Case study of a Dutch Telecommunication Company:

Critical Raw Material Supply and Human Rights Challenges

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MSc Industrial Ecology
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Abstract

Digitalisation pressures the earth's resources, especially critical raw materials (CRMs). The CRMs, are functional materials that meet current challenges and future demands in information and communication technology (ICT). The extraction and processing of CRMs are highly concentrated, mainly outside the European Union (EU). The EU is dependent on import supply. Due to growing demand, an increase in primary CRM mining is expected shortly. Moreover, research showed that primary CRM mining significantly impacts human rights abuse. The increased CRM demand and supply can have an increased effect on human rights challenges. A greater focus is being placed in the EU on preventing and mitigating human rights violations in the global value chain. However, there is limited research in the telecommunication industry on managing human rights in the context of primary CRM supply. The growing demand in CRMs for telecommunication products and technologies highlights the importance of incorporating strategies to secure their business within the telecommunication sector. Therefore, this research aims to answer the following question: *What strategies can telecommunication companies deploy in response to human rights challenges in primary critical raw materials supply?* The methodology is mainly based on a qualitative approach. The research includes scientific and grey literature reviews, expert interviews, internal documents, and expert workshops. Research data is analysed using the framework on human rights in primary critical raw material supply development.

The research provides an overview of human rights in primary CRM supply. It shows the drivers and barriers for KPN in how to deal with this changing environment. The main focus is on human rights in the context of Conflict Mineral (CM) supply instead of the EU CRM list. Companies don't have a fixed strategy in place to manage human rights challenges in primary CRM supply. Secondly, a case study is performed on cobalt extraction in the Democratic Republic of Congo (DRC). The general finding was that many human rights challenges occur in primary cobalt mining in the DRC. Various human rights challenges occur in artisanal small-scale mining (ASM) as well as in large-scale mining (LSM). Furthermore, among telecommunication companies, there are different levels of advancement in human rights due diligence practices in CRM supply. However KPN has an emergent strategy on the topic, the company is behind their peers in the level of advancement. At last, a strategy is developed for managing the human rights challenges in primary CRM supply. Experts validated the strategy.

The thesis concludes that becoming a responsible Mineral Initiative (RMI) member and implementing the OECD framework would be a decent start. The RMI provides tools and resources to advance on the topic. Having limited resources and capacity and dealing with complex mineral supply chains makes that a suitable option for KPN. In the medium term, KPN should explore additional actions, which should be the building blocks to advance on the topic and strengthen the company's position.

Further research could focus on exploring case studies CRMs in relation with human rights challenges, and understand the interaction of the system in depth. Moreover, develop schemes and guidelines for responsible supply of all minerals in LSM and ASM sector that are linked to human rights challenges. This is important in order to ensure that companies have a strategy in place. A strategy were human rights challenges are well managed and ensure responsible CRM supply.

Acknowledgement

Dear reader,

Before expressing my gratitude to everyone involved in the research, I would like to ask the question: do you know which materials, especially Critical Raw Materials, are contained in your telecom devices? Moreover, do you know where by whom and under which circumstances all these materials were extracted and processed? For me and the telecommunication sector, this is also a topic of interest.

This master's thesis research the relationship between human rights challenges and CRM supply for the telecommunication sector. However, the urgency is there. I was surprised that there is a poor link between human rights and CRM supply.

First of all, I want to thank my academic supervisors, David Peck and Rene Kleijn, for their guidance. It was a pleasure to have both of you as a supervisor. David, thanks a lot for all the advice and the creative mindset on how to approach several difficulties during this thesis. Rene, thank you as well for your valuable feedback and thoughtful comments during the meetings.

Second, big thanks to Jeroen for having me onboard at KPN and allowing me to research this controversial topic. Providing me with the right feedback, contacts and the possibility to participate in seminars helped me a lot. During my internship at KPN I had the opportunity to meet enthusiastic people and participate in inspiring events. I am grateful for having that opportunity.

I want to thank all interviewees who participated in this research. Your knowledge and insights raise the research to a higher level. Thank you Monique Bennema and the Social Hotspot Database for providing the me with the risk mapping tool. Moreover, I want to thank friends and family for their moral support.

Please enjoy reading this thesis,

Jan Kleinepier

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Abbreviations

ASM	Artisanal Small-scale Mining
CMs	Conflict Minerals
CMKK	Mining Cooperative Maadini Kwa Kilim
CRMs	Critical Raw Materials
CSR	Corporate Social Responsibility
EGC	Enterpise Generale du Cobalt
EJA	Environmental Justice Atlas
EMAK	association of artisanal miners in Katanga
ESG	Environmental, Social and Governance
EU	European Union
GRI	Global Reporting Initiative
JAC	Joint Audit Cooperation
ICT	Information and Communication Technology
ILO	International Labour Organisation
KPI	Key Performance Indicator
LSM	Large Scale Mining
OECD	Organisation for Economic Co-operation and Development
OHCHR	UN Office of the High Commissioner for Human Rights
PMG	Platinum Group Metals
RMAP	Responsible Minerals Assurance Process
RMI	Responsible Mineral Initiative
WGI	World Governmental Index

1. Introduction

1.1 Problem statement

Growing population, the transition to renewable energy, industrialisation and digitalisation puts pressure on the earth's resources, especially for critical raw materials (CRMs) (European Commission, 2020). The European Union (EU) defined a list of 30 CRMs. Supply of these primary materials is highly concentrated, mainly outside the EU. Therefore, the EU depends on import supply. CRMs are critical because of their high economic importance and supply risks (European Commission, 2020). CRMs are functional materials and meet current challenges and future demands in information and communication technology (ICT). Growing demand for these materials is critical (Hofmann et al., 2018). Besides the economic and technological strategies of CRM supply, other fields are emerging in material science. One of these fields in material science is the social impact in relation to primary CRM supply (Hofmann et al., 2018).

Primary mining has a significant impact on human rights abuse. This is considered as one of the most concerning social aspects in the mining sector (Mancini & Sala, 2018). Moreover, the growing demand for CRMs puts further pressure on human rights. Increased demand puts pressure on mining workers and maximises the extraction from mines. This likely will affect mining working conditions in undeveloped countries, while developed countries are in the digital transition (De Wit, 2020).

The EU developed a policy to improve the accessibility of CRMs. Fair and sustainable access to raw materials on global markets is one of the three pillars of the existing EU policy (Gislev & Grohol, 2018). More attention is paid in the EU to human rights in the global supply chain, and hundreds of millions of workers are operating in the global supply chain. Having sustainable global supply chains is essential to achieve the UN Sustainable Development Goals (SDG), which overlap with the human rights declaration. Around 90% of the SDG connects to international human rights and labour standards (European Union, 2020; Steiner, 2019). In line with these developments, the EU adopted a proposal for a directive on corporate sustainability due diligence. One of the requirements is that companies identify and end or mitigate human rights violations throughout the global value chain (EU Commission, 2022). The increase in primary CRM demand for digitalisation and supply risks concerning human rights challenges confront telecommunication companies to manage human rights challenges in CRM supply strategically.

1.2 Research aim

Increasing demand for CRM supply in telecommunication products and technologies points to a move towards primary CRM mining. Primary CRM mining significantly impacts human rights abuse (Mancini & Sala, 2018). The EU focuses on preventing and mitigating human rights violations in the global value chain (EU Commission, 2022). However, society seems aware of the problem; there is limited research on human rights challenges in primary CRM supply. On top of that, EU telecommunication companies have limited experience in managing human rights challenges in primary CRM supply for their products and technologies. KPN has an emergent strategy for addressing the adverse impacts on human rights in primary CRM supply, and a couple of actions have been taken. However, the exponential growth of CRM supply, which is linked to human rights challenges, can be increasingly damaging for telecommunication companies. Strategies are required to come up with solutions for managing human rights challenges in primary CRM supply. Research is conducted to bridge the knowledge gap on managing human rights challenges in primary CRM supply for telecommunication products and technologies. The case study is performed at a Dutch telecommunication company named KPN.

Main research question:

What strategies can telecommunication companies deploy in response to human rights challenges in primary critical raw materials supply?

Sub-research questions:

1. What are the drivers and barriers for telecommunication companies to address human rights challenges via strategic action in the context of primary critical raw material supply?

2. What is the human rights impact of primary cobalt mining in the Democratic Republic of Congo?

3. How do telecommunication companies manage the human rights impact in primary critical raw material supply?

4. What strategies can telecommunication companies develop toward managing the impact on human rights in primary critical raw material supply?

1.3 Research approach

The research approach contains four phases that are researched in a logical order. In the first phase, an investigation is made into developments in the field of human rights in primary CRM mining. Structuring internal and external drivers and barriers for telecommunication companies on deploying strategies in response to human rights strategies. The second phase explores the human rights impact in the context of a primary critical raw material and region. The third step is the policy and management approach of KPN and other telecommunication companies on human rights challenges in the context of CRM supply. The fourth step is developing strategies for telecommunication companies to address human rights challenges in primary CRM mining. An overview of the research approach is displayed in figure 1.1.
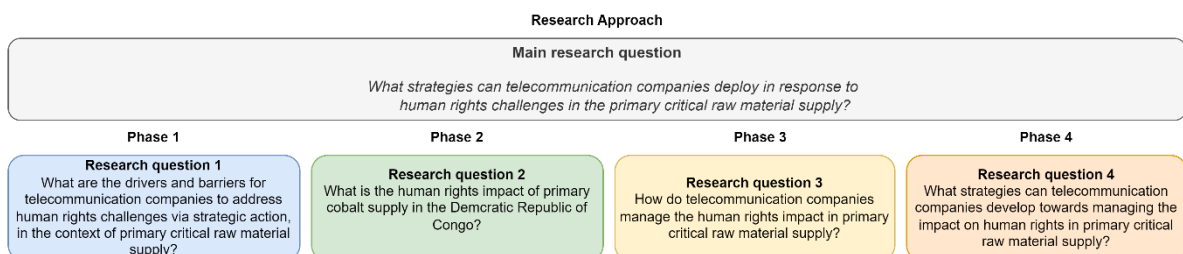
Figure 1.1: Research approach.

1.4 Case study company: KPN

KPN was found in 1881 as a company for telegraphy and telephony. Nowadays, KPN is the largest telecommunication provider in the Netherlands. KPN offers network connectivity, cloud solutions and workspace services. The company aims to be a digital partner for Dutch customers in a competitive telecommunication market. Sustainability and long-term value creation are the primary growth concepts. Therefore, KPN aims to be a pioneer in the field of sustainability. KPN aims to become net-zero carbon emission across the whole value chain in 2040 and compensate for the remainder. In the short term, KPN aims at a near 100% circular business model in 2025 (KPN, n.d. a; KPN, 2022 a). Suppliers of telecommunication products influence the circularity performances of the company. Environmental, social and governance (ESG) criteria are integrated into the KPN procurement process (KPN, 2022 a). One of the performances in the business model of KPN is environmental performance and a responsible supply chain. This performance is linked with SDG number 12: responsible

consumption and production (KPN, 2022 a). However, The demand for CRM supply in future telecommunication technologies will increase compared to current supply levels (Flik, 2021). Increased CRM supply within the telecommunication sector holds pressure on managing human rights challenges in primary CRM mining. The deployment of strategies helps to managing human rights challenges. KPN is a valuable case for human rights challenges in primary CRM mining. Within a couple of years, circular product design within KPN is desirable, and the company is constantly looking for innovation and collaboration to improve sustainability and circularity. Previous Industrial Ecology research at KPN offers data and insights on circular supply chains in the context of CRM supply. Data and insights are used to investigate supply chain circularity. Moreover, KPN and other telecommunication companies aim at transparency and sustainability in the supply chain. The case study is valuable research on responsible product design for the company and the academic world. Deploying human rights strategies in the supply chain of primary CRMs is essential for all EU telecom operators to operate responsible. Drawing conclusions from this research hold valid for the whole telecommunication sector.

1.5 Relevancy of the research
Scientifically, this research contributes to a better understanding of human rights and CRM supply. There is limited research on human rights and CRM supply. Research focuses mainly on Conflict Minerals (CMs) (Young et al., 2018). However, tantalum and tungsten are part of the CM and CRM list (European Commission, 2020). However, in society, the topic is a long-standing challenge. Increased CRM supply could deteriorate the human rights situation in the extraction of CRMs. On top of that, the research is from a telecommunication company perspective and how improvements in human rights challenges in CRM supply contribute to fair and sustainable product design. Besides recycling metals and minerals, responsibility for the supply has also contributed to sustainable consumption (Mudd, 2022). Telecommunication companies have limited access and information on the suppliers of CRMs, mainly due to long and complex supply chains. Identifying and managing human rights challenges in the context of CRM supply helps to increase scientific knowledge about this relatively unexplored research area. A case study is applied to fill the research gap.

Societally, this research provides new insights into the human rights challenges for telecommunication companies in the CRM supply chain. Telecommunication companies are moving towards a circular business model, and KPN aims at a circular business model in 2025 (KPN, 2017). However, increasing demand for CRMs in telecommunication products and technologies puts further pressure on circular business models (Kleinmagd, 2020; Flik, 2021). CRM supply is linked to human rights challenges (Amnesty International, 2016). Increased CRM supply can enhance human rights challenges. A better scope and strategy on human rights for companies can help to move towards sustainable CRM supply in telecommunication equipment.

Industrial ecology integrates technical, environmental and social perspectives. The interactions between human activities and the environment are systematically analysed (Graedel, 1996). Industrial ecology research is helpful to understand and evaluate issues regarding sustainable development and to design solutions for occurring problems. There are not enough stocks in society to meet the demand for many metals, especially for minerals and metals that are applied for modern technological changes. The supply of these CRMs is essential to provide happiness for consumers and communities that supply these CRMs (Mudd, 2022). Within the field of Industrial Ecology, this research contributes to gaining expertise in the sustainable product design of telecommunication equipment, addressing the human rights issues within the CRM supply chain from a social science perspective and focusing on a systematic approach to manage human rights issues in the CRM supply. In the research, the technological prosperity of CRM is combined with the social prosperity of human rights to manage and stabilise the system.

1.6 Goal and scope of the research

The research goal was to develop a business strategy for managing human rights challenges in primary CRM mining. KPN is moving from an emergent strategy into a business strategy to achieve its goals. The focus was on identifying the importance of human rights challenges in primary CRM mining. Moreover, a case study on a primary critical raw material in a geographic region was performed. The study focused on one material to get an in-depth understanding of the human rights challenges for this region. Moreover, best practices from KPN and their peers were researched. The period for conducting this study started in February until September 2022. Data was collected by literature review, expert interviews, and internal documents within the telecommunication company KPN.

1.7 Structure of the research

The first chapter outlines an introduction of the research, including the theoretical background, research gap, approach, goal and scope, and structure. Chapter 2 explains the methodology that is used for each of the three phases in the research. Chapter 3 provides the findings of the first research sub-question: drivers and barriers for developing strategies on human rights. Chapter 4 shows the results of the case study. Chapter 5 explains how European telecommunication companies measure and assess human rights. Chapter 6 represents the development and validation of possible strategies regarding human rights challenges in primary CRM mining for the telecommunication industry. In chapter 7, the results are interpreted and discussed. Chapter 8 contains the conclusion and answers the main research question.

2. Research design and methodology

This chapter presents the design and methodology of the research. The research design, methodology and data analysis part per chapter are explained. An overview of the research methods and data analysis is found in Figures 2.1 and 2.3.

2.1 Research design

The design of this research is an exploratory case study. This type of case study explores a phenomenon in depth. The case study covers the phenomenon and its context (Yin, 1981). Exploring and understanding the complex issue helps telecommunication companies to be aware of human rights challenges in primary CRM supply from a telecommunication company perspective. Findings help to open up the door for further examination of these challenges. The case studies are applicable in real-life situations where social issues arise (Zainal, 2007). Therefore, exploring human rights challenges in primary CRM mining fits within the research design.

2.2 Methodology Overview

Mixed research methods are applied to study the case in-depth. It consists of a literature review, expert interviews and analysing of existing data. The research is divided into four phases, one phase for each sub-question. In order to come to the right results and answer the main research question, figure 2.1 gives an overview of the content and methodology per phase. The methodology per phase is explained in the sub-chapters.
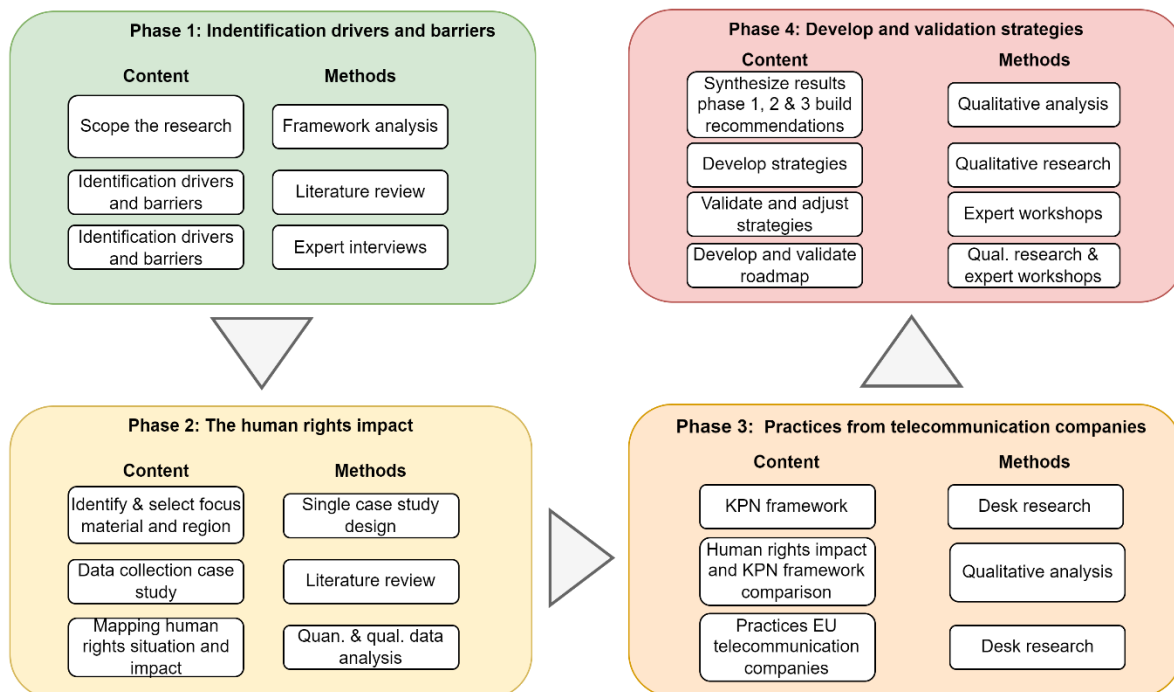
Figure 2.1: Methods overview scheme.

2.3 Phase 1: Identification of drivers and barriers

The first phase consists of a literature review and expert interviews. The review focussed on scientific and grey literature. To explore the field of interest, expert interviews are conducted. Their specific knowledge helps to retrieve a better understanding of the topic (Döringer, 2021). Findings from literature and interviews answer the first sub-question. From the external and internal analysis, a SWOT analysis is drawn. The analysis groups the external and internal drivers and barriers. These

results help to identify critical threats and opportunities for the company in its environment. The SWOT analysis helps companies to build an appropriate strategy (Gurl, 2017).

2.3.1 Framework human rights and primary CRM supply

The framework explains why the research should be conducted and gives a direction to the research. The framework answers why the research is important and what contributes to these research findings (Varpio et al., 2020). The framework is used to structure and constructively analyse the research data.

2.3.2 Literature review

The literature review provides a starting point for this research. The first step is identifying drivers and barriers for telecommunication companies deploying strategies for human rights challenges. The literature review gives an overview of the topic and the available information and helps to determine opportunities and problems. Moreover, the literature is evaluated in a critical way (Knopf, 2006).

Scopus database was applied to search for relevant scientific literature. Scopus database is applied because it is an acknowledged, extensive, and multidisciplinary database for scientific literature (Montoya et al., 2018). In Scopus, multiple combinations are applied related to the first reached sub-question. The most efficient ones are used, table 2.1. To keep the focus on critical raw materials and limit the number of articles, the search within results is used by applying "critical raw materials". Papers were selected in the period till the 16th of March 2022. Papers were found by keyword research. The keywords research resulted in various suitable literature, 15 out of the 41 articles were selected. These articles were selected because they are in line with the research. The computer tool Mendeley was applied to structure the scientific literature review.

The following concepts within the scope are defined:

Table 2.1: Number of results and numbers of papers used per Scopus search.

Database	Search Terms	# of Results	Of which selected
Scopus	critical raw materials AND human rights OR rare earth elements AND human rights OR minerals AND human rights OR mining AND human rights OR mining AND telecommunication OR mining AND due diligence OR mining AND responsible sourcing AND AND critical raw materials	41	15

Scopus search is limited, and therefore some additional articles are selected. These articles refer to the research framework. Secondly, a grey literature review was applied. Grey literature is produced on governmental, academic, business and industry levels that is not controlled by publishers (Rothstein & Hopewell, 2009). Moreover, grey literature was added to the scientific literature because scientific literature can't cover all the concepts of the research topic.

2.3.3 Expert interviews

The next step in the research was to conduct expert interviews with stakeholders to identify further drivers and barriers to human rights for telecommunication companies. Information from the previous findings in the literature is used to investigate the drivers and barriers further. Experts that are familiar with the topic can further elaborate on the findings in the literature and clarify their barriers and opportunities to human rights challenges.

Expert interviews include persons working in the telecommunication industry with a background in primary mining or human rights. Experts elaborate on drivers and barriers to developing human rights

strategies. The experts are contacted by email. The expert interviews are semi-structured. Semi-structured interviews contribute to exploring the subject and collecting qualitative data. The scope is determined beforehand, but there is flexibility in the sequence of the questions. Additionally, there is room for further elaboration and discussion on those answers. This collaborative way of exchanging information helps gather the data effectively (Magaldi & Berler, 2020). Therefore, these types of interviews help to identify the drivers and barriers.

The number of interviews that took place depended on the amount of data from the interviews (Baker & Edwards, 2012). In this research, it is recommended to stop conducting interviews after sufficient data is collected. The interview duration is based on the number of questions, and additional questions are asked to come to the right results. The interviews take place face-to-face or by using Microsoft Teams to achieve sufficient social interaction. Social interaction is useful for generating proper data (Irvine, 2011). A recording option is applied to engage actively during the interview. The focus is on asking questions and conversation instead of concentrating on making notes (Stockdale, 2002).

The interviews are conducted in Dutch or English. The participant signs a consent form to proceed with the data after the interview. Data is transcribed after the interview takes place. The data is stored on the computer and solely shared with the supervisors that are involved in this research. Labelling, organising and analysing the data is done in Microsoft Excel.

2.4 Phase 2: The human rights situation in primary CRM supply
The second phase of the research applies a case study on one CRM. The focus is on identifying the human rights challenges for a CRM in a specific region. To answer this sub-question, the following steps and methodology are applied.

Single case study design
To measure and assess the human rights challenges, a single case study research is applied. The case focuses on exploring one material mined in a specific region in depth, where human rights challenges are expected to be critical. To measure the situation of human rights in primary CRM mining case-studies are applied. Case studies contribute to knowledge about a social phenomenon (Yin, 2009). Applying case studies is challenging. Data needs to be collected, presented and analysed in a fair way (Yin, 2009). The phenomenon that is studied is the human rights situation in primary CRM supply. Several NGOs and other monitoring agencies publish reports about human rights in the supply chain (Sodhi & Tang, 2019). A limitation of this case study is that data is not collected at the mining site. Another limitation is that CRMs are extracted and processed differently, and results from a single case study are less generalisable. Outcomes are not always representative of other cases (Reis, 2009). However, identifying the human rights situation in primary CRM mining for one region is still valuable for scientific and social relevance. One of the misunderstandings in case studies is that single scientific case studies don't contribute to scientific development (Flyvbjerg, 2006).

Identification of the focus material and area
KPN has a database of the CRMs contained in its products and future technologies. A basic approach was applied to select the type of material and country of origin. Select the case study based on the following conditions:

1. CRMs that are contained in telecom products and future telecom technology equipment (Kleinmagd, 2020; Flik, 2021).
2. Identify global sourcing countries of CRMs (EU Commission, 2020).
3. Identify human rights scores per country (Fariss et al., 2020).
4. Select hotspots based on CRM importance (occurrence) telecom industry, human rights score, and data availability.

Literature review
To retrieve data on the topic, a literature review is applied. The literature review consists of collecting grey and scientific literature. Literature, databases and reports on the single case study are collected and analysed. Secondary data analysis allows studying a specific problem by analysing existing data that was collected for previous research. A limitation is that parts of secondary data can be inaccurate, incomplete, and unusable for analysing (Smith, 2008). Possibilities for human rights field research are limited because of safety and ethical challenges when collecting sensitive data (Silva & Marwaha, 2013). Moreover, visiting the side is not possible due to the long distance and time constraints for this research.

Case study: Data analysis
The results from the case study are mainly analysed qualitatively. First, quantitative data from the Social Hotspot database is applied to measure the situation. However, most of the data is retrieved from qualitative research reports to understand the case study in-depth.

2.5 Phase 3: KPN and EU telecommunication companies practices
The third phase is how telecommunications companies measure and asses human rights challenges in primary CRM supply. The practices of KPN and other European telecommunication companies are researched.

2.5.1 Practices KPN: desk research
This part consists of exploring the KPN strategy. The main focus is on the KPN framework, including the practices from the JAC certification system. EU telecom companies use the JAC certification system to measure and assess human rights challenges in the supply chain for the telecommunication industry. Moreover, a comparison between the practices and framework of KPN to manage the human rights challenges and the actual human rights situation identifies the shortcomings within KPN due diligence on human rights.

2.5.2 Best practices from peers: desk research
The second part explores the practices and systems in place among other EU telecommunication companies. Analyse to what extent these companies measure and assess the human rights challenges. These companies are based in Europe and are a member of the JAC.
A basic approach was applied to select companies based on company revenue and capacity to perform due diligence. Moreover, human rights legislation might differ among countries and results in advanced practices compared to companies based in other countries.

2.6 Phase 4: Strategy development and validation
The fourth phase research the development and validation of a strategy for telecommunication companies to manage human rights challenges in primary CRM supply.

2.6.1 Strategy development
To address human rights challenges, a strategy is developed. The focus is on translating the findings from the research into a strategy for the telecom industry. The strategy is formulated according to the model of the Strategic Management process. This model consists of 3 phases: formulation, implementation and evaluation of the strategy. Five steps are required to perform these three phases (David, 2009). The Model of the Strategic Management Process is further explained in chapter 3.1. Results of phases 1, 2 and 3 are synthesised to formulate the human rights strategy. Synthesising the findings from the three phases helps to translate the findings into recommendations for the telecommunication industry.

2.6.2 Strategy validation

In order to validate the strategy, expert interviews are applied. Four expert interviews were conducted to have different viewpoints from the experts on the strategy. Two telecommunication experts in Corporate Social Responsibility (CSR) and supply chain are interviewed. Two due diligence experts on the mineral supply chain are interviewed.

The expert interviews are structured in the format of a workshop. The workshop consists of four sections. The first section presents the research problem and the results. The second step is for the experts to devise the perfect solution on how telecommunication companies can manage the human rights challenges in primary critical raw material supply. This step consists of writing solutions and problems related to the perfect solution. The third step is about presenting the proposed strategy. The experts have an idea about the proposed framework and actions. The fourth step focuses on a SWOT analysis to validate the proposed strategy. Experts identify the strengths, weaknesses, opportunities and threats of the solution. The duration of the four workshops has a maximum of 60 minutes and Miro is used to visualise the outcomes.

After recommendations are collected, the strategies are adjusted to a certain extent. When reformulating the strategies, the condition is that strategies are still in line with the research results from previous phases. Workshops in research mainly take place with a group of people who learn, gain knowledge and perform creative problem-solving on a specific topic or issue (Ørngreen & Levinsen, 2017). The strategy builds on the relevant theoretical constructs and practical expertise of stakeholders. To validate the strategy for KPN, internal and external experts were invited for separate workshops to evaluate the strategy. The experts provide insights for measurements of success and corrections on the strategy.

2.6.3 Strategy Roadmap design:

The roadmap was designed using a holistic framework (Phaal et al., 2020). The roadmap answers the questions that apply in any strategic context:
1. Where do we want to go? Where are we now? How can we get there?
2. Why do we need to act? What should we do? How should we do it? By when?

The roadmap shows the step-by-step approach to map out the necessary actions that have to be taken to work towards the KPN future vision and mission statement. The focus is on past, short, medium and long-term steps in order to reach the vision and mission (Phaal et al., 2020). These steps are also formulated in the three strategic life cycle scenarios (Simonse et al., 2017). Here, there are three-time horizons projected in a logical order. Each horizon conceptualises different focus, management, tools, and goals. The first horizon focuses on the company's existing business model and extending the core capabilities in the short term. The focus is on incremental innovations and improvements in the existing market. The second horizon explores new customers, markets and targets by extending the business model and core capabilities. The second horizon serves as a preparation for horizon three. The third horizon focus on growth in the long run of the proposed enablers. The creation of new capabilities and new businesses are put into action to take advantage of disruptive opportunities and respond to counter-disruption (Simonse et al., 2017; Blank, 2019).

2.6.4 Strategy roadmap validation:

Two stakeholders were included in order to validate the strategic roadmap. Both stakeholders are employed at KPN. The first stakeholders is Strategic Lead Energy and Environment. This stakeholder validate if the strategic roadmap match with KPN sustainability goals. The second stakeholder is head Corporate Social Responsibility. This stakeholder validates whether the strategic roadmap matches social, ethical and environmental beliefs in KPN business operations.

The validation from both experts is combined in one online meeting to have an interactive discussion. The roadmap is shown in Miro. At first, a presentation is given to introduce the research and secondly, the roadmap is explained in detail. After the presentation, there is room for discussion. The discussion elaborates if the roadmap fits with KPN sustainability goals and matches social, ethical and environmental beliefs in KPN business operations. The duration of the meeting is about one hour. The meeting is recorded in order to analyse the validation results in detail.

2.7 Data analysis overview
Besides the content and methods, an overview is given of the data analysis part in figure 2.3. After the data is collected, data is structured and analysed to achieve the right results that answer the sub-research questions. The data analysis starts with collecting the data, preparing the data, analysing the data and interpreting the data. A detailed overview can be found in appendix B.
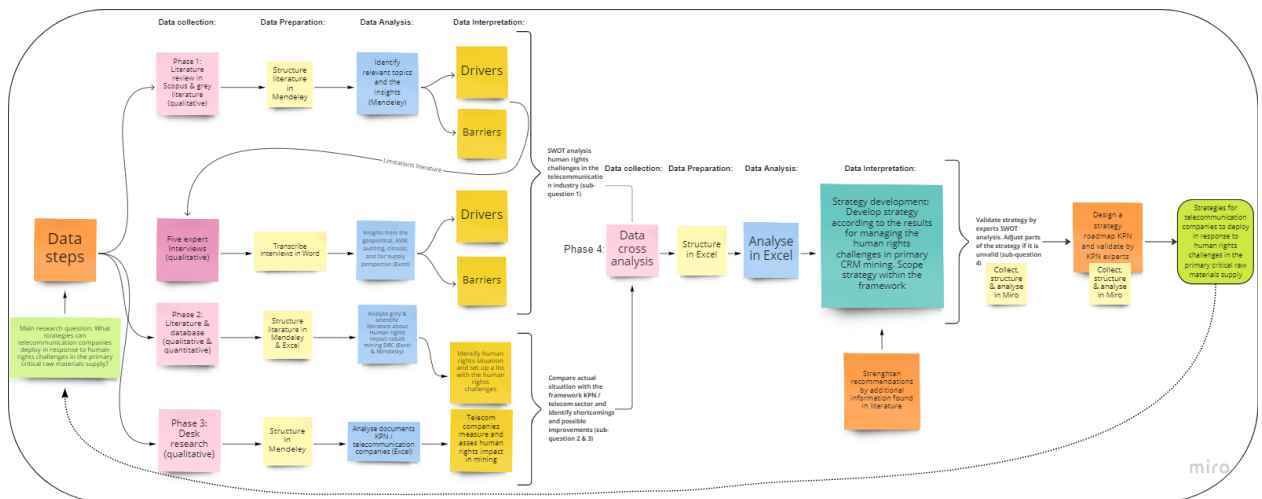
Figure 2.3: Data analysis overview.

3. Drivers and barriers for managing human rights challenges

The first section of this chapter explains the framework. The framework is used to scope the research and presents the starting point of the research. The second section is a literature review and explains the concepts. To gain additional insights, expert interviews were applied. Results from the literature review and expert interviews are grouped into internal and external drivers and barriers for telecommunication companies on human rights challenges.

3.1 Framework
The results of this research are discussed in relation to this framework. The framework structure is inspired by Lodhia (2018). The original framework focused on sustainability in mining. The new framework has the same structure as the original framework and is scoped to human rights in primary CRM supply. The framework is used to analyse the research data from the case study. Components function as a framework to proceed data consistently. Framework refers to the concepts described in the literature review. Relations give an overview of companies' drivers and barriers to deploying human rights strategies.

The framework starts with the recognition of human rights in mining. Recognition of human rights in mining means that people acknowledge the premise that business as usual is no longer acceptable. Respecting human rights in mining is essential for companies to proceed. Recognition of respecting human rights in CRM supply increased over time. Recognition of human rights in mining results in due diligence, contemporary challenges and corporate approaches for companies on human rights. The due diligence focuses on human rights aspects to reduce negative impact and improve benefits in extracting and processing minerals. Contemporary human rights challenges in mining should be addressed and monitored continuously. The challenges are related to the supply of a CRM from a specific region. The challenges are identified by due diligence and require a corporate sustainability approach to manage this challenge. Due diligence, monitoring contemporary challenges and corporate approaches have the potential to facilitate human rights solutions (Lodhia, 2018).
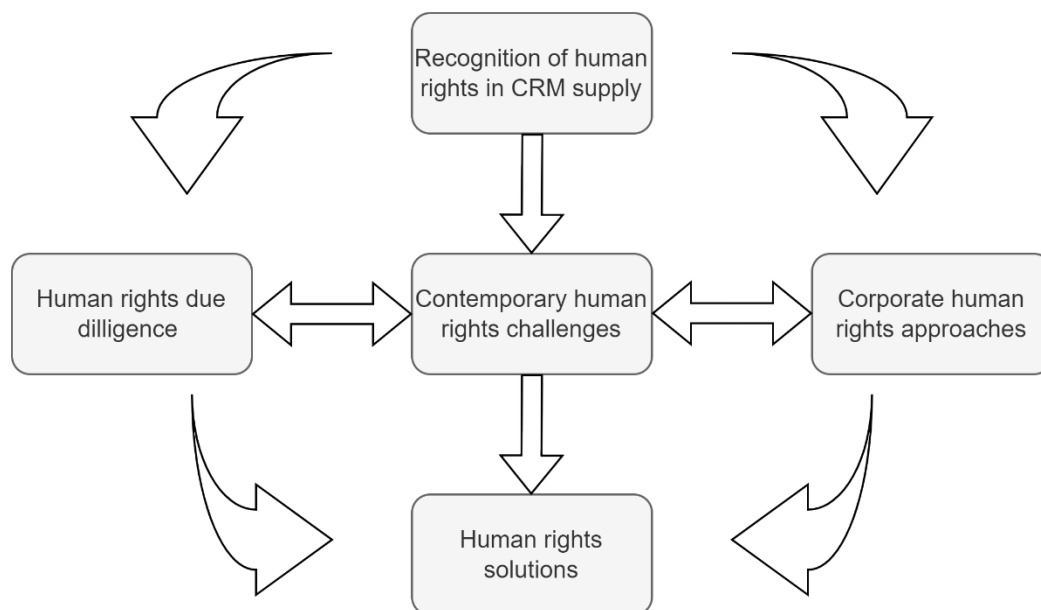
Figure 3.1: Framework for primary CRM supply and human rights development (adopted from Lodhia, 2018).

3.2 Literature review on human rights in primary CRM mining
The literature review starting point was identifying the most relevant research papers in the Scopus database. In total 15 scientific articles were selected from Scopus. The research terms are related to the research questions. In addition, grey literature, the framework article, previous case study literature and a couple of other scientific and non-scientific articles were added to the literature review. The concepts related to the research are explained.

Critical raw materials and the telecommunication industry
The growing population, the transition to renewable energy, industrialization and digitalization puts pressure on the earth's resources, especially for CRMs (European Commission, 2020). CRMs are critical, because of high economic importance and high supply risks (European Commission, 2020). CRMs are functional materials and meet current challenges and future demands in information and ICT. Growing demand for these materials is considered critical (Mudd, 2022; European Commission, 2020). The EU defined a list of 30 CRMs. The supply of these primary materials is highly concentrated, mostly outside the EU and therefore the EU is dependent on import supply. A part of the CRMs is clustered into groups. The Rare Earth Elements (REEs) are clustered into light and heavy REEs. Around 86% of these materials are extracted in China. Another group are the Precious Group Metals (PGMs) which are mostly processed in South Africa and Russia (European Commission, 2020). The supply risk parameters for raw materials focus on global supply risks, EU domestic supply, criticality factors, import reliance, substitution, and recycling (Bobba et al., 2020). The criticality factor contains a large variety of indicators. These risks are scarcity risks, demand risks, market risks, supply chain risks, geopolitical risks, environmental risks and social risks (Flik, 2021).
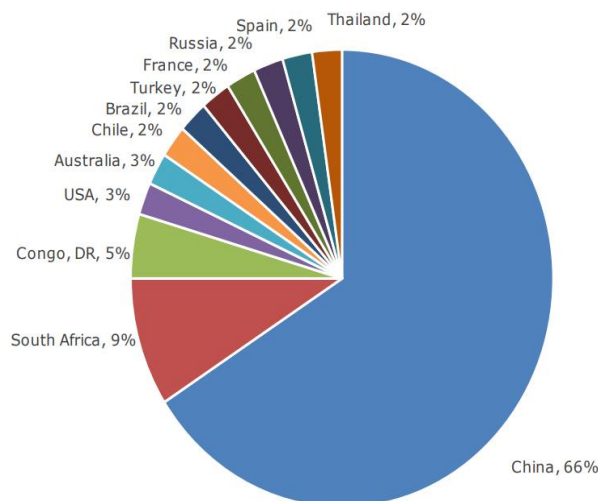
Figure 3.2: The main global supply countries of CRMs (European Commission, 2020).

Previous studies showed that 31 of the 46 CRMs in the table of elements on the EU list of CRMs are contained in four different KPN telecom products (Kleinmagd, 2020). Within four future telecommunication technologies, 42 CRMs in the table of elements occurred. The demand for 14 of these CRMs exceeds the supply in 2030 (Flik, 2021). Circular economy strategies, in terms of reducing, reusing and recycling have various limitations in their potential for telecommunication products (Park, 2021).

Primary CRM mining in relation to human rights
The telecommunication sector is highly dependable on CRMs and a focus on supply chain resilience is necessary. Mitigation strategies focus on design and recycling rates. However, new mining activities for the telecommunication industry are desirable (Flik, 2021). These materials are the starting point

in the manufacturing supply chain. The materials are extracted in mines or processed. The supply from these mines is geographically limited see figure 3.2. The processing part happens at the smelters, minerals are by-products in this case. Moving towards the use of current and future technologies asks for an increase in the mining and processing of these materials (Wall et al., 2017). At the moment there are not sufficient stocks in society to support recycled metals and meet the demand for many materials. Maximum efficiency in consumption, recycling and substitution can still not meet the demand. Therefore, primary CRM mining is essential for sustainable growth (Mudd, 2022; Nickless, 2018). Mining these materials is valuable for economic growth, use of future technologies and limited substitutability (Arendt et al., 2020). Further development of these technologies creates new demand for a different mix of raw materials (Nickless, 2018). Having access to CRMs is crucial for sustainable development in the European Union (Di Noi et al., 2020). On the other hand, extraction and processing of the materials have an impact on social and environmental performance (Manhart et al., 2019: Di Noi et al., 2020). This dual role in the CRM mining sector asks for an increase in primary material supply in a sustainable way (Mancini & Sala, 2018).

Aspects related to the local environmental and social performance become more relevant for raw-material policy-making and responsible sourcing strategies (Manhart et al., 2019). In 2008 the European Commission launched an integrated strategy to secure CRM for the EU. One of the pillars of the strategy is to secure and improve access to a fair and sustainable supply of raw materials from global markets. A list of CRMs is established at the EU level (European Commission, 2020). The methodology to identify CRMs focussed on calculating the economic importance and supply risks. The supply risk of the material was calculated based on factors that measure the risk of supply disruptions. These factors are supply concentrations, import reliance, governance performance, trade restrictions and agreements, and the existence and criticality of substitutes (European Commission, 2020). Focussing on the social performance within raw-material policy-making and responsible sourcing strategies, the World Governmental Index (WGI) is a parameter to measure the stability of a country (European Commission, 2020). The index considers six dimensions of governance and data comes from 31 sources. One of these sources is the "Cingranelli Richards Human Rights Database and Political Terror Scale". A public database that covers 192 countries focuses on human rights and political terror (Kaufmann et al., 2011).

Human rights: an overview
Human rights refer to the Universal Declaration of Human Rights (UDHR), proclaimed by the United Nations General Assembly in 1948. The declaration was established after the Second World War in response to prevent future cruelties that happened during that event. It refers to a common standard of achievement of freedom, justice and peace for all peoples and nations to promote the respect of these rights. The UDHR contains 30 articles, the articles refer to a broad range of civil, cultural, economic, political and social rights. The rights are inherent among the peoples of the Member States of the United Nations. Therefore it is widely recognized and at global and regional levels, rights are protected in international law (United Nations, n.d. a).
Human rights violations are still one of the most concerning social aspects of the mining sector (Mancini & Sala, 2018). There is a large variety of social and human rights issues within the academic literature, that mostly focus on CMs (Silva & Schaltegger, 2019). Huber & Steininger (2022) identified human rights issues for a couple of CMs and CRMs. These issues were child labour, the poorest working conditions, revenue support of warlords, conflicts with local inhabitants and mining companies, and violence. Mancini & Sala (2018) refer to discrimination, lack of inclusion and respect for indigenous populations, abuses and impacts on cultural and aesthetic resources when it comes to the human rights violation in mining.

The main focus in the academic literature is not on CRMs but CMs in relation to human rights. The CM refers to four minerals and metals: tin, tungsten, tantalum and gold. The term refers to minerals that

are an important source of income for warlords in the East of the Democratic Republic of Congo (DRC) (Huber & Steininger, 2022). There has been legislation on CM in the EU since 2017 and became effective in 2021. The legislation requires companies to stop importing CM. The goal is to eliminate financing of the armed groups and social and human rights abuses. Avoiding the use of CM and managing human rights issues in the supply chain is challenging for companies (Silva & Schaltegger, 2019). A CRM that is extracted in the DRC and not on the CM list is cobalt. Cobalt extraction is linked with child labour, forced labour and dangerous working conditions. Similar working conditions are in the extraction of REE. A significant part of these mineral reserves is located and mined in fragile countries, with a low governance structure and political instability. Bad working conditions in the mines are likely to happen (Huber & Steininger, 2022). Extending the regulations beyond the CM list and analysing the material supply chain on ethical standards is recommended to secure and improve access to the fair and sustainable supply of raw materials (Huber & Steininger, 2022).

Human rights topics and indicators
Moving to ethical, sustainable and responsible mining of primary materials requires guidelines and schemes (Mudd, 2022). To address and scope the social issues in mining, frameworks are useful. The social standards in mining are divided into three categories: geopolitical risks, small-scale mining and human rights abuses. The three categories can be used to measure supply risks. Data relies on international statistics and indicators (Arendt et al., 2020; Bach et al., 2017). Arendt et al. (2020) added that these indicators are imported to consider as an addition to the supply risks when the EU CRM methodology will be updated. Bach et al. (2017) divided the category of human rights abuses into three subcategories child labour, forced labour and torture. Torture included extrajudicial killing and political imprisonment. For the two labour subcategories, the Social Hotspot database is applied, and for torture, the Cringranelli-Richards Human Rights Physical Integrity Rights Index is used (Bach et al., 2017).

To measure and assess the impact on human rights, indicators on human rights topics are useful. Human rights indicators are broadly defined and can be quantitative and qualitative (Malhotra, 2012). According to the UN, there is no comprehensive list of indicators for mining and processing of the materials (Personal communication, April 6, 2022). Although there is no comprehensive list of human rights indicators available, the Office of the High Commissioner for Human Rights referred to the International Council on Mining and Metals (ICMM) and Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) as leading business association working on sustainability issues (Personal communication, April 6, 2022). In the EU corporate sustainability due diligence proposal there is no list of possible human rights risks (EU Commission, 2022). The Dutch law related to corporate sustainability due diligence in the supply chain has a limited focus on child labour and excludes most other human rights risks (Ministerie van Buitenlandse zaken, 2019).

The report of KPMG (2022) provides an overview of those human rights topics that are most at risk of being affected within KPN activities and/or business relationships worldwide. The topics are identified by applying key internationally accepted reference points for human rights management. These topics are identified out of a list of topics based on the International Bill of Human Rights and the International Labour Organizations' Fundamental Principles and Rights at Work. The human rights topics apply to four types of rights holders. Right holders have affected stakeholders. These are employees, customers, supply chain workers and society at large. In this research, human rights topics are scoped within supply chain workers of the telecommunication sector (KPMG, 2022).

The United Nations (n.d. a) defined human rights indicators as: *"specific information on the state or condition of an object, event, activity or outcome that can be related to human rights norms and standards; that addresses and reflects human rights principles and concerns; and that can be used to assess and monitor the promotion and implementation of human rights".*

To measure human rights, indicators can be quantitative or qualitative. There are various data on human rights violations on international, national and regional levels. Moreover, it is important to consider that countries and regions have their own social and political attainments. What might differ in the level of realisation of human rights. The different development priorities within human rights make it not always possible to have a universal set of indicators. A welcome suggestion is to measure the universal core content of human rights. Besides that, selecting the indicators by applying the RIGHTS criteria: Relevant and Reliable, Independent, global and universally meaningful, human rights standards-centric, transparency, and simple and specific (Malhotra, 2012). The Organisation for Economic Co-operation and Development (OECD) guidance uses various indicators of human rights to identify conflict-affected high-risk areas and assess this on national and sub-national levels (Young et al., 2019; OECD, 2006).

For the mining and metals sector, there are additional standards on top of the generally recognized human rights (GRI, 2010). These additional standards are the United Nations Declaration on the Rights of Indigenous Peoples & Voluntary Principles on Security and Human Rights. To report on human rights, human rights performance indicators are applied. The Global Reporting Initiative (GRI) (2010) defined the core human rights performance indicators:

Investment and procurement practices: percentage of a total number of significant investment agreements that include human rights clauses or that have undergone human rights screening. Also the percentage of significant suppliers and contractors that have undergone screening on human rights and actions are taken.

Non-discrimination: total number of discriminations and actions taken.

Freedom of association and collective bargaining: operations identified in which the right to exercise freedom of association and collective bargaining may be at significant risk, and actions are taken to support these rights. Commentary added under compilation to report how freedom of association policy is implemented.

Abolition of Child labour: Operations are identified as having a significant risk for incidents of child labour, and measures are taken to contribute to the elimination of child labour.

Prevention of Forced and compulsory labour: Operations identified as having a significant risk for incidents of forced or compulsory labour, and measures to contribute to the elimination of forced or compulsory labour.

Indigenous rights: Total number of operations taking place in or adjacent to Indigenous Peoples' territories, and number and percentage of operations or sites where there are formal agreements with Indigenous Peoples' communities.

According to the UN Office of the High Commissioner for Human Rights (OHCHR), there is no comprehensive list of human rights indicators in the mining and processing of minerals (Personal communication, 6 April 2022). An interesting starting point is the International Council on Mining and Metals (ICMM) principles. The ICMM is the leading business association focused on sustainability issues. One of the ten principles is to respect human rights and undertake to uphold the UN Guiding Principles on Business and Human Rights (IMCC, 2020). The performance expectations within human rights are:

- Respect human rights: According to the UN guiding principles. Focusing on policy commitment and undertaking due diligence to respect and mitigate impacts.
- Avoid involuntary resettlement: which means the involuntary physical and economical displacement of families and communities.
- Manage security while protecting human rights: Consistent with the Voluntary Principles on Security and Human Rights.
- Respect the rights of workers: prevent the employment of child and forced labour, human trafficking, and other bad working conditions.
- Provide fair payment and working hours: by a competitive wage within the job market and legally assign regular and overtime working hours.
- Respect Indigenous Peoples: focussing on their rights, interests, aspirations, culture and natural resources-based livelihoods in the project design.
- Work to obtain free, prior and informed consent: related to the Indigenous people to respect their livelihoods.
- Promote workplace diversity: Implement policy and practices to respect women's rights and support diversity in the workplace.

The research of Kolotzek et al. (2018) developed a quantitative raw material assessment model for business processes. There are three sustainability dimensions: supply risk dimension, environmental dimension and social dimension (Kolotzek et al., 2018). The social dimension and corresponding indicators are displayed in figure 3.3. The model focuses on resource extraction and the upstream supply chain. The social dimension consists of three criteria and 18 sub-criteria. The social dimension has the most sub-criteria, compared to the supply risk dimension and environmental dimension (Kolotzek et al., 2018). The social impacts of mining operations can vary in terms of perception, time, and scale. Social impacts from mining focus on the local community, but also the wider social-political, and environmental context (Sairinen et al., 2021).
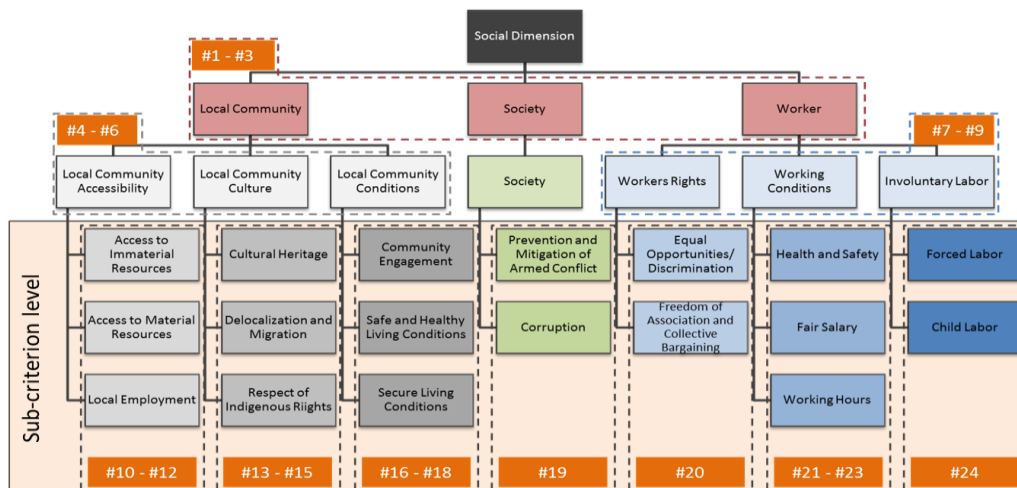
Figure 3.3: structure of the social dimension for the quantitative raw material assessment (Kolotzek et al., 2018).

Human Rights guidelines, directives and legislation
In 2011 the UN launched the business and human rights agenda. The goal is to address and prevent the human rights impacts linked with all business activities. Business enterprises are expected to respect human rights even if states do not fulfil their human rights obligations. This means that companies also have the responsibility to undertake human rights due diligence. Human rights due diligence focus on understanding, avoiding and addressing negative human rights impacts (United

Nations, 2011). The human rights due diligence process are defined by the guiding principles of business and human rights, United Nations (2011) as:

"To identify, prevent, mitigate and account for how business enterprises address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed" (p.17).

The guiding principles on business and human rights include that human rights due diligence should include own activities and links to the operations, products and services. Due diligence varies in complexity according to the size of the business enterprise, risk of the human rights impact, and context of operations. Due diligence is an ongoing process and human risks change over time, because of the evolving business enterprise's operations (United Nations, 2011).

Human rights are linked to the SDG. Over 90% of the SDG targets are directly connected to human rights instruments and labour standards (United Nations, 2011; WBA, 2021). The business and human rights agenda in 2011, resulted in human rights guidelines on a national level for the Netherlands. Companies have the responsibility to protect, respect and remedy human rights (Ministerie van Buitenlandse Zaken, 2011). The human rights impact assessment consists of an assessment of the social, health and environmental assessments. Addressing the human rights challenges requires continuous data collection, analysis and appropriate responses by companies in a proactive way (Salcito et al., 2014).

State laws can regulate business companies to respect human rights (United Nations, 2011). Within Europe, the French Duty of Vigilance law and the German national action plan on business and human rights are examples of assessing and managing social supply chain issues (Silva & Schaltegger, 2019). On February 23th 2022 the European Commission accepted the Corporate Sustainability Due Diligence and amended the Directive proposal. The directive is applied to companies that are based within the EU or operating within the EU and have a revenue of 150 million euros. The directive also applies to companies that have a revenue of 40 million within the EU and at least 50% is generated by sectors with a high impact. One of these sectors is the extraction of mineral resources and the production of metals. Companies are restricted to include environmental and human rights impacts in their value chain. Human rights should be incorporated into the business decisions of the companies, and become part of the company's resilience in the longer term. Incorporating the behaviour of the company is in line with the European Green Deal and Sustainable Development Goals. EU companies have various suppliers and complex value chains. Identifying the adverse human rights impacts becomes easier if more companies apply due diligence (European Commission, 2022). However, companies can encounter difficulties in due diligence in terms of obligations, complex value chains, market pressure, information deficiencies, and costs. The directive applies to the sector and product-specific value chain, including the import of CM from responsible and conflict-free sources. The due diligence of this directive also implies additional minerals that produce human rights adverse impacts (European Commission, 2022). Therefore, the directive can have a large effect on material sourcing and supply chain strategies for the companies. The CM represented a small fraction of the product components and had a large effect on sourcing and supply strategy (Silva & Schaltegger, 2019). In the past, only the CM were legally binding on social regulations (Wall et al., 2017). For example, cobalt and REE are not part of the CM but are linked with human rights abuses (Huber & Steininger, 2022).

Responsible sourcing initiatives and due diligence
Minimising the negative social effects is part of responsible sourcing (Wall et al., 2017). Young, Fernandes & Wood (2019) define responsible sourcing of minerals and metals:

"How multinational manufacturing firms manage supply chains to improve supply chain transparency and reduce negative impacts at lower-tier suppliers and supply chains"(p.2).

The responsible sourcing initiatives come from the companies. The main purpose is to satisfy investment banks and raise capital, gain approval from their host community to operate and comply with the laws of the countries in which they operate (Wall et al., 2017). For a couple of years, responsible sourcing initiatives are rising. Standards on sustainability programs and certification of these standards is a growing approach in the business supply chains (Young et al., 2019). This resulted in different responsible sourcing programs for CRMs and most of the mining companies tried to commit to these systems. Although there are many different programs in practice, it is hard to identify clear responsibility guidelines in mining activities (Wall et al., 2017). The world's largest mining companies are required to report on sustainability in mining, but there are no requirements for certification regimes. It makes clear that applying ethical standards is needed, but this complex requires further thought and enquiry (Mudd, 2022). Besides the mining companies, top-tier firms participate in certification and audit processes, to manage the risks. The most well-known social management approach is the OECD due diligence guidance. In this guidance, the focus is on responsible mineral supply chains from conflict and high-risk areas. The guidance is voluntary based and tries to secure human rights. Although guidelines are helpful, it is seen as insufficient because additional methods are lacking (Silva & Schaltegger, 2019). Huber and Steininger (2022) explain the five-step OECD due diligence guidance. The guidance focuses on respecting human rights and avoiding sourcing minerals or metals from conflict-affected and high-risk areas. The OECD guidance is acting as a legal standard on a global level and applies to all minerals and metals in the supply chain (OECD, 2016). These are the following OECD guidance 5 steps:

1. Establish strong company management systems.
2. Identify and assess risks in the supply chain.
3. Design and implement a strategy to respond to identified risks.
4. Due diligence auditing at identified points in the supply chain, carried out by independent third-party audits.
5. Report on supply chain due diligence

A sixth step that is not named in the mineral supply chain due diligence, but named in the general OECD Due Diligence Guidance for Responsible Business Conduct is: to provide or corporate in remediation when appropriate. This step is only applicable to smelters and refiners (OECD, 2018).
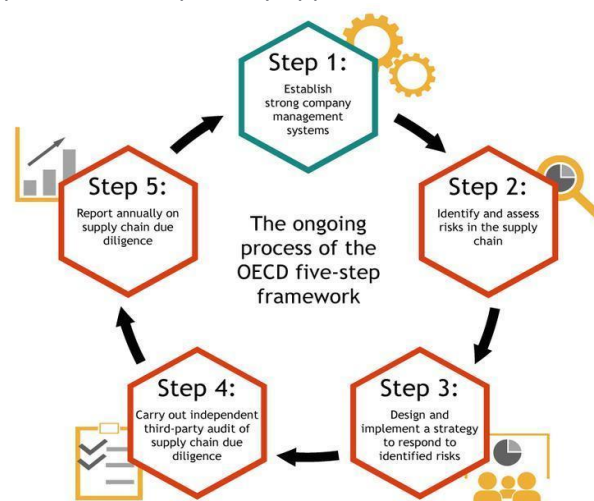
Figure 3.4: The OECD five-step due diligence framework in the mineral supply chain (source: EPRM, n.d.).

When companies focus on mandatory certification, it could negatively affect the employment situation in these areas. Companies won't source in these conflict areas and mineral export declines. The result is that revenues for governments and regions are reduced and economic and social development is affected. A possible result, is bad working conditions in the mines (Mancini & Sala, 2018).

Developing standards and auditing is not always the way to fit with the local communities. It creates legitimacy in the corporate world, but critical thinking is required about how these practices affect the communities. Communities have their own culture and behaviour which should be understood well in the field of mining (Armstrong et al., 2014).

Supply chain complexity
Globalisation and an increase in international supply chains make it extremely difficult to trace the extraction and processing location of the materials. Therefore, it is challenging to identify possible human rights abuses. Around two-thirds of the companies are not able to locate the country of origin of the minerals and face risks in terms of human rights violations in the supply chain (Huber & Steininger, 2022). These downstream firms are concerned about the risks but have limited sight of their suppliers (Young et al., 2019).

The complex supply chain of tin, tantalum and tungsten is displayed in figure 3.5. The figure is more or less representative for CRMs because tantalum and tungsten are also a CRM. The large gap in mid-tier suppliers makes it hard to identify the lower-tier suppliers for the top-tier firm. Besides the identification of these suppliers, managing the CRM suppliers is also a challenge. A possibility to identify and engage with suppliers is by jumping the chain. Jumping the chain means engaging directly with lower-tier suppliers. The focus is to engage with smelters and refiners, located at a focal point in the supply chain. Top-tier firms engage with them by emailing and sight visits. The top-tier firms provide financial incentives to smelters and refiners to implement due diligence systems. However, jumping the chain is uncertain if the top-tier supplier engages directly with a smelter and refinery that may not be their actual physical supplier (Young et al., 2019). Besides the complex supply chain and having an understanding on a theoretical level, the practical implementation needs additional clarification. Moreover, governance initiatives on minerals and metals are an emerging concept in scientific research and new methods and data collection are welcome. Lastly, responsible sourcing and due diligence in the supply chain practices by companies cannot be easily linked with tangible outcomes regarding improved human rights. Fieldwork on case studies is desirable to assess human rights circumstances and improve human rights in the mining areas (Young et al., 2019).
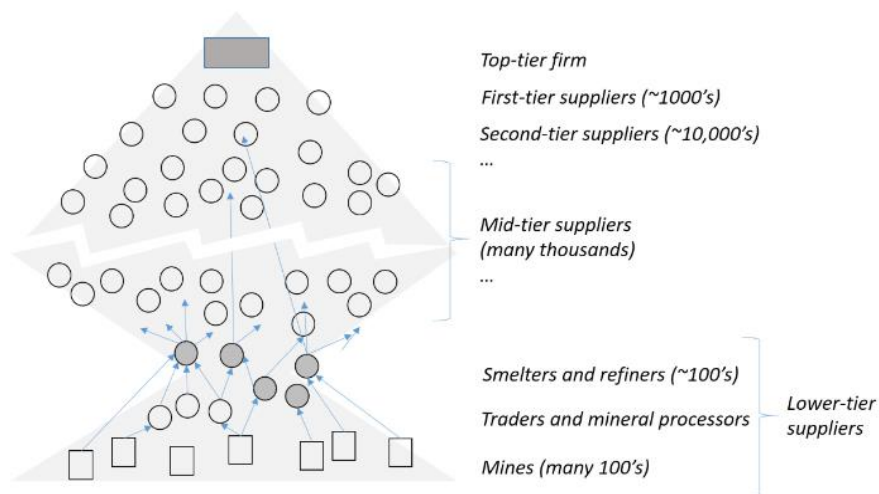
Figure 3.5. Schematic supply chain overview of tin, tantalum, tungsten to top-tier firm (Young et al., 2019).

Strategic action: Strategic management in business

In general, strategy is a set of coordinated actions to achieve a given purpose. The actions involve the deployment of resources, where a perceived opportunity is translated into successful outcomes (White, 2017). The strategy gives direction and scope to an organisation over the long term. The strategy gives the company an advantage in a changing environment through its configuration of resources and competencies. Important concepts in strategic management are that the situation is uncertain, complex, organisation-wide, fundamental change and long-term implications. Strategic management differs compared to operational management which is considered routinised, operationally specific and focused on the short-term implications. Strategic management includes an understanding of the strategic position of a company, strategic choices for the future, and turning strategy into action (Johnson & Scholes, 2002). Johnson and Scholes (2002) explore the three keystones in strategic management: the strategic position, strategic choices, and strategy into action:

The strategic position of a company relates to the external environment. Changes in the environment affect the position of the company. There is also a relation between internal resources and competencies. This is the strategic capability of a company, in other words also considered as strengths and weaknesses. At last, there is a link between the expectations and purposes within the cultural and political framework of a company. These three elements make up the strategic position of a company.

Strategic choices are described as the involvement of understanding the underlying bases for further strategy and the options for developing strategy in terms of both directions and methods of development. Strategy into action is about translating the strategy into working in practice. The strategy is carried out by structuring the process, enabling success, and involves a change in the organisation of the company (Johnson et al., 2002).

The elements of the model are grouped in five main stages: strategic analysis, environmental analysis, strategic choice, strategy implementation and strategy evaluation and control. These stages are applied in developing the strategy for KPN on managing human rights in primary CRM supply. The stages are shown in the model of the strategic management process, figure 3.6 (David, 2009).
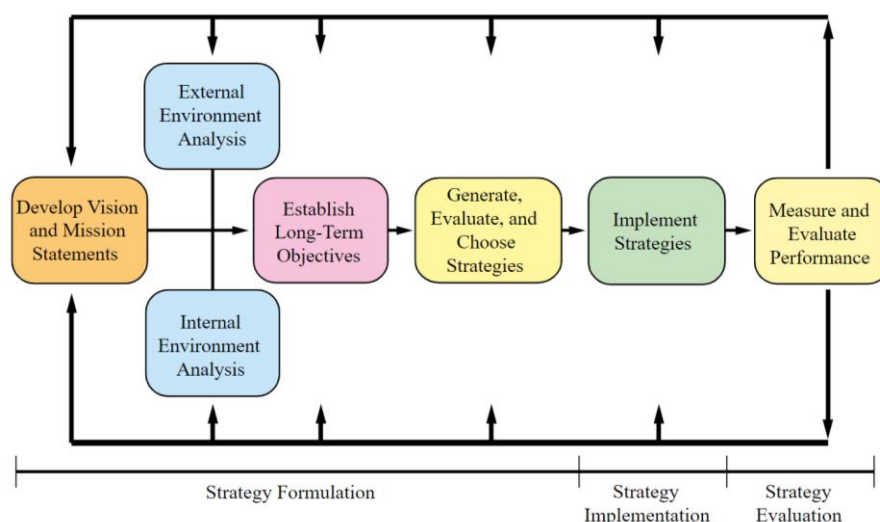
Figure 3.6: Model of the Strategic Management Process (David, 2009 p.46).

3.3 Expert interviews on human rights in primary CRM mining

Five expert interviews were conducted. Experts interviews were conducted because the literature on the topic of human rights in the context of CRMs supply is limited. The expert interviews contributed

to identifying drivers and barriers for telecommunication companies in managing human rights challenges, in the context of primary critical raw material mining.

Table 3.1: Overview of the expert interviews.

Expert	Company	Function
A	Fairphone	Circular Material Chains Innovator
B	Clingendael energy institute	Researcher
C	In2Waste | A&M Groep	Sustainability consultant
D	KPN	Manager CSR
E	Leiden University	Phd candidate ASM

Within the auditing system, a couple of barriers were discovered related to addressing human rights issues in the upstream part of the supply chain. According to telecommunication company KPN it is not possible to jump from tier 3 to the lower-tier suppliers in the complex supply chain. The auditing system is based on tracing the first tiers and the middle tiers first, before entering the lower tier suppliers. There is not enough capacity and budget available to audit the middle tiers before ending up at the lower tier suppliers (Expert D, personal communication, 2022). Moreover, certification systems are expensive. The EU directive proposal on human rights due diligence in the supply chain drives the telecommunication companies to do much more, compared to the current situation. Telecommunication company KPN responded:

"We already checked if it was possible to extend the auditing to tier 10 in our supply chain, but this was not realistic due to the huge amount of costs." (Expert D, personal communication, 2022)

Besides the costs and complexity of the auditing process, there are no specific audits on mining in the JAC methodology. Audits are based on tiers 1, 2, and 3. These suppliers are different in terms of operations compared to lower-tier suppliers. Moreover, KPN suggested that auditing mines can be an operational problem because mines are located in remote areas (Expert C, personal communication, 2022). In addition, within the audit methodology, it is important to consider the type of material. Most materials are extracted and processed in different ways, and therefore different setups are required to measure human rights challenges. Materials can be extracted at a specific location, but purified in other parts of the world (Expert E, personal communication, 2022). Overall, experts see the auditing methodology as a standardised process with limited possibilities to solve complex social issues, such as human rights.

There are several limitations explained by experts on having an auditing system. The suggestion is to start with mitigating human rights challenges for a couple of materials. Fairphone suggested starting with defining a list of focus materials. Materials and in particular CRMs are contained in telecom equipment. Defining a list of materials that are the most relevant for telco equipment. Select the focus materials that are widely used in the (IT) digitalization sector, and also have a high impact related to environmental and social aspects. Materials where telecommunication equipment uses a notable share of the production. Only if you are a relevant user in the industry, industry efforts can achieve changes in the extraction and processing of the materials. The main using industries of materials should take the lead in improving since they have the most leverage. For these focus materials, the telecommunication sector can create a positive impact. Name these focus materials instead of CRMs (Expert A, personal communication, 2022). Besides the materials, it is important to consider which human rights are the most important in mining. Solving all human rights challenges is something idealistic. However, it is possible to measure and assess human rights, focusing on a couple of human rights risks (Expert C, personal communication, 2022). One of the experts suggested that the focus

could be on the top-tier suppliers and the lower-tier suppliers. The top-tier suppliers are already audited and an additional system could be designed to audit the lower tiers in the supply chain. Auditing the middle tiers requires a large audit capacity because there are relatively large groups of middle tiers and they are small in size (Expert C, personal communication, 2022).

Besides the list of materials and human rights risks, a suggestion is to take into account the LSM sector as well as the ASM sector. Certified mining can't meet the material demand. Having certified mines up and running takes decades and the ASM sector fills the supply chain gap. Therefore the focus on artisanal small-scale mining (ASM) is important. However, companies that try to avoid working with the ASM sector ignore the issues in this sector. Improving the conditions is necessary because ASM is part of the supply chain (Expert A, personal communication, 2022). Focus on process, progress, diversity and local context instead of standardised checklists. A checklist typically does not consider context or temporality and can be especially discriminatory and exclude artisanal and small-scale mining due to the typically highly complex social and technological organisation associated with ASM (Expert E, personal communication, 2022). Companies that have an audit system in place are likely to work with the LSM sector that meets the audit criteria.

People working in the ASM sector don't know the current material prices. Moreover, in the ASM sector worker equipment is limited, and workers can't do something else instead of mining. ASM workers are dependent on this livelihood. ASM workers are dependent on local traders who determine the price because ASM workers have limited knowledge (Expert A, personal communication, 2022). The ASM sector is considered informal or illegal, however, a lot of these miners want to become formal but don't have the financial ability. Parts of the ASM sector legalised the activities and they still have the benefits. Government is partly responsible for these developments (Expert E, personal communication, 2022). Involving the ASM sector is important to fill the supply chain gap and improve the human rights situation simultaneously (Personal communication E, 2022). The types of human rights risks depend on the type of size of the mine and if it is controlled by the government (Expert C, personal communication, 2022). The types of human rights risks might differ for ASM. It is important to make the distinctions between the risks and how to measure those risks. Auditing ASM might focus on a couple of risks where there is room for improvement of the situation and LSM auditing requires a more broad range of audits. In ASM, children help with simple tasks, this is considered child work, unlike child labour. The money earned in the ASM sector is used to pay school fees for their children or used for the development of local communities (Expert E, personal communication, 2022). In the current auditing methodologies, the focus is on checklists, which is in favour of the larger companies who can invest and fulfil these criteria. The telecommunication sector needs to ask itself if auditing all human rights risks in mining is the right strategy. The question is, is auditing a valuable contribution to the local community or more in favour of the LSM sector (Expert E, personal communication, 2022).

To extend the auditing system to the lower tier suppliers, money is an issue within the telecommunication sector. Sustainable production requires investments. Most people find sustainability an important topic, but consumers don't want to pay the price or can't pay the price. Therefore, a societal switch is desirable and consumer awareness is an important theme. KPN can take the lead in responsible telecommunication products, but consumers need to prepare for paying a higher price. An option to extend auditing is to involve the consumer in the process and offer fair telecom subscriptions to customers. People pay a higher price for their subscriptions, and the money is used to invest in mitigating human rights issues in the supply chain. Diversifying the subscriptions by providing a voluntary option to pay extra costs. These costs are based on true pricing. This is a small step in the process but can already help to make a start with mitigating human rights risks. KPN can distinguish itself as a telecommunication provider in the market and make people aware of the human

rights situation. A couple of improvements in human rights can already have a large effect on the price. Constantly take into account that KPN wants to keep its competitiveness (Expert C, personal communication, 2022). Another expert explains that fairly sourcing the materials, in countries with high human rights standards means that the production costs probably will increase. Costs for materials will increase, but there is a possibility that it turns out better than expected for telecommunication companies. Material costs increase a bit which turns out in less profitable for producers. Telecommunication companies have more control over their supply chain and control the environmental and social standards (Expert B, personal communication, 2022).

Other results show that developing alternative models and strategic action is a possibility to address the human rights challenges. Possibilities are to focus on collaboration with companies that can measure and assess human rights challenges in the upstream supply chain, even if these mines or processing plants are not part of the telecommunication supply chain (Expert D, personal communication, 2022). The other way around is to invest time and money in the ASM sector to improve human rights conditions, contributing to the development of local communities (Expert E, personal communication, 2022). Another option is providing education to the local communities near the mines. Education is the core to start with ending poverty and education. The LSM companies can facilitate education. A couple of hours of education during the working days helps already a lot. If LSM offers education to ASM workers and tries to collaborate with them it is a positive development for both groups or increases the number of certified mines. However, LSM companies must take the lead for this opportunity (Expert C, personal communication, 2022).

The responsibility is on the telecommunication companies because they offer products to their consumers. KPN sets up the requirements for the products and direct suppliers can communicate these requirements to the indirect suppliers. The question is how KPN can increase the pressure on the suppliers to provide transparency. There are many suppliers involved, therefore product focus helps to start with the process. A roadmap helps to set and reach the targets and try to collaborate more with suppliers that aim at mitigating human rights risks in the supply chain (Expert C, personal communication, 2022).

Table 3.2 shows the internal and external drivers and barriers. The main barriers are that it is a long and complex supply chain, and human rights challenges are diverse and complex to solve. The budget and capacity of telecommunication companies are limited. Addressing human rights challenges requires decisiveness from telecommunication companies to extend the auditing system or develop an alternative approach to tackle the challenges.

Table 3.2 SWOT analysis of the drivers and barriers.

Strength	Weakness	Opportunity	Threats
SDG: Responsible consumption and production embedded in KPN strategy	KPN is dependable on CRM supply	Responsible sourcing initiatives are rising	Primary CRM mining is linked to human rights challenges
KPN is a member of the JAC, that offers possibilities for collaboration on a shared problem	No strategy in place managing human rights risks in primary CRM supply	Define a list of focus materials and prioritise human rights challenges	Growing CRM demand can increase human rights challenges
KPN has conducted previous research on CRM supply	Risks reputational image and financial penalties when human rights challenges are not managed	The UN launched the business and human rights agenda in 2011	Most materials are extracted and processed in different ways, and therefore different set ups are required to manage human rights challenges
KPN has identified the human rights topics in their supply chain	KPN has long and complex CRM supply chains.	The OECD guidance is acting as a legal standard on a global level and applies to all minerals and metals in the supply chain	Developing standards and auditing is not always a good approach, especially in ASM
	KPN has limited capacity and budget to manage human rights challenges.	European Commission accepted the directive: Corporate Sustainability Due Diligence proposal in 2022	Limited scientific research on human rights in relation with primary CRM supply
	Material certification systems are expensive.	Consider the LSM sector as well as the ASM sector. Certified mining can't meet the material demand	End-user companies need help from other stakeholders to manage human rights challenges by a collective approach
	KPN encounters difficulties in due diligence, in terms of market pressure and information deficiencies	Mapping CRM supply helps to prevent supply chain disruptions and identify the risks	Human rights are broadly defined and hard to measure. No comprehensive list of Human Rights indicators in mining

4. Case study results on cobalt mining in Katanga

This chapter focuses on a single case study: cobalt mining in the Katanga region, DRC. The chapter discusses what the human rights situation is in the mining area and which human rights challenges appear in the extraction of cobalt.

4.1 Case selection CRM supply and human rights

To find a potential case study, the methodology steps for selecting a single case study were applied. In total 43 elements from the Periodic Table are contained in telecom equipment (Kleinmagd, 2020; Flik, 2021). The main global supplier country is China. Other global main sourcing countries are South-Africa and DRC. China is the main global supplier of 30 individual materials (EU Commission, 2020). A human rights score of 0 means an average score relative to all countries. A score of 1 is one standard deviation better than the mean. The human rights protection score of China was -1.20 in 2019. The global main sourcing country of CRM that scored the lowest was the DRC, with -1,81 (Faris et al., 2020). The available data on human rights in the context of CRM supply in China is limited (personal communication expert A, 2022). The DRC is a country with a poor human rights score. Cobalt is a CRM that is not part of the CMs. However, human rights abuses are linked to cobalt extraction (Huber and Steininger, 2022). Moreover, NGOs reported human rights abuses in cobalt mining (Amnesty International, 2016).

The research focuses on cobalt extraction in the DRC. The DRC is the main global supplier, with a share of 59% (EU Commission, 2020). Cobalt occurred in three of the four main telecommunication products, and cobalt was identified in three of the four future telecommunication technologies, namely: 5G Technologies, Photonics and Edge Computing (Kleinmagd, 2020; Flik, 2021). The DRC has the poorest score on human rights compared to other global supplier countries of CRMs (Fariss et al., 2020). The DRC ranks 176 out of 187 countries on the UN Development Index (Härkönen, 2018). Cobalt is extracted in the same country as the CMs, and the supply of this CRM is linked to human rights challenges (Young et al., 2019). Cobalt is extracted in the southern part of the DRC. CMs are extracted in the east side of the country, which face heavy conflicts and human rights abuses. However, internal conflicts in the DRC have recently spread to the southern part of the country (Härkönen, 2018). An overview of the CRMs, and human rights score per global sourcing country is visualised in figure 4.1. The zoomed-in version is shown in appendix A.
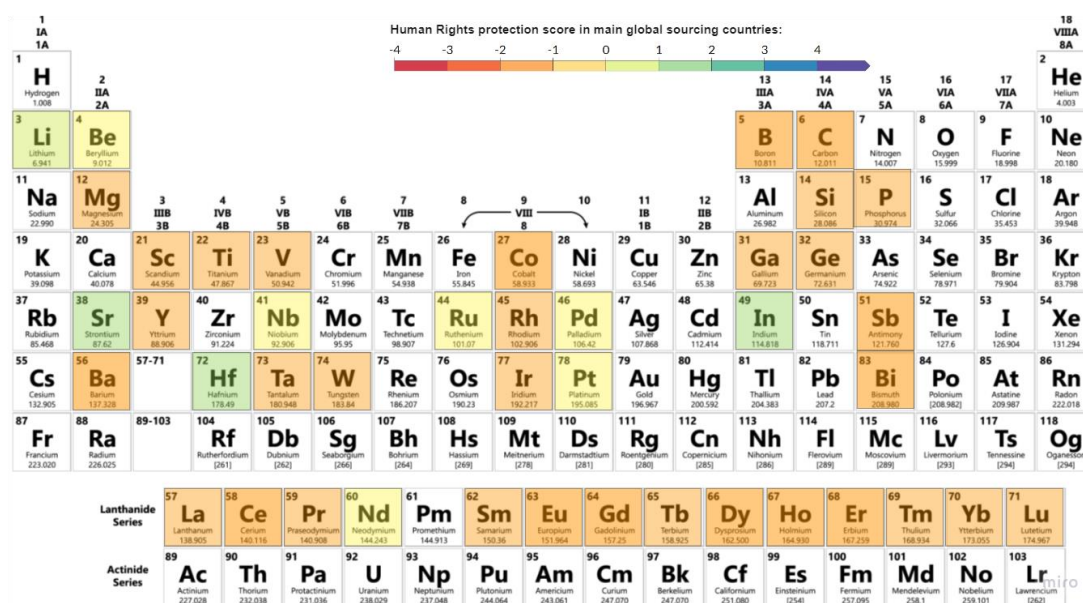
Figure 4.1: Overview of CRMs contained in all future technologies, including human rights score in main global sourcing countries per CRM.

4.2 Cobalt

Cobalt, also known as Co is part of Group 9 of the Periodic Table. Cobalt is a CRM, because of its high economic importance and supply risks. The material is used in various industries and is strategically important for countries. Cobalt is applied in the digitization industry, but also electronics, renewable energy and automotive industry (European Commission, 2020). More specifically, cobalt is applied in lithium-ion batteries used in electronic devices and electric vehicles (Van den Brink et al., 2020). Specifically for telecommunication equipment, a substantial amount of cobalt is contained in smart batteries (Park, 2021). More than 50% of the world's cobalt is used in batteries for mobile phones, computers and electric vehicles (Sovacool, 2019). Moreover, cobalt is contained in integrated circuits that are part of modern life. Focussing on smart devices, TVs, computers or other domestic applications. Also, semiconductors used cobalt for the chips, which is essential to make modern electronics work (Cobalt Institute, n.d.). Because of its high importance, it is expected that cobalt will quadruple in the next 40 years and other studies expect an even larger growth. Primary cobalt mining is unavoidable to meet the demand. Cobalt is mined as a by-product. Around 70% of cobalt is a by-product of copper and 20% is a by-product of nickel (Van den Brink et al., 2020).
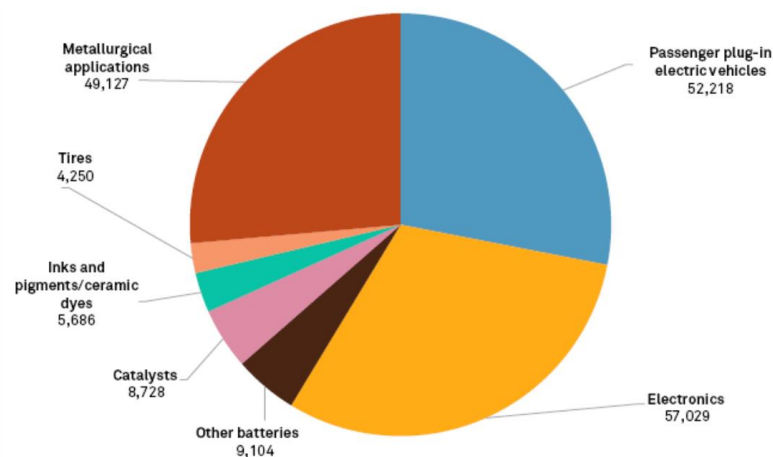
Figure 4.2: Estimated tonnes of global cobalt consumption in 2022 (S&P Global Market Intelligence, 2022).

4.3 Katanga Copperbelt

Cobalt production is geographically concentrated, around 60% of the world's cobalt originated from Congo (EU Commission, 2020). More specifically, cobalt mining takes place in the southern part of Congo: Katanga copperbelt. Several NGOs reported human rights abuses related to mining in Congo (Van de Brink et al., 2020). The country, region and mining sector are further explored, in the context of the human rights.

Haut-Katanga and Lualaba are provinces located in the south of the DRC (Maiotti & Katz, 2019). The province has been well known for its intensive mining activities for centuries. Mining activities started in the colonial period. Belgian authorised Congo, extraction of copper, cobalt and uranium was a main source of revenue for Belgium (Banza et al., 2009). It was beneficial to extract copper in Congo and resulted in a copper rush around 1900. Copper was an essential material for electricity infrastructure and the amount of copper quadrupled within 20 years (Pirard, 2010). An increase in mining activities resulted in a need for more miners and which had major consequences for agricultural land and the Congolese population (Buelens & Marysse, 2009). The DRC became independent in 1960. The DRC is located in the heart of Africa with more than 250 ethnic groups, various natural resources and sharing borders with 9 other countries. The state mining companies represented more than 60% of the national export income. The principal minerals are located at the border areas. After independence,

several conflicts occurred that resulted in civil wars. This was also described as 'the curse of raw materials. Resources were the main reason for conflicts and dictatorships, which resulted in human rights violations (Mazalto, 2009). In 1990, the state-owned mining company Gécamines was bankrupt due to numerous crises. International organisations called for the privatisation of the mining industry. However, the formal and informal sectors were characterised by corruption (Scheele, de Haan & Kiezebrink, 2016).

At present, the former Katanga region is also known as the "Katanga Copperbelt", because of its concentrated copper and cobalt reserves. Cobalt is extracted and supplied to the global market. Within the Katanga mining industry structural human rights violations and environmental damage took place. More specific environmental, health, land and livelihood rights violations occurred (Scheele et al., 2016). Katanga is relatively peaceful compared to the eastern part of Congo, where CM is mined. However, armed groups are not controlling this region, the region is considered unstable, violent and has little rule of law (Scheele et al., 2016). There are limited statistics available on human development at a regional scale. The DRC is ranked 186 out of 187 territories. Comparing 2015 with 1980, the DRC had a limited progression rate on the Human Development Index. Estimated that 88% of the inhabitants live in poverty (Scheele et al., 2016).

Figure 4.3: Former Katanga in the DRC, Lualaba and Haut-Katanga are two provinces within the south of the former Katanga province known for its rich copper and cobalt reserves (Scheele et al., 2016).

4.4 Introduction LSM and ASM sector

The DRC supplies around 60-70 percent of the total global supply. Around 70-80% comes from large-scale mining (LSM) and 20-30% is supplied by artisanal small-scale mining (ASM). An important note is that a significant number of LSM operators also source the ASM cobalt which is blended with cobalt from the LSM sector at various points in the supply chain. The supply chains of ASM and LSM mining are interlinked with each other (Maiotti & Katz, 2019). Around 90% of the cobalt miners work in the ASM sector and around 10% of the workers in the LSM sector (Callaway, 2018). What results is that the cobalt production per LSM worker is higher compared to an ASM worker. The other way around is that within the ASM sector a large group of workers depend on cobalt production for their livelihood. The percentages are visualised in figure 4.4.

Figure 4.4: Percentage amount of workers and extracted cobalt for LSM and ASM in Katanga (Made by author).

4.4.1 LSM sector

Large scale and industrial mining sector focuses on larger machinery. The sector is focused on mechanisation and automation (Sovacool, 2019). Nine out of the ten largest cobalt mines are located in Katanga (Mining Technology, 2021). Large investments in South-DRC from LSM companies started after the second civil war ended in 2003. The LSM companies took over most mining concessions in the DRC and put pressure on the ASM sector. This results in the fact the LSM sector has better preconditions for extracting and selling minerals. In terms of volume, the extraction, processing and export are larger compared to the ASM sector. Lastly, there is a financial advantage in the LSM sector due to the large volume. The growing influence of companies and other actors in the mining sector excludes ASM from entering LSM sites (Katz-Lavigne, 2020). Within the LSM sector, 8 of the 14 largest cobalt mines in the DRC are Chinese-owned and extracted almost half of the DRC output (Maiotti & Katz, 2019). The LSM sector is the main sector for cobalt production, in terms of volume. The LSM sector is highly diversified. Cobalt mining takes place in different contexts and mining permits vary from 1 square kilometre to 100 square kilometres (Maiotti & Katz, 2020).
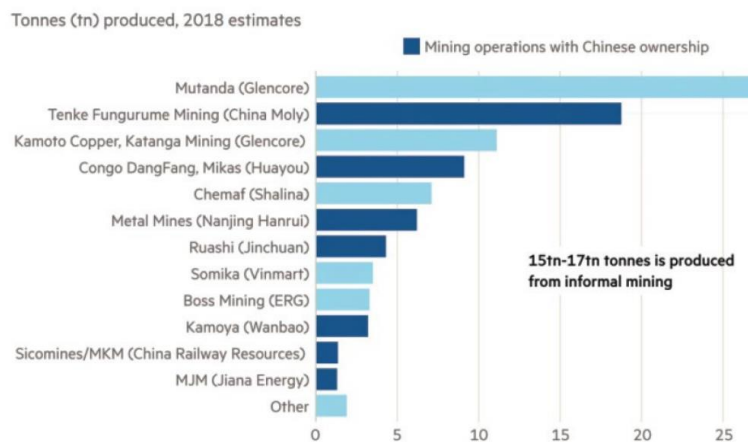
Figure 4.5: Mining companies extracting cobalt in the DRC (Maiotti & Katz, 2019).

4.4.2 ASM sector

ASM cobalt mining is characterised by a low degree of mechanisation. The sector offers opportunities to many individuals and teams who are collaborating in the value chain. The ASM value chain consists of mining, transport, washing, sorting, and buying cobalt. The diverse activities offer attractive opportunities for men and women and generate immediate cash flows (Stewart Carter & Strumes, 2020). People operating in the ASM sector are a combination of landowners and migrant entrepreneurs. The ASM sector accelerated during the Congolese wars in the 1990s and early 2000s because the LSM sector deteriorated during this period (Tsurukawa et al., 2011; Sovacool, 2019). Estimates are that in Katanga and Lualaba around 140,000 and 200,000 artisanal miners operate regularly in cobalt and copper. Around 50,000 work on a seasonal basis (Sovacool, 2019; Maiotti & Katz, 2019). Within the DRC 1.2 million people are working in the ASM sector and 10 million people

indirectly benefit from this activity. The ASM sector is the second largest employment sector. The sector is considered as informal and often illegally characterised (Banza Lubaba Nkulu et al., 2018). Therefore, artisanal miners are seen as the weakest actors in the supply chain (Katz-Lavigne, 2020). ASM takes place in different setups and is seen as a diversified sector. It is mainly categorised into three categories:

Zone d'Exploitation Artisanale (ZEAs) are areas appointed by the government. These areas are specifically for ASM and managed by a cooperative. In the province of Lualaba, there are around 60 ZEAs, but only one is operational at the moment. The reasons are that most of these deposits are already exploited in the past by the former mining state company and other potential zones are not yet explored or developed because it is a costly process (Stewart Carter & Strumes, 2020). Around 74% of the miners operate in the ZEAs (Callaway, 2018).

Permis d'Exploration (PE) are areas with a mining licence. These areas are controlled by LSM operators. ASM operators have the availability to work in the areas if an agreement is signed. Mostly, this is not the case and ASM operators work illegally in these areas (Stewart Carter & Strumes, 2020). Around 16% of the miners operate in the PE areas (Callaway, 2018).

Permis de Recherches (PRs) are exploration permits for the ASM and LSM sector. The only focus is on exploration and not operation. Therefore, mining and selling minerals are illegal by ASM miners and it is hard to estimate how many miners are operating in these areas (Stewart Carter & Strumes, 2020).

4.4.3 The interface between LSM and ASM sector

The LSM and ASM sector are seen as two different types of sectors. There is interaction and interface between these sectors in the upstream supply chain. This can be either commercially or physically. Interferences can be beneficial in terms of cooperation, but also result in conflicts, see figure 4.6 (Maiotti & Katz, 2019). LSM is differentiated in terms of size and ASM has different kinds of setups. The ASM sector can supply cobalt to the LSM sector, however, a legal framework for collaboration between these two sectors is missing. This results in inaccurate documentation of the origin of cobalt from the ASM sector (Maiotti & Katz, 2019). An example is that LSM companies in the DRC extract copper from a large-scale mine. In the same pit, ASM workers extract nickel and cobalt, because both materials are less of economic interest to LSM companies (Kemp & Owen, 2019).

Besides the fact that cobalt is outsourced by the LSM sector to ASM workers that extract cobalt and flow into the LSM sector. Another important note is that in some LSM cases subcontracting takes place. In subcontracting, the mining companies outsource the menial tasks to day labourers or unskilled workers (Calvão, Mcdonald & Bolay, 2021). Subcontracting in the LSM sector is considered as a non-transparent business. Subcontracting activities are blasting and construction at the mining sides for example (Callaway, 2018). Workers that are employed through subcontractors face exploitation. Within the LSM sector, multinational mining companies make use of subcontractors. The problem is that LSM companies treat the subcontractors well, but the subcontractors don't treat the workers well (Pattisson, 2021). The interface between LSM and ASM sectors results in unreliable documentation of cobalt produced by ASM workers, compared to LSM workers (Callaway, 2018). The DRC law allows hiring employees through subcontracting for a maximum of 40% of the total employees in the mines (Morse, 2022). Examples shown that the average percentage subcontractors hired is 57% and at one of the LSM companies even 68% of the total employees. However the government has a legal framework for protecting workers, the problem is limited enforcement of this framework in practice (Pattisson, 2021; Morse, 2022).
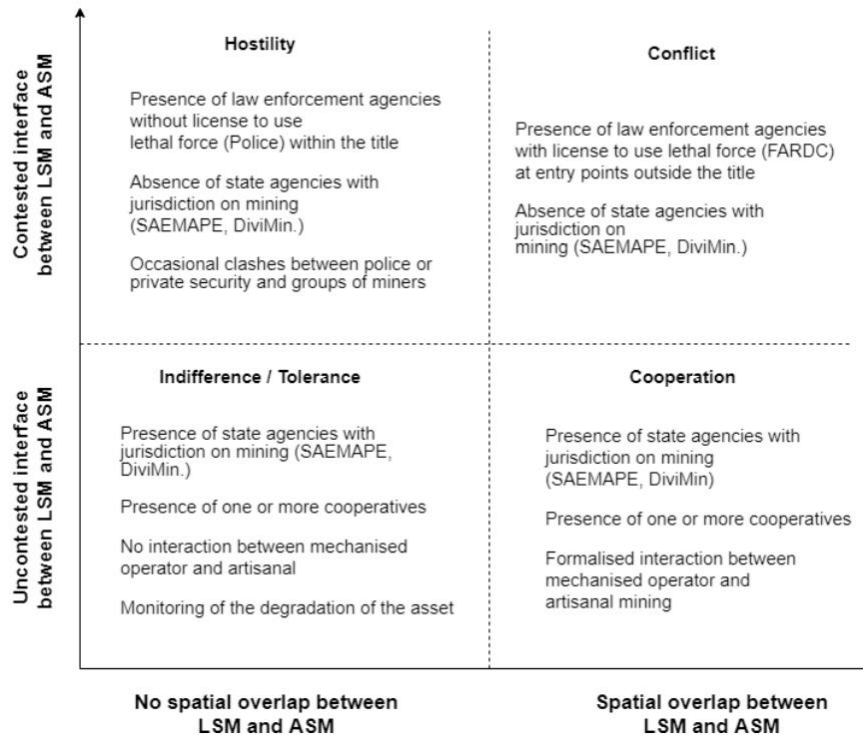
Figure 4.6: Types of ASM-LSM interfaces (Maiotti & Katz, 2019).

4.4.4 LSM & ASM connection with the upstream supply chain.

The extraction of cobalt is the first step in the supply chain, by LSM or ASM. Other stages in the upstream part of the supply chain are trading, transportation and processing and refining cobalt, see figure 4.7 (Maiotti & Katz, 2019). Metal processing is the next step after cobalt extraction. This step is essential to elevating the grade of the material to commercial quality. Simply transforming ores into metals. After the cobalt is refined, concentrates are transported to port cities outside the DRC: Dar es Salaam, Beira or Durban. The refined cobalt is predominantly shipped to China. China produces 80% of the world's cobalt chemicals and represents the vast majority of refining capacity. Other refiners are located in Finland and Belgium. The amount of cobalt refiners is limited and refiners are considered by the OECD as control points in the supply chain (Maiotti & Katz, 2019). Further up in the supply chain cobalt is mixed with other minerals around the world and enters the downstream part of the supply chain. Human rights due diligence on extracted minerals becomes increasingly complex when minerals are mixed (Martin-Ortega, 2014). China is predominantly present in the upstream part of the global supply chain, especially in the processing part. That allows China to secure cobalt to manufacture products that require this type of material. China dominates the market for manufacturing lithium-ion batteries that requires an input of cobalt (Gulley et al., 2019).
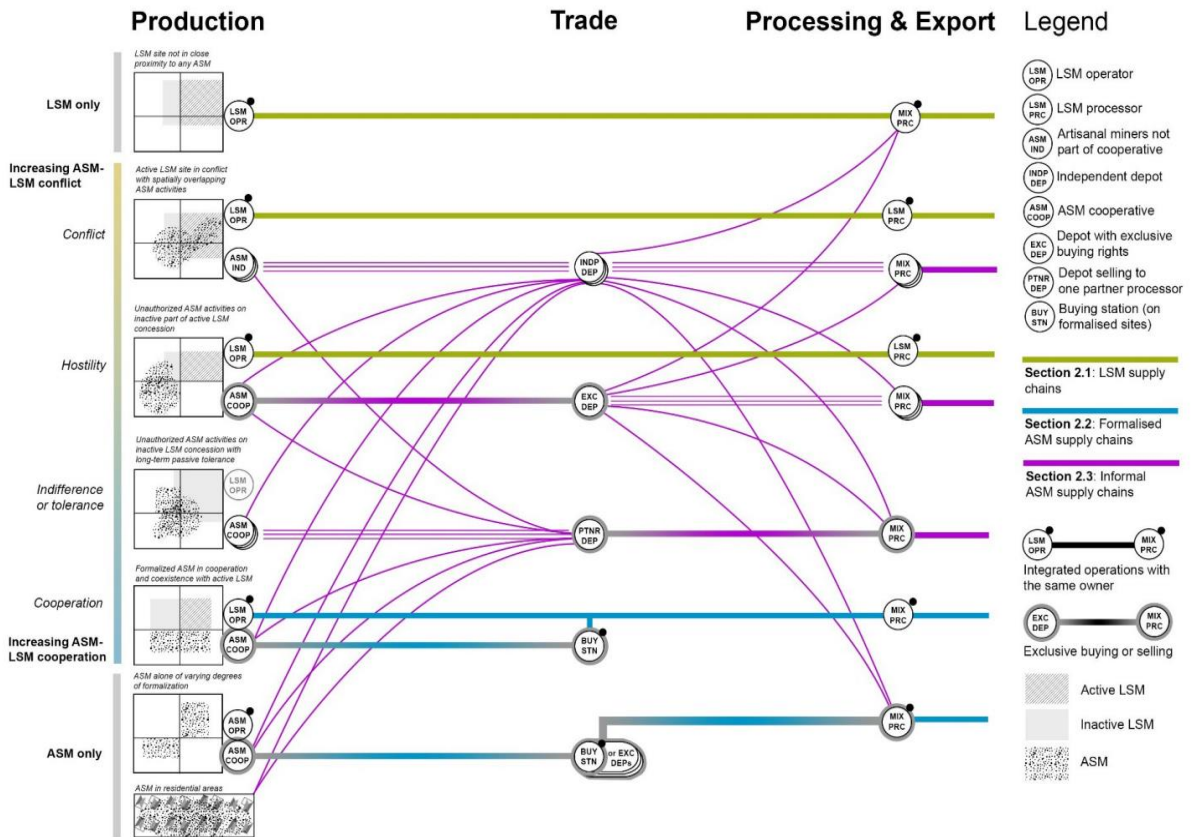
Figure 4.7: Overview and linkages within the upstream cobalt supply chain (Maiotti & Katz, 2019).
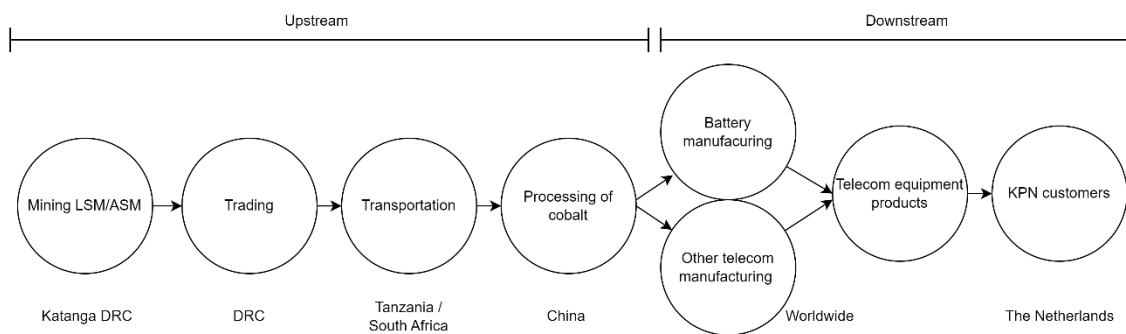
Figure 4.8: Simplified cobalt supply chain and link with KPN (Adopted by author from: Maiotti, 2022).

4.5 Human Rights situation in the cobalt sector Haut-Katanga and Lualaba

In this section, an elaborated overview is displayed of the human rights situation in the Katanga region. Firstly, risks are identified from a quantitative viewpoint. Secondly, the human rights situation is mapped by a qualitative approach. Focusing on the human rights situation in artisanal small-scale mining (ASM) and large-scale mining (LSM) sector.

4.5.1 Quantitative overview

To provide a general overview of the human rights situation in the DRC for the mineral sector the Social hotspot database is applied. The social hotspot focuses on improving social conditions in the worldwide product supply chain by providing data and tools. The risk mapping tool visualises and

analyses the risks within the sector. An overview of the human rights risks is given for the DRC mineral sector (Benoit-Norris et al. 2012; Social hotspot database, n.d.). The database divides the social indicators into five categories. Human Rights is a separate category. However, other categories cannot be excluded because it relates to topics such as child labour that impacts the human rights in a negative way. Scores are based on the level of risk: low (1), medium (2), high (3) and very high (4), compared to the global average. Grey means that there is no category data available. An overview is given in table 4.1.

Table 4.1: Scores (1-4) on subcategories based on social dimensions for the mineral sector in DRC.

Category	Subcategory	Score
Labour Rights and Decent work	Wage Assessments	
	Poverty	
	Child Labour	4
	Forced Labour	4
	Excessive Working Time	
	Freedom of Association, Collective Bargaining, Right to Strike	3
	Migrant Labour	2
	Social Benefits	
	Labour Laws/Conventions	
	Discrimination and equal opportunity	4
	Unemployment	
Health & Safety	Occupational Toxics & Hazards	
	Injuries and Fatalities	
Human Rights	Indigenous Rights	3
	Gender Equity	4
	High Conflict Zones	4
	Human Health Issues - Non-communicable Diseases and other health risks	2
	Human Health Issues - Communicable Diseases	3
Governance	Legal System	
	Corruption	4
Community	Access to Improved Drinking Water	4
	Access to Improved Sanitation	4
	Children out of School	
	Access to Hospital Beds	3

There are 24 subcategories in total and for 10 subcategories there is data available. Out of the 14 subcategories, eight subcategories have the highest score. Indicators that determine the score of the subcategory are listed in appendix C. There are four subcategories with high risks and two subcategories with medium risks. Classification of the risks is based on the global average. Overall, the majority of the subcategories have the highest score and all subcategories are at least at risk in the mineral sector.

The scores give a first overview of the risks, but there are several limitations. Scores are based on information from the mineral sector and not specifically for cobalt, it applies to the whole DRC instead of the Katanga region. Moreover, there is missing data for 10 subcategories, it is difficult to understand the context, and data may not be robust enough to explain complex issues. Therefore, human rights risks in cobalt mining are identified by a qualitative approach, and by exploring secondary data sources.

4.5.2 Qualitative overview
In order to have a detailed understanding of the situation a qualitative research has been performed. In order to scope the qualitative research, the focus was on nine human rights topics, identified in the supply chain of KPN (KPMG, 2022). The report of KPMG (2022) provides an overview of those human rights that are most at risk of being affected by EU telecommunication activities and/or business relationships worldwide. The human rights topics apply to four types of rights holders: employees,

customers, supply chain workers and society at large (KPMG, 2022). The right holders that are involved in the study on cobalt mining in the DRC, are supply chain workers. The supply chain is defined in the research of Stevenson and Spring (2007) as:

"The supply chain is the network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer" (p. 686).

Workers who extract the cobalt in the DRC are at the beginning of the supply chain (Van den Brink et al., 2020). The human rights topics that are identified for supply chain workers are displayed in table 4.2. The topics are defined by KPMG (2022) as follows: "KPN's salient human rights risks are those human rights that are inherently at risk of the most severe negative impact through KPN's activities and/or business relationships worldwide" (p. 13). One of these human rights topics is Conflict Minerals, the topic is excluded because cobalt is not a conflict mineral (Young et al., 2018).

Table 4.2 Human Rights Topics supply chain workers (KPMG, 2022).

Human Rights Topics:	Human rights by severity:
Conflict Minerals	High severity
Occupational Health & Safety	High severity
Forced Labour	High severity
Child Labour	High severity
Non-discrimination	Medium severity
Working conditions	Medium severity
Environmental impact of operations	Medium severity
Freedom of association	Medium severity
Excessive working hours	Medium severity
Adequate wages & benefits	Medium severity

These topics are the main focus point in the case study, except CMs. Other possible human rights topics that are applicable can be identified during the case study research. However, the concept of human rights is broadly interpretable even as the topics within human rights. The events and risks related to the topics are identified by secondary data for LSM and ASM. At first, the human rights topics were explained briefly. The standards from the International Labour Organisation (ILO) are applied to define human rights topics.

Occupational Health & Safety: According to the ILO workers must be protected from sickness, disease and injury arising from their employment. Specifically, the health and safety standards should cover maximum safety at work (ILO, n.d.).

Non-discrimination: Discrimination is classified when someone is treated unfavourably than other because of characteristics that are not related to someone's competencies or inherent requirements of the job. Bases of discrimination are race, sex, and religion for example (ILO, n.d.).
Working conditions: Working conditions cover a broad range of topics. The main topic is working time: hours of work, rest periods and work schedules. Other topics are remuneration and the physical condition and mental demands at the workplace (ILO, n.d.).

Excessive working hours: relates to the excessive amount of hours working and inadequate periods of rest. Excessive working hours can damage health and increase the risk of accidents at work. Most countries limit their working week to 48 hours maximum. To promote higher productivity and safeguarding health (ILO, n.d.).

Forced Labour: The ILO describes forced labour as work that is performed on an involuntary basis and under the menace of any penalty. Forced labour refers to situations where a human being is forced to

work by using violence, intimidation or by more subtle means such as debts or retention of identity papers (ILO, n.d.).

Child Labour: According to the ILO child labour is considered as work that is mentally, physically, socially or morally dangerous and harmful to children and/or interferes with their schooling. It depends on the age, working hours and working conditions if it is classified as child labour. Not all work that is done by children should be classified as child labour. If labour activities of children do not affect their health and personal development it is considered something positive. Moreover, child labour can be classified as the worst form of child labour when children work as slaves, and prostitutes, and harm their health, safety or morals (ILO, n.d.). Children that work in the mining sector are classified as child mining. Child mining is broadly defined and focuses on different types of tasks and the amount of hours worked in the mining sector (Sovacool, 2019). Working as an ASM is only allowed for DRC citizens with a minimum age of 18 years old (Tsurukawa et al., 2011).

Environmental impact of operations: Minimising the impact on the environment, including reduction of CO2 and other greenhouse gases, minimising the use of electricity, and preserving the environment and the planet's biodiversity for future generations, including complying with applicable environmental laws and regulations (KPMG, 2022).

Freedom of association: Ensuring that supply chain workers are free to form and join organisations of their choosing, either formally or informally. Ensuring that supply chain workers have a voice and are represented (KPMG, 2022).

Adequate wages & benefits: Ensure that workers have a minimum living wage. The wage should be fair and competitive compensation for their labour. This will foster good labour and management relations (KPMG, 2022; ILO, n.d.).

Conflict minerals (CMs): The term CMs refers to four minerals named tin, tantalum, tungsten and gold. Minerals originate from conflict-affected and high-risk areas, which affects the mining and trading of those materials. Companies that have CMs in the supply chain are associated with serious human rights abuses and conflict (OECD, 2016). However, cobalt is not considered as a CMs by the OECD and therefore this human rights topic is not researched in the case study. The Katanga region is not considered a conflict zone (OECD, 2022). However, the region is located near the conflict zone in east DRC and tensions could occur.

4.5.3 Human rights situation in large-scale mining sector
The increase in mining activities has an impact on the indigenous people in the region. In Congo, there are examples of companies that neglected the land and livelihoods of the indigenous people and there was a lack of consultation with indigenous communities (Abadie, 2011). Indigenous communities are acknowledged in the DRC. Indigenous people can cultivate or exploit their land in various ways that they have traditionally inhabited. However, it is unclear about the borders of the sites and if the land belongs to the indigenous or not. LSM companies request permission from indigenous communities and provide them with payments. An agreement led to the legal status of mining. However, there is corruption involved in the process and benefits are not always shared with the communities. (Tsurukawa et al., 2011; Sovacool, 2019; Bamana et al., 2021). The displacement of indigenous people has an impact on the stability of these groups, with a focus on food security. Mines and the infrastructure around the mines cross the sites of indigenous people and reduce the living space of the indigenous or ethical groups. Over the longer term, indigenous people face disadvantages in the mining sector. Mining communities have access to essential goods and indigenous people have limited access to jobs and economic opportunities. The social impact on the indigenous people is drug abuse, alcoholism, prostitution and polygamy (Sovacool, 2019). The Pygmy community is an indigenous group

in Katanga and claims of human rights violations against these communities are happening in the mining sector. However, several resources pointed out that this community is mainly living in parts of the province where no cobalt ore is extracted. (Tsurukawa et al., 2011).

The LSM Mining sector operates on a large scale, which has an impact on the environment. The loss of vegetation and water pollution due to mining activities has an impact on the surrounding areas. Research showed that pollutant waste from the mines is dumped into the river. The water was highly mineralised due to industrial activities and contains high concentrations of lead. The water from the river is used by local communities for washing, drinking, irrigating the land and fishing. The pollutant water is unsuitable for consumption by humans and affects the local area. Moreover, there is no alternative water source available (Scheele et al., 2016).

Processing facilities are near or located in the cities of the mining region. Communities live nearby these facilities. These industrial facilities and the trucks transporting ores produce hazardous fumes, dust and noise within the city. Also, the effluent water flows from the industrial facilities into the neighbourhood. Heavy pollution affects the health of people living nearby the processing facilities. The dust contains heavy metals and radioactive materials and continuously breathing dust is harmful to citizens (Scheele et al., 2016).

Other examples of LSM explosions near communities. The community homes are located close to the mines. Dynamites and toxic chemicals are used in LSM to extract the ore. This is a more standardised process, however, the communities that live near the mine are limited and taken into account (Katz-Lavigne, 2020; Sovacool, 2019). People are warned to leave their neighbourhood for several hours, because of explosions that affects their heath and safety. Physical safety is secured but these people are forced to leave their homes several times a week. Sometimes houses are hit and damaged by the rocks, compensation is not provided (Scheele et al., 2016). Besides temporarily forced displacement, communities are evicted from their homes. Little or no compensation is paid to the communities by the mining companies (Matundu & Kandolo, 2016).

Mining activities by ASM workers take place in unauthorised locations or in locations where access is forbidden. Security forces corrupt and earn money by allowing ASM miners to operate at the LSM site. (Katz-Lavigne, 2020; Tsurukawa et al., 2011). ASM workers that are trespassing the unauthorised mines can also be arrested or beaten when miners are not bribing them. Even gunfire is used to stop the ASM workers and killings are created by police and military (Sovacool 2019; Amnesty International, 2016). Moreover, if the workers access unauthorised locations, entering the pits could be dangerous. Explosions take place or toxic chemicals are used underground (Sovacool, 2019).

The LSM sector is focused on formal employment and is less accessible for women compared to the ASM sector. The LSM sector is in the first place more automated with machinery. This makes it possible to extract minerals with fewer people compared to ASM. Formal employment at LSM offers fewer possibilities for women and lower-educated people. In the ASM sector, women were vulnerable to help in the crushing, sorting and washing of the minerals. Other possibilities for them were to sell food and drinks to the ASM miners. The LSM sector offers fewer opportunities in terms of jobs and the more marginalised people are often excluded compared to the ASM sector (Katz-Lavigne, 2020).

Within the LSM sector, there is a more structured mining process. Besides that safety, security and due diligence are implemented and vary widely in the LSM sector (Maiotti & Katz, 2019). The companies are specialised and work with safety standards. The miners are wearing protective equipment, working in shifts and have arranged facilities (Sovacool, 2019). There is a level of respect regarding human rights. However, there are negative impacts. More people are excluded from the LSM sector and the people who are not involved in the process face negative effects. LSM takes away

the work and sites of the ASM sector and therefore revenue streams are declined for people who are not involved in this sector. Moreover, soil, air and water pollution from LSM affect the livelihoods and living standards of the people that are located around the mines or mining infrastructure. It highly depends on the type of mining and firm to what extent good governance and community empowerment are promoted (Sovacool, 2019). Therefore a fair share of representation from DRC communities in the decision making process is missing.

Besides the reports from NGOs and scientific research papers on cobalt mining in the DRC, the Environmental Justice Atlas (EJA) explains specific cases on risks related to human rights topics. There are four cases of LSM cobalt highlighted in the DRC. One of the cases explained that Chinese companies affect the workers through abuse, discrimination and racism (EJA, 2022). One of the LSM companies employed child labour at some mining sites, however, no further information is provided about this abuse (EJA, 2019). Another problem is pollution from LSM operations. The dust and chemicals from the operations cause air, water and ground pollution. This pollution results in health consequences for the local community. Research shows an increased number of congenital malformations in the area due to high concentrations of dust and metals in the bodies. Moreover, the pollution destroys the land and crops of the local communities (EJA, 2022). Another case indicates the little protection of mine workers when they have to work with toxic materials. Other problems are disrespecting natural protected areas and tribal communities before the mine was operational. Local communities did not feel involved enough in the projects (EJA, 2021).

4.5.4 Subcontractor employees in the LSM sector
Subcontractors hire temporary or daily workers for the LSM sector. The subcontracting sector is considered a large market for indirect jobs and subcontractors are hired in companies that differentiate in size (Rubbers, 2020; Pattison, 2021). The following human rights topics are identified:

Their jobs are precarious and salaries are relatively inferior for workers. An example is that these workers earned 5 dollars a day and had to buy their food (Rubbers, 2020). Other examples of workers employed by subcontractors earn less. If these workers skip lunch and work overtime they earn a little more, but the salary is very small. The relationship between the workers and the mine is described as the slave and the master. The jobs created by subcontractors are poorly paid and keep workers in poverty according to an expert. Other examples are physical abuse during work time and discrimination in terms of language by limited translation the meetings at work (Pattisson, 2021). Workers experience unsafe work conditions, physical abuse and excessive working hours for an extremely low living wage. The workers summarise the situation as neo-colonialism. Moreover, there is no or little improvement in the situation of the workers, because there is no one to represent the workers (Morse, 2022; Pattisson, 2021). Short-term contracts, human rights abuses, and limited benefits result in a precarious position for the workers. Workers pointing out towards neo-colonialism and LSM companies evade accountability (Pattisson, 2021). The LSM companies respond that they respect human rights and have a code of conduct and best labour practices in place (Pattisson, 2021). LSM in cobalt admits to freedom of association for workers. Workers employed at one of the largest mines in the Katanga region, with over 2000 employees, belong to 6 associations (Tsurukawa et al., 2011). However, the employees from subcontractors don't belong to these associations, because no one represents them (Morse, 2022; Pattisson, 2021).

4.5.5 Human rights situation in the artisanal small-scale mining sector
The DRC supplies cobalt for digital and consumer products around the world. Cobalt from the Copperbelt was traced in the supply chain of major transnational electronics and telecommunication companies. A significant part of the cobalt supply that is extracted in the DRC comes from the ASM sector (Sovacool, 2019). In this informal sector, there is less regulation, protection and standardisation in extracting the ore. The ASM sector is vulnerable to human rights abuses. Besides that, reporting

about human rights violations is limited in the ASM sector, because it is a more informal sector compared to LSM (Tsurukawa et al., 2011; Katz-Lavigne, 2020). The ASM sector is characterised by environmental, economic, and social aspects. The ASM sites also have different setups (Stewart Carter & Strumes, 2020; Mancini et al., 2021). The sector is considered as informal and human rights issues depend on the sites (Shumsky, 2020). Although there is limited information about the human rights abuses and their size, the following human rights abuses are identified:

Increased mining activities and unclarity of the site borders, give rise to conflicts between ASM miners and local communities. The discovery of a new mining ground causes a rush of Congolese migrants to these sites. ASM started mining illegally on the grounds of the indigenous people (Tsurukawa et al., 2011; Sovacool, 2019). Moreover, ASM of cobalt seriously damages the environment (Tsurukawa et al., 2011). Damage to the environment affects human health and ecosystems (Farjana et al., 2019). For ASM it might be less problematic due to less intensive processes compared to LSM. However, a potential effect on the environment occurred after mining activities. The clean-up or rehabilitation of the mine did not take place or was incomplete. Therefore, biodiversity has limited possibilities for recovery in these areas (Otamonga & Pote, 2020).

Child labour is one of the human rights abuses that is identified in cobalt mining. In the ASM cobalt sector, there are 19,000 – 30,000 children under 15 years old and 9,000 – 15,000 children between 15 and 17 years old. The younger children carry out simple tasks such as sorting and washing. The older children are employed in the mines (Tsurukawa et al., 2011). Other sources estimated that around 40,000 children were working in the ASM cobalt sector (Amnesty, 2016; Scheele et al., 2015). Child labour does often not occur under the LSM sector because the larger companies agreed with the mining code and the scrutiny of society. Child labour is a common phenomenon in the DRC because 73% of the population lives in poverty and half of the population is under 15 years of age (Tsurukawa et al., 2011). In the case study for 150 mining communities, 23% of the children worked in the mining sector. The main reasons for child mining are poverty and duty to their family. Child mining is broadly defined and focuses on different types of tasks and the number of hours worked in the mining sector. Child mining is considered safer and less harmful compared to other forms of child labour. For example child soldiers or child prostitution (Sovacool, 2021). There were no reports found on forced labour in the ASM sector (Tsurukawa et al., 2011). However, there are little job opportunities besides working in the mining sector for citizens in Katanga.

People working in the ASM sector are mostly unskilled and have limited options to earn money. A direct cash flow by earning money in cobalt mining is one of the few opportunities to make a living. In the informal sector and limited investments, results in unprotected working conditions. These working conditions could be dangerous in terms of safety and health (Sovacool, 2019). The ASM workers who are operating underground face dangerous conditions and frequent accidents take place (Amnesty international, 2016). Working underground is an intensive and long process. Workers are exposed to hazardous substances and work in confined spaces. Inhalation of mining dust that contains uranium is unavoidable. Especially during the rainy season mining could be dangerous, because of landslides (Tsurukawa et al., 2011). Moreover, because of the limited knowledge and tools, some of the miners don't know about the maximised depth of the mining shafts and horizontal banks that are required to work safely. Moreover, the location of the shafts needs to be at least 100 metres from any watercourse to have proper sanitation. The safe and healthy working conditions are named in the DRC mining code, however, less than 10% of the miners have any knowledge of the mining code. Many pits are dug without coordination and proper knowledge (Tsurukawa et al., 2011). Moreover, the pits are dug with the minimum equipment, sometimes with bare hands. There is no social protection and miners don't have insurance. ASM workers mostly focus on safe working conditions and invest in preventing fatal accidents, instead of using masks that prevent them from mining dust (Sovacool, 2019). Radioactive and cancer-causing particles are emitted during cobalt extraction. This affects the

health of workers and increases the risk of damage to organs. In specific, the lungs, eyes, heart and thyroid can be damaged (Farjana et al., 2019).

Gender is an important aspect of the ASM sector. Within the ASM sector, there is a gendered division of labour. The mining activities require different skills and women can fulfil these activities with their knowledge and practices compared to men or those of other genders (Sovacool, 2021). Men are working in the mines and women are fulfilling the tasks of sorting, crushing and washing. Other activities are related to selling the minerals or activities that have minimal profitability. The sorting, crushing and washing of minerals are considered unhealthy in terms of toxicity. Women are exposed to radiation from the minerals. A worrying aspect is that children are born with malformations of the body. A reason for the malformations is due to toxic contamination from their mother during pregnancy. Other sufferings are menstrual disruption and miscarriages. Around 95% have a very low level of education and working in the ASM sector is the only option. In ASM around ¾ of the women in the three ASM sites of the case study were subjected to sexual violence. In some cases, underaged girls were involved in prostitution (Matundu & Kandolo, 2016).

The social conditions in ASM miner camps are considered poor. There is very limited sanitation because water is polluted due to cobalt mining. Communities around 10 km from the mines or smelters have significantly higher urinary concentrations of As, Cd, Co, Cu, Pb and U. Also the waste from humans is not managed. Promiscuity and prostitution take place and increased the percentage of people infected with HIV. The use of alcohol and narcotics is common in the mining camps (Tsurukawa et al., 2011).

After the cobalt extraction, washing and sorting the adult miner sells the cobalt to licensed buying houses. Children sell their cobalt to adult miners or small-scale traders, and they sell the cobalt to licensed buying houses. Buying houses are located in the city outskirts. The buying houses sell the cobalt to larger companies that operate as smelters and export the processed ore. These buying houses are mostly owned by Chinese individuals (Amnesty International, 2016). The market price for cobalt is extremely volatile. However, the ASM workers receive less money compared to the market price. Cobalt is sold to the buying house below the average market price. The ASM workers did not receive a fair price and had limited options in selling cobalt (Sovacool, 2019).

The working conditions and excessive working hours are identified in the research of Tsurukawa et al (2011). Working in the ASM sector is considered a hard-working condition, due to the labour intensiveness process. Around 77% of adult miners work more than 8 hours a day. Moreover, days off are limited, because holidays are not paid and there is no fixed salary. Diggers are rewarded for their workload. Most miners work between 52 and 59 hours, which results in between 35 and 52% overtime work (Tsurukawa et al., 2011).

The term modern slavery is a term that covers various human rights. Modern slavery is the control of one person over another, involuntary aspects are involved and relate to the exploitation of a person (Jackson & Decker Sparks, 2020). The majority of the cobalt miners can be involved in modern slavery because they do make not enough money for a living, they lost their freedom and control over their lives, and traders or their families forced them for a loan or depth (Sovacool, 2021). The ASM workers are a vulnerable group and are constantly exploited by mining bosses, traders, policemen and the national secret service (Sovacool 2021).

Freedom of association and collective bargaining is initiated in the DRC. In 1999 the EMAK (association of artisanal miners in Katanga) was founded. The goal was to organise ASM workers and act as a union. The EMAK was criticised because of corruption and high affiliation fees. This resulted in the CMKK (Mining Cooperative Maadini Kwa Kilim). The CMKK initiated to lower the fees but was criticised as

well about corruption. In 2007 the two associations claimed they had in total of 90.000 members. However, this is doubtable, because a survey in 2010 identified that 16% of the workers in Katanga was a member of an association and extrapolation of the result indicates that 14.000 is member of an association in Katanga (Tsurukawa et al., 2011).

4.6 Overlap the human rights situation LSM and ASM
Investments in the LSM sector started at the beginning of the 21 century. During this period the DRC emerged from war and the state-owned mining company Gecamines did not play a significant role. Private mining companies invested in copper and cobalt mines. The private companies made concessions with authorities and disposed of the ASM sector operating in these areas. Compensation was limited and in some cases not provided to the ASM miners. Since companies started extracting minerals on their own, companies moved away from purchasing ASM minerals (Katz-Lavigne, 2020). The people working in the ASM sector are rarely hired to work in the LSM sector because the LSM sector hires people from other regions (Katz-Lavigne, 2020). However, hiring in the form of subcontracting is a common theme in LSM (Pattisson, 2021). Moreover, other businesses that are related to the mining site decreased because people hired by the LSM companies are mostly housed and eat at the side of the mine. This was not the case in the ASM sector where people could benefit from providing services to the ASM workers and earn revenue (Katz-Lavigne, 2020). The LSM sector offers security, transport, accommodations and food. In some cases, health care and education are offered to the workers (Sovacool, 2019).

Corruption is an important driver behind human rights violations. Disrespecting the economic and political system negatively affects disadvantaged groups (United Nations, n.d. c). In the research of Callaway (2018) the increasing cobalt production in the DRC is linked with corruption that affects democracy and human rights. Human rights abuses in the mining sector stand due to large corruption networks. Corruption is a crucial pillar in Congo's violent kleptocratic system. To improve the human rights situation, it is important to address the underlying issues of corruption (Callaway, 2018). Regarding regulation, the DRC implemented a new mining code in 2018. The code raises government control and royalties on cobalt. If the revenues from cobalt are managed responsibly and transparently, it could benefit social development. However, hundreds of millions of dollars went missing from state-owned mining companies. Transparency and due diligence in the cobalt supply chain can mitigate the risks and create a new environment where corruption and human rights abuses are not part of the business (Callaway, 2018). In the DRC this is a long-standing problem. The country faces poor governance, threatening responsible CRM supply and formalisation of the ASM sector (Brown et al., 2020).

There is limited regulation from the EU on companies with CRMs in their supply chain linked to human rights challenges. There is a regulation on CMs, but this list consists of four minerals and excludes most CRMs. Although, the EU Commission announced a directive that requires EU companies to manage the social and environmental impact in their supply chains (Mancini et al., 2021). Moreover, complicated supply chains make it difficult for manufacturers and end-user companies to track and assess the challenges in the supply chain. The global supply chain of this material is long and complex (Sun et al., 2019).

Figure 4.9 display the human rights situation. The figure shows the human rights topics that were identified in cobalt extraction for the LSM sector, including subcontracting and the ASM sector. These human rights challenges appear in mining due to various drivers at different levels. Moreover, the topics identified in cobalt extraction are linked to other human rights issues in the Katanga region. Cobalt extraction affects the human rights situation of indigenous people, local communities and people in the mining camps.
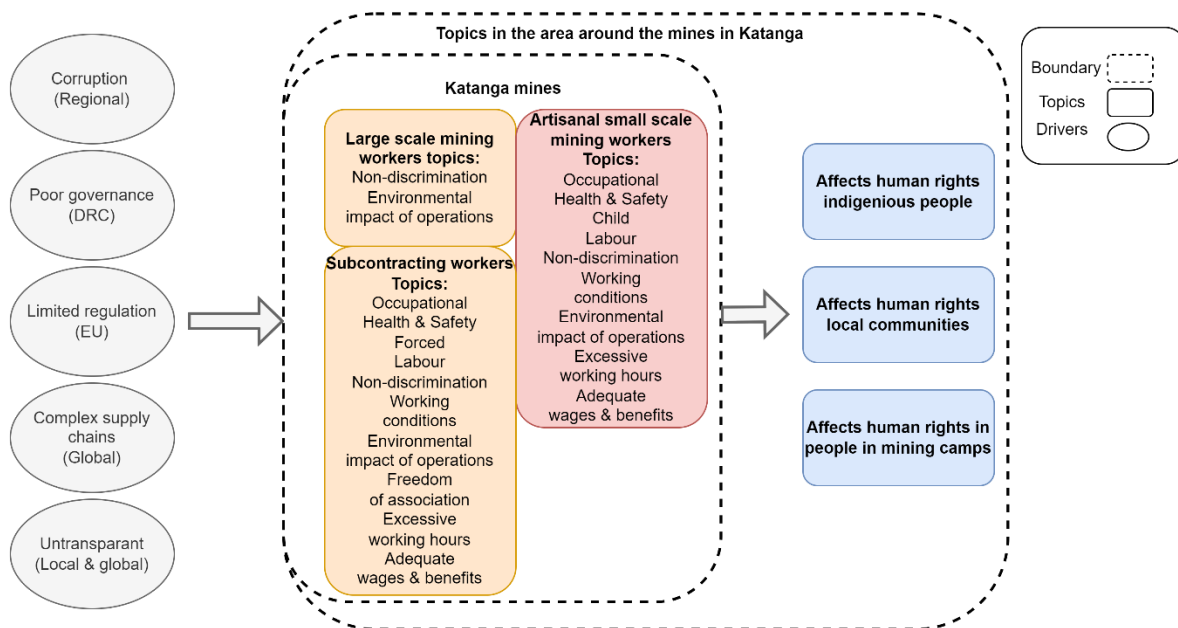
Figure 4.9: Human rights topics and linkages primary cobalt mining Katanga region (DRC).

4.7 Takeaways and recent developments

It is important to consider the fact that human rights abuses have a temporal dimension that is often unexamined. The temporal dimension is important because benefits and risks are dynamic and change over time (Sovacool, 2021). Moreover, there is limited research on human rights abuses in the ASM sector. In some large-scale mines, there is no accurate information on the human rights situation. The sector is less accessible and much fear among workers speaking out. This part of the supply chain is rarely examined, and therefore hard to develop knowledge about the mining activities in the DRC (Sovacool, 2021). An important note is that these human rights topics differ among the LSM and ASM sectors. Both sectors are heterogeneous, especially for ASM. This indicates that the type and intensity of the risk can differ from site to site.

In recent years several NGOs identified human rights risks in cobalt mining and received international attention. Amnesty International published its findings on human rights abuses in the cobalt sector and recommended governance agencies and companies in the supply chain for taking responsibility to mitigate these risks (Amnesty International, 2016). Highlighting the importance of these social issues in the supply chain and increased cobalt demand in the coming decades, increased attention to responsible sourcing (CERA, n.d.).

A development in responsible sourcing is that international companies pay more attention to better understanding the complex cobalt supply chain. This results in data collection, an understanding of the ASM contribution and the developing of a system that ensures sustainable development (Petavratzi & Kresse, 2020). More specifically, pilot projects were launched by LSM companies to transform the ASM into a sector that increases productivity, safe working conditions and fair earnings for female workers. LSM integrates and controls responsible ASM into their supply chain by working with government agencies. Providing knowledge and tools to the ASM sector helped these workers to operate more professionally and safely. In the end, this positively impacted local, social and economic conditions in the area (Shumsky, 2020). Another development is the establishment of the Enterprise Generale du Cobalt (EGC) in 2019. The ECG mandated by the DRC exercises a monopoly on sourcing cobalt from ASM operations in the DRC. One of the requirements is that cobalt production meets high social and environmental standards. The EGC focuses on themes: integrity, safety, responsibility, and transparency in cobalt supply. This led to better working conditions and protection of ASM

populations, increased income, implementation of traceability and overall strengthening of the reputation and image of the DRC ethical mining industry (EGC, n.d.). Moreover, international organisations collaborate with local partners in the DRC to increase ASM cooperatives and professionalisation of the ASM sector. This is done by a development cooperation framework that focuses on inspection, monitoring and control in the sector (BGR, 2019). However, the relationship between mining, social and environmental development in the DRC is characterised as complex (Banza Lubaba Nkulu et al., 2018).

5. The KPN strategy and practices from peers

5.1 KPN strategy & framework
The first part of the chapter explains the KPN framework on human rights challenges in the supply chain, and their practices related to the topic. The KPN procedure on human rights and challenges in the supply chain is formulated in a couple of documents. These documents are analysed to define the KPN framework and current strategy. In the end, this helps to develop a strategy for KPN on managing human rights in primary CRM supply.

KPN Integrated Annual Report
In the annual KPN report, the strategy on human rights is embedded in the environmental performance and responsible supply chain chapter, and the chapter on compliance and risk. The strategy is based on the guiding principles of business and human rights from the UN. The human rights policy is divided into three stakeholder groups: customers, employees and the supply chain. The focus areas of the supply chain stakeholder groups are supplier selection and security, KPN's corporate governance and human rights compliance. The Key Performance Indicators (KPIs) that are related to this theme are environmental performance and responsible supply chain (KPN, 2022a).

Supplier code of conduct
The supplier code of conduct is established for KPN suppliers to comply with the relevant international legislation and national legislation. KPN asks their suppliers to operate according to the definition of the International Labour Organisation (ILO) on human rights. The ILO operates in the spirit of the Character of the UN (KPN, 2022b). Moreover, suppliers will not admit to discrimination, child labour, forced labour, working hours, disciplinary practices, freedom of association & rights to collective bargaining, fair remuneration and health and safety. Besides these social topics, KPN asks their suppliers to limit the environmental impact. The other topic is ethical conduct, which incorporates fair business practices, and anti-corruption and bribery (KPN, 2022b).

KPN supply chain
The supply chain consists of four main purchase categories: IT, network infrastructure and energy, consumer and business products, and marketing and professional services. The supplier is classified as a low, medium and high-risk supplier. Suppliers are classified as high-risk suppliers when they produce tangible products in low-cost countries in Asia, Africa, Eastern Europe, and Central and South America. The top suppliers are responsible for 80% of KPN procurement spend. These suppliers are active in the various purchase categories (KPN, n.d. b).

How KPN interact with society
KPN has embedded a couple of themes in their CSR strategy. The themes and topics have a positive outcome on their society in the short and long term. One is that KPN is a transparent and reliable service provider. Providing the best products and services. Second, providing the best networks to their customers, in particular for transport, defence and emergency services. Third, providing a modern and flexible working concept for society. One of these ambitions is that it goes hand in hand with reducing carbon emissions. Another theme is energy and environment, with a focus on creating a better society, by respecting people and resources (KPN, n.d. b). Providing products, services and networks requires an increase in primary CRM supply (Kleinmagd, 2020; Flik, 2021). Primary CRM supply is linked with human rights risks (Mancini & Sala, 2018). KPN's themes might contribute to the majority of society, although minor groups face negative outcomes. These groups are people working in the primary CRM supply sector. A sector that is indirect connected to KPN (KPMG, 2022). Therefore, it is crucial to aim at prosperity for these groups as well.

KPN work with suppliers that have strategic goals and introduce improvements to CSR. These are social and ethical improvements. This theme is linked with the procurement policy and the supplier code of conduct. However, KPN needs to be aware of primary CRM increase and manage human rights challenges. Mainly because it is currently not explicitly named in the strategy.

KPN Human rights statement
KPN human rights statement contains respects and protects human rights by endorsing the character of the United Nations and covering conventions from ILO. Respect for human rights is endorsed in the KPN code of Conduct. The code focuses on themes: human rights, labour conditions, privacy, safety, environment, bribery and corruption. KPN tries to collaborate with strategic suppliers and focuses on the code of conduct. Suppliers need to comply with the code of conduct. If there is non-compliance, suppliers should communicate this to KPN and implement an improvement plan. KPN asks the suppliers to impose the supplier's code of conduct on their suppliers, although this is not mandatory (KPN, 2022 a). Respecting the code of conduct commits suppliers to conduct their business in a manner that is ethical, legal, environmentally friendly, respectful of human rights, socially responsible and adheres to the JAC standards. The reason for measuring and assessing the suppliers is that suppliers who are at risk could negatively impact KPN's reputational image and non-compliance can lead to fines. Moreover, KPN heavily relies on external suppliers for products and services. Unbalanced supply-demand of products and services affects the competitive price and quality. Moving towards a secure and resilient supply chain is core. Also, KPN aims at being an environmental social and governance (ESG) frontrunner (KPN, 2022 a).

EcoVadis onboarding
KPN collaborates with EcoVadis to ensure companies respect the code of conduct in their operations, products and services. EcoVadis conducts a risk assessment on possible new suppliers, by focussing on ESG criteria. In specific, the sustainability assessment contains labour and human rights, ethics, sustainable procurement and the environment. A minimum score of 35/100 points is required to pass the self-assessment, this is the average score in the industry they operate. Moreover, EcoVadis is involved in the responsible business assessment. The assessment classifies the suppliers in low, medium or high-risk suppliers. High risk-suppliers are subjected to social audits that are repeatedly audited by the Joint Audit Cooperation (JAC) (Personal communication with KPN, November 2021).

5.2 JAC certification system
The Joint Audit Cooperation (JAC) is a European association of telecom operators. The JAC was founded in 2010 and KPN joined the JAC in 2013. The goal is to verify, assess and develop CSR implementation across the ICT supply chains. One of the pillars is human rights. Developing standards and performing audits in the supply chain, aims at positive social and environmental change (JAC, 2019). The JAC operates according to the following guideline principles:

1. Auditing is a collaborative process between the supplier and the audit firm. The suppliers are operating in the ICT supply chain. The audits are set out by the JAC and carried out by an independent third-party auditor (JAC, 2019; KPN, 2022 b). The purpose is to identify the level of conformance with the CSR standards. The aim is to identify areas for continuous improvement and focus on efforts that create a maximum positive difference (JAC, 2019).
2. In 2020 there were 17 JAC members. Capacity growth resulted in a growth in the number of audits that were conducted. In 2010 the JAC performed 21 audits and in 2020 the JAC performed 88 audits (JAC, 2020).
3. Audits start with the preparation phase, collecting information about the plant. Secondly, skilled auditors are conducting the audits. These auditors work for international audit companies and specialised in social and environmental issues. The third guideline is confidentiality, audit results are only shared with the JAC members.

4. The fourth guideline is the methodology. This is a checklist defined by the JAC members, based on international social and environmental standards (JAC, 2014). The standards focus on the following elements: child labour, forced and compulsory labour, health and safety, freedom of association & right to collective bargaining, discrimination, disciplinary practices, working hours, remuneration, and management system (SAI, n.d.).

For every theme, there is a standardised question/requisites list. Answers or findings at the location of the plant need to comply with the social requirements. The amount of questions/requisites differ per the social theme. Some themes are broadly defined and require more questions/requisites compared to other themes. A rating is applied for every finding (JAC, 2014).

The findings from the auditing process are put into a report. The report describes the audit findings based on objective evidence. Cooperation with the suppliers: The report helps to make the suppliers aware of the CSR risks and move towards sustainable development (KPN, 2022 b).

If there is a non-conformity according to the theme, a specific corrective action plan (CAP) is encountered. The plan includes resolution procedures and timetables. The supplier is responsible for following up on the CAP within 12 months (KPN, 2022 b; JAC, n.d.). This connects to the last guideline: Collaboration and development with the suppliers.

The JAC performs audits for tiers 1, 2 and 3. In total 605 audits were conducted between 2010 and 2020. Out of the 605 audits, 166 direct suppliers were audited in 38 countries. The JAC extended their audits over the years. At first, the focus was mainly on auditing suppliers that are under direct control, tier 1. Over the years the JAC managed to audit the suppliers that are not under direct control, tiers 2 and 3. Auditing tiers 2 and 3 was mainly possible because more EU telecommunication companies became a member of the JAC and resulting in a larger capacity to perform the audits. Since 2017, the JAC audited between 80 and 90 sites for tiers 1, 2 and 3. Recently the JAC performed some audits in tier 4 (JAC, 2020).
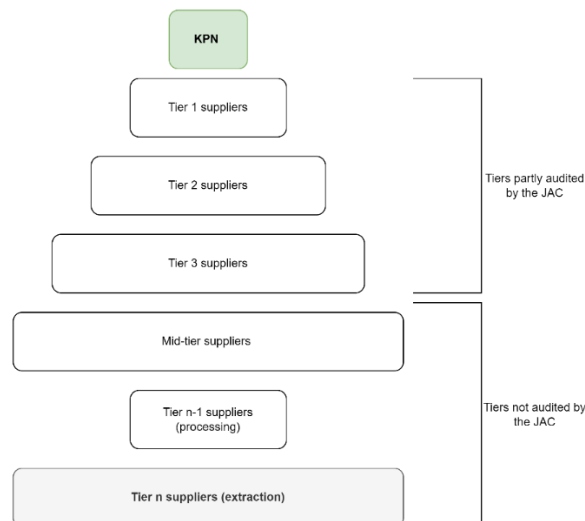
Figure 5.1: Overview of the CRM supply chain in the scope of KPN and JAC audits (made by author).

Limited capacity to conduct audits and scoping the complete supply chain makes it a challenging task to audit the lower-tier suppliers. Because there are many mid-tier suppliers in the chain it is too complex to identify these suppliers and involve them in the auditing process (Personal communication KPN, November 2021). Performing audits in the lower-tier supply chain make it even more challenging. Therefore, telecommunication companies are stuck at the early beginning of the auditing process. It is not possible to identify and gain knowledge on suppliers and start with the auditing process. To give an indication, KPN has 5000 suppliers that are in tier 1 (Personal communication KPN, November 2021). The traceability of the suppliers comes first to measure and assess the lower-tier suppliers in

the upstream part of the supply chain. Within the JAC this is currently not possible due to the supply chain complexity and audit capacity of the JAC. The JAC has a methodology to audit suppliers on human rights challenges, however, human rights risks might differ compared to the mining sector. Therefore, a new approach is desirable.

5.3 Comparison of human rights situation with the KPN framework
To explore the improvement in human rights due diligence in the upstream part of the supply chain, the results from the human rights situation in the DRC are compared with the KPN framework. The following shortcomings are identified:

Shortcomings of the auditing system:
- Traceability of the lower-tier suppliers. The auditing system is not able to trace the lower-tier suppliers in the upstream part of the supply chain. Therefore, the JAC can't measure and assess the human rights impact in primary critical raw material mining.
- Capacity to perform audits. The JAC can audit a limited number of suppliers every year. To measure and assess the human rights impact in primary critical raw material mining the JAC should extend the capacity to perform more audits.
- Measuring and assessing the human rights situation in primary critical raw material mining is complex in terms of time. Auditors reviewing covering at least the previous 24 months. Mostly during the operational phase of the mine. Human rights challenges that are not within this timeframe won't be audited. The methodology is not able to cover all human rights risks.
- The ASM sector is considered the informal sector. A large number of people depend on ASM and are responsible for 20-30% of the DRC cobalt supply. Limited documentation and operating in small groups are common in ASM. Auditing a large number of small groups and limited availability of documentation does not fit with the requirements of the JAC methodology. No company documentation can be read, reviewed and analysed.
- Audits focus on the documentation of social themes that are within the scope of the plants. Results showed that the area around the mines faces human rights challenges due to mining activities. These risks are not incorporated in the JAC methodology.

5.4 Best practices from peers: EU telecommunication companies
The majority of the EU telecommunication companies is a members of the JAC. Telecommunication companies are based in different countries and companies vary in size. A result is that companies face different regulations compared to other countries and differences in capacity to perform due diligence practices. The research focus is on three telecommunication companies: Orange, Deutsche Telekom, and Vodafone. The scope is on human rights due diligence in primary CRM supply.

The reason for selecting these peers is based on:
- The companies are based in different countries that have legislation in place on CSR and due diligence in the supply chain. French Duty of Vigilance law, the German national action plan on business and human rights, and the UK Modern Slavery Act hold companies corporate accountable within the global supply chains (Silva & Schaltegger, 2019; LeBaron & Rühmkorf, 2017).
- These three telecommunication companies are together with Telefonica Spain, the top four EU telecommunication companies by revenue. Deutsche Telekom has the largest revenue of 80.5 billion euros, and Vodafone and Orange have a similar revenue of around 43 billion euros in 2020 (O'dea, 2022). Their revenues are higher compared to the revenue of KPN which was 5.3 billion euros in 2020 (KPN, 2021). The high revenues give companies the possibility to increase the capacity for due diligence in the supply chain. Therefore, it is interesting to have a further look at their practices.

Orange
Orange developed a Vigilance Plan in 2022 to meet the obligations of French law. The plan reports on human rights and other social, but also environmental requirements. The policy plan incorporates the suppliers and subcontractors from Orange. The company ensures that its suppliers have performed due diligence on CMs. However, there is no statement on CRMs (Orange, 2022). Regarding traceability, Orange is involved in developing and testing new blockchain solutions to trace raw materials. The technology shows the potential and contribution to the EU telecom industry. The focus is on identifying, monitoring and tracing materials in electronic equipment (Maisonneuve, 2022).

Deutsche Telekom
The German-based company is aware of issues around CM supply. The company does not manufacture the products and therefore asks the suppliers to refrain from using CMs in their products. Moreover, Deutsche Telecom supports the Responsible Minerals Initiative (RMI) to move towards a sustainable supply chain (Deutsche Telekom, n.d. a). The RMI provides 400 member companies to source minerals in a responsible way and is the largest business initiative for responsible raw material sourcing. Tools and resources are provided to companies and help to improve compliance and responsible sourcing from conflict-affected and high-risk areas. Besides CMs, cobalt has been added to the focus area since 2017 (RMI, n.d.). Moreover, Deutsche Telekom handling the CRM section stated that there is a focus on mitigating social and societal risks that could be associated with mining resources (Deutsche Telekom, n.d. a). However, the majority of the auditing activities are conducted within the scope of the JAC (Deutsche Telekom, n.d. b). Moreover, there is no report on handling CRMs.

Vodafone
The company has a code of conduct in place and performs human rights due diligence in the supply chain. This is in line with the approach of the other EU telecommunication companies. The interesting part is that the British company published reports related to CMs and cobalt. The first report is on CMs. The interesting fact is that Vodafone published a detailed report on CMs instead of other companies highlighting the topic in a specific section. However, the last annual version dates to 2020. Although it is interesting to see that several annual versions were published since 2016 (Vodafone, 2020).

In the report, Vodafone (2020) highlighted that mines and smelters are many steps away in the supply chain and Vodafone highly relies on information from their suppliers. The RMI has a country of origin database that contains data on the origin of 81 countries of CMs and the 295 related smelters. The other part is related to the five-step OECD due diligence for minerals:

Step 1: Establish a strong company management system.
The Officer of the Group Chief Commercial Operations and Strategy is accountable for the sourcing policy and the procurement team manages the relationships with in-scope suppliers. Moreover, a consultancy service is assisting in tracking data, assessing risks and preparing Vodafone's reporting. Additionally, a third-party auditor is involved to assess the processes and procedures of Vodafone's CM program. Supplier contracts include CMs clauses. This means that direct suppliers are required to conduct due diligence to identify the source of the minerals. Expected is that direct suppliers ask their suppliers to include similar requirements in their contracts. The in-scope suppliers are asked to report their progress through the RMI Conflict Minerals Reporting Template (CMRT) on an annual basis. Related to the CMRT, Vodafone shared best practices and helped suppliers to meet the requirements of the contract clause on CMs (Vodafone, 2020).

Step 2: Identify and assess risks in the supply chain.
A request from Vodafone was that all identified suppliers of in-scope products complete the CMRT. The company analysed the CMRT and identified the risks. Smelters from the CMRT form were compared with active and conformant smelters from the RMI list. This is also known as the Responsible Minerals Assurance Process (RMAP). The conformant smelters have a system and process in place to support responsible sourcing and provide evidence to support their sourcing activities. The conformant smelters exchange confidential information and sign an agreement that they are responsible. If there are non-conformant smelters on the list or there is incomplete reporting from suppliers, a follow-up is required to assess and address these risks (Vodafone, 2020).

Step 3: Design and implement a strategy to respond to identified risks.
This includes a communication and escalation process to notify and engage with the Group Chief Commercial Operations and Strategy Officer where any potentially significant risks are identified. When these risks are identified, Vodafone engages with suppliers and asks for a corrective action plan to manage these risks. Smelters are asked to participate in the RMAP process. Additionally, Vodafone participates with the wider industry to support responsible sourcing and audit smelters (Vodafone, 2020).

Step 4: Carry out independent third-party audits of Smelter's due diligence practices.
Minerals are not directly purchased and Vodafone is many steps away from the upstream supply chain. The due diligence relies on cross-industry initiatives such as the RMI. The RMI conducts audits on smelters (Vodafone, 2020).

Step 5: Report annually on supply chain due diligence.
The annual due diligence reports are publicly available on the website. The reports have less than the same set-up and include the OECD due diligence framework. The last report dates from 2020 (Vodafone, 2020).

Vodafone focuses on continuous improvement by encouraging suppliers to conduct CMs policy, improve data completeness and quality, and ask suppliers for further due diligence processes. According to the report Vodafone has a limited impact on the supply. To contribute to improvement Vodafone set up an operator in Congo through their subsidiary program. In this way, a socio-economic improvement could be made. Helping local people through increasing connectivity and creating technology solutions (Vodafone, 2020).

The other report applies to a statement on human rights and artisanal cobalt mining in the DRC in 2017. Vodafone investigated the human rights risks in cobalt mining when Amnesty International published a report on human rights risks in the cobalt supply chain in 2016. Vodafone took a similar approach in relation to the CMs to mitigate the social and environmental risks in cobalt. Relevant suppliers were contracted and cobalt smelters were identified. Although the response rate was 100% from the suppliers and there was a couple of years of experience from CMs, it was extremely challenging to trace down to the smelters in the supply chain. Mainly because the supply chain consists of multiple tiers and many thousand suppliers. These suppliers have a very large number of their suppliers and are spread across the globe, these relationships between the suppliers change constantly. Quality was lacking and information incomplete, however, improvements could be expected. The membership of the RMI could help in the progression to trace cobalt and possible related human rights risks (Vodafone, 2017).

Member of the Responsible Mineral Initiative (RMI)
The main vision of the RMI is that mineral supply chains contribute positively to mitigate the social and environmental impacts of extraction and processing of minerals in the supply chain. The mission

is that the initiative serves as an umbrella organisation for industries that broadly support mineral sourcing and shape the dialogue and practice between the members. In the end, the goal is to support responsible production and sourcing of minerals in businesses in and beyond conflict-affected and high-risk areas. The industries are supported by tools and resources for regulatory compliance. The tools include a program to identify smelters and refiners, CMs reporting template, due diligence guidance and stakeholder engagement (RMI, 2021). The RMI vision, mission and goal are explained in figure 5.2. The telecommunication companies that are operating in the downstream supply chain are supported by the actions in the orange box at the bottom of the figure. In the end, the downstream resources help together with other support in the midstream and downstream to fulfil the desired outcome: "support responsible mineral sourcing globally to help foster peace and stability".
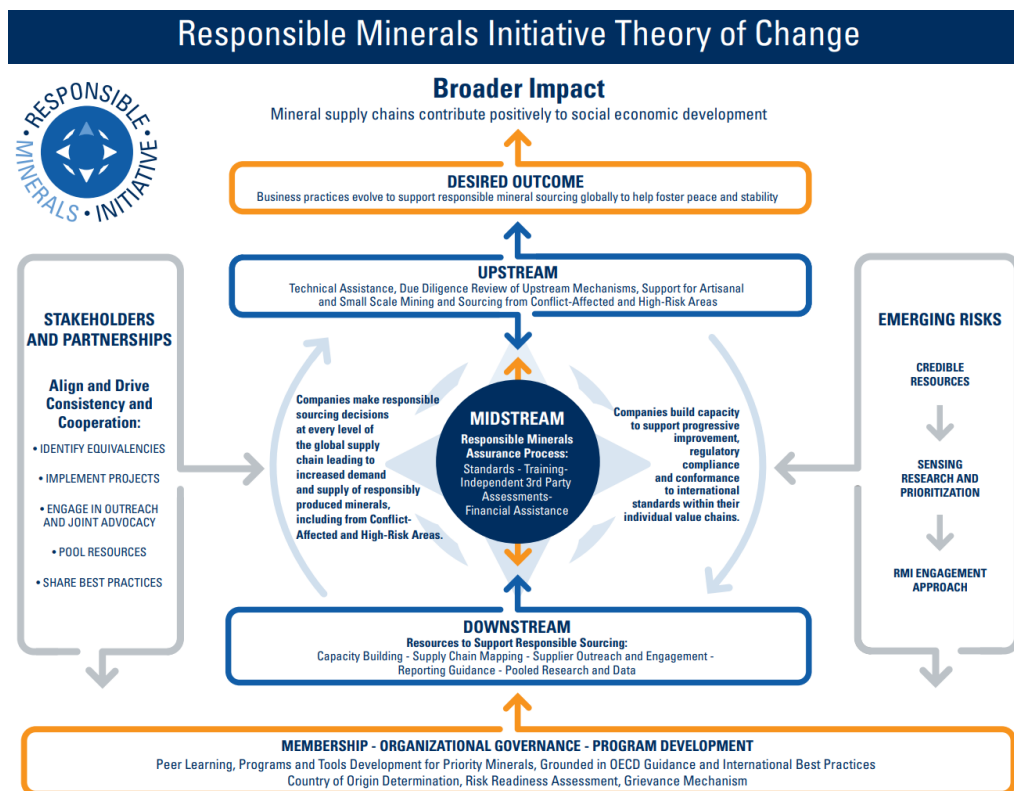

Figure 5.2: RMI theory of change (RMI, n.d.).

6. Strategy development & validation

This chapter analyses the findings derived from this research and translates them into proposed strategy development for the telecommunication company KPN. Findings from phases 1, 2 and 3 are analysed to develop a strategic business strategy. The strategy is purely focused on primary CRM supply in relation to human rights. The strategy is developed according to the stages in the strategic management process model (David, 2009), see figure 3.6. These stages are:
1. Develop the vision and mission statement.
2. External and internal environment analysis, and set long-term objectives.
3. Generate, evaluate and choose strategies.
4. Implement strategies.
5. Measure and evaluate performances.

6.1 Vision and Mission statement of KPN
The purpose of the strategy is to manage human rights challenges in primary CRM supply for telecommunication companies. Telecommunication company KPN is dependable on primary CRM supply. According to several reports, the supply of primary CRM is linked with human rights abuses. An increase in demand for primary CRM in telecommunication products and technologies can affect the amount of human rights abuses. Other external and internal factors drives KPN to develop a direction and scope over the long term, where KPN achieves an advantage in this changing environment through its configuration of resources and competencies.

The strategic vision statement of KPN is that securing CRM supply is important to expand their products and services to the customers. An increasing supply of primary critical raw materials is necessary to fulfil the demand. Products and future technologies require a variety of CRMs. Moreover, demand will exceed supply for some CRMs in future telecommunication technologies (Flik, 2021). Because of the link between human rights challenges and primary CRM supply (Mancini & Sala, 2018), companies need to deploy a strategy for managing human rights challenges. CRMs are essential for digitalisation, and managing human rights challenges are essential for providing sustainable products and services.

The mission statement of KPN is that KPN is a telecommunication company that offers products and services on the Dutch market. The Netherlands faces rapid digitalisation, and KPN wants to contribute to this digital transition. KPN aim is to connect all Dutch citizens and head toward a sustainable future. KPN operates sustainably and develops future-proof networks and services that connect all Dutch citizens (KPN, n.d. c). To fulfil this statement requires an increase in network and volumes of data. Previous research showed that CRMs are essential in telecommunication products and technologies (Kleinmagd, 2020; Flik, 2021).

6.2 External and internal environment analysis for setting objectives
To set long-term objectives, the external and internal environment was analysed. These are the results from phases 1, 2 and 3. A SWOT table is created to give an overview of the external and internal environment of KPN. The results of this paragraph are summed up in Table 6.1. These results are partly overlapping with the results from the SWOT analysis in chapter 3.

A strength is that KPN is well aligned with sustainability topics in the company strategy. Moreover, human rights challenges are identified as the top ties in the supply chain. Also, within the company research has been done on the impact of CRMs on telecommunication products and technologies. KPN is part of the JAC, which offers collaboration to increase social and environmental progression in the supply chains. Also, KPN offers differentiated products to their customers with better social and environmental performance (KPN, 2022c).

The weaknesses are that due to digitalisation KPN becomes more dependable on primary CRMs in their products and services. KPN needs a fixed strategy to manage human rights risks in primary CRM mining. If human rights challenges are not well managed, it could lead to reputational damage to the company, and non-compliance leads to financial penalties. The long and complex CRM supply chains make it time-consuming to identify and manage the challenges. KPN has a limited budget and capacity to manage the challenges, so a strategy is helpful.

In the external environment, several opportunities appear. More attention is paid to the topic, and the EU aims at a fair and sustainable supply of materials. Also, the EU directive on corporate sustainability due diligence was accepted this year. These drivers push all EU telecommunication companies to responsible sourcing CRMs. Responsible sourcing initiatives are rising, and global guidance frameworks are available. Moreover, KPN can prioritise the human rights challenges and start with a couple of focus materials out of the CRM list.

The external threats are that primary CRM supply is linked to human rights challenges, and increased CRM demand could increase human rights challenges simultaneously. A variety of CRM is contained in telecommunication products and services. These CRMs are extracted and processed in different ways. Moreover, there is a difference in human rights challenges between LSM and ASM. Developing standards and auditing is not always the best solution, and different set-ups are required to manage the challenges. However, human rights in primary CRM supply is an important theme it is barely researched. The human rights topic is also broadly defined, and the social impact of mining is not only directly related to miners but also intertwined with the wider social, environmental and political environment. Therefore, end-user companies are welcome to have guidance and collaborate with stakeholders to manage human rights challenges in primary CRM supply.

Table 6.1 SWOT analysis of the internal and external environment.

Strength	Weakness	Opportunity	Threats
KPN well aligned with sustainability topics in the strategy, for example SDG: Responsible consumption and production.	KPN is dependable on CRMs and the demand will increase in future telecom. technologies.	Responsible sourcing initiatives are rising and availability of frameworks and tools	Primary CRM mining is linked to human rights challenges. Growing CRM demand can increase human rights challenges
KPN is a member of the JAC, that offers possibilities for collaboration on a shared problem.	Emerging strategy in place managing human rights risks in primary CRM supply	Sustainable and fair positioned products gain market share	Most materials are extracted and processed in different ways, and therefore different set ups are required to manage human rights challenges
Human rights challenges are managed in supply chain for direct suppliers and tier 2 & 3.	Risks reputational image and financial penalties when human rights challenges are not managed	The OECD guidance is acting as a legal standard on a global level and applies to all minerals and metals in the supply chain	Developing standards and auditing is not always a good approach, especially in ASM
Differentiated products and services: sustainable and fair products, example Fairphone	KPN has long and complex CRM supply chains, tough to identify an manage challenges	The UN launched the business and human rights agenda in 2011	Limited scientific research on human rights in relation with primary CRM supply
KPN previous research on CRMs	KPN has limited capacity and budget to manage human rights challenges.	European Commission accepted the directive: Corporate Sustainability Due Diligence proposal in 2022	Human rights are broad defined and hard to measure. No comprehensive list of Human Rights indicators in mining.
KPN identified the human rights topics in their supply chain		Mapping CRM supply helps to prevent supply chain disruptions	End-user companies need help from other stakeholders to address human rights challenges in a collective way

After the internal and external environment analysis, long-term objectives could be set.
The purpose of this strategy is that KPN manages human rights challenges in primary CRM mining. Moreover, this purpose can be combined with a prior purpose of KPN: securing CRM supply to deliver products and services to their customers.

The overall goal is to manage human rights risks in primary CRM supply. However, a large variety of CRMs is involved in the supply chain. Also, various human rights challenges are linked to primary CRM supply. Therefore the objective is to prioritize the human rights risks and focus on a couple of CRMs in the beginning. Strategically it is feasible to focus on CRMs where telecommunication equipment uses a notable share of the production. When the telecommunication sector is a relevant user in the industry, efforts can achieve changes in the extraction and/or processing of the materials. Moreover, KPN can prioritize the CRMs that are most linked to human rights abuses. As well as prioritize human rights challenges. The human rights risks are divided into high severity and medium severity. Prioritizing the high severity challenges creates a better scope on the most urgent challenges.

Another development is that other telecommunication companies are ahead in managing human rights risks in the CRM supply chain. These companies are a member of the RMI and implemented the OECD framework. The position for KPN is that some of their peers are at the moment more advanced on implementing strategies that manage human rights challenges in their supply chain. Most of their peers have a limited focus on CRMs in their supply chain, however, some of them already started with human rights due diligence on CMs and cobalt. Performing due diligence is a time-consuming process and starting early with the process creates an advantage. A welcome benefit for KPN is that it is part of the JAC, where ideas about managing the risks can be discussed. Moreover, KPN has gathered information about the use of CRMs in their products, future technologies, and circular strategies. Also, KPN has its own human rights statement. However, there is no strategy developed to manage human rights challenges in primary CRM supply.

Therefore the purpose is to deploy a strategy and become more advanced on the topic. A strategy to manage human rights challenges in primary CRM supply. In the short term, several actions are required to achieve the overall goal. The ambition is that KPN offers products and services to customers that are sustainably designed, including responsible CRM supply. Keeping in mind that human rights due diligence are ongoing, proactive and reactive process. The variety of CRMs in telecommunication and complex supply chains makes it nearly impossible to manage all human rights risks.

Moreover, the goal can be combined with additional actions. Companies that understand and manage their supply chains, by performing due diligence have better financial performances and are more shielded from supply chain disruptions. Properly managing your supply chain gives the advantage that a company doesn't face a CRM supply stop compared to companies that have limited insights into their supply chain. Consider the fact that primary CRM demand will exceed supply for various CRMs. Current and future telecommunication products and technologies contains a variety of CRMs. A stop on CRM supply could damage the business telecommunication companies in the worst way. Connecting the goal of managing human rights challenges with securing the CRM supply, increase the importance of the topic. Short-term actions are required to achieve the goal. These actions are explained in the next step.

6.3 Generate, Evaluate, and choose a strategy
This part focus on the creation of objectives, to improve KPN competitive position. The objectives are divided in short and long term objectives.

6.3.1 Formulation of the business idea
The KPN business idea figure is adopted from Johnson and Scholes (2002). The business idea applies to why and how an organisation has been successful by reconciling the recent forces and influences on strategy. The original business concept was that there was an emergent strategy for human rights challenges in primary CRM supply. Experience showed that KPN products and services contain various

CRMs and the demand will increase in the future. Moreover, there is a link between primary CRM mining and human rights challenges. Therefore, it is important to develop and deploy a strategy on human rights in primary CRM supply. Identifying the challenges and mitigating the challenges is key. The goal is that deploying the strategy would result in fewer human rights challenges and KPN provides more responsible products and services to their consumers. The advantage in the external environment is that KPN is ahead on the legislation on human rights in the supply chain. The competitive advantage is that there is responsible CRM supply in products and services. Also, KPN has better insights into managing the supply chain and is more shielded from supply chain disruptions. That would result in a better reputational image and financial performance within the company. Moreover, satisfying their customers would increase market share. A possibility is a growth in the budget, which can be invested in human rights due diligence and builds trust among stakeholders.
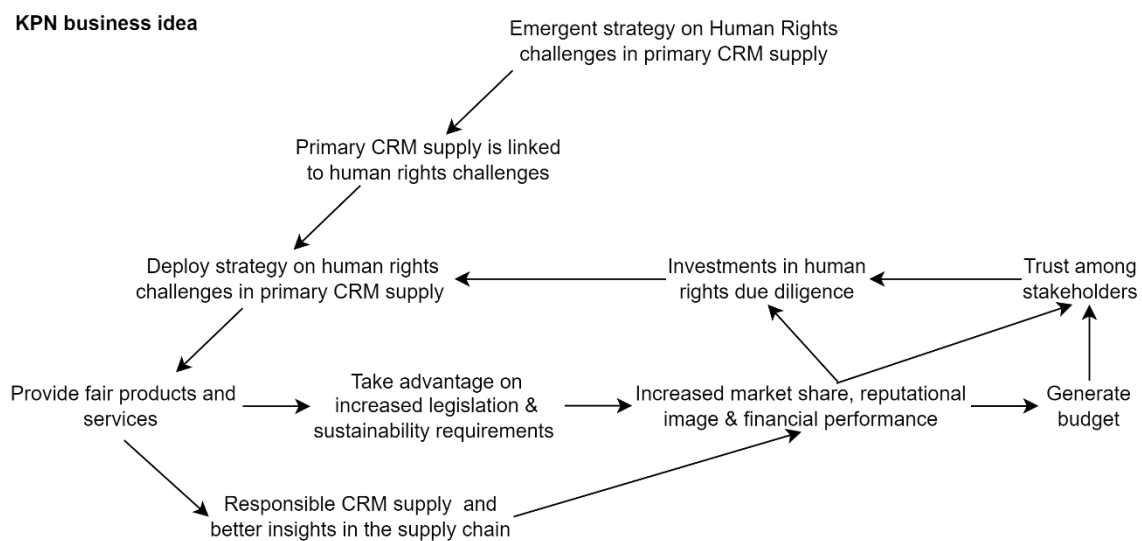
Figure 6.1: the business idea on human rights challenges in CRM supply adopted from (Johnson & Scholes, 2002).

6.3.2 Short term strategy

Reviewing the information that has been gathered. It seems a logical step for KPN to follow the same track as their peers. Becoming a member of the RMI and implementing the OECD framework is a logical first step. Mainly because these industry schemes are less in cost compared to individual practices. The industry schemes are a safe and simple way to start with and KPN can advance on the challenges. Using the schemes, it is important that KPN needs to be aware of having their own due diligence in place and take a comprehensive look at their CRM sourcing. Companies are encouraged to assess the relevance of these issue areas to their own operations and to manage risks accordingly.

Prioritizing a list of CRMs would be a proper start. A proper start would be the focus on CMs and cobalt. These minerals are recommended by the RMI for the electronics sector to perform due diligence. The RMI has tools and resources in place to help KPN with its due diligence. At the moment KPN asks their suppliers to undertake reasonable due diligence within the supply chain on CMs. The strategy recommends doing their due diligence. Therefore, it is recommended to start with the CMs and cobalt. These CRMs are already incorporated by other telecommunication companies, which focus on CMs and cobalt.

Implementation of the global OECD framework is a proven approach. Becoming a member of the RMI is less in costs compared to individual practices. Data and tools are provided by the RMI and there is a focus beyond the CMs. The budget within KPN is still limited and therefore becoming a member and applying the framework would be an interesting start. Start with managing the risks and don't be too

ambitious in the beginning. Showing that there is robust due diligence in place, is a sufficient start and there is room for advancing in the field of human rights due diligence. Performing due diligence and setting targets are important for shareholders and consumers. It reduces the reputational risk of the company and helps to secure the CRM supply. When voluntary human rights due diligence turn into legislation, KPN is advanced on the topic. What makes it easier to comply for the company.

6.3.3 Additional actions for long-term strategy

Besides the main focus on becoming a member of the RMI and implementing the OECD framework in the short term, there are additional actions that could enhance managing human rights challenges. If KPN wants to become a sector leader and advance on the topic additional actions are required. These are actions that help KPN in advancing on the topic. These actions might be helpful in the long term:

Allocate annual costs

In the first place allocate the costs on the long term is important to simplify the decision-making process. The actions on the long term require investments. Therefore, it is important to have an annual budget to perform due diligence and implement additional actions. It is important to have a due diligence system in place and reserve annual budget, this is part of the business.

KPN can also think of an price increase for products and services. Offering more responsible products and services to customers for a higher price, and investing these higher margins in managing human rights challenges. The company allows the customer to choose between a regular price or an increased price and invest the money in human rights improvement. The risk of losing market share is limited when the regular price option for products and services still exists (Johnson & Scholes, 2002). Customers have the choice to enclose a sustainable membership or not. The funding creates extra budget for investments to manage human rights challenges in primary CRM supply.

Increased collaboration JAC

Enhance collaborative initiatives are named as one of the options to tackle the complexity of the supply chain. The advantage is that KPN is a member of the JAC. Increased collaboration with its members contributes to the possibility to manage human rights risks in the primary CRM supply. KPN has a much smaller revenue compared to the top largest telecommunication companies. KPN is relatively small, with a limited budget and capacities for auditing. The JAC is helpful to share knowledge and discuss the latest developments on managing human rights challenges in CRM supply. Sharing information between telecom companies would help to get deeper insights on this topic. Besides the Responsible Minerals Assurance Process (RMAP) of the RMI, telecommunication companies can also think of extending their risk assessment for CRMs that are not part of RMAP. Collecting and sharing data within the JAC helps to identify potential hotspots. Scoping the materials and associated risks helps to advance on the topic. These advancements can be realised without direct help from external parties. Therefore it would be interesting to increase collaboration with the JAC. There is very limited information on CRM suppliers in the global supply chain. Most information is on CM and it would be interesting to increase collaboration with the JAC.

Involvement of NGOs

Over the last decades, NGOs tried to highlight human rights abuses in the extraction of CRMs. A couple of NGOs highlighted the human rights risks in cobalt extraction. But also other reports appeared on primary CRM supply in relation to human rights challenges. Supporting NGOs, who operate on the ground in sourcing countries helps end-user companies to identify the challenges. The main benefit is that NGOs have a similar intention: improving the human rights situation in the sourcing countries. Moreover, collaborating with NGOs provides an understanding of the human rights situation in the extraction of materials within a country or region. Gaining more knowledge on the activities and human rights challenges helps telecommunication companies to create specific strategies to manage

these human rights challenges. Experts indicated that CRMs are extracted and processed in various ways. Moreover, supply comes from countries all over the globe. Increasing knowledge about the situations contributes to prioritising the CRMs and human rights hotspots. Therefore, it helps to identify and assess the most urgent challenges.

Partner with learning platforms and participate in industries pilot projects
The automotive sector and electronic sector, and various industry schemes did a lot of work on due diligence and sourcing risks on CRMs. Industry platforms facilitate joint efforts to address the sourcing risks. Platforms provide resources and are expected to grow. More data becomes available on CRMs in relation to human rights. The information is useful for companies that have limited experience in the field or wants to become advanced with the latest developments. The platforms aim is to collaboration to share costs, and collective action and create more knowledge on the topic. One of these platforms is "Material Insights" which was co-founded by the RMI. The platform shares information about materials and global supply chains. Tools and resources are available in order to help with well-informed decisions about human rights challenges in the supply chain. Moreover, responsible supply chains creates economically resilience in material supply (Material Insights, n.d.).

Key industries linked to CRM supply in products and services did already a lot of work on the topic. KPN could further investigate on how these sectors manage human rights risks in primary CRM supply. The renewable energy sector and mobility sector, are well known for the use of CRM in their equipment (Re-sourcing, n.d.). New insights are obtained and telecommunication companies raise the level of the best-performing sectors. One of these examples is the implementation of pilot projects. The automotive sector has a focus on tracing responsibly produced cobalt. The cobalt is traced from upstream cobalt production facilities in the DRC to the production site in the downstream part of the supply chain. The automotive company founded the project together with smelters, traders and other supply chain participants. Moreover, the project is advised by respected industry bodies (Tesla, 2020). Interesting is the fact that KPN has a partnership with this automotive company on providing the connectivity system and other applications for these cars (KPN, 2014). Having partnerships with these companies, lower the barrier to collaborate in the projects.

Other situations where KPN has the possibility to use its leverage are joining organisations that share and discuss knowledge about the topic. In the Netherlands, a well-known platform is the Social and Economic Council (SER). The SER is an advisory body in which employees, employers and independent experts work together to reach agreements on key social and economic issues (SER, 2021). The SER focuses on the use of OECD guidelines and UN Guiding Principles on Business and Human Rights to put the EU directive on international corporate social responsibility into practice. Mainly by advising companies and organising dialogues. Governments, businesses and NGOs collaborate to manage human rights in international supply chains. Combining a high level of expertise with meaningful dialogues on improving circumstances in supply chains together with stakeholders, is helpful for KPN to advance on the topic. KPN can participate in the initiative that clarifies expectations through practical applications and moves to new sector agreements (SER, 2021). Moreover, KPN can focus on involving their top suppliers in the human rights dialogue. The top suppliers are responsible of 80% of KPN procurement spent (KPN, n.d. b).

Gaining in-depth knowledge on legislation and initiatives
Companies incorporate the on the OECD mineral due diligence guidance and the UN Business and Human documents. However, there are more specific standards such as Voluntary Principles on Business and Human Rights, focussing on human rights abuses by public and private security forces (Voluntary Principles, n.d.). Also, the Extractive Industries Transparency Initiative focuses on revenue transparency. Moreover, mineral legislation increases and sustainability initiatives for minerals are rising (CERA, n.d.). These developments are interesting for KPN to keep an eye on. Having a good

understanding of the latest developments and adapting these developments in the strategy, brings KPN closer to a sector leadership position.

Involvement in the ASM sector
Most companies focus on certification and source their CRMs in the LSM sector. The ASM sector is therefore mostly neglected. However, research showed that improving the working conditions in the ASM sector is important for human rights development and increased CRM supply. LSM can't meet the material demand, and both sectors fulfil an important role in CRM supply for digitalization. To fill the supply chain gap it is recommended to focus on ASM. In the DRC 90% of the mining people are working in the ASM cobalt sector and therefore a large part of the population relies on ASM. Small improvements in terms of fair prices for example can contribute to a large group of people working in ASM. This requires another approach compared to the standard auditing process, because of the complex social and technological organisation associated with ASM. Moreover, experts highlighted that due diligence should be done equally on LSM and ASM. This is one of the actions in the long term. According to experts, sourcing ASM in the short term because it is complex for KPN. Moreover, the local government plays a role in legalizing this sector. There is not enough legitimate ASM sourced material, therefore the government is responsible to speed up legalising this sector, and increasing the supply from ASM workers.
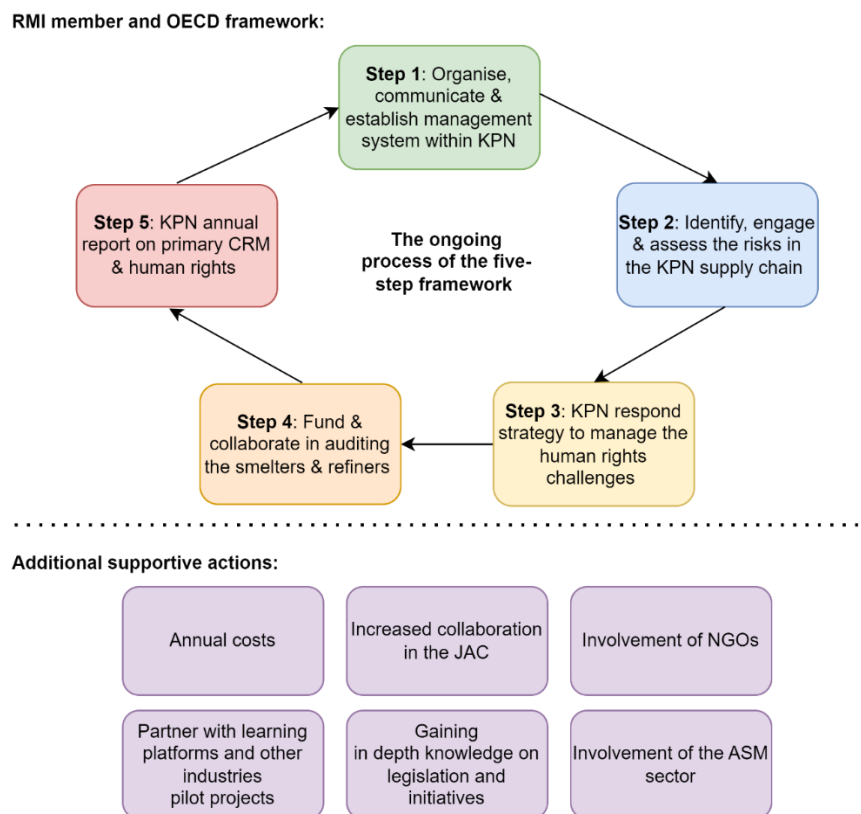
Figure 6.2: main actions for KPN strategy.

6.4 Implementation of the strategy
Managing human rights challenges is a complex issue, however, it is necessary to measure and assess human rights challenges in your supply chain. To manage human rights challenges in the right way it is important to start as early as possible with the implementation. Starting early helps to learn and develop progressively. The earlier a company implements their management plan the more accelerates its learning. Companies become more advanced in terms of human rights due diligence and good practice. Moreover, it helps to build well-managed relationships with suppliers and secure the supply of CRM. If KPN wants to advance on the topic, recommended is to start early with

implementing the OECD steps. If KPN has the ambition to become sector leader, KPN can implement additional actions. The implementation of the five step OECD mineral framework for KPN is visualised in figure 6.3.
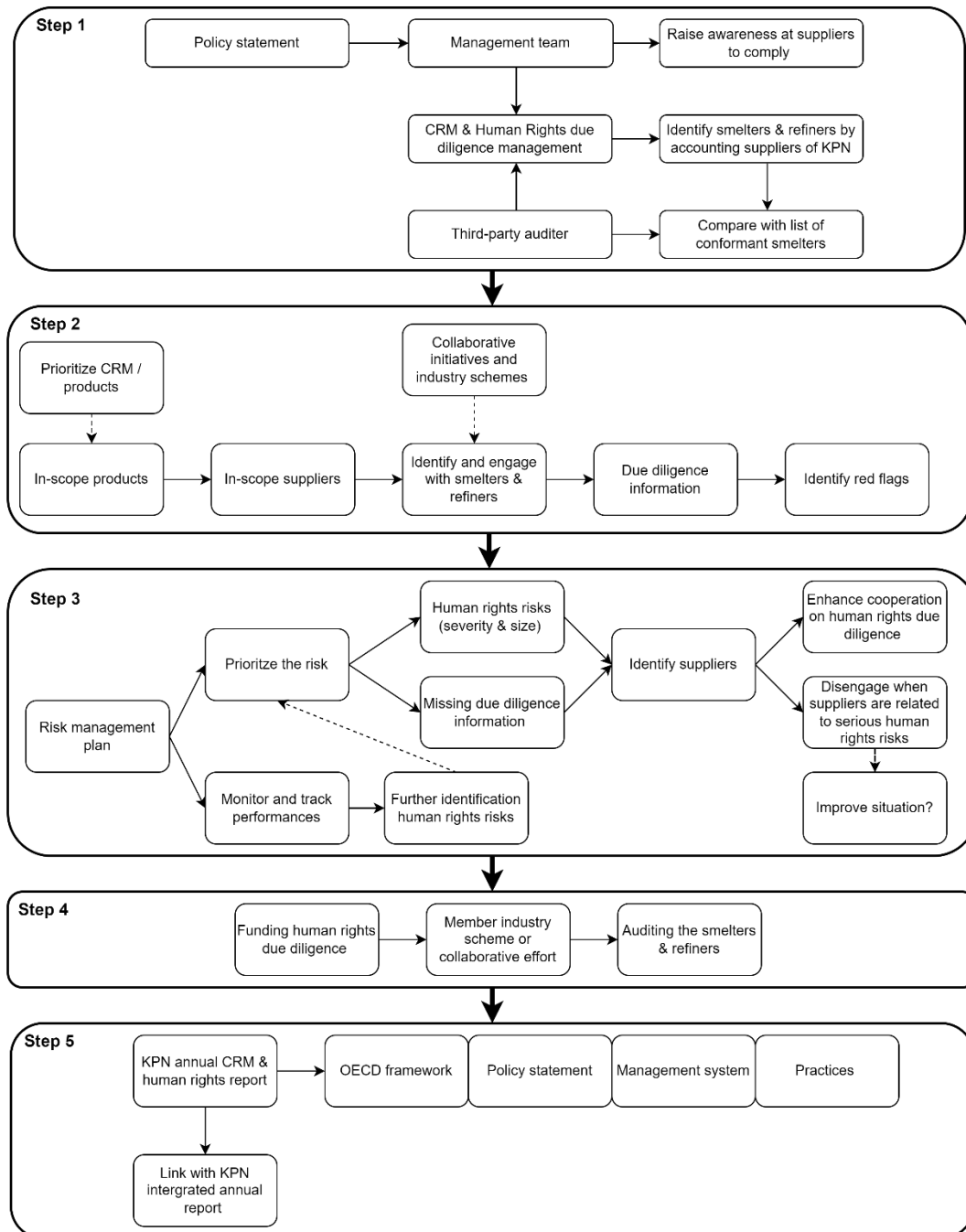
Figure 6.3: Implementation of the five step OECD mineral framework for KPN.

Step 1: Establish strong company management systems
The KPN management system should be in line with the due diligence standards. Due diligence standards for end-user companies include:

Commission an internal team that oversees supply chain due diligence and a manager that is accountable. At the moment KPN performs due diligence in the downstream part of their supply chain. The suggestion is that the tasks of this team are extended to the upstream part of the supply chain. Other EU telecommunication companies, appoint these tasks to the procurement team. This team is

responsible for procuring responsible products and services, and including mineral due diligence would be a logical next step.

Communicate company responsible sourcing expectations, policy and actions to suppliers. KPN has the supplier code of conduct in place that includes expectations on human rights, labour and the environmental performances. Detailed expectations, policies and actions within KPN and JAC about human rights due diligence in the mineral supply chain are lacking. Communicating KPN individual expectations, policy and actions about human rights in the mineral supply chain in the management system are advised to develop and implemented at the company level. The expectations and policy should cover human rights risks that are inherent to primary CRM supply. Actions are similar to the JAC methodology by detecting, alerting and escalating adverse human rights impacts within the supply chain. However, the different set-up in the upstream part, compared with the downstream supply chain should be considered. KPN can't directly engage with these suppliers. Moreover, KPN must define a list of focus materials.

Establish an internal system that includes transparency, data collection and records of supply chain due diligence processes. This requires serious efforts and capacity from KPN, therefore, the RMI membership is helpful. Tasks are related to data tracking, assessing risks and preparation of reports. Moreover, a third-party auditor is likely to have to assess the processes and procedures of the system. The system is put into practice in the next step. KPN has no internal company system in place but only an industry-driven program for auditing high-risk suppliers in tiers 1, 2 and 3.

One of the key themes in this strategy is to maintain records on the identity of smelters and refiners. Smelters and refiners are considered as chokepoints in the supply chain. In this part of the supply chain minerals are about to enter the downstream part of the supply chain. Meaning that the number of smelters and refiners is relatively small compared to other parts of the supply chain and materials are not yet mixed before it enters the downstream part. Therefore, KPN needs a system to collect the information. The following system is proposed for managing human rights challenges in primary CRM supply.

Step 2: Identify, assess and prioritise the risks
The first task for KPN is to identify their in-scope suppliers. These suppliers are required to conduct due diligence, to identify that the sourced minerals are not linked to human rights abuses. Suppliers can be identified by in-scope products and services that KPN offers to their consumers. Product suppliers, the manufacturing companies need to do their due diligence, by identification of smelters and refiners of these materials. Identifying these smelters is crucial but challenging. After completing the supplier list of the refiners and smelters, the list is compared with the RMI lists of conformant and active smelters and see if there is a non-confirmation. The red flag means non-conformity. The red flag in primary CRM supply can be interpreted as the following:
- CRM originated or is transported via a conflict-affected areas or high-risk areas.
- CRM is claimed to originate from a country that is not known or has limited CRM reserves.
- CRM is claimed to originate from a country in which minerals from conflict-affected and high-risk areas are known to transit.
- An upstream company works with shareholders that source CRM for a red-flag area or the upstream company sourced the CRM from a red-flag area in the last 12 months.

This is a time-consuming process that requires enormous effort. There are 31 EU CRMs identified in four KPN products and 42 CRMs contained in future telecommunication technologies (Kleinmagd, 2020; Flik, 2021). Collaborative initiatives and industry schemes are recommended to speed up the process. Besides that, it is important to prioritise your CRMs. Therefore the following suggestions:

- Increase the focus on CRMs, which two of these CRMs are also considered as CM. These materials are tantalum and tungsten. CMs are named in the KPN annual reports and form a direct risk due to legislation.
- Focus on CRMs where the telecommunication sector uses a notable share of production and industry efforts can achieve changes in the extraction process.
- Focus on CRMs linked with human rights abuses. For example, cobalt from the DRC contains multiple human rights risks.

Step 3: Manage risks
Step three is to design and implement a strategy to manage the risks. The first thing to do is to inform the manager about the red flags and prioritise the suppliers which KPN wants to address. Prioritise the suppliers by assessing their risk levels and the due diligence actions they corresponded. Human rights risks can differ in medium and high severity risks in the supply chain. The type and size of the human rights risk can be decisive in prioritising the supplier. An example is that forced labour percentage is higher at mining site A compared to mining site B. Or mining site A there is a risk of high severity and site B risk of medium severity.

Secondly, suppliers must document all relevant information to KPN regarding the risks. Suppliers that can't deliver the requested information from KPN are identified. There is a follow-up with these suppliers to stop uncooperative behaviour. If suppliers don't want to cooperate in due diligence, the next step is to disengage from suppliers that are cooperating with smelters or refiners contributing to the most serious human rights impacts. Serious human rights impacts are the most severe impacts named in table 4.2.

Next, the focus is on managing the risks by monitoring and tracking the performance of risk mitigation efforts. This step requires cooperation across the supply chain and managing the risks by implementing a risk management plan. The risk management plan is an important pillar in the third step of the OECD framework. The plan brings progressive action into place regarding the risk-mitigation measures and further identification of smelters and refiners.

Step 4: Audit of smelters and refiners due diligence practices
The fourth step focus on auditing the high-risk smelters and refiners in the CRM supply chain. In this step, it is required from KPN to support the auditing process. Funding the third-party auditors is key. The RMI membership which covers due diligence practices on CMs, CRMs, and other minerals. However, KPN has a limited budget available, due diligence is recommended to become part of their own business. Show that there is robust due diligence in place and that is part of the business and costs. A feasible way of doing this is to become a member of an industry programme. Some EU telecommunication companies are already a member of the RMI.

Step 5: Report on supply chain due diligence
The final step for KPN is to report publicity on the due diligence that has been carried out. Report includes the OECD due diligence framework methodology and practices related to key findings and actions from human rights risks. Recommended is that KPN publish an annual report in order to see the progression which has been made every year on managing human rights challenges in primary CRM mining. The policy and actions can be linked with the KPN integrated annual report.

Implementation of additional supportive actions:
On top of the five-step framework, there are a couple of supportive actions which might help to speed up the process. These actions contribute to one or more steps in the framework. The following actions are derived from the results:

Annual costs
Discuss and calculate the annual costs and spent on human rights due diligence every year. Besides that, for implementing the product and service differentiation, a detailed plan on how to implement this action point is recommendable. The main focus should be on communicating this to the consumers in an understandable way. KPN needs to explain to their customers what the contribution of this idea is and where the money is invested in.

Increased collaboration in the JAC
Preferably, the performances would be discussed during the JAC meetings. Every year two JAC meetings are scheduled. It would be interesting to put the topic of CRMs on the agenda with a focus on human rights challenges. Sharing resources and best practices among European telecommunication companies is helpful. Telecommunication companies are advancing on the topic. Companies that are more advanced compared to other, share their practices and performances with other telecommunication companies. That could be beneficial for KPN which is less well aligned with the topic at the moment.

Partner with learning platforms and other industries pilot projects
Start with the involvement in one or a couple of platforms or pilot projects. Becoming a member of these platforms or participating in these projects helps to gain new insights and become more advanced in the topic.

Involvement of NGOs
1. Having regular meetings with NGOs that are working on the ground, helps to keep up with the latest information that is available on human rights challenges in primary CRM supply. Sharing information regularly helps to identify the hotspots.
2. A recommendation is that KPN collaborates with an NGO that is a member of OECD watch. These NGOs are informed and advised by this organisation on how to make use of the OECD due diligence guidelines for multinational Enterprises. One of these main topics is human rights, their vision is formulated that all business is conducted in a way that respects human rights (OECD Watch, n.d.).

Gaining in-depth knowledge on legislation and new initiatives
Aiming at a proactive way to perform this action point. To gain knowledge, data must be collected. This is a time-consuming process. It would be recommendable to discuss within the company to what extent performing due diligence and managing human rights risks is possible. What is desirable and also what is feasible concerning the capacity and budget. Solving the human rights situation is something idealistic. Therefore prioritize the action points and set benchmarks.

Involvement of the ASM sector
If KPN feels comfortable, the company can source ASM materials, however, the implementation of this action is not recommended at the moment. The main reason is that it is complex to source the material. However, at some point, KPN can involve in ASM as well. ASM sector contributes to filling the supply chain demand gap. Involvement in the ASM sector requires advanced knowledge of the subject.

6.5 Measure and Evaluate Performances
The last step is focused on performance measurement. To measure and evaluate the strategy, it is recommended that KPN has a roadmap in place, see figure 6.5. This roadmap, includes a timeline, action points and progression rate. The roadmap is explained in section 6.7. Measuring actual results versus the plan helps to determine the progression. Important to consider is that due diligence on human rights is a work in process. Human rights issues in primary CRM supply will still arise. To

measure and evaluate the performances don't be too ambitious in managing human rights challenges. Moreover, the external and internal environment on the topic is continuously changing. KPN needs to be aware of the strengths, weaknesses, opportunities and threats that arise in the environment. Constantly measuring and evaluating performances is recommendable, and if needed take corrective actions.

Key takeaway
Overall, it is recommended to think of a simple solution for this complex issue. There is already work done on the topic by other sectors. Experts point out that it is not needed to reinvent the wheel. Where the focus should be first on identifying, asses, and prioritising challenges. Secondly, focus on preventing and mitigating the challenges.

6.6. Strategy Validation
The strategy was validated by four experts. The results are based on the perfect solution. This includes insights into what is expected and also includes the limitations of the perfect solution. Besides this, a SWOT analysis was performed on the developed strategy. An elaboration of this section is explained in chapter 2: Methodology. A zoomed-in version of the results is included in appendix D.

Table 6.2: Overview of the expert workshops.

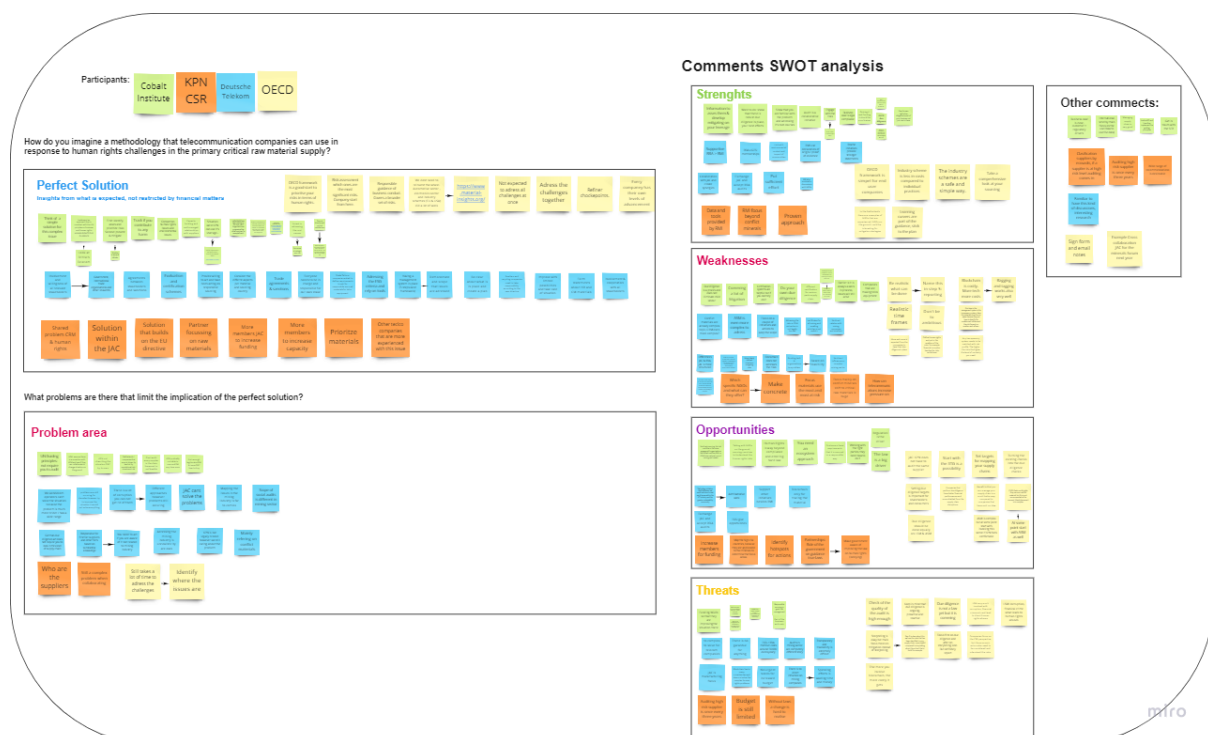| Expert	Organisation	Function
1	Cobalt Institute	Head of responsible sourcing and sustainability
2	KPN	Head of corporate social responsibility
3	Deutsche Telekom	Sustainable supply chain manager
4	OECD	Policy analyst, responsible business conduct

Figure 6.4: Overview of the results in Miro.

Aiming for a perfect solution and potential problems
The perfect solutions were explained by experts. Including the problems that limit the implication of the perfect solution. The results are explained below:

KPN aims for a solution by collaborating with the JAC because there is a shared problem among telecommunication companies. Collaboration between EU telecommunication companies is key to increasing the capacity and sharing best practices. Besides that, it is recommended to have strong partnerships with raw material organisations that help us with these challenges. Moreover, I think that it would be feasible to prioritize the materials, to structurally manage the challenges. However it is a complex problem and collaboration and partnerships are probably not enough to manage the risks (Expert 2, personal communication 2022).

Deutsche Telekom points to the involvement and willingness of all relevant stakeholders to cooperate. If there is no agreement between the stakeholders, issues won't be addressed properly. Therefore, the involvement of government, international trade organisations and other relevant stakeholders is desirable. Deutsche Telekom explains: "We as telecom operators can't solve the situation because the problem is much more bride" (Expert 3, personal communication 2022).

Human rights challenges are still occurring over time and implementing, of the different approaches to tackle these problems would help, however solving all problems is idealistic and not possible. Corruption is a driver that affects the progression of these issues. Overall, a collective effort among stakeholders is key to managing these issues and telecommunication companies are according to the German due diligence act not required to look at the lowest tiers in the supply chain. However, the company still cares about the problem. In short, to manage these problems schemes, tools, agreements, sanctions, and willingness from the relevant stakeholders are important (Expert 3, personal communication 2022).

The Cobalt Institute proposed a simple solution for this complex problem. First, companies need to be aware of the fact that they track the suppliers if a company contribute to any harm. Second, implement an approach that is consistent with the UN principles on business and human rights. To scope the approach, it is recommended to identify, assess, and prioritize human rights risks. Secondly, prevent and mitigate the risks. Overall, it is recommended that KPN use its leverage according to the situation. Therefore, look at existing practices from other telecommunication companies and join organisations for collaborations. From this viewpoint, try to work on capacity building and manage your relationship with suppliers. Also, invest in strategically addressing root causes. A possibility is to source directly and cut out the middle tiers, by setting up long-term and direct contracts with the LSM sector. This helps to secure sources, set the right price and manage human rights risks. Ideally, KPN sources also from ASM but this is not always possible due to the limited amount of legitimate ASM (Expert 1, personal communication 2022).

The OECD suggested that it is a possibility to start with the OECD Due Diligence mineral framework. The framework expects companies to prioritize human rights and financial crimes risks in the company mineral supply chain. This will allow companies to identify the most significant risks. Companies will be able to proceed by implementing the OECD Due Diligence Guidance for responsible business conduct, which covers a broader set of risks (e.g. environmental, and labour risks). Moreover, the proposed solutions don't ask KPN to reinvent the wheel. The automotive and energy sector, including through industry associations and related audit schemes, did already done a lot of work on the topic. Again, the aim is to take a progressive approach which prioritises challenges based on the most serious risks without addressing them all at once. Companies have their level of advancement and can set achievable targets for improvements: this is also the case for KPN (Expert 4, personal communication 2022).

SWOT analysis of the proposed strategy
The results from the strategy validation are combined in the four aspects of the SWOT analysis:

Strengths
In the strategy, there is a clear due diligence system in place. Moreover, aiming at a collaborative effort speed up the process. Creating partnerships and making use of the supportive tools from the RMI is an important step (Expert 1, personal communication 2022). A welcome fact is that the due diligence framework is a proven approach to managing human rights and financial crimes challenges in the supply chains. The framework is relatively simple for end-user companies like KPN. Mapping the supply chain until smelters and refiners and checking that these are correctly undertaking due diligence. Joining industry schemes allows companies to pool resources and knowledge, although this does not mean outsourcing the responsibility on carry out due diligence. The OECD framework is a safe and simple option to implement. Related to the additional action points: Dutch NGOs are experienced in the supply chain due diligence and have a good reputation for their work on the ground. Collaborating with NGOs could be beneficial to get advice on how to improve (Expert 4, personal communication 2022). Moreover, KPN aims at the prioritisation phase. Mapping high-risk countries and identifying hotspots for action (Expert 2, personal communication 2022).

Weaknesses
One of the weaknesses in the strategy is that you probably can't manage or identify all risks at once. Therefore be realistic in what KPN can do to manage the risks. Setting targets that are realistic through step 5 of the Guidance, public reporting on due diligence is therefore important (Expert 4, personal communication 2022). Various certification systems are helpful but don't be overly on tese systems (Expert 1, personal communication 2022). The weak point of the strategy is that the scope on CMs is limited and shifting to CRMs is even more complex. Moreover, incorporating the ASM sector is though. Considering the situation that companies are not legally bonded to address the risks, managing all challenges in CRM supply is impossible and the end user companies like KPN are on the other side of the supply chain. Therefore, knowledge of the situation is required to come up with a sufficient strategy (Expert 3, personal communication 2022). Another recommendation is to make the strategy more concrete. Described clearly in the strategy which materials and risks KPN want to prioritize and for example which NGOs to involve (Expert 4, personal communication 2022).

Opportunities
There are several opportunities that this strategy offers. The rise of responsible sourcing organisations on minerals allows engaging with them and strengthening the due diligence system. KPN can develop their due diligence system, but working with the right parties is key to making progression. Having a sufficient due diligence system in place means that KPN is prepared for incoming regulations on human rights due diligence (Expert 1, personal communication 2022). Some recommendations: starting with due diligence on tin, tungsten, tantalum and gold, also known as CMs. Besides CM, start with copper and cobalt as well, because there is sufficient knowledge on mapping the supply chains. Other telecommunication companies have already started by performing due diligence on these materials. To extend the due diligence targets it is important in business that: targets and progression are communicated to shareholders and customers. Moreover, Studies have shown that companies having a due diligence system in place results in better financial performance and companies are more shielded from supply chain disruptions. Having a due diligence system in place allows for managing the CRM supply chain in a much better way compared to companies that have little knowledge (Expert 4, personal communication 2022). Deutsche Telekom points out the opportunity to collaborate in initiatives and alliances that share expertise on responsible sourcing. Taking part in various initiatives allows for gaining knowledge and improving due diligence (Expert 3, personal communication 2022).

Threats
Due diligence should be equally carried out on ASM and LSM. Take into account that in the LSM sector corruption, and financial crime can be prevalent in a certain context, which then is an enabler to

serious human rights and environmental abuses. The ASM sector has a different scope of risks, but at some point, companies can start considering sourcing materials from the ASM sector by engaging in them. Companies need to keep in mind the that due diligence is an ongoing, proactive and reactive process. This means that it requires continuous efforts and investments. Checking the auditing quality is desirable to manage the challenges. Other threats are storytelling which is less useful compared to clear reporting and showing the progression. The use of technologies for traceability systems, for example, blockchain, can add a level of certainty, but is not always a necessity and can also be costly. The technologies like blockchain don't offer complete solutions but address transparency (Expert 3, personal communication 2022). Due diligence does not stop at traceability. Traceability systems should be tailored to the risk profile of the supply chain (Expert 2, personal communication 2022). Moreover, technologies such as blockchain only focus on the visibility part but do not address the problems (Expert 1, personal communication 2022). Deutsche Telekom explained that blockchain has many uncertainties that can't solve complex human rights issues (Expert 3, personal communication 2022). Another threat is that due diligence is costly and benefits are overlooked. This can result in a view that due diligence is wasting time and money when it is not required by the law (Expert 3, personal communication 2022).

KPN points out the limited capacity and budget for auditing, however, there must be good risk management which is part of the business and costs. KPN said that without regulatory requirements from the government it is hard to realise a change (Expert 4, personal communication 2022). However, it can be valuable to have a proper due diligence system in place and be ahead of other companies. Advancing in due diligence is a time-consuming process.

Table 6.3 SWOT analysis of the strategy validation.

Strength	Weakness	Opportunity	Threats
OECD framework is a safe and proven approach	Long and complex supply chains	Data and tools available at RMI	Other telecom. companies and sectors are ahead of KPN
Additional action points are welcome to advance on the topic	Impossible to manage and solve all risks	Proven approach by other companies & sectors	Willingness from all stakeholders to manage the challenges
Shared problem telecom sector and aim at shared solution	Variety of CRMs in telecom. products & technologies	Responsible sourcing initiatives for partnering are rising	Due diligence is not always required and is a costly process
Identify and use your leverage	KPN has limited experience with these challenges	Prepared for incoming legislation	Hidden drivers behind human rights challenges
Partnership raw material organisations	Strategy can be more detailed	Working with the right parties is key to make progression	Due diligence is a work in progress and don't stop at traceability
Prioritize and set targets	Certification systems are helpful but don't overly on it		Due diligence on all minerals is not required by the law
Member of the JAC	Shift from CMs to CRMs due diligence is complex		
More shielded from supply chain disruptions	Incorporate ASM is complex		

6.7 Strategy roadmap

Out of the feedback from the experts and SWOT analysis, a recommendation was to visualise and explain the strategy in more detail. The proposed strategy is formulated in short-term actions and actions over the longer term. In order to communicate and implement the strategy, a strategic roadmap is designed to visualise the actions required by KPN to reach the objectives. The strategic roadmap is made for implementation and further development of managing human rights in primary CRM supply. An elaboration of this section is explained in chapter 2: Methodology. The KPN strategy roadmap is displayed in figure 6.5. A detailed version of the roadmap is added to appendix E.
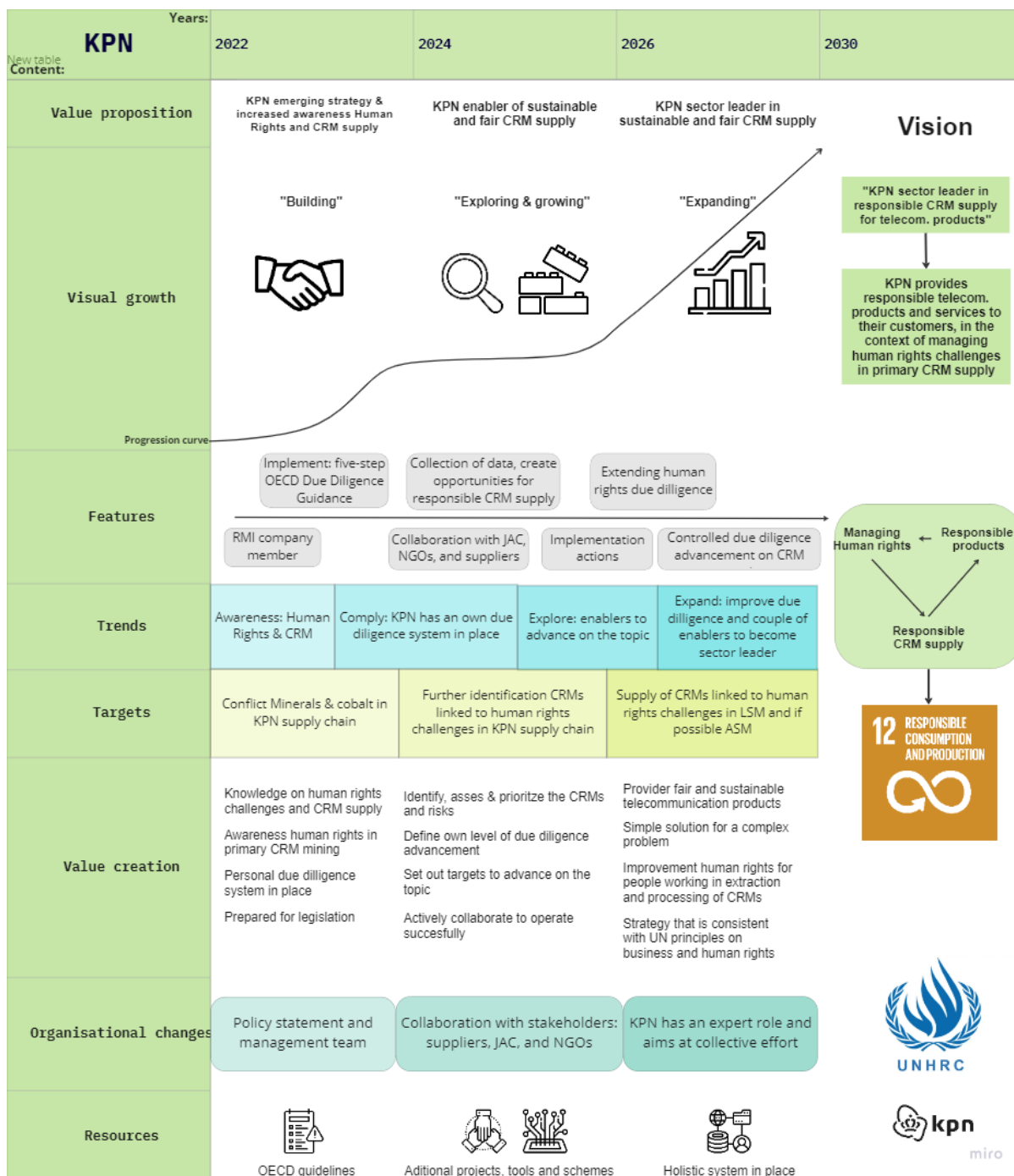
KPN	Years: 2022	2024	2026	2030
Value proposition	KPN emerging strategy & increased awareness Human Rights and CRM supply	KPN enabler of sustainable and fair CRM supply	KPN sector leader in sustainable and fair CRM supply	Vision
Visual growth	"Building"	"Exploring & growing"	"Expanding"	"KPN sector leader in responsible CRM supply for telecom. products" / KPN provides responsible telecom. products and services to their customers, in the context of managing human rights challenges in primary CRM supply
Features	Implement: five-step OECD Due Diligence Guidance / RMI company member	Collection of data, create opportunities for responsible CRM supply / Collaboration with JAC, NGOs, and suppliers	Extending human rights due dilligence / Implementation actions / Controlled due diligence advancement on CRM	Managing Human rights ← Responsible products / Responsible CRM supply
Trends	Awareness: Human Rights & CRM	Comply: KPN has an own due diligence system in place	Explore: enablers to advance on the topic	Expand: improve due dilligence and couple of enablers to become sector leader
Targets	Conflict Minerals & cobalt in KPN supply chain	Further identification CRMs linked to human rights challenges in KPN supply chain	Supply of CRMs linked to human rights challenges in LSM and if possible ASM	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Value creation	Knowledge on human rights challenges and CRM supply / Awareness human rights in primary CRM mining / Personal due dilligence system in place / Prepared for legislation	Identify, asses & prioritze the CRMs and risks / Define own level of due diligence advancement / Set out targets to advance on the topic / Actively collaborate to operate succesfully	Provider fair and sustainable telecommunication products / Simple solution for a complex problem / Improvement human rights for people working in extraction and processing of CRMs / Strategy that is consistent with UN principles on business and human rights	
Organisational changes	Policy statement and management team	Collaboration with stakeholders: suppliers, JAC, and NGOs	KPN has an expert role and aims at collective effort	UNHRC
Resources	OECD guidelines	Aditional projects, tools and schemes	Holistic system in place	kpn

Figure 6.5: KPN strategy roadmap.

Horizons: future visions

In order to work towards a future vision for KPN, three horizons are designed. The vision of KPN is to manage human rights challenges in primary CRM supply. CRMs are essential to proceed with digitalisation and expanding telecommunication products and services to customers. The goal of this future vision is for KPN to become a sector leader in sustainable supply of CRMs for telecommunication products. The three horizons are further discussed below.

Horizon 1: Building the strategy

KPN has an emergent strategy approach to manage human rights challenges in CRM supply. Several independent actions has been taken in the past years. These actions are:

Managing human rights challenges is applied in the top tiers in their supply chain by high-risk auditing suppliers with other EU telecommunication companies (JAC, 2020). Moreover, KPN has scoped the human rights topics in the supply chain (KPMG, 2022). Additionally, research has been conducted on the topic of CRMs within KPN. This is in line with an emergent strategy. Several actions were realised, despite the absence of intentions (Mirabeau & Maguire, 2014). However, KPN is less advanced compared to other EU telecommunication companies. These companies have already started managing human rights challenges for CM and cobalt supply. KPN can advance on the topic by following the same track as their peers, becoming an RMI member and implementing the five-step OECD mineral framework. The industry schemes help KPN reach the advancement of other EU telecommunication companies. Therefore KPN should focus on the five-step OECD framework, explained in section 6.4. In the first horizon, the main goal is for KPN to have a personal due diligence system. This enables the company to identify and mitigate the risks without relying on the JAC. The focus on performing due diligence is on CM and cobalt. These materials are a recommendable starting point for KPN because there is a link with human rights challenges. Moreover, the RMI has data and tools to perform due diligence for these materials.

The main benefit is that the OECD framework is a proven and global approach for end-user companies in the existing market. Having a system in place to perform human rights due diligence in the CRM supply chain is the first logical step in the short term. KPN proves to their customers and shareholders that the company tracks and responds to human rights challenges in CRM supply by having its own due diligence system. Becoming a RMI member and using the available data and tools saves time and costs.

The proven OECD approach, combined with the fact that KPN identified the human rights risks in the supply chain and KPN previous research on CRMs, is a welcome advantage for the company. This allows KPN to adapt the framework in the short term in their strategy. Having a partnership with the RMI and implementing the framework gives the availability for building the strategy. The strategic advantage for KPN is that the company has its own due diligence system in place. KPN is producing more responsible and prepared for incoming EU regulations. In addition, mapping the supply chain and risks makes KPN more shielded from supply chain disruptions. KPN will reach the same or higher level of advancement compared to their peers. KPN must remember that fulfilling the first horizon is mainly to comply with the regulations. Therefore it is the minimum requirement to fulfil. The benefits and efforts in horizon one are explained in table 6.4. More detailed information on what the RMI membership entails is shown in Appendix G.

Table 6.4: RMI membership benefits and efforts KPN

Benefits:	Efforts:
Reasonable Country of Origin (RCOI) data	Spend $7,500 per year to become a RMI partner member
Facility Database	Hire Human Rights Manager and internal team
Risk Readiness Assessment Platform	Connect to supplier data and identify high-risk areas in KPN minerals supply chain
Global Risk Mapping Platform	Implement the five-step framework set out in the OECD Due Diligence Guidance
Program Development Workgroups	
By Invitation Only RMI Events and Training	
RMI Annual Conference	

Horizon 2: Exploration and growth of the strategy
Horizon two focuses on new opportunities and extending the business model. The focus is on the exploration and growth of the strategy in order for KPN to become an enabler of responsible CRM supply. KPN extend the focus to additional supportive actions, named in paragraph 6.3. The actions are meant to grow the strategy. This can be achieved within the OECD framework and additional actions that help strengthen the strategy. Therefore the primary goal of this horizon is to: *Establish a*

stable strategy, where KPN position framework and additional actions to expand their human rights due diligence process.

The focus is on defining building blocks in order to become a sector leader. In horizon two, the focus is on exploring new opportunities for KPN. A lot of work has already been done in other sectors. The energy and automotive sector who are dealing with similar issues regarding the topic. The focus in the second phase should be twofold:

- First, KPN should consider extending the additional CRMs and human rights challenges they want to address. The OECD gives the main advice and provides tools and resources for the materials. However, thinking about the next steps for human rights due diligence shows that KPN is moving towards an expert role in addressing the challenges in CRM supply. In this case, it is recommendable for the due diligence implementation to work towards a list of CRMs linked to human rights abuses and further explore the human rights challenges for every single CRM. Extending the five-step OECD mineral framework to these CRMs would be desirable. Together with the OECD, KPN has designed and implemented a plan for CRM supply to manage human rights challenges.

- Second, KPN explores new opportunities with a focus on collaboration. Collaborating with JAC and NGOs in pilot projects, learning platforms, the ASM sector, and additional guidelines and schemes beyond the OECD framework helps advance the topic. This part of horizon two offers multiple actions that are recommended to explore. These actions are explained in section 6.4. Collaboration is key in horizon two to explore and set new actions. KPN is a relatively small telecommunication company compared to other European or global telecommunication companies. Therefore it would be logical to focus on collaboration in the field instead of investing time and money as an individual. KPN engage with other member companies, customers, stakeholders and partners to promote responsible minerals sourcing.

Collaborating with NGOs that work on the ground or have knowledge about the OECD due diligence framework helps KPN advance on the topic. Information includes identifying the hotspots in the supply of CRMs, that can be managed by using the framework. Furthermore, the focus is on collaboration within the JAC and sharing best practices. The JAC is a valuable partnership for telecommunication companies with a shared topic problem. Showing and discussing practices during the JAC meetings is an opportunity to gather knowledge on the latest innovations in the field. Based on that knowledge, KPN can decide which actions are suitable to incorporate and move to sector leadership.

Moreover, KPN can focus on additional actions that contribute to the strategy. Therefore, it would be recommended to focus first on prioritising CRMs and human rights by collaborating with RMI, NGOs and the JAC. After having scoped the direction and identified the hotspots of the topic with these parties, it is interesting for KPN to start with the exploration of new opportunities that helps to improve the situation in achieving the goal and vision.

KPN must invest in a couple of action points that address the hotspots. Due to the limited capacity, focusing on a broad set of actions is not feasible. Again, it is recommendable to prioritise the action points. Action points help to map the risks in the supply chain and help to be better shielded from supply chain disruptions. Understanding the latest advancements and adapting these advancements in the strategy brings KPN closer to a sector leadership position. Important is to consider which advancements should be prioritised to conduct the strategy properly. Not all challenges can be addressed at once, and therefore the focus should be on:

First, a collaboration by having partnerships in the RMI, NGOs, and JAC. Similarly, the focus is on collaboration with suppliers. The top suppliers that are responsible for 80% of KPN their procurement

spend. Close collaboration is important in this phase because these partners need to be involved in the strategic approach and achieve maximum effect. It is important that KPN and the JAC put pressure these suppliers to manage human rights challenges in primary CRM supply. The input from both sides is essential to ensure two-way communication and meet the requirements of both sides. In this way, the system is expanded and functional.

The realisation of the second horizon creates an advantage for KPN, where it starts with exploring and implementing new action that offers opportunities to become a sector leader. The OECD framework has been operational for a couple of years and offers the possibility to discover and implement the next steps. After the first horizon is completed, partnerships gain the interest of organisations to collaborate in the strategy. KPN has gained experience in the topic, and organisations feel tempted to join the transition to responsible mineral supply. Therefore these organisations must know what the trade-offs are in collaboration. Trade-offs are summarised in table 6.5.

Table 6.5: trade-offs for collaboration.

Organisation:	Trade-off:
RMI	Funding from KPN, used for the advancement on responsible minerals
NGOs	NGOs identify the hotspots and telecom. sector implement due diligence on CRM supply
JAC	Invest and collaborate to develop shared solution for responsible CRM supply
Direct suppliers	Secure CRM supply and working together towards a responsible supply chain

The focus in horizon two is not primarily on identifying and addressing the challenges but on creating a basis for Horizon 3. Progression is low compared to horizon two. Although, it creates an opportunity to expand the due diligence system in the next horizon. Within KPN, it is important to define their own level of due diligence advancement to operate realistically and consistently in horizon three.

Horizon 3: KPN becomes sector leader in responsible CRM supply
The third horizon focus on growth in the long run of the proposed enablers. The creation of new capabilities and new businesses are put into action in order to create an advantage. The third horizon focuses on growth in the long term by expanding the due diligence on CRM supply and implementing the proposed enablers that were defined in horizon two. The proposed CRMs and enablers are put into practice in a logical order. This horizon aims to scale up the enablers and further develop to reach a strategic advancement and come closer to the strategic vision. The goal is to establish a holistic and advanced system where KPN manage most of the challenges.

Parts of the pilot projects, learning platforms, ASM sector, and additional guidelines and schemes are adopted in the strategy. These actions create a resilient supply of CRMs for KPN with less involvement in human rights challenges. KPN has put into practice a broad set of match-making actions with solutions for problems. The set of actions should not be to broad but relatively simple and easy to implement for KPN. KPN is an end-user company that does not manufacture products. Therefore, KPN needs to use their leverage. Moreover, the company is relatively small compared to other telecommunication companies and operates only in the Netherlands. The main focus should be on the data-driven decisions from the OECD and other relevant organisations to track and mitigate the risks. At last, the situation in the external environment influences KPN's management strategy. Especially in horizon three, which is the last and, therefore, the most uncertain horizon.

Collaborating with the ASM sector can only be realised when enough legitimate material is supplied on the market. Moreover, the various CRMs and human rights embedded in a long and complex supply chain make it time-consuming to identify and mitigate all risks. Therefore KPN can deploy itself as a sector leader, but it is nearly impossible to manage all human rights risks within all the CRMs contained in products and technologies. On top of that, it is recommended to collaborate and think of a simple solution that manages most challenges. The progression in horizon three should be linear. A vast

yearly budget allows progress stably and comes closer to the vision on a responsible supply of CRMs for telecommunication products.

Time pacing: Why this timeline?
In order to manage the human rights challenges in the near future a timeline is chosen from 2022 till 2030. The year 2030 aligns with the 2030 UN agenda for Sustainable Development. Between now and 2030 is an important path to resolve the protection of human rights. The focus is on people, prosperity, planet, partnership and peace (UN, 2015). Moreover, a significant increase in primary CRM is expected by 2030 (Flik, 2021).

For KPN it is important to comply with global standards and advance on the topic as soon as possible. Moreover, KPN is prepared for the EU directive on corporate sustainability due diligence (EU commission, 2022). Therefore, the first horizon focuses on implementing the global OECD mineral framework in the organisation of KPN in the short term. In the medium term, KPN is required to set out the building blocks. There is a two-year timeframe to extend the business model and explore new opportunities. In horizon three, KPN has six years to work towards becoming a sector leader in the EU telecommunication market. This is the most uncertain horizon because KPN is dependable on its willingness to become a sector leader, stakeholders, and other factors that influence the market. Collective action among telecommunication companies and their suppliers is key to progress.

6.8 Validation of the roadmap
Besides the strategy being validated by experts, it would be nice to receive proper feedback on the KPN strategy roadmap from a couple of internal experts. The roadmap is validated by two experts working in the KPN sustainability area and members from the JAC.

Expert 1: Manager Corporate Social Responsibility
The roadmap is a valuable contribution to the topic of human rights. However, there are no clear objectives yet within KPN related to this topic. Managing human rights challenges in primary CRM supply is an emergent strategy within KPN. At this stage, it is still being determined if KPN wants to become a sector leader. However, we want to adopt the roadmap into our business strategy.

KPN is willing to advance on the topic, and the incoming regulation drives the company to take action. Becoming a RMI member in the short term and having a personal due diligence system is key to a proper start and advance on the topic. KPN cannot do all the work by itself, and help of an organisation such as the RMI is welcome. Becoming a member of the RMI is the most important step. However, more detailed information is expected from KPN on what the membership entails. In general, if KPN wants to become a member of the RMI, what are the conditions and benefits? In order to receive funding from the board, it is key to focus on these details in the roadmap strategy.

The additional action points seem logical. However, the focus should first be on the possibility of becoming a RMI member and implementing the OECD framework. The first horizon is the most important and because it is a proven approach, the step can be made more concrete. The second and third horizon is essential as well. However, it is far from the current practices within KPN. Collaboration with the JAC in the second horizon seems a logical option to explore new initiatives beyond the RMI.

Expert 2: Strategic Lead Energy and Environment
The most significant social and environmental impact is probably at the beginning of our supply chain. Therefore this roadmap offers a strategic way to manage these challenges and reduce the impact. Implementation of the roadmap within KPN shows the consumers and stakeholders that KPN is eager to manage the challenges and have a personal statement in place.

Implementing the first horizon seems a logical solution to this wicket problem. However, a detailed approach to the first horizon can be improved. In the second horizon, it is recommended to collaborate with suppliers that supply large volumes. KPN needs to set forward requirements to their suppliers to manage the challenges. The roadmap can be adapted among the procurement, energy & environment, CSR and compliance team. No department will implement the roadmap individually. Therefore, it is challenging to organise the implementation smoothly. A plan must be designed about who is involved and the required budget to perform the steps. The first horizon is a proven approach. The second horizon mainly entails the exploration of the topic, that can be discussed in the JAC. Choosing the right building blocks and becoming a sector leader after horizon three is the most uncertain part.

7. Discussion

This chapter evaluates the results and methodology of the research. The discussion includes the interpretation, implication, and limitations of the research results. On top of that, the discussion elaborates on the scientific contribution of this research and recommendations for further research.

7.1 Results

What are the drivers and barriers for telecommunication companies to address human rights challenges via strategic action in the context of primary critical raw material mining?

In chapter 3, the scientific literature review, an introduction is given to human rights in the context of CRM supply. The main focus is on economic importance and high supply risks within the CRM methodology (European Commission, 2020). Human rights are embedded in the CRM methodology. Within the methodology, the WGI is part of the social performance and covers 31 sources. However, just one source refers to human rights. This is the "Cingranelli Richards Human Rights Database and Political Terror Scale" (Kaufmann et al., 2011). The research of Manhart et al., (2019) and Di Noi et al., (2019) showed that the extraction and processing of materials significantly impact social and environmental performance. Regarding social impacts, human rights violations are still one of the most concerning social aspects of the mining sector (Mancini & Sala, 2018). The topic of Human rights is structured in different ways in the research papers. Some papers categorise human rights under social impacts, and in other papers, human rights refer to different sub-topics.

CRMs are linked with human rights, although there is limited scientific research on this topic. A possible reason is that human rights issues are commonly linked to CM (Silva & Schaltegger, 2019). The Universal Declaration of Human Rights (UDHR) was established in 1948 and is a common global standard that applies to all people and nations (United Nations, n.d. a). However, there is a weak connection between human rights challenges and CRMs supply in academic research. From a societal point of view, it is desirable to gain more knowledge on the topic. Increased demand for CRMs in the telecommunication sector (Flik, 2021), in combination with the human rights challenges in primary mining (Mancini & Sala, 2018), indicates that human rights challenges can increase gradually with the increase in CRM supply. The telecommunication sector needs to be aware of this emerging issue.

In addition to the literature research, expert interviews provide insights into the topic. One of these insights was that solving human rights challenges is idealistic. Mainly because of the various amount of CRMs, long and complex supply chains, limited capacity, and new challenges will arise. This has important implications for KPN, which might only solve some challenges but not all. Therefore, to what extent KPN should trace the upstream suppliers and what effect KPN want to achieve in the end is important. Does KPN want to keep auditing all risk suppliers and have a clean supply chain, contribute to a positive change, or something else? Therefore, it is interesting to understand the human rights situation in the upstream part of the mining sector. Moreover, it raises the question of when KPN is satisfied and takes sufficient action in managing human rights challenges because ending all human rights in the supply chain is idealistic.

Interestingly, the Declaration of Human Rights was established after World War II to prevent future cruelties. In February 2022, the Russians started a war and invaded Ukraine. The invasion has led to many documented violations of human rights (Levy & Leaning, 2022). Infringe the humanitarian law resulted in import bans and export controls by the EU and US. Policies to address the human rights issues challenges business and governments. The economic sanctions have also impacted the supply chain (Kaye, 2022). Russia is the leading global supplier of palladium and supplies 40% of the global market. This CRM is highly economically important and is exploited in many applications (European Commission, 2020). That is also the case for telecommunication products and future technologies (Kleinmagd, 2020; Flik, 2021). Human rights challenges appear in the extraction and processing phase

of CRMs. Moreover, these challenges also appear in global events when there is a link with human rights violations. Companies must be well aligned with these situations that are damaging to the company.

What is the human rights impact in primary cobalt mining in the DRC?

To scope the human rights theme and the human rights topics, the report from KPMG on KPN's Salient Human Rights Risks was used (KPMG, 2022). In the report ten human rights topics were identified in the category of supply chain workers (KPMG, 2022). Nine of these topics were recognised in primary cobalt mining in the DRC, and a distinction was made between LSM, subcontracting and the ASM sector. Amongst the topics, some appeared more frequently in the researched reports than others. As well as that the human rights situation differs per site, risks vary in size, and the human rights situation evolves. Also, the sectors can't be generalised and are highly intertwined (Maiotti & Katz, 2019). Looking at the environmental impact of operations is probably much more relevant for LSM than ASM. Around 75% of the cobalt comes from the LSM sector, and the ASM has a low degree of mechanisation compared to the large machinery in LSM (Maiotti & Katz, 2019). Furthermore, the working conditions in both sectors are more relevant to the ASM sector, which employs a larger group of people. However, the LSM sector supplies a larger amount of cobalt on the global market (Callaway, 2018).

There is an interconnection between human rights topics and the Copperbelt region. Issues that happen during the cobalt extraction process also result in issues that arise outside the mines. When looking into large amounts of cobalt extraction, a variety of pollution impacts the environment. The accumulation of heavy metals that flows from the mines to the agricultural fields, water bodies and urban areas is a concerning problem. Moreover, dust and soil ingestion from mining and smelter activities affects the population's health. Communities within 10 km of the mines or smelters face risks affecting their living standards (Cheyns, 2014). Besides the environmental impact of operations, other topics, such as working conditions and wages, are considered poor and impact the living standard. The mining camps face a high rate of crimes and sexual violence. Moreover, facilities, especially in healthcare, are limited. Mainly women are victims in the camps because of gender inequality (Sovacool, 2021). Cobalt exposure's impact on public health is largely unknown in the area (Kayembe, 2022). These impacts are linked to various human rights challenges (United Nations, n.d. a). The social impact of cobalt extraction has an impact on human rights appearances outside these mines. Companies need to have a sufficient understanding of the complete human rights impact.

A human rights topic not on the list but identified in the case study by exploring human rights risks in the cobalt mining sector is land rights. There is no human right to land under international law. However, land rights are considered as a critical human rights issue. Land rights refer to the use, control, and transfer of a parcel of land. People can occupy, enjoy and use land and resources (Gilbert, 2013). According to the OHCHR, the land is an essential element for realising many human rights and is therefore considered a cross-cutting issue. Under international human rights law, there is no explicit reference to a general human right to land (OHCHR, 2015).

However, the human rights aspect of land impacts directly on communities, which was identified in this case study. Indigenous communities are affected by illegal mining practices that cross their borders. Local communities are limited, considered or compensated in planning operations of large mining practices. Therefore, the term indigenous land rights is sometimes used. Indigenous people have strong spiritual, cultural, social and economic connections with their lands. Moreover, the land is used for the greater good, as it contributes to tackling climate change and biodiversity loss. In 2007, the UN stated that 20% of the earth's surface is indigenous land, containing 80% of the world's biodiversity (United Nations, 2007). There are limited references to the relationship between human

rights and land in international environmental law. Although, there is growing awareness that land is one of the elements that is a precondition for the enjoyment of human rights (OHCHR, 2015).

Safe drinking water and sanitation is an internationally recognised human right. The right was adopted in 2010. Water and sanitation are essential for enjoying life and all human rights (United Nations, n.d. b). In the case of cobalt production in the DRC, there is competition between land. Land can be used for production purposes, in this case mining or used for collective purposes. Collective purpose is in this case residential use for housing and human settlement (OHCHR, 2015). Regarding land use, there is competition between the (indigenous) communities, ASM and LSM sector. Increased production purpose can lead to a decline in collective purpose. Moreover, LSM has an impact on the environmental impact of operations. The human right to safe drinking water and sanitation can be affected when environmental impact is at risk due to mining operations. Prioritising mining operations over local communities in water use is doubtable, considering this human right (United Nations, n.d. b). These interpretations and implications show that having a checklist of human rights topics is limited, and a deeper understanding of the topic is recommendable to understand the situation better.

How do telecommunication companies measure and assess the human rights impact in primary critical raw material mining?

Orange, Deutsche Telekom, and Vodafone are steps ahead in performing due diligence compared to KPN. Reasons for these developments might be increased legislation in these countries on due diligence in the supply chain. Companies have more revenue and budget available for a due diligence plan. It is remarkable that the companies are all members of the JAC but have different levels of advancement in due diligence compared to KPN.

However, in practice, it is increasingly challenging for these EU telecommunication companies to perform due diligence and address the human rights risks. Companies have an incomplete management system to manage the human rights impact in primary CRM supply, and the CRMs are low on the priority list compared to the CM list. For telecommunication companies, managing the human rights risks in primary CRM supply will take massive efforts and time investments. Increased legislation and other factors in the external environment might speed up the development of managing human rights challenges in primary CRM supply. The question for telecommunication companies is to what level they will advance in their due diligence.

Which possible strategies can telecommunication companies develop toward managing the impact on human rights in primary CRM mining?

The answer to this sub-research question was based on the results from the previous sub-research questions. The strategy formulation focused on implementing the OECD framework in the short term. Implementing the OED five-step framework is a straightforward outcome. The main reason for applying the OECD framework is that there is limited research on the topic, which is seen as highly complex. Moreover, KPN is less advanced in the topic compared to its peers. Other sectors have also experience in the topic. Collaboration, limited budget, and capacity to manage the challenges play an important role. Therefore, having a strategy that covers these practices and is relatively safe and easy to perform would be a suitable way for KPN to advance in the field.

Additional benefits for the company are that the OECD framework for mineral supply chains applies to all minerals and is not limited to CRMs (OECD, 2016). Therefore, this implementation is helpful for due diligence on other minerals in their telecommunication supply chain. One of these minerals is

Mica, which is not a CRM. Mica is widely used in the electronics sector, and mining operations. Mica supply is linked with severe human rights abuses (Schipper & Cowan, 2018).

After the strategy was developed, it was validated by four experts. One of the previous discussions was to what extent KPN performs due diligence on human rights in primary CRM supply. One expert answered that KPN should invest in addressing the root causes if KPN contributes to any harm in the supply chain. Performing due diligence is part of the business and costs of a company (Expert 1, personal communication 2022). It is essential to mention that KPN won't change the situation in primary cobalt mining in the DRC by itself, but the company should use their leverage. Also, performing due diligence does not illuminate all human rights risks. Issues will still arise, and it is a work in process. Part of the company's profits should be used for their due diligence. Other experts emphasise the complex situation for telecommunication companies, and collaborative action over the whole supply chain is important to reach sufficient effects. Everyone needs to be in charge and is responsible for their stake. These arguments indicate that the strategy's feasibility is important and should be simple enough to implement.

Moreover, the roadmap offers good communication and visualises the company's strategy. However, the information contained in the roadmap is limited. The progression towards the vision year 2030 makes the implementation and progression of the actions more uncertain in the long term. It is strongly advised to monitor the changing environment and check whether this affects the strategy roadmap towards 2030.

7.2. Methodology
The discussion of the methodology is divided into the data approach, data collection, and framework.

Data approach and data collection limitations
Regarding the data approach and data collection, several points require attention. The points that require attention are named per chapter.

Drivers & barriers managing human rights
The EU list of CRM is applied in this research (European Commission, 2020). However, other minerals within the telecommunication sector might face heavier risks in terms of human rights abuses. For example, mica supply is a mineral is linked to human rights abuses (Schipper & Cowan, 2018). Scoping this research to the EU CRM list, exclude other minerals that face similar or heavier risks in terms of human rights.

The scientific literature research resulted in limited articles on the scope of the topic. Therefore, grey literature and expert interviews were applied to gain additional insights. Grey literature is of lower quality than scientific literature (McAuley et al., 2000), which might affect the scientific character of this research. Another point of critique is that the experts interviewed were not all experts in the field of the telecommunication industry, primary CRM mining and human rights. Most interviewees mentioned that they were unfamiliar with one of the three subjects. This resulted in answers related to their expertise. However, it is an emerging topic, and some experts are familiar with telecommunication companies managing human rights challenges in primary CRM supply. However, it was interesting to have a diverse group of experts involved who explained all different viewpoints on the topic.

Case study cobalt DRC
A single case study is applied to get proper insights into the human rights impact on primary CRM mining. The reason for choosing a single case study approach is to understand the human rights situation better. Moreover, due to time constraints, it was not possible to conduct case studies on

other CRMs and mining regions. Therefore, it is not possible to generalise the results of a single case study. The research of Mudd (2022) added that including other metals and minerals and focusing on other regions besides the DRC would be valuable to know more about the risks. The single case study is mainly characterised by a qualitative approach where interviews are part of the data collection. This case study data was mainly a mix of grey and scientific literature. Also, quantitative information was available through the social hotspot database. However, the database needed to be completed and detailed enough to show further insights into the human rights situation for cobalt extraction. An extensive and time-consuming data-gathering process is required to have an in-depth understanding of the human rights situation.

KPN and best practices from peers
Best practices on human rights due diligence of KPN and other EU telecommunication companies were researched. Beforehand, KPN pointed out that they don't measure and assess human rights challenges in primary CRM mining. Therefore, retrieving results on this sub-question was considered limited and straightforward. A welcome benefit was that another group of master's students from Leiden University researched human rights and corporate governance in the case of KPN. The research group conducted three case studies on corporate social responsibility and due diligence. The main benefit was that the data collection took place in the same period as this research. The possibility was to exchange information, and the master's students highlighted that research on how other EU telecommunications perform due diligence would be valuable. The group highlighted the CMs report by Vodafone and the statement from Vodafone on artisanal cobalt mining in the DRC. Sharing information is a useful way of speeding up the data collection process on this relatively broad topic.

Strategy development and validation
The strategy was built on the results of this research's previous phases and was validated by four experts. Two experts were more familiar with responsible sourcing and the framework. The other two experts were familiar with the telecommunication industry and the CSR policy. The idea was that all experts should join a workshop to discuss and validate the strategy. However, it was not possible to organise one conversation workshop due to the holidays and it was split up into four separate workshops. Therefore it was not possible to have an active discussion on the strategy and do the SWOT analysis together. However, the separate workshops allowed for a longer conversation with each expert. Another limitation was that the strategy was not proposed in the format of the five-step approach in strategic management (David, 2009). Moreover, out of this strategy, a roadmap was designed to improve the feasibility. The roadmap was validated by two internal experts from KPN and presented to external experts during an EU telecommunication meeting. The most difficult part during the validation was that going into more detail beyond complying with the standards became less familiar to stakeholders. Therefore, the feedback was limited when going into that much detail.

The roadmap is helpful for other EU telecommunication companies. Besides these European companies, the strategy can be useful for other end-user companies dealing with CRMs supply. Moreover, the strategy could also apply to companies outside Europe because most countries have similar materials in their supply chain linked to human rights challenges.

7.3. Scientific contribution
Human rights in relation to primary CRM supply is barely researched. Most scientists in the field of CRM focus on other supply risks. Human rights are established and widely acknowledged. However, the connection with CRMs is poor. However, more legislation on human rights due diligence in the supply chain has emerged in recent years. Conducting research on human rights in the context of primary CRM supply from an end-user company perspective makes this case study a valuable contribution. The study fills the research gap on human rights challenges in the context of primary

CRM supply. The research combines existing literature and provides new insights by conducting a case study at a telecommunication company.

7.3.1 Recommendations for further research

The recommendations for further research are mainly based on the limitations identified earlier. The practice-related recommendations for KPN are formulated in the previous chapter. Figure 7.1 provides a brief overview of the recommendations for further research.

1. Gain further insights in human rights situation and understand the interactions in the system

2. Conduct human rights case studies on other CRMs and identify the challenges

3. Research material supply in relation with human rights challenges not within scope of the EU CRM list

4. Explore and develop schemes and guidelines to manage human rights challenges for all minerals in LSM and ASM sector

Figure 7.1: Recommendations for further research.

An extension of this research could be done in several ways, in terms of the content of the results and in terms of methodology. The first recommendation is to conduct additional research to gain deeper insights into the human rights situation on cobalt extraction in Katanga, DRC. Conceptualising the human social system, including industrial systems, is an outcome of a better understanding of technological and social interactions (Graedel, 1996). Understanding the holistic industrial system results in better solutions for social change (Hoffman, 2003). In this case, understanding the human rights challenges and linkages to other challenges in the cobalt extraction region. Moreover, quantify the intensity per human rights challenge, and increase the focus on human rights in ASM and subcontracting.

It would be interesting to conduct similar case studies for other CRMs. In academic literature, CMs and cobalt are mainly researched in the context of human rights abuses (Young et al., 2019). Various CRMs are contained in telecommunication products and technologies. These materials are extracted and processed in different ways and supplied by countries all over the globe, which can result in different human rights situations. Additional insights on the social impact of CRM supply can be discovered. Those insights help develop human rights strategies for telecommunication companies.

This research focused on CRMs in relation to human rights challenges. However, minerals outside the EU CRM list might be more at risk in terms of human rights. Recommended is to conduct case studies on these minerals and identify the human rights challenges.

In academic literature and this research, the main focus is on the OECD framework. Although this framework is internationally acknowledged it would be interesting to research alternative schemes and guidelines or develop new standards for human rights challenges in primary CRM supply. At the moment, most of the CRMs are not incorporated into the OECD framework. However, research showed that the supply of CRMs not in the OECD responsible mineral sourcing list is linked to human rights challenges (Huber & Steininger, 2022). Therefore it is recommended to see if these CRMs can be incorporated into the OECD framework or develop a standard that integrates all minerals from LSM and ASM sectors.

8. Conclusion

The supply of CRMs gained more attention in the telecommunication sector. Mainly because challenges appear in increased CRM supply for telecommunication products and technologies. One of these concerning problems is the role of human rights challenges. Research has been conducted from a telecommunication company perspective to gain insights on the topic. This chapter answers the main research question of this thesis research: *What strategies can telecommunication companies deploy in response to human rights challenges in primary critical raw materials supply?* The four sub-questions that were formulated will lead to an answer to the main research question.

1. What are the drivers and barriers for telecommunication companies to address human rights challenges via strategic action in the context of primary critical raw material mining?

The main focus in academic literature is on CM instead of CRM supply and human rights challenges. Companies manage human rights challenges in the downstream part rather than the upstream part. The reason is that supply chains are long and complex, and regulation is in place for CM. There is an increased demand for primary CRM supply in telecommunication products. The awareness of securing CRM supply for digitalisation and managing human rights challenges has grown in interest among telecommunication companies. The social and environmental aspects play a role in human rights due diligence. There is growing legislation, schemes, guidelines and initiatives on human rights due diligence. However, there needs to be more clarity and knowledge on the corporate human rights due diligence obligations. Besides this, human rights are universal and widely recognised on global levels. However, human rights are not yet an established topic in primary CRM supply. Most companies don't have a fixed strategy yet for managing human rights. Obligations are voluntary based, and the complexity of CRM supply chains creates information deficiencies. Moreover, the budget and capacity are limited to manage the challenges. Although it is possible to define a list of focus materials for the EU telecommunication sector, prioritise the human rights risks, and set out a roadmap to reach the targets. Funding the costs by membership diversification, exploring alternative models beyond the auditing system, and increasing the pressure on suppliers to perform due diligence are considerations to deploy. However, this requires a new approach to target the challenges, and costs and capacity for due diligence practices will increase. It takes time and effort from EU telecommunication companies to address these complex challenges, and a strategic approach is required.

2. What is the human right impact in primary cobalt mining in the DRC?

The cobalt mining sector in the DRC is split up between ASM and LSM. Both sectors are differentiated and interlinked with each other. Therefore, human rights challenges differ between these sectors and within the sectors. A sufficient understanding of the complex situation is required to understand the impact of human rights impact. Quantitative data gives an incomplete and undetailed understanding of the human rights impact of primary cobalt mining in the DRC. However, the social risks in mining are mostly considered very high in the DRC compared to the global average. The case study on cobalt mining in the DRC identified various human rights issues across the LSM and ASM sectors. All nine human rights topics from the list occurred in cobalt extraction. In the LSM sector, all human rights topics are identified, except child labour. In this sector, most human rights risks occur in subcontractors' employment. Also, the ASM sector faces seven out of nine human rights risks. In the ASM sector, only forced labour and freedom of association are not identified as topics at risk. Table 8.1 gives a brief overview of the research findings.

An important note is that the impacts are interpretative, heterogeneous and differ in size. Therefore it is hard to generalise these risks for the entire sector. Although, the human rights situation in primary cobalt mining in the DRC is considered poor for most miners. Recent studies showed growing attention

to the human right situation in primary cobalt mining. However, it is still being determined if the situation has improved a lot in Katanga since the international attention on the topic.

Table 8.1 Identified Human Rights topics primary cobalt mining in the DRC for LSM and ASM sector, including subcontracting in LSM sector.

	Human Rights topics	LSM	Subcontract.	ASM
Highly severity	Child Labour			▓
	Forced Labour		▓	▓
	Occupational Health & Safety		▓	▓
Medium severity	Non-discrimination	▓		▓
	Working conditions		▓	▓
	Environmental impact of operations	▓		▓
	Freedom of association		▓	▓
	Excessive working hours		▓	▓
	Adequate wages & benefits		▓	▓

3. How do telecommunication companies currently measure and assess the human rights impact in primary critical raw material mining?

European telecommunications have a slightly different approach to managing the human rights impact in primary critical raw material mining. The main difference among the companies is the level of advancement in managing human rights challenges in CRM supply. KPN has a statement on human rights and incorporated SDG, sustainable production and consumption in its strategy. Also, KPN has a statement on CMs, but this only overlaps with two CRMs. The KPN procurement and suppliers policy focuses on downstream suppliers. Auditing downstream suppliers is in collaboration with the JAC.

Other EU telecommunication companies operate more independently and have slightly different approaches. Deutsche Telekom has a statement on CRM and Orange developed a personal due diligence plan. Vodafone has published annual reports since 2016 on CMs by incorporating the OECD framework. On top of this, Vodafone made a statement on human rights and artisanal cobalt mining in the DRC. The company partnered with an industry scheme, the RMI, to address the CMs supply chain risks. To conclude, differences in practices are mostly related to the fact that companies are more advanced on the topic than others. These EU telecommunication companies performed a similar approach, joining the RMI and implementing the OECD framework.

4. What strategies can telecommunication companies develop toward managing the impact on human rights in primary CRM mining?

Having investigated the internal and external environment, the human rights situation in the DRC on cobalt mining, and practices from peers. The final step was to use the results and develop a strategy for KPN. The strategy focused on the formulation, implementation and evaluation. A starting point for KPN is to become a member of the RMI and apply the five-step OECD mineral framework. Mainly because addressing human rights challenges in primary CRM supply is challenging due to the complex and long supply chains and the variety of CRMs in telecommunication products and services. Moreover, KPN has limited capacity to perform due diligence independently. The RMI offers tools and resources and is well aligned with the OECD framework. The initiative helps KPN to perform human rights due diligence. The framework is a proven approach and speeds up the process. KPN should aim at the implementation of the five-step due diligence framework.

Besides this action in the short term, additional actions are recommended for KPN to become a sector leader. These actions are focused on allocating annual costs, increasing collaboration with the JAC, suppliers and NGOs, partnering with learning platforms and other industries' pilot projects, engaging with the ASM sector when possible and gaining in-depth knowledge on legislation and new initiatives. Strategies on human rights challenges in the context of CRMs are challenging due to the various CRMs contained in the telecom supply chain. Materials are extracted in different countries, and the extraction and processing phase can differ per CRM. Overall, an active due diligence approach is required. Starting as early as possible is highly recommended because it is a time-consuming process. Moreover, becoming more advanced in managing human rights challenges in primary CRM supply creates more knowledge and additional benefits for KPN in primary CRM supply. Advancing on the topic makes KPN more shielded from supply chain disruptions. Therefore, the strategy roadmap helps KPN to structure the actions and progress towards the vision statement.

Concluding remarks
Ultimately, this case study explores human rights due diligence in primary CRM supply for telecommunication companies. The case study mainly consists of qualitative research methods. Managing human rights challenges in primary CRM supply is challenging for telecommunication companies. However, prioritising this goal on the agenda is desirable. The study shows insights into the complexity of this topic and encourages further research. Therefore, it is time for telecommunication companies to take action to reach these goals. Investing actively in human rights due diligence on primary CRM supply is highly recommended for the responsible supply of CRMs.

References

Abadie, D. (2011). Canada and the geopolitics of mining interests: a case study of the Democratic Republic of Congo. Review of African Political Economy, 38(128), 289-302.

Amnesty International. (2016). *" This is what We Die For": Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt*. Amnesty International.

Arendt, R., Muhl, M., Bach, V., & Finkbeiner, M. (2020). Criticality assessment of abiotic resource use for Europe–application of the SCARCE method. Resources Policy, 67, 101650.

Armstrong, R., Baillie, C., & Cumming-Potvin, W. (2014). Mining and communities: understanding the context of engineering practice. Synthesis Lectures on Engineers, Technology, and Society, 8(1), 1-148.

Bach, V., Finogenova, N., Berger, M., Winter, L., & Finkbeiner, M. (2017). Enhancing the assessment of critical resource use at the country level with the SCARCE method–case study of Germany. Resources Policy, 53, 283-299.

Baillie, C. (2006). Synthesis lectures on engineers, technology, and society. San Rafael, CA: Morgan and Claypool.

Baker, S. E., & Edwards, R. (2012). How many qualitative interviews is enough.

Bamana, G., Miller, J. D., Young, S. L., & Dunn, J. B. (2021). Addressing the social life cycle inventory analysis data gap: Insights from a case study of cobalt mining in the Democratic Republic of the Congo. One Earth, 4(12), 1704-1714.

Banza, C. L. N., Nawrot, T. S., Haufroid, V., Decrée, S., De Putter, T., Smolders, E., ... & Nemery, B. (2009). High human exposure to cobalt and other metals in Katanga, a mining area of the Democratic Republic of Congo. *Environmental research*, *109*(6), 745-752.

Banza Lubaba Nkulu, C., Casas, L., Haufroid, V., De Putter, T., Saenen, N. D., Kayembe-Kitenge, T., ... & Nemery, B. (2018). Sustainability of artisanal mining of cobalt in DR Congo. Nature sustainability, 1(9), 495-504.

Benoit-Norris, C., Cavan, D. A., & Norris, G. (2012). Identifying social impacts in product supply chains: overview and application of the social hotspot database. Sustainability, 4(9), 1946-1965.

BGR. (2019). Mapping of the Artisanal Copper-Cobalt Mining Sector in the Provinces of Haut-Katanga and Lualaba in the Democratic Republic of the Congo.

Blank, S. (2019). McKinsey's three horizons model defined innovation for years. Here's why it no longer applies. *Harvard Business Review*, 1-5.

Bobba, S., Carrara, S., Huisman, J., Mathieux, F., & Pavel, C. (2020). Critical raw materials for strategic technologies and sectors in the EU—a foresight study. European Commission, 100.

Brown, C., Daniels, A., Boyd, D. S., Sowter, A., Foody, G., & Kara, S. (2020). Investigating the potential of radar interferometry for monitoring rural artisanal cobalt mines in the democratic republic of the congo. *Sustainability*, *12*(23), 9834.

Buelens, F., & Marysse, S. (2009). Returns on investments during the colonial era: the case of the Belgian Congo 1. The Economic History Review, 62, 135-166.

Callaway, A. (2018). Powering down corruption. The Enough Project, 1-28.

Calvão, F., Mcdonald, C. E. A., & Bolay, M. (2021). Cobalt mining and the corporate outsourcing of responsibility in the Democratic Republic of Congo. The Extractive Industries and Society, 8(4), 100884.

CERA. (n.d.). Deliverable 5.7 Final Report WP 5 Project 16199 CERA – CERTIFICATION OF RAW MATERIALS

Cheyns, K., Nkulu, C. B. L., Ngombe, L. K., Asosa, J. N., Haufroid, V., De Putter, T., ... & Smolders, E. (2014). Pathways of human exposure to cobalt in Katanga, a mining area of the DR Congo. *Science of the total environment*, *490*, 313-321.

Cobalt Institute. (n.d. Cobalt is a key element in the manufacturing of the devices that power today's information society. https://www.cobaltinstitute.org/essential-cobalt-2/enabling-technology/

David, F.R. (2009). Strategic Management: Concepts and Cases. 12th ed. FT Prentice Hall, p. 36-37, 45-47, 93

De Wit, A. (2020). Decarbonization and Critical Raw Materials: Some Issues for Japan.

Deutsche Telekom (n.d. a). SUPPLIERS: Resource scarcity and raw materials sourcing. Retrieved from: https://www.cr-report.telekom.com/site19/suppliers/resource-scarcity-and-raw-materials-sourcing

Deutsche Telekom (n.d. b). SUPPLIER MANAGEMENT: 2018 audit results. Retrieved from: https://www.cr-report.telekom.com/site19/suppliers/supplier-management/2018-audit-results#atn-16013-16015

Di Noi, C., Ciroth, A., Mancini, L., Eynard, U., Pennington, D., & Blengini, G. A. (2020). Can S-LCA methodology support responsible sourcing of raw materials in EU policy context?. The International Journal of Life Cycle Assessment, 25(2), 332-349.

Döringer, S. (2021). 'The problem-centred expert interview'. Combining qualitative interviewing approaches for investigating implicit expert knowledge. International Journal of Social Research Methodology, 24(3), 265-278.

ECG. (n.d.). About us: Entreprise Générale du Cobalt SA "EGC". Retrieved from: https://www.egcobalt-rdc.com/about-us/

EJA. (2019). Glencore-Katanga Mining Ltd., Democratic Republic of Congo (DRC). Retrieved from: https://ejatlas.org/conflict/glencore-katanga-mining-ltd-in-the-democratic-republic-of-congo-drc

EJA. (2021). Mutanda Mine, Democratic Republic of Congo. Retrieved from: https://ejatlas.org/conflict/mutanda-mine-democratic-republic-of-congo

EJA. (2022). Ecological and sanitary disaster in the cobalt mines of Kolwezi, DR Congo. Retrieved from: https://ejatlas.org/conflict/kolwezi-ecological-and-sanitary-disaster

European Commission (2020). Study on the EU's list of Critical Raw Materials (2020). Final Report. doi: 10.2873/11619.

European Commission. (2022). DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Corporate Sustainability Due Diligence and amending Directive (EU). https://ec.europa.eu/info/sites/default/files/1_1_183885_prop_dir_susta_en.pdf

Farjana, S. H., Huda, N., & Mahmud, M. P. (2019). Life cycle assessment of cobalt extraction process. *Journal of Sustainable Mining*, *18*(3), 150-161.

Fariss CJ, Kenwick MR, Reuning K. (2020). Estimating one-sided-killings from a robust measurement model of human rights. Journal of Peace Research. 2020;57(6):801-814. doi:10.1177/0022343320965670

Flik, G. (2021). Material Criticality for Future Telecommunication Technologies: Scenario Development and Supply Chain Resilience Strategies.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative inquiry*, *12*(2), 219-245.

Friends of the Earth Netherlands, SOMO, GoodElectronics Network, based on research by Premicongo, ACIDH and Afrewatch, "Katanga Calling. Congolese Cobalt and Consumer Electronics," May 2015, 12 December 2015

Gilbert, J. (2013). Land rights as human rights: the case for a specific right to land. SUR-Int'l J. on Hum Rts., 18, 115.

Gislev, M., & Grohol, M. (2018). Report on critical raw materials and the circular economy. Publications Office of the European Union, doi, 10(331561), 80.

Graedel, T. E. (1996). On the concept of industrial ecology. *Annual Review of Energy and the Environment*, *21*(1), 69-98.

GRI. (2010). Sustainability Reporting Guidelines & Mining and Metals Sector Supplement. https://icmm.uat.byng.uk.net/website/publications/pdfs/commitments/gri-mining-and-metals-supplement

Gulley, A. L., McCullough, E. A., & Shedd, K. B. (2019). China's domestic and foreign influence in the global cobalt supply chain. Resources Policy, 62, 317-323.

Gurl, E. (2017). SWOT analysis: A theoretical review.

Härkönen, E. (2018). Conflict minerals in the corporate supply chain: is transparency the solution to human rights violations in the tantalum, tin, tungsten and gold supply chains?. European Business Law Review, 29(5).

Hoffman, A. J. (2003). Linking social systems analysis to the industrial ecology framework. *Organization & Environment*, *16*(1), 66-86.

Hofmann, M., Hofmann, H., Hagelüken, C., & Hool, A. (2018). Critical raw materials: A perspective from the materials science community. Sustainable Materials and Technologies, 17, e00074.

Huber, S. T., & Steininger, K. W. (2022). Critical sustainability issues in the production of wind and solar electricity generation as well as storage facilities and possible solutions. Journal of Cleaner Production, 339, 130720.

ILO (n.d.). International Labour Organisation Topics. Retrieved from: https://www.ilo.org/global/topics/lang--en/index.htm

IMCC. (2020).Mining principles: performance expectations. Retrieved from: https://www.icmm.com/website/publications/pdfs/mining-principles/mining-principles.pdf

Irvine, A. (2011). Duration, dominance and depth in telephone and face-to-face interviews: A comparative exploration. International Journal of Qualitative Methods, 10(3), 202-220.

Jackson, B., & Sparks, J. L. D. (2020). Ending slavery by decarbonisation? Exploring the nexus of modern slavery, deforestation, and climate change action via REDD+. Energy Research & Social Science, 69, 101610.

Johnson, G., & Scholes, K. (2002). *Exploring corporate strategy*. Hoboken: Financial Times Prentice Hall.

Joint Audit Cooperation (JAC). (2014). Joint Audit Cooperation (JAC) Supply Chain Sustainability Guidelines.

Joint Audit Cooperation (JAC). (2019). Audit Process Overview Information for Suppliers. Retrieved from: https://www.proximus.com/dam/jcr:bf34c1a0-221e-4d24-9498-24344990675b/Official_declaration_of_JAC_en.pdf

Joint Audit Cooperation (JAC). (2020). 37° Joint Audit Cooperation Leadership Assembly.

Katz, B., & Maiotti, L. (2020). ANALYZING SUPPLY CHAIN COLLABORATION FOR ASM COBALT FORMALIZATION IN THE DRC. State of the Artisanal and Small-Scale Mining Sector.

Katz-Lavigne, S. (2020). Distributional impact of corporate extraction and (un) authorised clandestine mining at and around large-scale copper-and cobalt-mining sites in DR Congo. Resources Policy, 65, 101584.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: Methodology and analytical issues1. Hague journal on the rule of law, 3(2), 220-246.

Kaye, D. (2022). Online Propaganda, Censorship and Human Rights in Russia's War Against Reality. *American Journal of International Law*, *116*, 140-144.

Kayembe, T. (2022). Metal exposure and congenital malformations in the Katangan Copperbelt.

Kemp, D., & Owen, J. R. (2019). Characterising the interface between large and small-scale mining. The Extractive Industries and Society, 6(4), 1091-1100.

Kleinmagd, T. (2020). Material criticality for service providers: Assessment framework and outlook on mitigation strategies. A case study for a Dutch telecom provider. Master's Thesis for the study program of Industrial Ecology

Knopf, J. W. (2006). Doing a literature review. PS: Political Science & Politics, 39(1), 127-132.

Kolotzek, C., Helbig, C., Thorenz, A., Reller, A., & Tuma, A. (2018). A company-oriented model for the assessment of raw material supply risks, environmental impact and social implications. *Journal of Cleaner Production*, *176*, 566-580.

KPMG. (2022). KPN's Salient Human Rights Risks: Final Summary Report. KPMG Advisory N.V.

KPN. (2014). KPN zorgt voor M2M-connectiviteit in Tesla. Retrieved from: https://www.overons.kpn/nieuws/kpn-zorgt-voor-m2m-connectiviteit-in-tesla/

KPN . (2017). KPN and major suppliers aim for circular operation by 2025. Retrieved from https://www.overons.kpn/en/news/2017/kpn-and-major-suppliers-aim-for-circular-operation-by2025

KPN. (2021). KPN Integrated Annual Report 2020. Retrieved from: https://ir.kpn.com/download/companies/koninkpnnv/Results/KPN_IR_2020_Single_navigation.pdf

KPN. (2022a). KPN Integrated Annual Report 2021. Retrieved from: https://ir.kpn.com/download/companies/koninkpnnv/Results/KPN_Integrated_Annual_Report_2021.pdf

KPN. (2022b). Supplier Code of Conduct. https://www.overons.kpn/nl/kpn-voor-nederland/duurzaamheid/leveranciers

KPN. (2022c). Duurzaam en goed: de Fairphone 4. Retrieved from: https://www.kpn.com/beleef/blog/duurzaam-goed-fairphone-4.htm

KPN. (n.d. a). Welcome to KPN. https://www.kpn.com/algemeen/english.htm#

KPN. (n.d. b). Subcode 4: How we interact with society. Retrieved from: https://ir.kpn.com/websites/kpn/English/7050/code-of-conduct.html

KPN. (n.d. c). Our mission: the network of the Netherland. Retrieved from: https://www.overons.kpn/en/the-company/our-mission

LeBaron, G., & Rühmkorf, A. (2017). Steering CSR through home state regulation: A comparison of the impact of the UK bribery act and modern slavery act on global supply chain governance. Global Policy, 8, 15-28.

Levy, B. S., & Leaning, J. (2022). Russia's War in Ukraine—The Devastation of Health and Human Rights. *New England Journal of Medicine*, *387*(2), 102-105.

Lodhia, S. K. (2018). Mining and sustainable development. In *Mining and Sustainable Development* (pp. 1-8). Routledge.

Magaldi, D., & Berler, M. (2020). Semi-structured interviews. Encyclopedia of personality and individual differences, 4825-4830.

Maiotti, L., & Katz, B. (2019). Interconnected supply chains: A comprehensive look at due diligence challenges and opportunities sourcing cobalt and copper from the Democratic Republic of the Congo.

Maisonneuve A. (2022). Blockchain: the winning ticket to improving raw material traceability and the circular economy? Retrieved from: https://www.orange-business.com/en/blogs/blockchain-winning-ticket-improving-raw-material-traceability-and-circular-economy

Malhotra, R. (2012). Human rights indicators: a guide to measurement and implementation.

Mancini, L., & Sala, S. (2018). Social impact assessment in the mining sector: Review and comparison of indicators frameworks. Resources Policy, 57, 98-111.

Mancini, L., Eslava, N. A., Traverso, M., & Mathieux, F. (2021). Assessing impacts of responsible sourcing initiatives for cobalt: Insights from a case study. *Resources Policy*, *71*, 102015.

Manhart, A., Vogt, R., Priester, M., Dehoust, G., Auberger, A., Blepp, M., ... & Kosmol, J. (2019). The environmental criticality of primary raw materials–A new methodology to assess global environmental hazard potentials of minerals and metals from mining. Mineral Economics, 32(1), 91-107.

Material Insights. (n.d.). About us: Material Insights is the result of a collaboration between TDI Sustainability and the Responsible Mineral Initiative. Retrieved from: https://www.material-insights.org/about-us/

Martin-Ortega, O. (2014). Human rights due diligence for corporations: from voluntary standards to hard law at last?. Netherlands Quarterly of Human Rights, 32(1), 44-74.

Matundu Mbambi, A., & Kandolo, L. (2016). Life at the bottom of the chain: WOMEN IN ARTISANAL MINES IN DRC. Retrieved from: https://wilpf.org/wp-content/uploads/2016/10/WomenInArtisanalMinesInDRC_web.pdf

Mazalto, M. (2009). Governance, human rights and mining in the Democratic Republic of Congo. Mining in Africa. Regulation and Development, 187-242.

McAuley, L., Tugwell, P., & Moher, D. (2000). Does the inclusion of grey literature influence estimates of intervention effectiveness reported in meta-analyses?. The Lancet, 356(9237), 1228-1231.

Mining Technology. (2021). World's ten largest cobalt mines in 2020. Retrieved from: https://www.mining-technology.com/marketdata/ten-largest-cobalts-mines-2020-2/

Ministerie van Buitenlandse Zaken. (2011). OESO-richtlijn hoofdstuk 4: Mensenrechten. https://www.oesorichtlijnen.nl/oeso-richtlijnen/mensenrechten/documenten/publicatie/2014/12/8/oeso-richtlijnen-mensenrechten

Ministerie van Buitenlandse zaken. (2019). Wet van 24 oktober 2019 houdende de invoering van een zorgplicht ter voorkoming van de levering van goederen en diensten die met behulp van kinderarbeid tot stand zijn gekomen (Wet zorgplicht kinderarbeid). https://zoek.officielebekendmakingen.nl/stb-2019-401.html

Mirabeau, L., & Maguire, S. (2014). From autonomous strategic behavior to emergent strategy. *Strategic management journal*, *35*(8), 1202-1229.

Montoya, F. G., Alcayde, A., Baños, R., & Manzano-Agugliaro, F. (2018). A fast method for identifying worldwide scientific collaborations using the Scopus database. Telematics and Informatics, 35(1), 168-185.

Morse, I. (2022). Cobalt miners call out 'neocolonialism' as firms avoid accountability. Retrieved from: https://greenrocks.substack.com/p/cobalt-congo-labor-workers-energy-climate

Mudd, G. M. (2021). Sustainable/responsible mining and ethical issues related to the Sustainable Development Goals. Geological Society, London, Special Publications, 508(1), 187-199.

Nickless, E. (2018). Resourcing future generations: a contribution by the earth science community. Natural Resources Research, 27(2), 143-158.

O'dea, S. (2022). Telecommunication operators/companies worldwide by revenue in 2020 (in billion euro). Retrieved from: https://www.statista.com/statistics/221382/revenue-of-top-30-global-telecommunication-operators/

OECD. (2006). Integrating Human Rights into development: donor approaches, experiences and challenges. OECD publications. Retrieved from: https://www.oecd.org/dac/accountable-effective-institutions/Integrating_Human_Rights_document_web%20no%20cover.pdf

OECD. (2016). OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. Retrieved from: https://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf

OECD. (2018). OECD Due Diligence Guidance for Responsible Business Conduct. Retrieved from: http://mneguidelines.oecd.org/OECD-Due-Diligence-Guidance-for-Responsible-Business-Conduct.pdf

OECD. (2022). Responsible business conduct in critical raw materials supply chains. Retrieved from: https://www.dropbox.com/sh/dnnidg7gy6t9t58/AABnB_vaKLGoj2ZZYPMU9iwRa/Presentations/Friday?dl=0&preview=Luca+Maiotti+RBC+in+CRM+supply+chains.pdf&subfolder_nav_tracking=1

OECD. (n.d.). Due Diligence Guidance for Responsible Mineral Supply Chains. Retrieved from: https://www.duediligenceguidance.org/#

OECD Watch. (n.d.). OECD Watch: A global civil society network promoting corporate accountability and access to remedy for victims of corporate misconduct. Retrieved from: https://www.oecdwatch.org/wp-content/uploads/sites/8/2020/06/About-OECD-Watch.pdf

OHCHR. (2015). LAND AND HUMAN RIGHTS. Standards and applications. Retrieved from: https://www.ohchr.org/sites/default/files/Documents/Publications/Land_HR-StandardsApplications.pdf

Orange. (2022). 2022 Vigilance Plan and 2021 Report. Retrieved from: https://gallery.orange.com/rse/media/942ae5b9-c9fe-4c84-93ce-329a46308824/#l=en&ss=d12f45cd-059f-4515-a548-8463e67b35e3&v=Version1&p=0&lc=1

Ørngreen, R., & Levinsen, K. (2017). Workshops as a Research Methodology. Electronic Journal of E-learning, 15(1), 70-81.

Otamonga, J. P., & Poté, J. W. (2020). Abandoned mines and artisanal and small-scale mining in Democratic Republic of the Congo (DRC): Survey and agenda for future research. Journal of Geochemical Exploration, 208, 106394.

Pattison, P. (2021). The road to ruin? Electric vehicles and workers' rights abuses at DR Congo's industrial cobalt mines. RAID. Retrieved from: https://www.raid-uk.org/sites/default/files/report_road_to_ruin_evs_cobalt_workers_nov_2021.pdf

Park, Y. (2021). Circular Economy Strategies' Impact on Critical Raw Materials in Servers: A Case Study from the Perspective of a Dutch Telecommunications Company.

Petavratzi, E., & Kresse, C. DATA CHALLENGES IN UNDERSTANDING MATERIAL FLOWS FROM ASM ACTIVITIES: COBALT CASE STUDY.

Peyer, C., & Maillard, Y. (2016). Contracts, Human Rights and Taxation: How A Company Exploits A Country. The Case of Glencore in The Democratic Republic of Congo.

Pirard, E. (2010). A history of early copper exploration in Katanga (DR Congo). Proceedings INHIGEO 2010.

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European journal of education studies*.

RCI. (2016). Facing challenges, sharing responsibility, joining hands and achieving win-win. Retrieved from: https://respect.international/wp-content/uploads/2018/08/Responsible-Cobalt-Initiative-RCI.pdf

Reis, R. (2009). Strengths and limitations of case studies. *Retrieved from*.

Re-sourcing. (n.d.). EEE SECTOR: Overview. Retrieved from: https://re-sourcing.eu/sectors/electronics-and-electronic-equipment/overview/

RMI. (n.d.). Cobalt. Retrieved from: https://www.responsiblemineralsinitiative.org/minerals-due-diligence/cobalt/

RMI. (2021). Responsible Minerals Initiative Releases New Global Standard for All-Minerals Due Diligence. Retrieved from: https://www.responsiblebusiness.org/news/all-minerals/

Rothstein, H. R., & Hopewell, S. (2009). Grey literature. The handbook of research synthesis and meta-analysis, 2, 103-125.

Rubbers, B. (2020). Mining boom, labour market segmentation and social inequality in the Congolese Copperbelt. *Development and Change*, *51*(6), 1555-1578.

Sairinen, R., Sidorenko, O., & Tiainen, H. (2021). A research framework for studying social impacts: Application to the field of mining. Environmental Impact Assessment Review, 86, 106490.

Salcito, K., Singer, B. H., Krieger, G. R., Weiss, M. G., Wielga, M., & Utzinger, J. (2014). Assessing corporate project impacts in changeable contexts: a human rights perspective. Environmental impact assessment review, 47, 36-46.

Scheele, F., De Haan, E., & Kiezebrink, V. (2016). Cobalt blues. Environmental Pollution and Human Rights Violations in Katanga's Copper and Cobalt Mines, 57.

Schipper, I., & Cowan, R. (2018). Global mica mining and the impact on children's rights. Stichtingonderzoek Multinationale Ondernemingen, Centre Res. Multinat. Corp., Amsterdam, The Netherlands, Tech. Rep.

SER. (2021). Effective European due diligence legislation for sustainable supply chains. Retrieved from: https://www.ser.nl/-/media/ser/downloads/engels/2021/due-diligence-sustainable-supply-chains.pdf?la=en&hash=FC7A5239E5EEC53CCB7FC1F6775CD46C

Shumsky, s. (2020). MUTOSHI COBALT PILOT PROJECT, DRC: TRANSFORMING ASM FOR INCREASED PRODUCTIVITY, SAFER WORKING CONDITIONS, AND FAIRER FEMALE EARNINGS. Retrieved from: https://delvedatabase.org/uploads/resources/2020-SoS_OHS-2_Mutoshi-Cobalt.pdf

Silva, R., & Marwaha, J. (2013). Collecting Sensitive Human Rights Data in the Field: A Case Study from Amritsar, India. Human Rights Data Analysis Group.

Silva, S., & Schaltegger, S. (2019). Social assessment and management of conflict minerals: a systematic literature review. Sustainability Accounting, Management and Policy Journal.

Simonse, L., Iwanicka, B., & Whelton, J. (2017). Design Roadmapping. BIS Publishers.

Smith, E. (2008). Using secondary data in educational and social research. McGraw-Hill Education (UK).

Social Accountaility International (SAI). (n.d.). SA8000 Standard. Retrieved from: https://sa-intl.org/programs/sa8000/#:~:text=The%20SA8000%20Standard%20is%20based,%E2%80%94not%20checklist%2Dstyle%20auditing.

Social Hotspot Database. (n.d.). Human Rights Due Diligence. Retrieved from: http://www.socialhotspot.org/human-rights-due-diligence.html

Sovacool, B. K. (2019). The precarious political economy of cobalt: Balancing prosperity, poverty, and brutality in artisanal and industrial mining in the Democratic Republic of the Congo. The Extractive Industries and Society, 6(3), 915-939.

Steiner, A. (2019). Human Rights and the 2030 Agenda. UNDP. https://www.undp.org/speeches/human-rights-and-2030-agenda

Stevenson, M., & Spring, M. (2007). Flexibility from a supply chain perspective: definition and review. International journal of operations & production management.

Stewart Carter, A., & Strumes, D. (2020). Digging for Change Towards a Responsible Cobalt Supply Chain. Retrieved from: https://delvedatabase.org/uploads/resources/20200618-Digging-For-Change.pdf

Stockdale, A. (2002). Tools for digital audio recording in qualitative research. *Social Research Update*, *38*(1-4).

Sun, X., Hao, H., Hartmann, P., Liu, Z., & Zhao, F. (2019). Supply risks of lithium-ion battery materials: An entire supply chain estimation. *Materials Today Energy*, *14*, 100347.

Tesla. (2020). Tesla 2020 Impact Report. Retrieved from: https://www.tesla.com/ns_videos/2020-tesla-impact-report.pdf

Tsurukawa, N., Prakash, S., & Manhart, A. (2011). Social impacts of artisanal cobalt mining in Katanga, Democratic Republic of Congo. Öko-Institut eV, Freiburg.

United Nations. (2007). United Nations Declaration on the Rights of Indigenous Peoples. Retrieved from: https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf

United Nations. (2011). Guiding principles on business and human rights: Implementing the United Nations "Protect, Respect and Remedy" framework.

United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. Retrieved from: https://wedocs.unep.org/bitstream/handle/20.500.11822/9824/-Transforming_our_world_the_2030_Agenda_for_Sustainable_Development-2015TransformingOurWorld_2015.pdf.pdf?sequence=3&amp%3BisAllowed=

United Nations. (n.d. a). Universal declaration of human rights. https://www.un.org/en/about-us/universal-declaration-of-human-rights

United Nations. (n.d. b). About water and sanitation OHCHR and the right to water and sanitation. Retrieved from: https://www.ohchr.org/en/water-and-sanitation/about-water-and-sanitation#:~:text=OHCHR%20and 20the%20right%20to%20water%20and%20sanitation,-

Overview&text=International%20human%20rights%20law%20obliges,prioritizing%20those%20most
%20in%20need.

United Nations. (n.d. c). Corruption and human rights. Retrieved from:
https://www.ohchr.org/en/good-governance/corruption-and-human-rights

Van den Brink, S., Kleijn, R., Sprecher, B., & Tukker, A. (2020). Identifying supply risks by mapping the
cobalt supply chain. Resources, Conservation and Recycling, 156, 104743.

Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory,
theoretical framework, and conceptual framework. Academic Medicine, 95(7), 989-994.

Vodafone. (2017). Statement on Human Rights and Artisanal Cobalt Mining in Democratic Republic
of Congo - 2017. Retrieved from:
https://www.vodafone.com/content/dam/vodcom/sustainability/pdfs/Vodafone_Statement_on_Co
balt_Sourcing_2017.pdf

Vodafone. (2020). Conflict Minerals Report 2019. Retrieved from:
https://www.vodafone.com/sites/default/files/2020-09/conflictminerals2019.pdf

Voluntary Principles. (n.d.). The Voluntary Principles Initiative. Retrieved from:
https://www.voluntaryprinciples.org/the-initiative/

Wall, F., Rollat, A., & Pell, R. S. (2017). Responsible sourcing of critical metals. Elements: An
International Magazine of Mineralogy, Geochemistry, and Petrology, 13(5), 313-318.

WBA. (2021). Ensuring corporate respect for human rights: a benchmarking approach.
https://assets.worldbenchmarkingalliance.org/app/uploads/2021/09/Ensuring-corporate-respect-
for-human-rights-FINAL.pdf

White, C. (2017). *Strategic management*. Bloomsbury Publishing.

Yin, R. K. (1981). The case study as a serious research strategy. Knowledge, 3(1), 97-114.

Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). sage.

Young, S. B., Fernandes, S., & Wood, M. O. (2019). Jumping the chain: how downstream
manufacturers engage with deep suppliers of conflict minerals. Resources, 8(1), 26.

Zainal, Z. (2007). Case study as a research method. Jurnal kemanusiaan, (9), 1-6.

Appendices

Appendix A. Overview on CRMs contained in all future technologies including human rights score in main global sourcing countries per CRM.

Global sourcing countries scope:
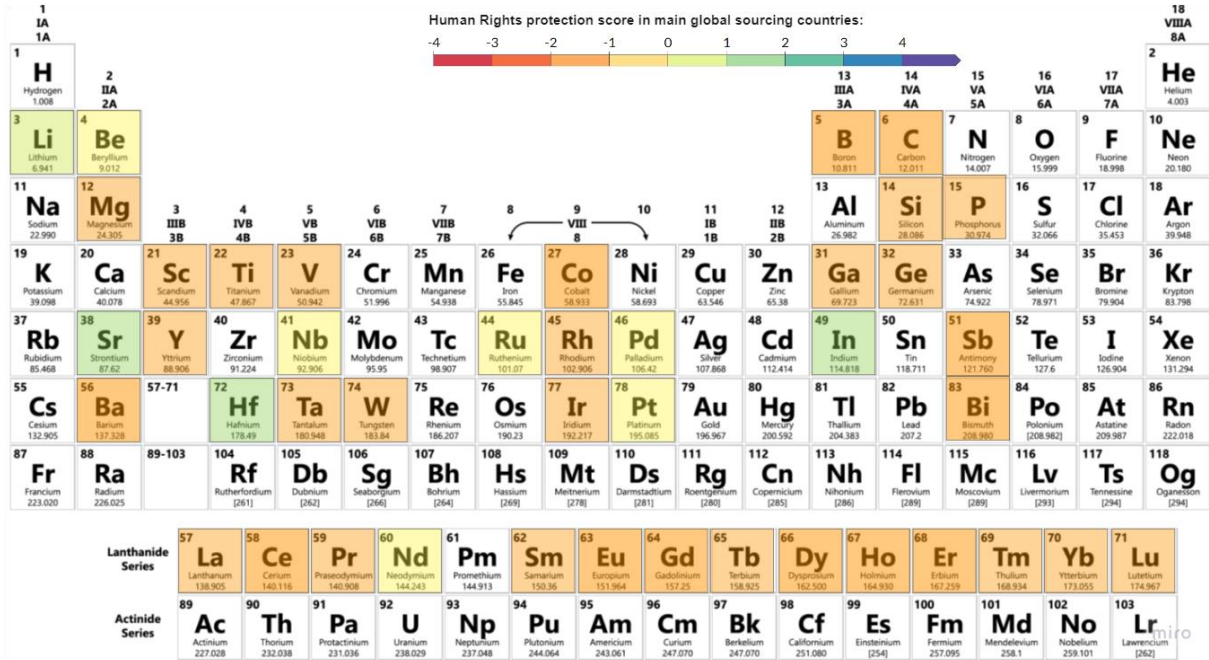
Appendix B: Data Analysis

https://miro.com/app/board/uXjVOqwk9es=/?share_link_id=739860700833

Appendix C: Quantitative Indicators Social Hotspot Database

PDF-file: "SHDB-Indicators V4 2019"

Appendix D: Strategy validation

https://miro.com/app/board/uXjVOqwk9es=/?share_link_id=739860700833

Appendix E: KPN strategy roadmap

https://miro.com/app/board/uXjVOqwk9es=/?share_link_id=739860700833

Appendixes F: Personal communication

Organisation	Expert	Contact	Date
OHCHR	SDG manager	Email	April 6, 2022
KPN	Procurement Compliance Lead	Email & interview	November 14, 2021
Fairphone	Circular Material Chains Innovator	Interview	January 31, 2022
Clingendael energy institute	Researcher	Interview	January 6, 2022
In2Waste | A&M Groep	Sustainability consultant	Interview	April 20, 2022
KPN	Head of corporate social responsibility	Interview	April 22, 2022
Leiden University	Phd candidate ASM	Interview	April 25, 2022
Cobalt Institute	Head of responsible sourcing and sustainability	Interview	June 24, 2022
KPN	Head of corporate social responsibility	Interview	June 24, 2022
Deutsche Telekom	Sustainable supply chain manager	Interview	June 27, 2022
OECD	Policy analyst, responsible business conduct	Interview	July 4, 2022
KPN	Head of corporate social responsibility	Interview	October 19, 2022
KPN	Strategic Lead Energy & Environment	Interview	October 19, 2022

Appendix G: RMI one pager

Exclusive Membership Benefits

- **Reasonable Country of Origin (RCOI) data:** country of origin information associated with smelters and refiners that are validated through the Responsible Minerals Assurance Process (RMAP)
- **Facility Database:** an online database with data obtained through RMAP and workgroup research for thousands of companies in the 3TG, cobalt, and other mineral supply chains
- **Risk Readiness Assessment Platform:** a self-assessment tool for mineral producers, smelters and refiners to assess and communicate their risk management practices to their customers across 32 issue areas and 22 minerals
- **Global Risk Mapping Platform:** a practical tool for companies to identify conflict-affected and high-risk areas using resources recommended by the OECD and the European Commission
- **Program Development Workgroups:** stay engaged with other industry professionals through our workgroups covering topics including regulatory compliance, supply chain mapping, and material-specific issues (e.g., gold, cobalt, mica, tin)
- **By Invitation Only RMI Events and Training:** members will be invited to exclusive events around the world.
- **RMI Annual Conference:** save $500 USD per attendee for the RMI Annual Conference and Members Meeting

Membership Eligibility

Membership is open to companies that use or transact in raw materials. Associations of companies that use or transact in raw materials are also eligible for membership.

Membership cycle: Our membership period runs on a calendar year basis, January to December. Companies signing up in the last quarter of the year (October 1 onward) are automatically enrolled for the next calendar year term.

Annual dues for Partner members are:

- **$7,500 per year (Company Annual Revenue under $9 Billion)**
- **$15,000 per year (Company Annual Revenue over $9 Billion)**

Annual dues for Association members are $10,000

- **$7,500 per year for members of RMI Association member**

Annual dues for Upstream members are $5,000.

Annual dues information for Vendor Members is on the RMI website.

JOIN US!

Click Here to start the application process

For more membership information contact
rmi@responsiblebusiness.org

RMI
Membership

Founded in 2008 by members of the Responsible Business Alliance and the Global e-Sustainability Initiative, the Responsible Minerals Initiative has grown into one of the most utilized and respected resources for companies seeking to responsibly source minerals.

The RMI's Membership offers exclusive tools and collaborative opportunities with industry experts for companies to enhance their responsible minerals sourcing programs.

RMI membership will help you

- Connect to supplier data and identify high-risk areas in your company's minerals supply chain
- Conduct a due diligence review of your entire chain and develop best practices aligned with international standards
- Engage other member companies, customers, stakeholders and partners to promote responsible minerals sourcing

Testimonials

"RMI provides extremely valuable services, the smelter audits enable us to have assurance that our supply chain is using conformant sources. We also find incredible value in supporting many of the RMI member workgroups; they enable us to understand what other companies are doing and assist us in expanding our mindset." – RMI Member

"To fully realize and scale the impacts of our work in responsible sourcing, we have leveraged the platform provided by the RMI to collaborate on broader industry-level issues. We know we cannot achieve the impact we desire alone and working with RMI allows us to scale this impact with the broader industry." – RMI Member

"As a company with a small staff and budget, there is no better resource to support our responsible sourcing of minerals than RMI. RMI has emerged as the preeminent organization for the responsible sourcing of raw materials." – RMI Member

"The willingness of the RMI to listen to membership and adjust where it makes sense and push back when it doesn't is essential. We truly rely on the RMI's expertise and it has been a great experience as our programs have evolved together and expanded into new territory." – RMI Member

Appendix H: 30 articles in Universal Declaration of Human Rights

Articles in Universal Declaration of Human Rights

1. We are all born free & equal
2. Don't discriminate
3. The right to life
4. No slavery
5. No torture
6. You have rights no matter where you go
7. We're all equal before the law
8. Your human rights are protected by the law
9. No unfair detainment
10. The right to trial
11. We're always innocent until proven guilty
12. The right to privacy
13. Freedom to move
14. The right to seek a safe place to live
15. Right to nationality
16. Marriage and family
17. The right to your own things
18. Freedom of thought

19. Freedom of expression
20. The right to public assembly
21. The right to Democracy
22. Social Security
23. Workers' rights
24. The right to play
25. Food and shelter for all
26. The right to education
27. Copyright
28. A fair and free world
29. Responsibility
30. No one can take away your human rights