the mines. There are approximately 150 000 to 255 000 Congolese working

within the ASM (Schleich, 2024, p. 139-140; RAID, 2024, p. 11). Out of these 40 000 are children. The children working within the mining industry work in the same conditions as adults, but they are paid less than adults and are subjected to work for twelve hours a day. (Schleich, 2024, p. 139-140) However, Save the Children (2024) estimates, that as much as 10 million people depend directly or indirectly on small-scale artisanal mines in the sub-Saharan Africa. (Save the Children, 2024)

2.8.1 Cobalt Mining and the Local Community

According to research done by the Amnesty International in 2023, mining companies and the local authorities have force evicted local residents as mines have expanded. The residents have had no other choice but to leave their homes and move into houses without electricity or running water. (Amnesty International, 2023)

According to an interview by Terry Gross (2023) with Siddharth Kara, who has been researching modern-day slavery, child labour and human trafficking for two decades, there is no such thing as a clean supply chain of cobalt from the DRC. According to Kara, the working conditions in the cobalt mines in the DRC is similar to something that has happened centuries ago, as miners use shovels, pickaxes and their bare hands to dig up cobalt in tunnels. Young mothers with babies strapped around their backs are forced to work in horrible conditions. (Gross, 2023)

As the need for cobalt and other minerals used in lithium-ion batteries increase, so does the number of Congolese, who have been exposed to cobalt, which is poisonous to breathe and to touch. The particles that are being released during cobalt mining consists of radioactive emissions, cancer-causing particles and particles, that may cause vomiting and nausea, vision problems and cause damage the thyroid gland. (Gross, 2023; Schleich, 2024, p. 137-138)

2.8.2 Women in Small-scaled Artisanal Mines

According to research done by Women's International League for Peace and Freedom (2016) men and women do not perform the same functions in small-scale artisanal mines. Women work in crushing the minerals, washing and sorting them, sifting of the crushed minerals, processing of the waste and selling the minerals. According to the research, women search for a job in the mines mainly because of a higher wage than those derived from farming, which is a result of poor harvest due to drought or lack of work due to the destruction of agricultural areas. 95% of the women working in mines have a very low level of education, many of them cannot read or write (Women's International League for Peace and Freedom, 2016, p. 11 & 15).

Miners working in small-scaled artisanal mines work under slavery-like conditions. Women are faced with gender-based discrimination. Within the communities, the harmful effect of artisanal mining is widely known as the work will probably lead to cancer in the future and deformities in the offspring. Children of women who are working in the mines are at high risk of developing certain birth defects in the eyes, head, mouth and arms. This is likely a result of the mother's exposure to toxic contamination from cobalt mining during pregnancy. Women working in mines also suffer from menstrual disruptions and miscarriages. (Women's International League for Peace and Freedom, 2016, p. 15)

According to a study conducted by the Women's International League for Peace and Freedom (2016), women working in small-scaled artisanal mines are expecting an overwhelming amount of violence as 73,75% of women working in the small-scale artisanal mines, are subjected to sexual violence, in addition to all other violent incidents. (Women's International League for Peace and Freedom, 2016, p. 17)

2.8.3 Children in Cobalt Mining in the DRC

Although the mining of cobalt is essential for green technology, it often involves child labour and exposes children to serious health risks. (Save the Children, 2024) There are 40 000 children working in cobalt mines in the DRC (Schleich, 2024, p. 139-140).

The children working in cobalt mines are exposed to health risks such as respiratory and digestive diseases, spinal deformities due to dust inhalation, prolonged sun exposure and the need to carry heavy loads. (Save the Children, 2024)

In 2022, the Child Labour Monitoring System was integrated by the Inter-ministerial Commission to combat child labour in mines and artisanal mining sites. 2000 labour inspectors and controllers were recruited to monitor the mine sites. However, the efforts made by the DRC hasn't paid off as the national army is involved in the worst form of child labour by supplying weapons and munitions to non-governal armed groups, who are known for recruiting children. The government has not been able to take active measures to ensure that children are not being improperly imprisoned, punished or physically harmed. (USDOL, 2022)

According to Congolese law working in mines is prohibited under the age of 18. Children in the DRC are required to attend school up till the age of 12. This makes children vulnerable for child labour between the ages of 12 and 18 as they are not required to attend school, but they do not have legal permission to work. In 2022, there were 51 574 public schools in the DRC. Of these

half-received funding from the government and the rest relied on prohibitively high education fees, paid by the parents of the students. (USDOL, 2022) According to the UNICEF (2023), because of the high fees and insecurity of the DRC, three-quarters of a million of children's education was disrupted between 2022 and 2023.

2.9 Blood Diamonds, Why Not Blood Cobalt?

When looking back to the millennium shift, one can see several similarities in mining practices in the DRC. Only back then miners were mining for diamonds in artisan mines, today they are mining for cobalt. The working conditions have, unfortunately stayed the same. (Goreux, 2001, p. 3-6) The United Nations (1999) defines a diamond, that has been mined in regions controlled by forces opposing the legitimate, internationally recognized government of a country, and sold to finance military action against that government, a conflict diamond or blood diamond. One of the regions from where blood diamonds have been mined is the DRC. (Anderson, 2007) As mining for cobalt is known to cause human rights violations, should cobalt be called blood cobalt?

The Democratic Republic of Congo introduced a mining code in 2018, which aims to reform the mining practices in the DRC (Vella, 2018). The changes largely concerned increasing royalties and taxes paid to the Democratic Republic of Congo by foreign mining companies. The primary goal of the reform was to increase the taxes and royalties paid by foreign countries to the DRC. Ideally, the additional revenues would have been directed to the local Congolese communities, who are most affected by mining. Given the country's long history of poverty, violence, and instability as the influx of mining revenues has only fueled the already existing corruption as both officials and citizens struggle for financial resources. With a fragile government, it is not surprising that existing laws and regulations are not always enforced. Although the 2018 reform introduced penalties to combat child labor, the problem remains widespread in the mines. (Schleich, 2024, p. 140-141).

2.10 Mining in Finland

According to the National Battery Strategy 2025 published by the Ministry of Employment and the Economy (2021), as the dependency on fossil fuels decrease, the demand of minerals increases. Prior to the publication of the National Battery Strategy, in 2021, a collaborative research study by European research organizations discovered 104 cobalt-containing deposits, 79 of which are located in Finland, Sweden and Norway (Horn et al., 2021; GTK, 2021). Finland plays a key role in the European Union's cobalt supply, as it has the largest known cobalt reserves and the only operating cobalt-producing mines in Europe. Additionally, Finland is a key global

producer of refined cobalt, with 10% of global production of refined cobalt is in the country. Despite this, both Finland and the rest of Europe are still highly dependent on cobalt imports. (Konnunaho et al., 2023; Horn et al., 2021)

Cobalt mining and refining in Europe is strongly centralized in Finland, where two mines – Kevitsa (Boliden) and Sotkamo (Terrafame), represent the only operating cobalt mines within the EU (Konnunaho et al., 2023). In recent years, Finnish mines has represented 1% of global cobalt production. In 2016, 13% of the world's cobalt was refined in Finland. (Törmänen & Tuomela, 2021)

2.10.1 From the DRC to Umicore in Kokkola

Umicore is a leading company is circular materials technology. The company is experienced in the fields of material science, chemistry and metallurgy. Their mission is to produce "materials for a better life", through development, production and recycling. (Umicore, n.d. b) The company is experienced in the fields of material science, chemistry and metallurgy. Their mission is to produce "materials for a better life", through development, production and recycling. (Umicore, n.d. b) Umicore's focus is on recycling, refining, transformation and marketing of cobalt and nickel (Umicore, n.d. c).

The Umicore processing faculty, located in Kokkola Finland, is the largest cobalt refining plant outside China and a major European precursor plant (Umicore, n.d. a). Since 2012, Umicore has had a dedicated Sustainable Procurement Framework for Cobalt. The company strives to operate in an ethical way, and in accordance with laws and regulations. This means, that they respect the fundamental human rights, and local laws and regulations when conducting their operations globally. In their code of conduct Umicore highlights, that they will only collaborate with companies, that share their values. (Umicore, 2023) The company has also a policy on responsible global supply chain of minerals from conflict affected areas and high-risk areas, which is a five-step process for risk based due diligence. Through this policy, Umicore aims to minimize procuring cobalt, that in any way harms people, society or the environment. (Umicore, 2021)

The company does not reveal from where it gets its cobalt. However, they highlight, that they are the first company in the world to have introduced a Sustainable Procurement Framework for Cobalt. The company also uses external validation for its ethical procurement. (Umicore, 2021)

According to Resource Matters (n.d.) Umicore procures its cobalt from IXM SA, Africa Pty. Ltd. and Tenke Fungurume Mining (TFM), Kwatebala Sx/Ew. IXM SA has been accused of using

forced labour in its mines and local communities have also accused them of unfair compensation and relocating of locals (Business & Human Rights Resource Centre, 2025a; Business & Human Rights Resource Centre, 2025b).

2.11 Foreign States Impact on Cobalt Mining in DRC

It is indisputable that both Western and Chinese mining companies have a broad effect on the circumstances in the cobalt mines in the DRC. Next, this paper examines the impact of Western countries and China on cobalt mines in Congo.

2.11.1 China

China lacks domestic cobalt reserves, and therefor they rely heavily on cobalt reserves from DRC (IEA, 2021). 73% of the world's cobalt comes from the DRC and it is almost exclusively exported to China (Colville, 2023). According to Schleich (2024) many U.S. companies purchase their cobalt through Chinese mining companies. (Schleich, 2024, p. 142) In 2019, 75% of the global cobalt production was produced by ten mining companies. Four of these companies were Chinese owned, and they accounted for 24% of the globally produced cobalt. (Liu et al., 2023)

In 2014, the China Chamber of Commerce for Metals, Minerals and Chemicals Importers and Exporters (CCCMC) published its guidelines for socially responsible outbound mining investments. These guidelines require Chinese mining companies participating in overseas mining projects to comply with the UN Guiding Principles on Business and Human Rights throughout the life cycle of a mining project. In addition, the CCCMC published the Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains, which outlines the risks and considerations for responsible mining. However, these guidelines are largely voluntary and there is low enforcement, making compliance optional in practice. (Castillo & Purdy, 2022, p. 16) There is only one other relevant legislation in China regarding ethical mining practices. The Company law, which simply requires companies to "observe social morals and commercial ethics," *and* "assume social responsibility." (Company Law of the People's Republic of China, 2004.) Chinese mining companies have faced criticism for not adhering to international best practices as strictly as their Western counterparts. The most severe allegations against Chinese companies have involved violations of human rights such as forced evictions, child labour, human rights violations through subcontracting models and corruption. However, these allegations do not only apply to Chinese mining companies. (Castillo & Purdy, 2022, p. 16-18)

2.11.2 United States and the European Union

The development of responsible procurement standards through regulations, industry systems and reputation risks in the U.S. and the EU could affect Chinese mining companies to change their mining practices. New laws or downstream pressure could restrict market access for Chinese companies and could force them to undertake more rigorous due diligence practices in order overcome legal and logistical barriers in exporting critical minerals. (Castillo & Purdy, 2022, p. 17-18)

With the Regulation on Forced Labour taking effect in December 2027, electric vehicle companies must ensure that the cobalt used is mined ethically before entering the Union market so that products do not fall foul of the supervisory authorities. In 2023, 438 034 battery-electric cars were imported from China. In the past three years, the market share of electric cars made in China has increased on the European market from 3% to 20%. Chinese brands account for 8% of the electric vehicle market share. (Acea, 2024)

The European Union is not the only one trying to combat forced labour violations within the mining industry. In 2012 the United States Congress passed the Conflict Minerals Act, that requires that U.S. public companies determine if used tin, tungsten, tantalum, and gold are ethically sourced. This act was passed to combat working conditions and exploitations in the DRC. However, the act does not cover the use of cobalt and is not aimed to directly target forced labour in mines within the DRC. Since the passing of the conflict minerals act there has been no progress on a legislation level in the U.S. regarding cobalt nor ethical mining practices. (U.S. Securities and Exchange Commission, 2012; Schleich, 2024, p. 141-142)

2.12 Summary of the chapter

This research is focused on the hidden costs of the green transition, with a particular ethical focus on human rights and environmental issues related to cobalt mining in the DRC. As a part of the EU Green Deal initiative, the EU has set a standard that all new cars and vans sold in Europe must be zero-emission vehicles starting from 2035. Due to this goal, the demand for EVs has increased rapidly. EVs are marketed as a more sustainable alternative to traditional gasoline- and diesel-powered cars, but their supply chain - especially the mining of minerals like cobalt, nickel and lithium used in the battery production - raises significant human rights and environmental concerns. Can something that violates human rights be called green?

This research key focus is on the DRC, which supplies more than half of the world's cobalt. This chapter includes an overview of the country's history of exploitation and conflicts and shows how

armed groups profit from the country's mineral extraction, forced labour and continuous violence. Miners, which include women and children, face dangerous working conditions, exposure to toxic substances and economic exploitation. Women experience gender-based violence, and children are subjected to extreme working conditions that jeopardize their health, education and even lives.

The EU has set a new regulation on banning products made with forced labour, which will come into effect in 2027. The aim of the regulation is to increase transparency in supply chains. As Chinese companies dominate the mining industry in the DRC, who will take responsibility for monitoring supply chains? Chinese companies operate under Chinese laws, and although the China Chamber of Commerce for Importers and Exporters of Metals, Minerals and Chemicals (CCCMC) has published guidelines for socially responsible outbound in mining investments, which require Chinese mining companies to comply with the UN Principles for Business and Human Rights throughout the project lifecycle, these guidelines are largely voluntary, with only a minimal enforcement. In addition, CCCMC presented China's Due Diligence Guidelines for Responsible Mineral Supply Chains, which outline risks and considerations for ethical mining practices. However, due to lack of enforcement, compliance is optional in practice.

Finland is a key producer of refined cobalt, as 10 % of refined cobalt is produced in the country. This research will in the empirical section try to trace the origins of the cobalt, to better understand how ethical the supply chain is, and do the Finnish refineries operate under the coming Forced Labour laws.

While the green transition is essential for the future of our planet, sustainability must not only be seen as carbon emissions, but it must extend beyond this to include ethical sourcing and fair labour practices. Without addressing human rights issues, the green energy sector risks perpetuating new forms of exploitation, rather than truly achieving sustainability throughout the supply chain.

3 RESEARCH METHODOLOGY

In this chapter, the research methodology used in the research project is introduced and justified. The aim of my master's thesis is to anticipate some key effects of the EU Regulation on Forced Labour on cobalt mining for battery production, with a focus on the electric vehicle supply chain. The regulation will take effect on 14 December 2027. This research will seek an answer for the following questions 1) Through what kind of mechanisms can the electric vehicle industry ensure that their battery supply chains operate in compliance with the EU Forced Labor Regulation? 2) What are the expected key impacts on the operation of the electric vehicle supply chain?

Due to the fragile nature of the research topic and the fact that the electric car industry, EU regulations, and human rights are all well-documented areas, existing sources such as NGO reports, industry studies, EU publications, and academic research are available. Therefore, this research will utilize existing data. Together, these sources provide a robust, credible and diverse datasets for analysis. These datasets have been collected by experts in their respective fields with extensive resources, which enhances the reliability of the findings.

In addition to existing studies, reports and datasets, this research will include interviews with experts in their respective fields. These include: a human rights researcher, Finnish geological researcher, a senior representative from an industry advocacy organization, and an official from the Ministry of Economic Affairs and Employment with direct contact to the Forced Labour regulation on EU and national level.

This research approach ensures a well-rounded dataset, which incorporates perspectives from different stakeholders, and will form a triangle of data. Flick (2022, p. 226) describes data triangulation as a "systematic comparison of different researchers' influences on the issue". Triangulation has traditionally been intended to increase the validity of research results. It may be used in both qualitative and quantitative researchers and could also be called mixed-methods research. (Wilson, 2014 p. 74) This research method is used due to the vulnerable subject of the study.

3.1 Sampling Strategies and their purpose

According to Galletta (2012, p. 21), when conducting research, one should "consider *what methods show the greatest promise in studying this research topic?"* Therefore, this research will use document analysis as a research method, which falls under qualitative research and is a

form of secondary data analysis. In addition, this research will also collect data through semi-structured interviews with experts in the field. Therefore, this research is conducting a multi-method qualitative study, which means that it utilizes two different qualitative data collection techniques, in order to gain a deeper insight.

The research aims to find differences in how different stakeholders talk and acknowledges forced labour. Based on the collected data from the semi-structured interviews, and the secondary data collection, research questions will be answered.

3.2 Qualitative Research

Qualitative research may be either descriptive, evaluative, exploratory, explanatory, or a combination of these. Descriptive research focuses on identifying the features and details of a certain phenomenon, while evaluative research examines the effectiveness or impact of a measure or program. Exploratory research investigates new topics or brings new insights, while explanatory research digs into the underlying causes of a phenomenon. (Saunders et al., 2012, p. 121-172) This research combines interviews with the analysis of existing data, such as industry data from EV representatives, NGOs, open sources, and authoritative sources.

3.3 Research Approach

According to Azungah (2018), combining both inductive and deductive approaches in qualitative research is beneficial, as this hybrid method enhances analytical precision by allowing theory testing while remaining open to new theories. This approach ensures a balanced perspective by integrating theoretical frameworks with real-world data while still providing flexibility for adapting new theories.

This research combines both inductive and deductive approaches. It utilizes data as a basis for theory development while also validating existing theories through on data analysis.

3.4 Semi-Structured Interviews

This research includes interviews with experts in the field of EU regulation and areas related to the EV industry. The interviewees were selected based on their expertise in human rights, Finnish law, and the mining and geological sectors in Finland. As none of the contacted refineries in Finland, NGOs, or EV industry representatives accepted the interview request, they were excluded from the list of interviewees. The interviews are based on the same framework but are tailored to fit each interviewee. Since the interviews are semi-structured, the method allows room for

discussion during the interviews, which may provide new insights into the topic (Galletta, 2013, p. 2). Patton (2015, p. 621) summarizes qualitative interviewing as 'qualitative interviewing asks questions.' This is precisely what this research does.

Semi-structured interviews were held on a basis of an interview guide. The guide outlined the topics or questions that were discussed during the interview and served as a checklist for the interviewee. The interview guide is an important tool in order to ensure that all interviews follow the same pattern, and all interviewees get asked the same questions. (Patton, 2015, p. 644) Since the interviewees represent different industries, the interview guide was tailored to interviewee's area of expertise.

The semi-structured interview questions were built upon the literature review of this research and theories relevant to the research questions. The questions were open ended in order to leave the interviewee the opportunity to answer as he or she wishes. The interviewer then had the possibility to ask further questions based on the interviewee's answer. (Galletta, 2013, p. 17-18) However, as Galletta (2013) highlights, it is important "*not to overload an interview with excessive attention* in a desperate attention" to gain groundbreaking data from the interview. (Galletta, 2013, p. 77-79)

Ones the data was collected, the data was transcribed, made anonymous, grouped and analysed by labelling the data according to key themes, relevance to research question, according to relationships between different data and coded accordingly. The data was also stored in a secure location. The data was coded with color codes. If collected data has challenge existing theories, or introduce new dimensions, new labels have been created accordingly. According to Galletta (2013, p. 120-124) the documentation of data is important because it traces the analysis from start to finish and makes the researcher accountable for the research process.

Table 2 Contacted anonymized potential interviewee candidates

Participated interviewees				
Company	**Industry**	**Contacted person**	**Participated**	**Date**
A	Research and law	Human rights researcher	Yes	24.3.2025
B	Geology	Finnish geological researcher	Yes	2.4.2025
C	Mining industry	Industry representative	Yes	27.3.2025
D	Ministry of Economic Affairs and Employment	Official	Yes	28.3.2025
Declined or did not-answered interview request				
E	Electric vehicle manufacturer	Legal department, local representee	No answer	6.3.2025 15.3.2025
F	Electric vehicle manufacturer	Sustainability and legal department	No answer	10.3.2025 19.3.2025
G	Electric vehicle manufacturer	Marketing and sustainability department	No. Declined	11.3.2025

H	Human rights organization	Executive director	No answer	14.3.2025 20.3.2025
I	Human rights organization	Finnish branch who guided me forward. International human rights representee and a human rights researcher were contacted.	No answer	13.3.2025 20.3.2025 26.3.2025
J	Human Rights organization	Human rights researchers (three persons)	No answer	20.3.2025 26.3.2025
K	Refining company located in Finland	Company contacted directly	No answer	13.3.2025 20.3.2025
L	Refining company located in Finland	Company contacted directly	No answer	13.3.2025 20.3.2025
M	Battery industry	Contacted directly. Helped by guiding forward	No	14.3.2025
N	European Parliament	Representative	No	26.3.2025
O	European Parliament	Representative	No	26.3.2025

3.5 Document Analysis

Ethical considerations have been considered while conducting this study. Directly interacting with workers affected by human rights violations in mining requires careful ethical planning, approvals, and safety measures, which have not been feasible for this study. Therefore, the use of secondary data reduces the ethical complexity associated with the collection of sensitive data.

Since the data analysed in this study is already existing and has been collected by experts, the analysis and cross-checking of different sources took about four weeks, which was a bit longer than expected. By combining existing data with primary data gathered through expert interviews, this research aims to highlight discrepancies between the cobalt mining industry, NGO reports, and lawmakers. Some of the analysed data is presented in Table 3.

Table 3 Data used for document analysis

Author/Publisher	Name of publication	Year	Published in
Amnesty International	Industry Giants Fail to Tackle Child Labour Allegations in Cobalt Battery Supply Chains	2017	Amnesty International website
Amnesty International	Democratic Republic of the Congo: Industrial mining of cobalt and copper for rechargeable batteries is leading to grievous human rights abuses	2023	Amnesty International website
Amnesty International	Recharge for Rights: Ranking the Human Rights Due Diligence Reporting of Leading Electric Vehicle Makers.	2024	Amnesty International website
Amnesty International	Global: New Human Rights Ranking of Electric Vehicle Industry Exposes Laggards	2024	Amnesty International website
Business & Human Rights Resource Centre	A report highlights forced labour in cobalt mining in the Democratic Republic of Congo; with co. responses	2025	Business & Human Rights Resource Centre
Business & Human Rights Resource Centre	DRC: Local communities accuse some mining companies of unfair compensation and relocation process; with co. responses	2025	Business & Human Rights Resource Centre
Calma, J.	Tesla battery material supplier tops list of human rights abuses for second year in a row.	2023	The Verge
Carfrae, J.	Electric Vehicles will need 'battery passports' to enter EU from 2027	2024	Autocar
CMOC	Annual Results Announcement for the Year Ended 31 December 2022	2022	CMOC Group Limited
Gordon, J.	Electric car makers blasted in battery material mining report	2024	Autocar
Hook, L & Wilson, T.	Metals trader IXM bids to become China's answer to Glencore	2024	Financial Times
Jolly, J.	Concerns raised over mining companies' role in battery passport scheme	2023	The Guardian
Martinello	Tavararoiden vapaa liikkuvuus	2024	Euroopan Parlamentti
Nippon	Nearly 10 000 Suppliers Works for Both Honda and Nissan	2025	nippon.com

Nissan	Lithium-iron-phosphate batteries	n.d. b	
Nissan	Sustainability Report 2020	2020	Nissan Motor Corporation
OHCHR	Guiding Principles on Business and Human Rights	20211	United Nations Human Rights
Ohnsman	Elon Musk's Laughable Solution to Tesla's Child Labour Worries	2024	Forbes
Polestar	Vastuullinen hankinta	n.d. a	Polestar.com
Polestar	Code of Conduct for Business Partners	n.d. b	Polestar.com
Polestar	Polestar Modern Slavery Statement 2024. Under Modern Slavery Act 2015. p. 11-12, 14	2023	Polestar.com
RAID	Beneath the green p. 1, 11-13, 29, 77	2024	RAID and AfreWatch
Stevens, M.	Polestar's sustainability boss on minerals mining and 'animal welfare' leather	2022	Which Car?
Summer, D.	Tesla Child Labour Scandal: Is Elon Musk's Solution a 'Joke'?	2024	International Business Times
Tesla	Additional resources	2024	Tesla.com
Työ- ja elinkeinoministeriö	EU:n sisämarkkinat ja vapaa liikkuvuus	n.d.	Tem.fi
Umicore	Umicore's sustainable cobalt procurement externally validated for the 6th year in a row	2021	Umicore.com
Umicore	Sustainable Procurement Framework for cobalt	2023	Umicore.com

Document analysis is often used together with other research methods as a mean of triangulation (Bowen, 2009). Denzin (1970, p. 291) describes document analysis as "*the combination of methodologies in the study of the same phenomenon*."

For this research three different electric vehicle companies where chosen. These companies were chosen because their brands represent the most common electric cars in Finland, and because the researcher had an existing connection to two of them. This research utilizes publicly available documents of these companies and their cobalt supply chain.

3.6 Data Analysis

Data collected through interviews and document analysis has been analysed using a consistent set of parameters. The parameters for the interview analysis are geographical, social considerations, motivation, risks and the future. In addition, each interview has been analysed according to specific sub-categories, that reflects the expertise of each interviewee. As all interviewees are specialists in different fields, it has not always been possible to apply identical sub-categories across all interview analysis.

Document analysis was conducted using the following parameters: zero-tolerance issues, issues of concern, labour and human rights, certification, traceability, risk assessment, risk criteria, supplier self-assessment questionnaires, and additional background screening. These categories have been further analysed by categorization.

3.7 Data Categorization

According to Spiggle (1994, p. 493), categorization in qualitative research involves organizing data through coding, which goes beyond the identification of themes to form comprehensive theoretical categories. The goal of categorization is to classify data segments that represent a broader phenomenon by labeling occurrences within the data. Researchers often refine and narrow categories early in the analysis process, often starting with 50 to 100 first-order categories. This volume can feel overwhelming, leading to a sense of being "lost" in the data. However, as Gioia et al. (2013) emphasize, this confusion is a natural and essential part of the analytical journey. Gioia has often used the phrase "You gotta get lost before you can get found". (Gioia et al., 2013, p. 16)

This research has utilized 36 different data sources alongside 4 semi-structured interviews. The categorization of data from semi-structured interviews has been grouped and categorized according to relevance to the research questions, overarching themes, and other significant information that emerged during the semi-structured interviews.

Data categorization of the document analysis has been grouped and categorized according to criteria and indicators, description, requirement level and implementation.

3.8 Replication of the Study and Trustworthiness

Since all steps of this research are well-documented, it can be replicated by other researchers. The findings may vary depending on when the research is conducted. This is because the study focuses on a fast-developing industry where new parameters and principles are introduced at a rapid pace. The types of interviewees used for the research may also impact the final results. This study utilizes experts in their respective fields, including a human rights researcher, a Finnish geological researcher, a senior representative from an industry advocacy organization, and an official from the Ministry of Economic Affairs and Employment with direct contact to the Forced Labour regulation at both the EU and national levels. The interviewees were selected based on their knowledge availability.

According to a framework by Wallendorf and Belk (1989), trustworthiness of collected data may be evaluated by focusing on validity, reliability, objectivity, generalizability, and replicability:

- **Validity:** The extent to which data accurately reflects the intended topic depends on the use of reliable and consistent measures, which ensures the relevance of the data to the research question (Wallendorf and Belk, 1989).
- **Reliability:** The consistency and reliability of the data over time suggest that the study's outcomes can be replicated, meaning that repeating the research should produce similar results (Wallendorf and Belk, 1989).
- **Objectivity:** The extent to which the data remains objective and free from personal interpretation involves gathering and analysing the data without allowing the researcher's biases or opinions to influence the process (Wallendorf and Belk, 1989).
- **Generalizability:** The degree to which the findings can be applied to a larger population beyond the sample group depends on the sample being representative and the research methods being flexible enough to suit different contexts (Wallendorf and Belk, 1989).
- **Replicability:** The ability to repeat the study and achieve consistent results relies on transparent and thoroughly documented research procedures, allowing other researchers to replicate the study (Wallendorf and Belk, 1989).

This research maintains a high level of trustworthiness, even though EV industry representatives declined interview requests. However, it analyses existing data from EV representatives, NGOs, open sources, and authoritative sources, combining these findings with data collected through interviews. Therefore, the trustworthiness of this study remains high.

3.9 Delimitations

This research examines the perception that the electric car industry as an eco-friendlier alternative to fuel-powered vehicles. The focus of this research is on human rights violations in upstream cobalt supply chains for EV battery production in the DRC. The thesis excludes other battery powered means of transportation than EVs such as electric bikes and battery powered public transport. This thesis also excludes other battery-powered devices that include cobalt, such as electronics.

The research focuses on human rights violations related to forced labour in cobalt supply chains and will include forced labour, child labour and unsafe working conditions. The research excludes broader societal impacts, such as other human rights concerns such as land displacement, community conflicts, political instability caused by cobalt mining and environmental related issues. The study does not analyse the economic effects of cobalt mining on local economies, trade policies, or the international relations of mining and importing countries. The research also

excludes the affordability aspect of EVs and a general access to green technologies. Therefore, the research does not focus on other environmental concerns such as carbon emissions and lifecycle analyses of EVs. Due to space limitations, this research excludes human rights violations and forced labour occurring in the EV battery cobalt supply chain outside of the cobalt mines in the DRC.

The research will focus on the Forced Labour Regulation but will exclude broader environmental policies such as the EU Green Deal, with an exception if a regulation is directly linked to human rights and the battery supply chain in the electric car industry. Although the study examines human rights violations, it does not assess the effectiveness of corporate social responsibility (CSR) efforts or the ethical sourcing initiatives of EV manufacturers. The time frame analysed will focus on recent development, from 2020 onwards.

The geographical scope is limited to the mines in the DRC and the European Union, as the thesis reflects on European Union laws. Non-EU countries are excluded to be able to maintain alignment with the Forced Labour Regulation. This research delimits its analysis to specific stakeholders including corporations and regulators. The research includes case studies drawn from key industry players in Finland. The research excludes consumers from its scope.

4 ADRESSING FORCED LABOUR IN EV BATTERYSUPPLY CHAINS

The aim of this research is to anticipate some key effects of the EU Regulation on Forced Labour on cobalt mining for battery production, with a focus on the electric vehicle supply chain. The regulation will take effect on 14 December 2027. The study focuses on human rights and especially on forced labour in mining of cobalt in the Democratic Republic of Congo and how the supply chains of the electric car industry consider the EU's new law on forced labour.

This study employs a qualitative research method. It includes four semi-structured interviews with experts in their respective fields. These include: a human rights researcher (Respondent A), a Finnish geological researcher (Respondent B), a senior representative from an industry advocacy organization (Respondent C), and an official from the Ministry of Economic Affairs and Employment with direct contact to the Forced Labour regulation on EU and national level (Respondent D).

In addition to the interviews, this research incorporates document analysis on secondary data, such as sustainability reports, compliance disclosures from selected electric vehicle companies and NGO reports, all publicly available. EU policy documents and industry standards have been assessed to be able to match the company documents with regulatory expectations. In order to evaluate the selected companies using the same criteria, a table has been produced for each company.

4.1 In Theory, How Will the EU Forced Labour Regulation Work on Cobalt Supply Chains?

According to Respondent D (Ministry of Economic Affairs and Employment official), the EU Forced Labour Regulation prohibits products made with forced labour to enter the European Union. The aim of the regulation is to address the global issue of forced labour by restricting such products from entering the European market. (Respondent D, 2025)

Products suspected of being produced using forced labour are first subject to an official recall decision, which requires their removal from the market and destruction. After which the company is given the opportunity to prove that the products were not made with forced labour. If the company does not provide sufficient evidence and the origin of the goods cannot be verified, the products will be destroyed. Failure to comply with this decision will initially result in a warning; continued non-compliance may lead to financial penalties. (Respondent D, 2025)

However, according to Respondent D (2025), the most significant consequence for companies is not a fine, but the inability to use the products commercially. In the worst-case scenario, companies face a double loss: the immediate costs of product destruction and possible reputational damage. The process of removing products from the market is described as heavy, and its impact on the brand image can be considerable. Ultimately, it is the ban itself, rather than financial sanctions, that acts as the strongest enforcement mechanism of the regulation. (Respondent D, 2025)

The mechanism behind the Forced Labour Regulation is new for the European Commission, as the commission will act as the competent authority and be responsible for conducting investigations in third countries. EU Member States will in turn, be responsible for enforcement within their own territories. Together, this will form a network which effectiveness depends on ongoing dialogues between the Member States and the Commission. (Respondent D, 2025)

Member States are also expected to recognize the decisions of other Member States, as goods typically move freely within the internal market. According to Respondent D, the exact operational mechanism will be determined once the Regulation enters into force on 14 December 2027. Since the Regulation relies heavily on mutual recognition of findings between Member States, its concrete effects are difficult to predict. (Respondent D, 2025)

Because the regulation is at the EU level, it obliges all member states to comply with it. This, in turn, supports the effective functioning of the EU internal market, as the regulation aims to ensure the free movement of goods within the EU, something that would not be possible if the regulation were country specific. The regulation is directly applicable in Finland and will be monitored by a legislate authoritative. (Respondent D, 2025)

4.1.1 The Role of Customs

According to Respondent D (2025), it has not yet been determined which national authority will be responsible for monitoring compliance with the Forced Labour Regulation. Customs authorities does not have the mandate to make independent decisions regarding products falling under the scope of the Regulation. Instead, Customs collaborates with the designated national competent authority by intercepting potentially non-compliant goods at the border and acting upon the authority's instructions. (Respondent D, 2025)

Customs controls the European Union's external borders, as goods move freely on the EU's internal market. (Työ- ja elinkeinoministeriö, n.d.; Martinello, 2024) Goods arriving from third

countries to the EU will be checked by local Customs authorities in arrival country. Only goods that arrive directly from a third country to Finland, will be checked by the Finnish Customs authorities. (Respondent D, 2025)

4.1.2 Finnish Perspective

When examining cobalt supply chains from a Finnish perspective, with a focus on Umicore for the purpose of this research, as previously discussed, the company claims to minimize the procurement of cobalt from sources that harm people, society or the environment (Umicore, 2021). The company has a due diligence policy on responsible global supply chain for minerals from conflict affected and high-risk areas. (Umicore, 2021) However, according to Respondent B's (Finnish geological researcher), Umicore does not procure cobalt from Finland; instead, all of its cobalt is procured from abroad (Respondent B, 2025).

As Finland is located in a rather isolated area, no container ships are operating directly between DRC and Finland. Container ships transporting cobalt are sailing to the ports in the Netherlands, where the cargo is reloaded into smaller cargo ships, that can sail to Kokkola harbor, for example. (Respondent B, 2025) According to Respondent D, due to this, the cargo ships carrying cobalt from DRC are being checked by the local authorities. When the cargo enters the European Union, it may move around freely, as the EU functions on the basis of a free internal market. This means that the local customs authorities in the Netherlands are responsible for the supervison of the imported goods. (Respondent D, 2025).

According to the information provided by Table 1 (Umicore, 2021), Umicore does some work for trying to procure forced labour free cobalt. However, Umicore does accept secondary artisanal mined cobalt, if corrective actions are being made. As discussed in chapter 2, many manufacturers are unable to trace their entire supply chain, especially in the mid-tier sections, where constant changes are driven by lower costs. (Carfrae, 2024) Umicore demands that its suppliers update their supplier self-assessments questionnaires annually. Countries that have a high-risk classification, such as the DRC, will have their backgrounds checked every three years. (EU AML/CFT, 2022; Umicore, n.d. d) According to Respondent C (a senior representative from an industry advocacy organization), cargo can change ownership several times along the route from DRC to Finland (Respondent C, 2025). This raises the question: how can Umicore be certain that if fully knows their entire cobalt supply chain if it only requires suppliers to update their self-assessment once a year?

Table 4 Umicore Cobalt Risk Prioritizing

Category	Criteria/Indicators	Description	Requirement Level	Implementation
Zero-Tolerance Issues	Forced & child labour, torture, war crimes, bribery, artisanal mining (as a primary source), rejection of Umicore policy by supplier (Umicore, n.d. d)	Severe violations. Zero-tolerance, will lead to disqualifying of supplier.	Non-negotiable	Explicitly forbidden
Issues of Concern	Lack of permits, secondary artisanal mining, lack of action plan on zero-tolerance issues, no commitment to OECD-aligned due Diligence or sustainability certifications. No procedures for; environmental impact reduction or minimizing social impacts (Umicore, n.d. d)	Medium to high risk. Requires further mitigation.	Requires mitigation	Accepted, if corrective actions are being made
Labour and Human Rights	Worker-rights, anti-discrimination, child labour prohibition (Umicore, n.d. d)	Workplace ethics	Mandatory	Supplier must implement policies aligned with zero-tolerance issues
Certification	OECD-aligned due diligence, third-party sustainability certification (Umicore, n.d. d)	Verification of responsible sourcing	Time-bound and mandatory	Needs to be certified or in process by 2025
Traceability	Registration of source, transaction logs, lot-receipts, plant visits, supply chain mapping (Umicore, n.d. d)	Supply chain transparency and tracking	Ongoing	Full traceability
Risk Assessment	Country risk classification, background checks, frequency of reassessment (Umicore, n.d. d)	Tiered approach based on regional and supplier risk	Continuous risk-based assessment	Background checks every three years in high-risk areas
Risk Criteria	Compliance with OECD Annex II guidance is required for CHARA-based miners, sanctions (Umicore, n.d. d)	External indicators for assessing country risk-level	Defined screening criteria	New un-certified suppliers, are expected to enter the certification process within a year of signed contract
Supplier Self-Assessment Questionnaire	Supplier policies, labour practices, corruption, ESG indicators, due diligence (Umicore, n.d. d)	Supplier screening tool	Mandatory for all Suppliers	Updated annually
Additional Background Screening	High-risk indicators will lead to additional background screenings. Key suppliers may be selected for additional enhanced background checks. Screenings are based on market research, including media reports, NGOs , and government institutions (Umicore, n.d. d)	In case of allegations of zero-tolerance issues, suppliers are expected to implement corrective actions within six-nine months		Umicore is committed to be audited by independent third parties

Source: Umicore, 2021

4.2 Mines Operating in Finland

According to Respondent B (Finnish geological researcher) there are 209 occurrences in Finland, where cobalt is listed as a valuable component. In 87 of these occurrences, cobalt is classified as one of the primary valuable elements. However, cobalt is not usually the most important valuable element, as cobalt is mined as a side product. In 122 occurrences, cobalt is present among the secondary or subordinate valuable elements. It is ranked as the main valuable element in only 13 occurrences in Finland. Despite the number of occurrences, there are only two operating mines in Finland, which produce cobalt as a by-product, Terrafame in Sotkamo and Boliden in Kevitsa. (Respondent B, 2025)

According to Respondent B, it is estimated that there are 186 000 tons of unidentified cobalt occurrences in Finland. These occurrences are located up to 2 km underground and are

distributed across the country. However, according to Respondent B, if production capacity of cobalt extraction were to be increased, the best way to achieve this would be by increasing the production volume at the Terrafame mine in Sotkamo, as it has by far the largest cobalt reserves and is already an operating mine. Establishing a completely new mine could take up to 20 years. (Respondent B) However, according to Respondent C, it typically takes about 4-8 years to get a new mine fully operational. Cash flow is usually used as a metric to determine when the mine has properly started production. However, because metal prices are very volatile, they could cause a collapse in mine productivity. (Respondent C, 2025)

At present, critical minerals such as phosphate, cobalt, copper, nickel, platinum, palladium and feldspar are mined in Finland. Lithium mining will begin later in 2025. There are eight mining projects that are not yet operational but are intended for mineral extraction. These projects aim to produce critical raw materials. Among them, three are expected to produce cobalt. These mines are Hautalampi, Hietaharju and Sakatti (Kolmisoppi). (Respondent B, 2025)

On March 25, 2025, Terrafame's Kolmisoppi ore deposit was granted strategic project status under the EU Critical Raw Materials Act (CRMA). Through the Act, the European Union strives to strengthen the critical minerals value chains of raw materials that are crucial for EUs economy and clean transition. Terrafame has applied for an environmental permit to exploit the ore and is waiting for a response in 2025. The company aims to start mining in the Kolmisoppi area in 2028. (Terrafame, 2025)

4.2.1 Responsible Cobalt Mining in Finland

According to Respondent B and Respondent C Finland has the opportunity to position itself as a responsible cobalt-producing country, as it offers good working conditions, and the use of child labour is prohibited by law (Respondent B, 2025; Respondent C, 2025). According to Respondent C (2025), it is not even allowed to offer summer jobs to 15–18-year-olds since it is not allowed to have minors working within the industry.

However, Respondent A (a human rights researcher), challenges the vision that cobalt mining could be seen as something that is responsible, since the environmental impacts of mining have heavy consequences on the environment, as it is mineral exploitation and a very polluting industry. According to Respondent A, it doesn't help to do safety regulations, since mining pollutes the environment and water supplies. (Respondent A, 2025)

Respondent A also highlights, that two UN Committees found in 2024, that the State of Finland violated the rights of Sámi Indigenous people, by allowing permits for exploration and reservation submissions. These permits were granted without an impact assessment or an adequate participation process. (Respondent A, 2025; OHCHR, 2024) According to the UN Committee decision, these exploration and reservation permits were violating human rights. (Respondent A, 2025)

According to Respondent C, Finnish mines focus on safety, responsibility, communication and ore exploration, and its general image. The so-called Sámi home region, that covers Enontekiö, Inari, and Utsjoki municipalities, and the Northern parts of Sodankylä municipality, are so called no-go areas for mining companies. However, according to Respondent C, eventually mining companies will enter these areas as well, as the pressure of starting mines in these areas will rise as the demands for critical minerals increase. (Respondent C, 2025) According to the UN Committee's decision, such actions do not provide legal recognition to the rights of the Indigenous Sámi People and their traditional territories, which is also to the basis of their livelihood. (OHCHR, 2024)

4.3 Self-Sufficient Europe

According to Respondent B, Respondent C and Respondent D (2025), Europe does not have the possibility to become self-sufficient when it comes to critical minerals. Even if large amounts of minerals were suddenly discovered within the Union territory, it would not be possible to increase the production capacity very much. The EU is not able to produce more than 10% of its required minerals. (Respondent C, 2025)

Instead of aiming towards a full self-sufficient Europe, the EU will in the future aim to re-use raw materials, and in this way achieve a larger self-sufficiency. By contributing to circular economy, the EU wouldn’t be so dependent on virgin materials. (Respondent D, 2025)

Finland is not either self-sufficient in any of the minerals mined domestically, exept for chromium, which is mined in Kemi. (Respondent B, 2025)

4.4 Traceability of Cobalt

The Finnish geological research center (GTK) has been involved in two separate projects, BATTRACE, which investigated Finnish cobalt, and MaDiTraCe, which investigated both domestical and international cobalt. During the investigation a composition-based traceability

investigation of battery metals, minerals and materials was made. The projects investigated the geo-fingerprint of the previously mentioned. (Respondent B, 2025; Kinnunen, et al., 2024)

According to the finding of these projects, it was discovered, that the fingerprint used for traceability of cobalt may be altered during processing. Therefore, cobalt traceability cannot sorely rely on o isotopic composition in the same way as it can for lithium traceability. However, the trace element composition of the ore and the isotopic ratio of sulphury appear to remain relatively well preserved throughout cobalt processing. (Respondent B, 2025)

By comparing sample analyses to known deposit compositions allows to do tentative origin tracing. However, overlapping deposit signatures and material mixing significantly limit the accuracy of the finding. Therefore, composition-based traceability still remains in its initial elements and is unsuitable for mass production investigation. (Respondent B, 2025)

4.5 Problems in Cobalt Mining in DRC

Since mining causes environmental pollution, it is harmful for local communities living near mining sites. As 70 % of the world's cobalt is mined in DRC, which is classified as a high-risk country, and geopolitically it's a so-called failed state. Within DRC, there are hundreds of thousands of displaced people, as it is one of the areas where the level of conflict is the highest. The conflict violations have been linked to acts of genocide. (Respondent A, 2025) This is where the fuel for the green transition, cobalt, is coming from.

Mining companies there often operate without proper external supervision. Without any monitoring, how can child labour be eliminated from cobalt mining? When monitoring does occur, miners are usually notified in advance. The minors are asked to leave, and they can return to the mining sites after the monitoring has been completed. (Respondent A, 2025) As early as 2017, Amnesty International reported on how EVs run on child labour, as children mined for cobalt. Children are forced to work as their parents can't afford to send them to school or provide them food without their contribution. (Amnesty International, 2017b)

4.5.1 4.5.1 Tenke Fungurume Mining and IXM

Located in 106 km from Kolwezi, the capital of Lualabala province in the Central Africa's copper-cobalt belt is the Tenke Fungurume Mine (TFM). The mine produced its first copper output in 2009, six years after the DRC's years of war ended. Since 2016, the mine has been 80 % owned by Shanghai and Hong Kong-listed China Molybdenum CMOC Group Limited. The Congolese state-owned company Gécamines owns the remaining 20 %. (RAID, 2024, p. 12-13) In 2022, TFM

produced 20,286 tons of cobalt, which is 9.65% more than during the previous year (CMOC, 2022).

IXM is established in 2006 and is a subsidiary company of China Molybdenum (CMOC). They specialize in metal trading (cobalt, nickel, copper, zinc, niobium, lead) and represent the third-largest metals trader. (Hook & Wilson, 2024) In 2022, IXM's trading volumes where 3.118 million tonnes of metal concentrates and 3.137 million tonnes in refined metals (CMOC, 2022).

Both Tenke Fungurume Mining (TFM) and IXM SA have been accused of using forced labour in their mines. The local communities have also accused the companies of unfair compensation and relocation of locals, as the mines have grown. (Business & Human Rights Resource Centre, 2025a; Business & Human Rights Resource Centre, 2025b).

TFM does not publicly disclose, which refining companies procure its cobalt. However, as IXM is a subsidiary for TFM and one of the world's leading metal trading companies, there is a strong possibility that cobalt from TFM is distributed globally.

4.6 Electric Vehicle Companies

For this research three different electric vehicle companies where chosen. These companies were chosen as their brands represent the most common electric cars in Finland, and the researcher had an existing connection to two of them. According to research published by Amnesty International in 2016, two of these companies are listed as procuring their cobalt from high-risk cobalt mines (Amnesty International, 2016).

According to Respondent A (2025), EVs are essential for advancing the green transition. However, EVs are manufactured using similar methods to traditional vehicles and continue to drive extractivism. This raises the question of whether the EV market has already become a platform for greenwashing, as consumers believe they are making environmentally responsible choices by purchasing EVs, while in reality, they may simply be perpetuating harmful practices. (Respondent A, 2025)

4.6.1 Tesla

Tesla does not have a sustainability representee in Finland. According to a Finnish Tesla employee, they closed their legal department in Finland in January 2025. According to the employee, law and environmental responsibility has been centralized at the head office in the USA. The writer of this research tried to contact the company's chief paralegal but was met without an answer. Tesla did not response to an interview request.

According to Calma (2023), Tesla sources its cobalt for batteries from Glencore, a company that, according to the nonprofit Business and Human Rights Resource Centre (BHRRC) (2024), has the highest number of human rights abuse allegations related to clean energy. According to Summer (2024) and Ohnsman (2024), after Tesla faced allegations of child labour in its cobalt supply chains, the company refused to commission a third-party audit of its cobalt supplier. Instead, Elon Musk, owner of Tesla, suggested installing a live camera within the mine, which according to the most recent available Tesla's most recent Impact Report (2023, p. 117), (the most recent available at the time this research was written), was installed at the Kamoto Copper Company (KCC) in DRC. However, the promised live video feed has been replaced by a single satellite image, captured monthly by an Airbus satellite. The image resolution is so low that only the process facility is visible, making it impossible to determine whether children are present in the mine. (Summer, 2024; Ohnsman, 2024)

In 2023, 984 supplier facilities completed Tesla's Self-Assessment Questionnaire. 156 suppliers underwent audits of which 96 % comply with Tesla's Supplier Code of Conduct and 4 % are working on corrective actions. (Tesla, 2023, p. 113-114) 2023 was the first year, that the company utilized responsible sourcing due diligence policies to their guidelines of internal Global Procurement Policy supplier selection. (Tesla, 2023, p. 132) Tesla is heavily relying on their suppliers to respond honestly to their SAQ surveys and act according to their Supplier Code of Conduct. Tesla will focus further investigation based on supplier practices and prioritize due diligence on high-risk suppliers only. Tesla supports its suppliers in improving supply chain visibility and addressing policy gaps. (Tesla, 2023, p. 133)

On 18th of January 2023, the first battery passport pilots were introduced at the World Economic Forum in Davos. The pilots were done as a collaboration between Glencore, LG Energy Solution and Tesla. According to the pilots' results, the whole of the battery supply chain is traceable, as 100 % of the cobalt is originating from the Glencore Kamoto Copper Company (KCC) in DRC. (Re-Source. 2024) As Table 2 presents, the pilots results may be seen questionable, as KCC has been accused of having the highest number of human rights abuse allegations related to clean energy (Calma, 2023). Also, NGOs have raised concerns over Tesla's and Glencore's involvement in the battery passport scheme, as both companies have been accused of human rights violations while contributing to the development of the initiative. Critics argue that this creates a conflict of interest, potentially allowing companies to verify their own practices without independent oversight, which could potentially weaken the credibility of the initiative. (Jolly, 2023)

Table 5 Tesla Cobalt Risk Prioritizing

Category	Criteria/Indicators	Description	Requirement Level	Implementation	Other
Zero-Tolerance Issues	Forced labour, child labour, human trafficking, modern slavery	Tesla strictly prohibits any form of forced labour, child labour, human trafficking, and modern slavery within its supply chain	Non-negotiable	Suppliers are contractually obligated to adhere to Tesla's policies, including the Supplier Code of Conduct and Human Rights Policy. Violations may lead to termination of the business relationship	
Issues of Concern	Complex supply chains, upstream sourcing challenges, lack of full traceability	Tesla acknowledges the challenges in tracing materials through complex, multi-tiered supply chains, especially for upstream suppliers	Requires mitigation	Tesla requires suppliers to establish due diligence frameworks and management systems consistent with OECD guidelines to address these challenges	
Labour and Human Rights	Workplace rights, fair wages, working hours, health and safety, freedom of association, non-discrimination	Tesla emphasizes the importance of ethical treatment and protection of worker rights throughout its supply chain	Mandatory	Suppliers must comply with Tesla's Supplier Code of Conduct and Human Rights Policy, which outline expectations for labor practices and human rights	
Certification	OECD-aligned due diligence, third-party assessments, industry initiatives	Tesla adheres to international norms for responsible sourcing of raw materials	Mandatory for relevant suppliers	Suppliers are expected to engage in due diligence practices aligned with the OECD Due Diligence Guidance for Responsible Supply Chains	
Traceability	Supply chain mapping, identification of upstream sources, data collection via supplier disclosures	Tesla works to improve traceability, especially for cobalt and other critical battery minerals. How?	Ongoing	Tesla collaborates with suppliers to trace raw materials back to mines and processing facilities where possible	
Risk Assessment	High-risk countries, artisanal mining, corruption risk	Tesla acknowledges upstream human rights risks, but provides fewer specific criteria than other companies included in this research	Ongoing	Suppliers must assess their own risks. Tesla oversees and expects risk-based mitigation	
Risk Criteria					Tesla discloses less detailed information about specific risk criteria (high-risk countries, risk scoring tools). Risk evaluation appears to rely more on general principles and supplier responsibility, than company's own criteria
Supplier Self-Assessment Questionnaire	Lack of due diligence systems, poor SAQ results	Risk is based on how well a supplier can demonstrate alignment with Tesla's standards	Mandatory	Tesla uses supplier self-assessments and onboarding procedures	
Additional Background Screening	Tesla screens suppliers for red flags (negative media reports, complaints from NGOs, communities, or workers, and audit its findings	Red flag suppliers may be subjected to extra scrutiny	Required for high-risk suppliers	Includes training, supplier engagement	

Source: Tesla, 2024.

4.6.2 Polestar

Polestars are manufactured by Volvo Cars and Geely. By the end of 2023, the supply chains of Polestars covered 747 direct material suppliers, of these 586 suppliers were located in high-risk regions. The company uses a Responsible Business Alliance (RBA) tool to identify high-risk regions for labour rights violations. (Polestar, 2023, p. 12) All potential suppliers must comply with Polestar's Code of Conduct for Business Partners, which includes due diligence measures

such as self-assessment questionnaires (SAQs). Suppliers must score above 70 % on the SAQ to qualify. Additional checks include trade sanctions screening and evaluation of ethical principles. Furthermore, all new suppliers operating in high-risk regions are required to undergo a third-party on-site human rights audit. However, this audit is limited to tier 1 and tier 2 suppliers only. (Polestar, 2024, p. 11) According to Polestar's 2024 Modern Slavery Statement (2023), only 45.8% of its suppliers in high-risk areas have undergone third-party on-site human rights audits, despite such audits being a stated requirement for supplier approval. (Polestar, 2023, p. 11-12) Due to the data openly provided by Polestar and the fact that Polestar does not specify which suppliers produce components for multiple vehicle models, this calculation does not account for the possibility that some supply chains share the same component suppliers.

Polestar communicates openly about their supply chain sustainability on their website. They also highlight the importance of the collection of minerals from mines, without using forced labour and child labour. They talk about their due diligence and how they asses their suppliers. (Polestar, n.d. a) In their Code of Conduct for Business Partners (Polestar, n.d. b), Polestar emphasizes the importance of working conditions and states that all human rights requirements must be met for a business relationship to continue. Under no circumstances does Polestar accept the employment of children under the age of 15 (or 14 were permitted by national law), or below the country's legal minimum age if it is higher. (Polestar, n.d. b), However, Polestar provides no evidence or data to demonstrate how it ensures that neither forced nor child labour is involved in cobalt extraction or refining. Additionally, there is no mention of third-party assessments on the matter. According to Stevens (2022), all cobalt used in Polestar's vehicles is traceable.

Polestar acknowledges risk related to critical minerals supply chains such as cobalt and rely on blockchain technology-based traceability by collaborating with Circulor, a traceability-as-a-service provider. According to Polestar (2024) technology-based supply chain visibility will revolutionize and create new standards for the traceability from raw materials to finished products. (Polestar, 2023, p. 14) As a result of advancements in blockchain technology, Polestar (and Volvo) will introduce their own battery passport for all BEV and PHEV vehicles by 2027. This initiative aims to ensure compliance with the EU Battery Regulation, which mandates that all EVs sold in EU are equipped with battery passport starting from February 2027 onwards. (Carfrae, 2024; Autocar, 2024)

Polestar did not reply to an interview request for this research.

Table 6 Polestar risk prioritizing

Category	Criteria/Indicators	Description	Requirement Level	Implementation
Zero-Tolerance Issues	Forced and child labour, human trafficking, modern slavery	Severe violations. Zero-tolerance, will lead to disqualifying of supplier	Non-negotiable.	Prohibited under the Code of Conduct; suppliers must prevent forced/child labour at all levels
Issues of Concern	Complexity of supply chains, unclear auditing beyond Tier 2, lack of proof of forced labour prevention in cobalt sourcing	Risks present due to limited audit scope and lack of verification in raw material sourcing	Requires mitigation	Due diligence policies in place, but practical enforcement beyond Tier 2 is unclear
Labour and Human Rights	Workplace rights, fair wages, working hours, health and safety, freedom of association, non-discrimination	Ethical treatment and protection of worker rights are core requirements	Mandatory	Policies must align with the Code of Conduct for Business Partners
Certification	OECD-aligned due diligence, third-party audits	Suppliers in high-risk areas must undergo third-party audits to assess adherence to standards	Time-Bound and Mandatory for high-risk regions	Only 45.8% of Polestar suppliers in high-risk areas have undergone third-party on-site human rights audits, despite such audits being a stated requirement for supplier approval
Traceability	Registration of Source, Transaction Logs, Lot-Receipts, Plant Visits. Blockchain-based supply tracking (e.g., Circulor)	Transparency from mine to final product using tech-based tools	Ongoing	Polestar claims full traceability for cobalt; supports traceability innovation
Risk Assessment	Country risk assessment using RBA tool, supplier evaluation	Identification of labour risks in supply chains, especially in high-risk countries	Continuous and risk-based	High-risk suppliers identified using RBA tool; 586 direct material suppliers out of 747 suppliers located in high-risk zones
Risk Criteria	Based on a RBA framework, linked to human rights risks	High-risk countries flagged using RBA´s labour and ethics risk scores	Mandatory for all suppliers	Used to prioritize third-party audits and deeper supplier engagement
Supplier Self-Assessment Questionnaire	>70% score required, due diligence, trade sanctions screening, integrity checks	Evaluation tool for pre-qualification and monitoring of suppliers	Mandatory for all suppliers	SAQ required; suppliers must meet threshold and undergo yearly updates
Additional Background Screening	On-site audits in high-risk zones, only Tier 1 & 2	Third-party human rights audits for new suppliers in high-risk regions	Required for approval in high-risk areas	45.8% of high-risk suppliers audited in 2023. Scope limited to Tier 1 and 2

Source: Polestar, 2023; Polestar n.d. b.

4.6.3 Nissan

Since the launch of Nissan LEAF in 2010, Nissan has been committed to "become a leader in zero-emission vehicles". The company has since the launch promoted EVs, built electric vehicle infrastructure and collaborated with various national and local governments, electric power companies as well as other industries. By early 2030, Nissan will stop producing traditional gasoline vehicles for key markets and only focus on electric vehicles. Nissan aims for closed loop for batteries. They promote the "4R" of Reuse, Resell, Refabricate and Recycle. Depending on the battery condition, batteries will be either reused in BEVs, electric forklifts or industrial storage. (Nissan, n.d. a)

Nissan has developed lithium-iron-phosphate (LFP) batteries, which do not include rare earth metals such as cobalt (Nissan, n.d. b). The company will continue to develop this innovation, which will reduce the amount of cobalt used, and aims to achieve battery cost-effectiveness

comparable to traditional gasoline powered vehicles by 2030 (n.d. c). In January 2025, Nissan announced that they will build a new lithium-iron-phosphate (LPF) factory in Kitakyushu City, Japan (Battery Tech Network, 2025).

Table 7 Nissan Cobalt Risk Prioritizing

Category	Criteria/Indicators	Description	Requirement Level	Implementation	Other
Zero-Tolerance Issues	Forced labour, child labour, human trafficking, modern slavery	Nissan prohibits forced labour, child labour, and human trafficking throughout its supply chain	Non-negotiable	All suppliers must comply with Renault-Nissan Purchasing Way, the Nissan CSR Guidelines and Nissan's Human Rights Policy	Violations may lead to termination of co-operation
Issues of Concern	Complex supply chains, upstream sourcing challenges in traceability in high-risk regions	Tesla acknowledges supply chain risks, especially regarding minerals from high-risk and conflict-affected areas	Requires mitigation	Suppliers must establish due diligence frameworks that follows OECD guidelines	Nissan relies on self-management for suppliers. Limited amount of external verification is revealed publicly
Labour and Human Rights	Workplace rights, freedom of association, fair wages, health and safety throughout supply chains	Nissan emphasizes respect for internationally recognized human rights throughout its supply chain	Mandatory	Suppliers must comply with Nissans human rights principles outlined in Nissan's CSR Guidelines	
Certification	OECD-aligned due diligence, third-party assessments	Nissan refers to compliance with OECD due diligence guidelines for responsible supply chains	Mandatory for relevant suppliers	Nissan encourages suppliers to participate in third-party initiatives, like RMI, but does not require it from its suppliers	No regular third-parry audits on cobalt supply is discussed in publicly available documents
Traceability	Supply chain mapping, upstream source identification	Nissan requires efforts to ensure traceability through supplier disclosures and supply chain mapping	Ongoing	Relies on supplier-provided information. No mention of blockchain nor technological solutions	Less developed traceability tools compared to Polestar
Risk Assessment	High-risk regions, ASM, risk of corruption	Nissan conducts supply chain risk assessments focusing on regions that have been associated with human rights violations	Ongoing	Supplier questionnaires	Limited amount of publicly available information on how cobalt risks are evaluated and prioritized
Risk Criteria	High-risk country sourcing	Nissan uses general principles for risk critera rather than cobalt specified	Ongoing	Suppliers are expected to do self-assessments based on Nissan's guidelines	Risk evaluation is less detailed compared to Polestar
Supplier Self-Assessment Questionnaire	Lack of due diligence systems, policy gaps	Self-assessment questionnaires to evaluate supplier compliance	Mandatory	Corrective action plans may be required after SAQ to identify gaps	No public information on SAQ results
Additional Background Screening	Media rports, NGO complaints, community reports	Red flag suppliers may be subjected to extra scrutiny	Required for high-risk suppliers	Corrective measures or changes in business ties may occur, if risks are found	

Source: Nissan, 2020 p. 152-159.

According to a study by Teikoku Databank (2024), the Japanese automotive industry included a total of 68 485 supply chain companies. Of the suppliers, most (22 334) operate at a Tier 2 level, meaning that they do not directly co-operate with Nissan nor the other investigated automotive companies. 16 040 suppliers operate on Tier 3 or beyond level. (Nippon, 2025)

As shown in Table 4, Nissan does not publicly reveal, how it ensures that its cobalt supply chains operate without forced labour. The company heavily relies on supplier self-assessment and doesn't conduct third-party audits.

Nissan declined an interview for this research.

4.7 NGOs

4.7.1 Amnesty International

Amnesty International has published several articles and researchers (2016; 2017; 2023; 2024a; 2024b) where they accused the cobalt ming industry and local authorities in DRC and the EV industry for utilization of forced labour.

In 2016 Amnesty International's research found, that among others, Nissan and Tesla had failed to take actions to remove child labour from the cobalt mines from where they procured their cobalt. The research found that children as young as seven were mining for cobalt in ASM areas. The research highlighted that ASM miners have a high risk of fatal accidents, serious lung diseases, earning only a dollar a day. (Amnesty International, 2016)

According to research published by Amnesty International in 2024, most EV companies were still not adequately demonstrating compliance with international human rights standards, nor implementing their own policies in practice. Amnesty Internation recognized a trend of ad hoc pace throughout the industry, which shows that legislation is needed to bring about meaningful change. (Amnesty International, 2024a)

The research published in 2024 drew a framework for EV companies human rights due diligence practices in their mineral supply chains (Amnesty International, 2024a). The UN Guiding Principles requires that companies take proactive and ongoing steps to identify and respond to its potential or actual human rights impacts. (OHCHR, 2011) Of the EV companies included in this research, Tesla scored 49/90 points meaning, that they demonstrate moderate level of identifying human rights risks across its mineral supply chains, whereas Nissan only scored 22/90 meaning, that they lack a absent of alignment to the UN Guiding Principles. (Amnesty International, 2024a)

In 2023 Amnesty International published an article where they accused industrial mining of copper and cobalt to cause grievous human rights abuses in DRC as the expansion of industrial-scale cobalt mines have led to forced evictions of local communities from their homes and their farmlands. Local communities in the city of Kolwezi and Kamoa-Kakula, have faced illegal resettlements as they have been forcibly evicted after their houses have been destroyed or burned by soldiers of the Republican Guard. The residents have also faced sexual assaults, arson and beating. (Amnesty International, 2023)

The Democratic Republic of Congo has a central role in the green transition. But as Agnés Callamard from Amnesty International said “the rights of communities must not be trampled in the rush to mine minerals critical to decarbonizing the global economy.” (Amnesty International, 2023)

4.7.2 Campaign Group Rights and Accountability in Development (RAID)

The UK based corporate watchdog Rights and Accountability in Development (RAID) published a report in collaboration with DRC-based African Resources Watch (AFREWATCH) in 2024, which findings challenge the narratives of multinational mining companies promote of ‘clean’ and ‘sustainable cobalt’. The research focuses on industrial cobalt mining in the DRC, and it found that the mining of cobalt has contaminated water supplies, which has affected gynecological and the reproductive health of women in girls. The pollution has also destroyed livelihood for farmers and fishermen. (RAID, 2024, p. 1, 29,77)

The research exposed that cobalt from small-scaled artisanal mining, which has been linked to child labour, had entered EV supply chains. Several major manufacturers - eager to maintain their reputation as responsible EV producers, who are aware of potential risks - promised to take corrective action. (RAID, 2024, p.11)

There is an accelerating interest in sodium-ion batteries, which does not require lithium, cobalt or nickel in its production. (Petavratzi, et al., 2024, p. 4). 28 sodium battery factories are already operating, are planned or are under construction, most of them in China. According to an estimate, China will hold 95 % of sodium battery factories by 2025. However, when looking at the medium term, approximately 57 % of EV cathode demand will still come from battery chemistries, that include cobalt. Therefore, DRC and its cobalt will remain critical to the energy transition. (RAID, 2024, p. 12)

5 DISCUSSION

This study's aim was to anticipate some key effects of the EU Regulation on Forced Labour on cobalt mining for battery production, with a focus on the electric vehicle supply chain. The regulation will take effect on 14 December 2027. This research has sought to answer the following questions 1) Through what kind of mechanisms can the electric vehicle industry ensure that their battery supply chains operate in compliance with the EU Forced Labor Regulation? 2) What are the expected key impacts on the operation of the electric vehicle supply chain?

5.1 Findings Within Presented Literature

DRC is blessed to have enormous amounts of natural resources, but throughout history it has also been a curse. On February 5, 1885, Belgian King Leopold II brutally turned the Congo Free State into personal property, and the Congolese were forced to labour for valuable natural resources such as ivory and rubber (BBC, 2025; National Geographic 2024). The country has been called a geopolitically failed state, and the humanitarian situation is horrible as its resident's face genocide like conflicts (Respondent A, 2025).

Cobalt mining is not only causing human rights violations at the time of the mining. Since cobalt is toxic, it causes a lot of health-related issues. It causes serious harm to the reproductive health of women in girls. Children of women who are working in the mines are at high risk of developing certain birth defects in the eyes, head, mouth and arms. This is likely a result of the mother's exposure to toxic contamination from cobalt mining during pregnancy. Women working in mines also suffer from menstrual disruptions and miscarriages. Long-term exposure to cobalt-containing dust can lead to a serious and potentially fatal lung condition known as hard metal lung disease.

The implementation of forced labour free cobalt should also pay attention to how the local communities in DRC could benefit from their highly valued minerals. Mining companies should give more back to the locals More money, develop local communities, provide education for children so that children wouldn't have to work. And so that parents wouldn't have to decide on if they want to eat that day or send their children to school to get an education.

To fight forced labour, the EU has set a Regulation on Forced Labour, which prohibits products made with forced labour to enter the European market. Although the regulation is a responsibility legislation, it is specifically a product legislation. The regulation is set at EU level so that it obliges all member states to act in accordance with it. This way, the free movement of goods within the

EU is not jeopardized. It was hard for Member States to oppose this regulation, as no one can politically oppose a ban against products made with forced labour.

According to a research published by Amnesty International in 2024, most EV companies were still not adequately demonstrating compliance with international human rights standards, nor implementing their own policies in practice. Amnesty Internation recognized a trend of ad hoc pace throughout the industry, which shows that legislation is needed to bring about meaningful change. (Amnesty International, 2024a) Mining companies are not following the UN Guiding Principles on Business and Human rights as they violate human rights by forcibly evicting local residents for expending open industrial mines. Therefore, EU Forced Labour Regulation is very much needed in order to stop human rights violation in cobalt supply chains in DRC. As legislation seems to be the only way to stop human rights neglections. But how to monitor it?

This question was also raised during an interview with Respondent D (2025). As Member States are responsible for monitoring goods being imported to their own respective countries, the Commission has the aspect as the competent authority and will be responsible for investigations in third countries. A big question is, how the Commission will conduct its researches in third countries, without revealing the mining companies their presence in advance.

The Forced Labour Regulation has a clause, that in certain cases, the Commission has the right to decide, that only the Member States leading authority has the right to decide on if they have received enough indications of forced labour in supply chains or not. The Regulation also excludes critical raw materials from automatically being destroyed, as these product owners/importers companies have the right to provide more evidence on their supply chains working without forced labour. If enough evidence is found, the product will be released for resell. Since the Regulation relies heavily on mutual recognition of findings between Member States, its concrete effects are difficult to predict.

According to the findings, monitoring the upstream of cobalt supply chains in DRC will be difficult since suppliers change rapidly on level Tier 2 upwards. EV manufacturers should show more interest in monitoring their cobalt supply chains on a more rapid frequence than one's or twice a year. If these companies would really want to make an impact, they should put more pressure on the mining companies.

The Forced Labour Regulation and monitoring of cobalt supply chains is a thing that will require a lot of more work. It's impossible to say, when looking at cargo in a ship carrying cobalt, if it has been mined according to the regulation's standards or not. It seems like the pressure needs to

come from consumers to EV manufacturers and from there upstream to the mining companies, miners and local communities. As it looks now, a lot more needs to be done by EV companies. They talk nicely, but the harsh reality is something else. Therefore, the pressure needs to come from consumers.

Companies that are included in this research, and did not participate in this research through interview should provide more proof of their supply chain monitoring. For example, according to Respondent B's knowledge, Umicore does not procure cobalt from Finnish sources. Instead, the company has been linked to the Tenke Furuminge Mine in DRC, which has been criticized for inhumane working conditions. Despite this, Umicore claims only to procure cobalt from ethically operating mines.

5.2 Contribution to Research

This study contributes to existing research by bringing a clear Finnish perspective to the discussion on human rights violations in the global supply chains of cobalt for electric vehicle batteries. While many existing studies address general EU-level or international dynamics in supply chains, this study highlights how Finland, both as an EU Member State and a key player in the raw materials sector, interprets and prepares for the implementation of the EU Forced Labor Regulation.

The research provides a forward-looking analysis by anticipating some of the potential legal, ethical, and logistical implications of the Regulation on cobalt supply chains. The multi-dimensional approach of the study enriches the existing academic debate on sustainable sourcing and the impacts of regulation. The study also draws on the UN Guiding Principles on Business and Human Rights, with particular emphasis on corporate due diligence. By connecting these principles to existing traceability practices, this research addresses the challenges companies face in verifying the ethical origin of critical raw materials, such as cobalt. This research also addresses new methods of tracing critical minerals, such as a new technique on geo-fingerprint of raw materials.

By combining ethical, scientific, an legal insights, this thesis provides an interdisciplinary contribution to existing research, that underscores both limitations of current tools and current mechanisms to remove forced labour from global cobalt supply chains. The thesis highlights the need for better corporate practices, more robust regulatory mechanisms, and continued research on verification methods.

5.3 Limitations of the Study

No EV manufacturers, cobalt refining companies nor NGOs were willing to give an interview for this research. This can also be seen as a result, as it seems like no one wants to speak the truth about their cobalt supply chains. Either they don't have the answers, or they don't want to tell what is actually happening in their supply chains. It is just easier to write beautiful words in their responsibility publications. Of the three EV companies investigated, Polestar seems to be the only one who is able to trace its entire cobalt supply chain. The reality, however, might be something else.

Unfortunately, the planned NGO interviews were also left out, due to no response on several interview requests. NGO reports have however been analyzed.

The interview sample size in this research is small, but it represents a wide range of different experts in their own fields. This gives the research a solid variation. However, if the research were to be done again, the result could vary depending on the sample size, who would be interviewed and from which countries perspective they are talking.

5.4 Future Research

Future research could explore how companies using cobalt in their EV batteries might contribute positively to the lives of local communities in the DRC. This could increase strategies for lobbying local governments and authorities, as well as measures to prevent armed groups such as M23 from profiting from the inhumane conditions in cobalt mines. A natural follow-up study would be to investigate, how companies in the EV industry are actually preparing to meet the EU Forced Labour Regulation.

Another important area for future research is cobalt mining in Finland, where 209 cobalt occurrences have been identified, 87 of which list cobalt as a primary element. Future studies could either examine the potential to expand mining capacity or assess the environmental impact of planned mining projects. The supply chain from extraction to refining, both domestically and internationally, would also need a deeper investigation. Especially the new battery factory, that is being built in Kotka, could be investigated.

Future research should also consider the human rights of Sámi Indigenous people, whose traditional lands, livelihoods, and cultural practices are increasingly threatened by expanding mining operations.

Looking from a marketing perspective, future research could be done around, if consumers would be willing to pay a bit more for an EV that's battery's cobalt would 100% be originating from ethically operating cobalt mines. Ofcourse, the whole supply chain would be free of human violations.

6 CONCLUSION

According to the findings of this research, it will be difficult to monitor the entire cobalt supply chain used in EVs, as suppliers change frequently, and EV manufacturers currently inspect their suppliers only once a year or, in some cases, every two years. This cycle should be significantly shortened, ideally to at least once every six months. However, increasing the frequency of audits would require additional resources, leading to higher costs for EV companies. Still, could this be seen as a benefit for consumers? As awareness of ethical concerns evolving around consumption grow, starting with electric cars and extending to how they are produced, consumers may begin to demand higher standards of transparency and accountability.

The actual impact of the EU Forced Labour Regulation remains uncertain, as there are still unresolved questions regarding communication, monitoring, and inspections both within EU member states and in third countries. Nevertheless, the regulation is a crucial step, as forced labour is, unfortunately, still widespread. By requiring companies to audit their supply chains more thoroughly, we may begin to see improvements over time.

Although EVs are marketed as a more sustainable alternative to traditional gasoline-powered vehicles, the reality is more complex. Battery supply chains have been linked to serious human rights violations. The green transition cannot focus solely on reducing emissions; it must also address human rights and ethical sourcing if it is to be truly sustainable.

By improving the monitoring of cobalt supply chains, through more frequent audits, site visits, and stricter requirements for suppliers across all Tier levels, EV manufacturers have the potential to make cobalt sourcing more ethical and human centred. Still, the full impact of the EU Forced Labour Regulation on cobalt supply chains for EVs remains difficult to predict, as its practical implementation is not yet clear.

6.1 Critical Assessment of the Research

The research topic has proven to be increasingly interesting as the research has progressed, which has at times led to challenges in maintaining a narrow and clearly defined research area. The thematic complexity and broad social importance of green transition, ethical sourcing and forced labor risks in cobalt supply chains made it attractive to explore the topic beyond the original research boundaries. As a result, the scope of the material could occasionally dilute the core focus.

One of the main limitations of the research is the lack of participation of key stakeholders, such as NGOs, EV manufacturers and cobalt refiners. Their absence limits the depth of analysis and

the ability to present a more balanced or triangulated view on the research topic. By including these perspectives in the research would have enriched the results, especially in terms of industrial responsibility and practical responses to the upcoming EU Forced Labour Regulation.

Despite these limitations, the study provides valuable insights into the ethical challenges of cobalt supply chains and lays the foundation for future work that could build on these findings by involving a broader range of stakeholders.

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Appendix 1 Interview Guide

Interview 1

Interviewee: Respondent A

Human rights researcher

Interviewer: Jenni Karsten-Laitinen

Time: Monday 24.3.2025 at 1-1.30 pm

Type: Semi-structured

Introduction (3-5 min)

1. Thank you for participating in the research. We have 30 minutes for this interview. Is it OK that I record and transcribe? The recording will be destroyed once the thesis has been approved.
2. Before we dive into the interview questions could you share a bit about your research focus and how it relates to topics like responsible mineral sourcing, forced labour in supply chains, or human rights due diligence frameworks?
3. I am investigating the mining of cobalt in DRC for the needs of the electric car industry, which has been accused of human rights violations, and the EU's upcoming forced labor directive. My research also deals with the mining of cobalt in Finland, the further processing of domestic and imported cobalt. It is undeniable that to curb climate change, the automotive industry must shift more to electric vehicles. This goal supports the EU's Green Deal program, which has set a goal that all new cars registered from 2035 are intended to be emission-free.

Key questions (20-22 min)

The green transition and resource governance (8 min)

1. What do you see as the biggest ethical challenges of sourcing critical minerals like cobalt for the green transition, including the electric vehicle industry? How do you see the role of legal and voluntary mechanisms in governing these in global supply chains?
    - Do you think that current EU frameworks (e.g. Green Deal, Critical Raw Materials Act – which doesn't include cobalt) can adequately address human rights and environmental risks?

Indigenous rights and extractive industries (7 min)

1. In Finland, in relation to mining – what do you consider the most salient human rights risks?
2. When thinking of mining in Finland, are indigenous people's rights (Sámi) considered in natural resource governance and in accordance with for example the UNGPs?
    - Does the current legal framework ensure meaningful participation and consent in mining projects?

Corporate responsibility and law (7 min)

2. In your opinion, could **corporate due diligence laws** (like the EU's Corporate Sustainability Due Diligence Directive) provide **strong enough mechanisms** to prevent human rights violations in global supply chains, including cobalt from the DRC?
    - What could be improved?

Snowballing and Wrap-Up (3-5 min)

3. Who else would you recommend I speak to regarding:
4. Cobalt supply chains (DRC–Finland)?
5. Human rights and corporate responsibility in resource extraction?

6. Indigenous rights and mining in Finland?
7. Are there any key reports, projects, or case studies I should explore further?

Interview 2

Interviewee: Respondent B

Finnish geological researcher

Interviewer: Jenni Karsten-Laitinen

Time: Wednesday 2.4.2025 at 15-16

Type: Semi-structured

Language: Finnish

Aloitus (2–3 min)

1. Kiitos osallistumisesta tutkimukseen. Haastatteluun on varattu 55 minuuttia. Sopiiko, että tallennan ja litteroin haastattelun? TAI sopiiko, että äänitän haastattelun? Tallenne tuhotaan, kun gradu on hyväksytty.
2. Voisitko kertoa hieman taustastasi ja nykyisestä roolistasi GTK:lla, erityisesti siltä osin, miten työsi liittyy mineraalisten raaka-aineiden toimitusketjuihin, vastuullisuuskysymyksiin ja esimerkiksi koboltin alkuperään liittyvään seurantaan?
3. Tutkin siis koboltin louhintaa Kongossa sähköautoteollisuuden tarpeita varten, siihen liittyviä ihmisoikeusloukkauksia, sekä EU:n tulevaa pakkotyövoimadirektiiviä. Tutkimukseni käsittelee myös koboltin louhintaa Suomessa, sekä kotimaisen ja maahantuonnin koboltin jatkojalostusta. On kiistatonta, että ilmastonmuutoksen hillitsemiseksi autoilun on siirryttävä enemmän sähköautoiluun. Tätä tavoitetta tukee EU:n **vihreän kehityksen ohjelma**, joka on asettanut tavoitteeksi, että kaikki uudet rekisteröitävät autot vuodesta 2035 on oltava päästövapaita.

Kobolttivarannot Suomessa ja niiden merkitys (12 min)

4. Millaisia kobolttivarantoja Suomessa on ja missä niitä esiintyy?
5. Millainen on Suomen kobolttivarantojen merkitys globaaleihin tarkoituksiin nähden?
6. Millaisia haasteita ja mahdollisuuksia näet kotimaisen tuotannon kasvattamisessa?
    a. Kannattavuus (taloudellinen ja ympäristöllinen näkökulma)
7. Voiko Suomi profiloitua vastuullisena koboltintuottajana globaalisti?
8. Onko sähköautojen yleistyminen ja yleisestikin sähköistyminen on vaikuttanut kiinnostukseen Suomen koboltti esiintymiä kohtaan?

Vastuullinen kaivostoiminta Suomessa ja globaalissa kontekstissa (15–20 min)

9. Miten Suomessa varmistetaan kaivostoiminnan vastuullisuus (ympäristö, yhteisöt, ihmisoikeudet)?
10. Miten GTK tukee kaivosalan yrityksiä vastuullisuuden ja ESG-kysymysten kehittämisessä?
11. Miten EU:n Green Deal, akkustrategia ja kriittisten raaka-aineiden sääntely vaikuttavat Suomen koboltin tuotantoon?

Jäljitettävyys ja toimitusketjut (5–7 min)

12. Miten hyvin kotimaisen koboltin jäljitettävyys toimii?

Omavarainen Eurooppa

13. Suurimmat koboltin esiintymät löytyvät Kongosta, Suomessa on havaittu olevan Euroopan suurimmat varannot
14. Onko Euroopalla mahdollisuutta olla omavarainen, kun kyse on kriittisistä mineraaleista, etenkin koboltista?
15. Miltä GTK:n näkökulmasta näyttää koboltin ja kriittisten mineraalien kenttä Suomessa tulevaisuudessa?

16. Mitä innovaatioita tai uusia teknologioita pidätte erityisen lupaavina vastuullisuuden näkökulmasta?
17. Onko vielä jotain, mitä haluaisitte tuoda esille?

Interview 3

Interviewee: Respondent C

Senior representative from an industry advocacy organization

Interviewer: Jenni Karsten-Laitinen

Time: Thursday 27.3.2025 at 9–9.30

Type: Semi-structured

Language: Finnish

Aloitus (2–3 min)

1. Kiitos osallistumisesta tutkimukseen. Haastattelu kestää n. 30 min. Sopiiko, että tallennan ja litteroin haastattelun? TAI sopiiko, että äänitän haastattelun? Tallenne tuhotaan, kun gradu on hyväksytty
2. Voisitko ennen varsinaisia kysymyksiä avata lyhyesti omaa työtäsi ja sitä, miten Teollisuusliitossa olette olleet mukana edistämässä vastuullisia toimitusketjuja ja torjumassa pakkotyötä esimerkiksi kriittisten raaka-aineiden tuotannossa?
3. Tutkin siis koboltin louhintaa Kongossa sähköautoteollisuuden tarpeita varten, siihen liittyviä ihmisoikeusloukkauksia, sekä EU:n tulevaa pakkotyövoimadirektiiviä. Tutkimukseni käsittelee myös koboltin louhintaa Suomessa, sekä kotimaisen ja maahantuodun koboltin jatkojalostusta. On kiistatonta, että ilmastonmuutoksen hillitsemiseksi autoilun on siirryttävä enemmän sähköautoiluun. Tätä tavoitetta tukee EU:n **vihreän kehityksen ohjelma**, joka on asettanut tavoitteeksi, että kaikki uudet rekisteröitävät autot vuodesta 2035 eteenpäin on oltava päästövapaita.

Suomen ja Teknologiateollisuuden rooli koboltin toimitusketjuissa (5 min)

4. Miten Kaivosteollisuus näkee Suomen aseman globaalissa koboltin toimitusketjussa?
    - Miten tärkeää koboltti on suomalaiselle teknologiateollisuudelle?
    - Miten suuri osa koboltista tulee kotimaasta ja kuinka paljon tuodaan esimerkiksi Kongosta?

Vastuullisuus DRC:n toimitusketjuissa ja pakkotyö (10 min)

Useiden tutkimusten mukaan Kongon koboltti kaivoksilla rikotaan ihmisoikeuksia mm. pakkotyövoimaa ja lapsityövoimaa käyttäen. Tätä tapahtuu sekä pienimuotoisilla käsiteollisilla kaivoksilla, että suurilla teollisuuskaivoksilla.

5. Miten Teknologiateollisuuden jäsenyritykset hallitsevat vastuullisuusriskejä, (kuten pakkotyötä eritysesti) Kongon koboltin louhinnassa?
    - Miten toimitusketjun läpinäkyvyys varmistetaan, kun pienistä ja isoista kaivoksista louhittua kobolttia sekoitetaan keskenään?
    - Mitkä ovat suurimmat haasteet koboltin alkuperän jäljittämisessä?
6. EU:n pakkotyövoimadirektiivi astuu voimaan joulukuussa 2027.
    - Miten Teknologiateollisuuden jäsenet valmistautuvat sen vaatimuksiin?
    - Millaisia käytännön vaatimuksia direktiivillä voi olla koboltin hankintaan?

Kotimaisen tuotannon merkitys ja mahdollisuudet (7 min)

7. Millainen rooli kotimaisella koboltin kaivostoiminnalla ja jalostuksella on Suomen toimitusketjujen vastuullisuudessa?
    - Voiko Suomi profiloitua globaalisti vastuullisena koboltin tuottajamaana?

Tulevaisuuden näkymät ja yhteistyö (5 min)

8. Mitä lisätoimenpiteitä tarvitaan, jotta koboltin toimitusketjut olisivat aidosti vastuullisia EU:n pakkotyövoimadirektiivin astuessa voimaan?
    - Miten viranomaiset, yritykset ja kansalaisjärjestöt voisivat parantaa yhteistyötään näiden tavoitteiden saavuttamiseksi?

Lopetus (2–3 min)

9. Onko jotain, mitä vielä haluaisit nostaa esille?
10. Kiitos ajastasi ja asiantuntemuksestasi!

Interview 4

Interviewee: Respondent D

Official from the Ministry of Economic Affairs and Employment

Interviewer: Jenni Karsten-Laitinen

Time: Friday 28.3.2025 at 10-11 am

Type: Semi-structured

Language: Finnish

Aloitus (5–10 min)

1. Kiitos osallistumisesta tutkimukseen. Haastattelun on varattu 60 min. Sopiiko, että äänitän ja litteroin haastattelun? TAI sopiiko, että äänitän haastattelun? Tallenne tuhotaan, kun gradu on hyväksytty.
2. Taustakysymykset:
    - Voisitko lyhyesti kertoa taustastasi ja nykyisestä roolistasi Työ- ja elinkeinoministeriössä?
    - Miten työsi liittyy yritysvastuuseen, pakkotyön torjuntaan ja vastuullisiin toimitusketjuihin?
    - Oletko ollut mukana EU:n pakkotyödirektiivin tai muiden vastaavien sääntelyaloitteiden valmistelussa? Jos kyllä, millä tavoin?
3. Tutkin siis koboltin louhintaa Kongossa sähköautoteollisuuden tarpeita varten, siihen liittyviä ihmisoikeusloukkauksia, sekä EU:n tulevaa pakkotyövoimadirektiiviä. Tutkimukseni käsittelee myös koboltin louhintaa Suomessa, sekä kotimaisen ja maahantuonnin koboltin jatkojalostusta. On kiistatonta, että ilmastonmuutoksen hillitsemiseksi autoilun on siirryttävä enemmän sähköautoiluun. Tätä tavoitetta tukee EU:n **vihreän kehityksen ohjelma**, joka on asettanut tavoitteeksi, että kaikki uudet rekisteröitävät autot vuodesta 2035 on oltava päästövapaita.

EU:n pakkotyödirektiivi ja sen vaikutukset (12–15 min)

4. Miten kuvailisit EU:n pakkotyödirektiivin keskeisiä tavoitteita ja vaikutuksia yrityksille, etenkin yrityksille, jotka toimivat Suomessa?

5. Miten direktiivi liittyy muihin EU:n sääntelyaloitteisiin, kuten yritysten sosiaalisen vastuun (CS3D) lainsäädäntöön tai kestävän kehityksen raportointivaatimuksiin?

6. Miten pakkotyödirektiivin täytäntöönpano etenee tällä hetkellä Suomessa?

    - Millaisia haasteita tai erityiskysymyksiä liittyy sen kansalliseen soveltamiseen?

7. Miten arvioisit direktiivin vaikuttavan kriittisten raaka-aineiden, kuten koboltin, toimitusketjuihin ja niiden valvontaan EU:n alueella?

8. Millä tavalla viranomaiset Suomessa tulevat valvomaan tai varmistamaan pakkotyötä koskevien sääntöjen noudattamista toimitusketjuissa?

Koboltin toimitusketjut ja vastuullisuus Kongon näkökulmasta (15–20 min)

9. Millä tavoin EU ja Suomi pyrkivät varmistumaan, että kriittisten raaka-aineiden, kuten koboltin, toimitusketjuissa ei käytetä pakkotyövoimaa?

10. Miten pakkotyödirektiivi voisi/tulee vaikuttaa/vaikuttamaan yritysvastuukäytäntöihin ja due diligence -velvoitteisiin koboltin hankinnassa?

11. Miten näette pakkotyöhön liittyvien riskien kartoittamisen ja hallinnan toimivan käytännössä suomalaisyrityksissä, jotka ovat osa globaaleja toimitusketjuja?

    - Näetkö tässä ongelmia?

Tulevaisuuden kehitysnäkymät ja yhteistyö (5–10 min)

13. Miten Suomi tekee yhteistyötä muiden EU-maiden tai kansainvälisten toimijoiden kanssa pakkotyön torjumiseksi toimitusketjuissa?

14. Mitkä ovat suurimmat haasteet tai esteet, joita näette pakkotyödirektiivin tehokkaassa täytäntöönpanossa?

15. Miten arvioitte direktiivin vaikuttavan suomalaisyritysten kilpailukykyyn tai toimintaympäristöön pitkällä aikavälillä?

16. Mihin suuntaan uskot, että EU:n ja Suomen yritysvastuusääntely kehittyy tulevaisuudessa kriittisten raaka-aineiden ja pakkotyön näkökulmasta?

Lopetus (5 min)

17. Onko jotain, mitä haluaisitte erityisesti korostaa tai tuoda esiin liittyen pakkotyöhön, vastuullisiin toimitusketjuihin tai koboltin tuotantoon DRC:ssä?

Appendix 2 Interview Analysis

Respondent A interview, 24.3.2025

Language: English

Location: Teams

Color code	Category	Topic	Key elements	Interpretation
Blue	Geographical	Environmental issues	• Mining is polluting • Mineral exploitation • Dispossessing of land	Heavy for the environment
		Social issues	• Intertwined with environmental issues	Environmental impacts have an impact on local communities
		DRC	• Geopolitically failed state • Conflicts linked to genocide • High-risk country • Not operating according to safety regulations • No monitoring • Mines in the middle of forests • Voluntary legislation	No one monitors
Red	Social considerations	Child Labour	• No monitoring • Knows about upcoming monitoring	No continued third-party monitoring
		OECD guidelines EU Corporate Sustainability Due Diligence Directive	• Companies and miners promote fake solutions • Could be a part of the problem • Have companies implemented OECD guidelines in the first place? • Legal system that operates in an illegal way in order to legitimate the entire process	• Legitimises the illegal activities to an extent that gives an appearance of legitimacy • Sceptical on how voluntary mechanisms will work • Sceptical that the guidelines are not addressing the structural problems • Creating ecological arms • Does not address a structural problem because it is legitimating a corporate model that exploits natural resources from the local communities • The legal model does not address the structural issues

Purple	Motivation	China and western countries	• Play by the same rules • Want to exploit natural resources • Because of the new regulations (FLD), we ask more of European companies	• Interviewee hopes that due to the upcoming regulations, European companies will act more due diligently • And hopes that Chines companies will do the same in order to stay on the EU market
Yellow	Risks	Finland	• Environmental risks • Mining exploitation • Two UN Committee decisions from 2024 that state that the state of Finland had violated the rights of the Sami people by allowing permits for exploration and reservation on submissions • UN Committee decided that these exploration and reservation permits were actually violating human rights • Interviewee sees clearly how exploitation will cause social and environmental injustices	• Green Deal asking to fast tracking permit processes might cause human rights violations • This is the case in Finland as well
Green	The future	EVs	• Necessary, but they are a false solution in a way • EVs are built on the same way as old cars in extractivism	• When does the EV market become a good market for greenwashing? • People believe that they are doing the right thing, when they are actually just continuing to do the same worst thing (to humans and the environment) by purchasing them • So, it's an old problem just perpetuating

Respondent B interview, 2.4.2025

Language: Finnish

Location: Teams

Color code	Category	Topic	Key elements	Interpretation
		Cobalt in Finland	• 209 cobalt occurrences, where cobalt is listed as a valuable component • In 87 of these occurrences, cobalt is classified as one of the primary valuable elements • In 122 occurrences, cobalt is present among the secondary or subordinate valuable elements • Marked as the main valuable element in only 13 occurrences in Finland • Estimated that there are 186 000 tons of unidentified cobalt occurrences in Finland • These occurrences are located from the face of the earth to up to 2 km deep underground. Distributed across the country • When the Finnish battery strategy was first published in 2007, there was no mention of batteries or minerals. Today, batteries and minerals are the main topic of the strategy • Approximately 10 % of global cobalt is refined in Finland • Refineries doesn't utilize cobalt mined in Finland	• Cobalt is usually not the most valuable element in mineral occurrences • Best way to increase cobalt production would be to increase the production of the Terrafame Sotkamo mine, as it has the largest cobalt reserves • Refineries import cobalt
		Self-sufficient Europe	• Impossible • An exception might be feldspar, which was listed as a critical raw material for the first time during the previous listing. • Feldspar is one of the most common minerals in the earth's crust. It is used for ceramics • The aim has been set, that by 20230 Europe would mine 1/10 of all critical minerals from their own land • • According to estimates, by 2030 cobalt demand for batteries would be 54 000 tons annually. • Cobalt mines in EU produce 1000 tons annually, and not even all of this is possible to refine	The notion that the EU could produce one-tenth of the strategic minerals it consumes by 2030 appears highly unrealistic. The interviewee expresses scepticism regarding this target. He estimates that by 2030, the EU's demand for cobalt for battery production alone will amount to approximately fifty-four thousand tonnes per year. • The aim is that by 2027 90% of cobalt from used batteries would be re-used.

Blue	Geographical		• An GSEU-project estimated, that EUs cobalt reserves would be 120 000 tons at the moment • • With this demand and these reserves, the amount would only last two years, as the annual demand is 54 000 tons	• The interviewee, however, doesn't seem to believe that Europe will be self-sufficient by this time and with the help of circular economy For this reason, there is no way EU can be self-sufficient in cobalt production
		Self-sufficient Finland	• Finland is not self-sufficient in any minerals that are mined here • Although nickel, copper, and zinc are all produced in Finnish mines, a significantly larger amount of these metals are imported into Finland as concentrates, than are produced domestically	Finland is by no means self-sufficient in the production of several metals. Chromium is an exception. It is produced at the Kemi mine
Red	Social considerations	Responsible cobalt sourcing in Finland	• No forced labour • No mining by hand as mining is done with the help of machines • Shorter supply chains, as cobalt can be shipped from Finland directly to Belgium to be refined. > cobalt from DRC is shipped to China and then to Belgium to EV factories • No-one wants to have a mine on their backyard. For example, because of the noise the mine produces and because an operating mine could according to someone color the ski trails brown	• Shorter supply chains • Mining permits aim to manage things to well that these kinds of environmental problems don't arise • There will never be a way of doing thing so good that nothing will ever happen • Electrification is in no way a final or blissful solution, and if it causes a horrendous increase in mining activity, that will cause carbon dioxide emissions and other emissions. • Electrification is a complex issue
		Existing mines in Finland	• Environmental aspects: • Terrafame hiilineutraali 2029 mennessä • Terrafame mine and refinery locations are right next to each other. Which leads to shorter supply chains • Talvivaara, which was bankrupted, caused the worst environmental problem in the history of Finnish mining, as wastewater and mine water got into the environment • The concentration of the material that they are mining in Terrafame mine in Sotkamo is so low, that they have to mine incredibly large quantities of it. • They use bio-leaching heaps, and the mining activities cause incredible heaps of waste rock.	

			• It is not environmentally friendly in any way (mining operations)	
Purple	Motivation	EU Green Deal	• It is acknowledged that critical battery minerals are needed • At the same time mines are also expected to meet increasingly strict environmental standards, in order to minimize the risk of environmental damages • Environmental damages will accrue despite the strict standards	
Yellow	Risks	New mines	• Price volatility • Starting a new mine takes approximately 20 years • Umicore, sustainability programs. How can they be sure that they don't purchase cobalt that is produced with forced and child labour?	Cobalt is produced as a side product, so price volatility on cobalt doesn't hurt mining companies
		Projects	Finnish GTK has had two separate projects (BATTRACE and MaDiTraCe), where they have investigated composition-based traceability of battery metals, minerals and materials. • In BATTRACE, they only investigated Finnish cobolt • MaDiTraCe included both domestical and international cobalt samples The problem is, that cobalt ore can be processed in many ways, which will change its fingerprint	Composition-based traceability is in its initial elements, as it hasn't been research much, at least not for battery materials, prior to the BATTRACE project. • The fingerprint used for traceability may be altered during processing, particularly since cobalt traceability cannot rely on isotopic composition in the same way as lithium traceability. • Nevertheless, the main finding of these studies is that the trace element composition of the ore and the isotopic ratio of sulphur appear to remain relatively well preserved throughout cobalt processing Comparing sample analyses to known deposit compositions allows for tentative origin tracing. However, overlapping deposit signatures and material mixing significantly limit accuracy. Consequently, composition-based cobalt traceability remains unsuitable for mass production.
			• Currently only two operating cobalt mines: Terrafame in Sotkamo and Boliden in Kevitsa	• Cobalt is not the main mineral that is mined in these mines either

Green	The future	Mines	• Terrafame Kolmisoppi deposit was granted strategic project status under the EU's Critical Raw Materials Act • Kolmisoppi could produce cobalt fast, as there already is an existing mine • Is cobalt needed in 10 years' time? Or has new technology been developed that doesn't need cobalt? • The interviewee mentions that hydrogen, that is produced from water, would be maybe the most environmentally friendly way of powering cars	• Production can be increased only according to current permits • Minerals intelligence tries to do future scenarios
		Sustainability	• Traceability would be a great thing if it would work well. Then responsible operators would have a competitive advantage • Especially if companies and consumers would be willing to pay a bit more for responsible sourced cobalt • Responsible practices • Mining mineral tax came into effect in 2024, and the first payment is due in spring 2025. • The mining mineral tax was drafted with the idea that it would initially generate 25 million euros. But as it looks, it will generate about 30 million for 2024. • There are plans of raising the tax so that it would generate 45 million euro annually	The mining mineral tax could be seen as a step towards more sustainable operations. As this tax is a compensation paid by mining companies for the use of non-renewable mining minerals. 60% of the tax goes to the municipality where the mine is located and 40% goes to the state.
		DRC cobalt	• Finnish foreign trade statistics • Previously the raw material imported to Finland was previously known as cobalt ore or cobalt concentrate • During the last few years, the importation of the cobalt ore and concentrates have been changed to cobalt matte, which is a intermediate product • A few years ago, the origin of the cobalt matte was hidden from the Finnish foreign trade statistics	• According to the interviewee, there is no reason to believe, that the cobalt imported to Finland would origin anywhere else than in DRC, as cobalt production is highest in Congo and there is no other alternative of the origin as no other countries can compete with the production capacity

Orange	Supply chain		According to the interviewee, supply chain-based traceability could be used to go all the way back to the source. • However, it requires, that the company utilizing the mineral actually bothers to take the trouble to trace its supply chain. • The composition-based traceability is not suitable for the original verification of large quantities, at least not at the moment • It is possible that in the future, responsible cobalt could become this kind of premium cobalt, which would have a certain market advantage due to a better reputation, and that consumers would be willing to pay a little more for it. But we are not quite there yet.	• In theory, there is a slight chance that Umicore utilizes cobalt, that has been produced without forced labour. But there needs to be some kind of evaluation process, that can be trusted • • The interviewee doesn't think that China believes in sustainably produced cobalt. As Chinese companies just want to purchase cobalt as cheap as possible • • The whole supply chain is a "mess". And does anyone really have a clue of what is going on?
		Finland	• At the moment critical phosphate, cobalt, copper, nickel, platinum, palladium and feldspar are produced. Lithium mining will begin this year • There are many mining projects in Finland, that are still not operating mines, but they are aimed at mining operations that would produce critical raw materials. • Of these 8 mining projects 3 will also produce cobalt: Hautalampi,Hietaharju and Sakatti (Kolmisoppi).	Changes are not fast, as it takes years to start a new mine

Respondent C Interview, 27.3.2025

Language: Finnish

Location: Teams

Color code	Category	Topic	Key elements	Interpretation
Blue	Geographical	Cobalt in Finland	• One of the few, if not the only country in Europe who produces cobalt • Cobalt is produced in a few mines. A few others are in a planning stage • Amounts are small • Supply chain from mine onwards is not known exactly • Finland is a very small production country	We´re bragging about being a major mining country when in reality, we're an increadibly small player. The Finnish mining sector is responsible for about one percent of the gross domestic product, or a little above
		Possible new mines	• For some reason, new mines are not wanted in Southern Finland. A few mines could fit in Uusimaa, but people don't like the idea • For this reason, mines are being builtfurther away, in areas where there are not that many people	
Red	Social considerations	Finnish mining companies	• Focus on safety, responsibility, communication and ore exploration, and the general image • Legislation taces up majority of the time • When it comes to responsibility, the focus is on methos of operation, how mines operate in Finland	
		Industry advocacy organization	• Follows how mining companies function until they deliver their products forward • Most of the companies they represent sell their products to further processing in Finalnd • Does not control imported minerals, as this is done by TUKES	Cobalt is not listed as a critical mineral, eventhough it might be the most critical one. Which according to Respondent C tells something about the openness of international agreements
		Imported products	• Includes: energy, some explosives, machines, electronics • Have their own supply chains	
Purple	Motivation	Sustainability	• The advocacy organization has implemented in their own operations a sustainability assessment ten years ago.	According to the interviewee no other industry utilizes this kind of reporting, where all

			• It is an industry-driven standards, which origins come from Canada, Towards Sustainable Mining, TMS • Also, the advocacy organization has had a corporate social responsibility report running for the past ten years. • The report is available for anyone to find and all companies report by the same parameters	companies report with the same parameters The introduction of the reporting was done long before the introduction of CSRD. Therefore the level of accuracy of the parameters are not on the same level as in these responsibility reporting directives. The accuracy of the parameters were supposed to be changed, but are now on standby because of Omnibus
Yellow	Risks	Supply chain from DRC to Kokkola	• A large Chinese operator in DRC • Also European companies • And then there's that middle ground, which isn't really flattering for either party • Sipped from DRC harbour to Rotterdam, from where it is transported by smaller ships to Kokkola and sometimes to Harjavalta • • The cargo can change ownership several times along the way from DRC to Finland	Respondent C has had a conversation with company representatives in Kokkola years ago, on their cobalt supply chain. According to the conversation, which occurred before the supply chain reviews and reports of verification became a reality, the companies try to rely on European companies. What this means in practice in DRC Respondent C isint able to answer.
		Cobalt from DRC	• The western vcountries are reliable on cobalt from DRC	
		Environmental, Finland	• All industries have their impacts and so do mines • Mines in Finalnd have a small carbon footprint, because there are	

			only a few operating mines in Finland • Climate emissions are very limited • Especially large open pit mines, looks rough and ruins the surrounding landscape • The big thing is the water discharges • The circulation of water has improved. But according to Respondent C, from the advocacy organization perspective, we have too much water in Finland, which creates challenges. How to capture the different water fractions and how well process water can be purified. • Process water can be purified quite well at the moment, but could it be done even better	
Green	The future	Self-sufficient Europe	• Unless more minerals are suddenly discovered somewhere, Europe will not be able to be independent of others in the future regarding critical minerals. • Even if there would to be large new discoveries in Europe, it is not possible to increase production very much in Europe • When looking at statistics, Europe is not the only continent that is independent on importation. America is not only dependent on mineral importation, but other goods as well and the same situation is in China and Russia as well.	The European Commission seems to be very happy with what they have achieved but the reality is, that the EU is not able to produce more than 10% of required minerals, which is a ridiculously small amount for a superpower. If Europe wants to be a superpower
		Mining in Finland	• The so called home region (kotiseutualue), that covers Enontekoö, Inari, and Utsjoki municipalities and northen parts of Sodankylä municipality, are so called no-go areas meaning, that mining companies will not go there • However, according to Respondent C, this will eventually happen • Wheter it will happen in five, ten or twenty years, but there will be preassure of starting mines in these areas • These areas are inhabitanted with also others than Sami people, and it's a matter of property rights. Who will the benefits be distributed to. • Then there are environmental issues • After a stone pile has been done, no one will likely move it in our lifetime, or even after that, because it is such an expensive undertaking to mive millions of tons to another place.	Lifecycle accounting should start with the consumers

			• • The stone piles will probably be examined in more detail from the perspective of circular economy in the coming decades • • But here the problem will bethe economic equitation. A new kind of further processing for the stones, which would require that the utilized materials are mined already	
		Mining industry in Finland	• The industry can not offer summer jobs for 15-18 year olds, as its not allowed according to Finnish law to have minors working within the industry. • Perhaps the biggest issue in the future will be the workforce issue. In the entire Lapland region there are about 165 000 inhabitants • The average age is incredibly high in the whole country • Future workforce for the possible new mines will be hard to find. According to Respondent C, these people will not be found in Finland	
		Setting up new mines	• According to Respondent C, it takes about 3-8 years to set up a new mine • Cash flow is used as a metric for when the mine is up and running	

Respondent D interview, 28.3.2025

Language: Finnish

Location: Café Engel, Helsinki

Color code	Category	Topic	Key elements	Interpretation
Blue	Geographical	EU forced labour regulation and Finland	• The regulation is directly applicable in Finland and will be monitored by a legislate authoritative. • Therefore, no separate implementation process in Finland needs to be done	
		EU forced labour regulation	• With the regulation EU wants to reward companies that act properly and carefully • It is not fair, that companies gain competitive advantage by exploiting forced labour in their supply chains and in this way possibly gets a lower price for its raw materials. This distorts the situation • If there were separate prohibitive laws on a country level within the EU, that would hinder the functioning of the internal market • This regulation is specifically a product legislation, although it is a responsibility legislation, it is also a product legislation. • It affects products that are permitted on the EU market • The regulation doesn't require companies to do anything in principle, as it doesn't create new obligations.	This regulation is a pure prohibition regulation That is why this has had a completely different perspective than, for example, CS3D or CSRV, because they both create obligations for companies to do something directly. It was terribly difficult for member states to oppose this regulation, because who can oppose such a ban on products made with forced labour? No one, politically
		Failing to comply	• If a company is caught of not following the regulation they will receive one warning and if not being able to prove that their supply chain is free from forced labour, the goods will be destroyed and the company will receive a fine • For companies the biggest penalty is that they can't commercially exploit those products	The biggest problem if not complying with the regulation is the brand reputation damage and the terrible process of having to remove the prouct from the market. And the financial loss of not being able to commercialy exploit the products

		Actual obligations for companies	• May create a lot of obligations for companies • Effects depend on the industry in which the company operates • Importers who import risky products to the market, may have a higher risk that forced labour is used in third countries	Companies operating in third countries with high-risk products, need to be more careful because of the ban
		Customs	• Customs does not have any role as a competent authority • The co-operate with the national competent authority • Customs only monitors goods that comes into the EU from third countries	Customs does not make any decisions independently Customs doesn't interfere with the movement of goods within the internal market
Red	Social considerations	Impact on Finnish companies	• Biggest impact depends on what they import from third countries	
		Regulation control	• The regulation is based on the fact that each Member State appoints a competent authority to supervise the implementation of the regulation • The Commission has the aspect of the competent authority and would act as the competent authority and would be responsible for investigations in third countries • Member State competent authorities are responsible for their own territories • By doing so, the Member States and the Commission form a network, which effectiveness is based on the implementation of the regulation and having open dialogue with each other	Member States an the Commission are all active in their own territority and they all mutually recognise the decisions of other Member States, as goods typically move within the internal market
Purple	Motivation	Due diligence obligations	• The regulation does not impose new due diligence obligations to companies • Companies are forced to follow due diligence principles, especially if they operate in high-risk areas • They don't have to, but they should as there is a commercial risk of loosing the product, receive fines and have an imago loss	
Yellow	Risks	Forced labour	• When thinking on a domestic and internation perspective, a huge amount of forced labour is related to services. Services do not fall under the scope of the forced labour regulation	
		Imporation of cobalt	• If a product is banned, the decision will be made by the Commission • The Commission then publishes an announcement in a database that	

			these products are high-risk products and that the local authorities need to be alerted • This does not automatically mean that the products are produced using forced labour. Some mining companies may have been approved using a verification process, which means that they are free to pass into EU	
		Funtionality	• There is no way in which one could anticipate how the regulation will work in practice • How can the origin of products be proven? • This is a really har thing to prove • This is a regulation, that applies to all companies	Companies may face either consequenses during an investigation either by providing false information or by helping the investigation . Then the Commission might do a decision for 'other special reason'. The reason why this regulation is a bit looser in this matter is because it is recognized that there might be resistance during the investigation process. Therefore the regulation has a clause, that in certain cases the Commission might decide, that only the Member States leading authority can make the decision if it hasn't received enough indications on forced labour activities.
		Critical Raw Material	• Cobalt is listed as a critical mineral • In the regulation there is a point, that if a product falls into a critical raw material category, than it cannot automatically be sent for destruction. • If the company behind the product can prove that they have removed forced labour from its supply chain, the product can still be utilized	As cobalt is listed as a critical raw material, it cannot be destroyed until further investigation
		Biggest obstacles or challenges	• The biggest risk is that we have authoritiez who don't investigate cargo • If they do not investigate, there are no cases	A big questionmark is how will the Commission investigate things in third countries?

			How eager are Member State authorities to investigate cases?	How will they have enough evidence? Also, volumes that should be investigated are large. How do they have the resources to conduct all needed investigations?
Green	The future	Resources for competent authority	• According to the regulation, the authorities must be given sufficient resources, with sufficient expertise • This is mandatory according to the regulation • But how it will actually work is a question mark • It is difficult to estimate the number of needed person-years at this stage • The authority needs to be able to receive notifications from other Member States and the Commission on the day that the regulation enters to force	The competent authority of Finland has not been decided yet
		Future	• We are trapped in this global market, which includes these interdependent relationships • The EU aims to re-use raw materials and in this way achieve a larger self-sufficiency so that we wouldn't be so dependent on virgin materials	This is something that we can't hide, even though the current trade policy situation is what it is Contribution to the circular economy
		Climate change	• Previously responsibility was the subject that everyone talked about • Now it is competitiveness • Everything is planned so that it will boost EUs competitiveness	

AI disclaimer

Automatic transcription of interviews was carried out using Transcription and Dolby On, which was used to record one live meeting. Dolby On then produced a full transcript of the meeting, which was subsequently checked manually while listening to the recording.

In order to improve the language, grammar and flow of text in my work at some points of the work, I have used an artificial intelligence language model called ChatGPT (OpenAI, 2023).

The work was done as follows: first, I wrote my original text which I then inputted to the language model with the purpose of reviewing possible grammar errors, vocabulary, and errors of text flows. Suggestions given by ChatGPT was then carefully reviewed and used where appropriate. It is important to note, that the role of ChatGPT was strictly limited to providing suggestions and helping with grammar errors, which especially occurred when writing while tired. I have made the final decisions regarding the suggestions to make sure, that the work reflects my perspective and understanding of the subject.