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Governance of global value chains – The case of the Global Battery Alliance and its role and legitimacy in governing the battery value chain

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Daniela Veigl, B.A.

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Abbreviations

ASM ..... artisanal and small-scale mining
BCI ..... Better Cotton Initiative
CAP ..... Cobalt Action Partnership
CLI ..... Child Labour Index
CMAG ..... Critical Minerals Advisory Group
CSR ..... Corporate Social Responsibility
DRC ..... Democratic Republic of the Congo
EITI ..... Extractive Industries Transparency Initiative
EU ..... European Union
EV ..... electric vehicle
FCAB ..... Federal Consortium for Advanced Batteries
FLA ..... Fair Labour Association
FSC ..... Forest Stewardship Council
GNI ..... Global Network Initiative
GRI ..... Global Reporting Initiative
GVC ..... global value chain
HRI ..... Human Rights Index
ILO ..... International Labour Organization
IPCEI ..... Important Projects of Common European Interest
ISO ..... International Organization for Standardization
LIB ..... lithium-ion battery
MNE ..... multi-national enterprise
MSI ..... multi-stakeholder initiative
NGO ..... non-governmental organisation
NPO ..... non-profit organisation
OECD ..... Organisation for Economic Co-operation and Development
OEM ..... original equipment manufacturer
OHS ..... occupational health and safety
RSPO ..... Roundtable on Sustainable Palm Oil
RTRS ..... Roundtable on Responsible Soy
SDGs ..... Sustainable Development Goals
UN ..... United Nations
UNGPs ..... United Nations Guiding Principles for Business and Human Rights
WEF ..... World Economic Forum

1 Introduction

Global value chains (GVC) are high on the political agenda and there is a "boom of policy debates" (DIE 2022, 7) on this topic, ranging from debates about human rights and decent work, to circularity and decarbonisation, and to the need of increased resilience. They

> *"are playing a vital role in the implementation of the UN SDGs and the actors involved are addressees as well as contributors to more sustainability at the same time. GVCs are linking together economic activities from the world's North and South and can be both a blessing and a curse for social, economic, and environmental sustainability in the host companies."*(Fischer 2019, 252)

Being associated with manifold social and environmental concerns on the local and global level, GVCs call for regulation (DIE 2022, 21). GVCs are embedded in various kinds of regulation and the range of different governance mechanisms trying to mitigate social and environmental risks in GVCs is broad and ranges from voluntary to mandatory, from public-initiated to private-initiated, from local to international, from industry-specific to industry-overarching. There is consensus about the need of making GVCs more sustainable, however, the different trajectories are highly debated. The effectiveness, impact and potential unintended consequences of these different mechanisms are subject of discussion both on an industry-overarching and an industry-specific level (DIE 2022, 7).

1.1 Research context

This work explores a specific GVC and its regulatory governance in more detail. Due to the significant increase in demand for batteries and the severe social and environmental costs, which are exacerbated by the scale-up along the entire value chain, it is crucial to take a closer look on the global battery value chain.

The battery is considered a key technology for the energy and mobility transition and thus for achieving national and international climate protection goals. It is essential for electromobility and an indispensable storage medium for electricity from renewable energy sources (Ghadimi et al. 2022, 1; Kieckhäfer et al. 2019, 292). While various technological solutions for batteries are emerging, the most common model is the lithium-ion battery (LIB). Because of its advantages of high reliability, high energy density, light weight and fast-charging capability, the LIB has emerged as a preferred component in electric vehicles (EVs), electric bicycles and motorcycles as well as in industrial power systems (Li et al. 2022, p. 1f). The high relevance of

this type of battery is also reflected in the fact that three researchers who are considered to be the developers of the LIB were awarded the Nobel Prize in Chemistry in 2019 (Li et al. 2022, p. 1). Despite its high relevance and advantages, however, the battery value chain is accompanied by sustainability issues like the large amount of energy and water needed for its production, political instability of production countries, child labour at mines, occupational health and safety risks, long transport routes, a lack of controls and international standards, or unanswered questions regarding battery recycling (Ghadimi et al. 2022, 3-9; Mayoral 2022, 16).

The regulatory environment of the global battery value chain has recently experienced dynamic development. Several governance actors have become active in developing mechanisms to regulate the social, environmental, economic and governance challenges associated with batteries. For instance, the European Union (EU) has revised its EU Battery Directive and adopted a Regulation that governs the whole battery lifecycle and shall create a set of rules to strengthen sustainability along its entire value chain (European Parliament 2023). Additionally, there are currently two Important Projects of Common European Interest (IPCEI) in place that aim at improving the sustainability performance in all segments of the battery value chain by facilitating cross-border cooperation and by combining public and private resources to work on research and development. The first IPCEI on batteries, approved by the European Commission in December 2019, involves 17 companies from seven European countries and aims, among others, at the reduction of the CO2 footprint and waste. The second IPCEI is implemented since January 2021 and works towards sustainable and innovative approaches for the raw and advanced material stage and "is expected to contribute to the development of a whole set of new technological breakthroughs" (European Commission n.d.). 42 companies from 12 countries participate in the IPCEI European Battery Innovation (European Commission n.d.).

The efforts to enhance the sustainability of the global battery value chain go beyond the EU. The USA under the Federal Consortium for Advanced Batteries (FCAB) lead by the Department of Energy released a national blueprint document for lithium batteries that outlines strategies for creating a sustainable, domestic value chain (FCAB 2021, 17). It includes, among other measures, efforts to protect the environment, improve working conditions, and consult with communities in raw material extraction areas. To achieve this, innovation shall drive the reduction of demand for critical minerals and the value chain shall be localised (FCAB 2021, 6).

On a global level, growing awareness about social and environmental concerns within the battery value chain from the public, private, and social sectors have driven cooperative methods. Against the backdrop of the highly interconnected value chain spanning different countries and continents, stakeholders call for a strengthened cooperation between producer and consumer countries (IEA 2022, 4). As an example for a cooperation-based approach to drive sustainability in the industry's GVC, the Global Battery Alliance (GBA) can be mentioned. Launched in 2017 on the initiative of the World Economic Forum (WEF), the multi-stakeholder partnership brings together more than 140 stakeholders from the entire global battery value chain that range from the public, private to the social sector. It aims to establish a sustainable and responsible battery value chain by 2030. Under a shared vision and guided by mutually agreed upon principles, the Alliance intends to "provide a collaborative platform for members to pool their expertise to achieve the shared goals of circularity, environmental protection and sustainable development" (GBA 2023a).

In the following work, the GBA is defined as a multi-stakeholder initiative (MSI), and as a regulatory governance actor within the global battery value chain. Its role and legitimacy as such shall be analysed. As the literature on partnerships in the battery sector is limited and in order to get an overview of discussions about MSIs in general, the next part briefly reviews existing research on MSIs in other industries.

1.2 Research topic and state of the art

Existing research on MSIs is rich, interdisciplinary in nature and covers topics like the formation of MSIs, their legitimacy, challenges, institutionalisation processes, and outcomes (De Bakker et al. 2019, 355).[1] Searcy recognises that MSIs play a critical and increasing role in GVCs, for instance, in driving their sustainability. Respective multi-stakeholder approaches have mushroomed over the last decades and have become a well-established instrument in various sectors (Searcy 2017, 73). Broadly spoken, the research focus of existing literature lies on the "input into creating and governing MSIs; the institutionalisation of MSIs; and the impact that relevant initiatives create" (De Bakker et al. 2019, 343).

[1] The phenomenon of multi-stakeholder approaches is a widely discussed research topic among different academic disciplines and contains various terminologies that differ slightly in their meaning, albeit there are no uniform definitions. Terminologies that are often used in this context range from "multi-stakeholder initiatives", "multi-stakeholder networks", "multi-stakeholder partnerships", to "multi-stakeholder processes", "multi-stakeholder platforms", "multi-stakeholder dialogue" and "multi-stakeholder alliances" (D'Haese et al. 2018, 3). For the sake of simplicity, this work uses the term "multi-stakeholder initiatives".

In the apparel industry, major MSIs, e.g., the Better Cotton Initiative (BCI), the Fair Labour Association (FLA), and the Better Work Initiative are seen as "foundations of sustainability efforts" (Searcy 2017, 73) and as essential vehicles to improve working conditions or address environmental issues. Coe et al., conducting an empirical assessment of the BCI, analyse the MSI's sustainability standard setting process with regard to balancing stakeholder inclusion with efficiency in standard-setting, balancing scalability and stringency of the standard system, and balancing capacity building and auditing (Coe et al. 2019). As an initiative for transforming the cotton industry, the BCI aims to minimise harmful externalities of cotton production, increase water efficiency, protect the soil and natural habitats, and simultaneously promote decent work and preserve the quality of fibre (Coe et al. 2019, 215). The analysis has shown that the BCI contributes to capacity-building of farmers and to the inclusion of marginalised smallholders. However, it also revealed major deficits in inclusive decision making and the dominance of efficiency and scalability values in the standard setting process (Coe et al. 2019, 231).

For the Costa Rican pineapple industry, D'Haese et al. analyse three MSIs on a company (Ethical Trading Initiative and Fyffes), national (National Platform for the Responsible Production and Trade of Pineapples) and transnational (Civil Society Mechanisms within the European Central American Association Agreement) level that aim to enhance social and environmental performance and show limitations with respect to their representativeness, procedural fairness, and consensual orientation (D'Haese et al. 2018, 7). More precisely, they find that trade unions as stakeholders lack of participation in MSIs, which "calls for continuous evaluation of MSI participatory processes […] and strengthening of union power resources" (D'Haese et al. 2018, 19). They conclude with the need for the inclusion of weaker stakeholders and for strengthened research on the role of different actors in MSIs (D'Haese et al. 2018, 18).

Baumann-Pauly et al. analyse two industry-specific MSIs, namely the FLA and the Global Network Initiative (GNI) regarding their formation and processes to define and enforce standards and instruments to ensure accountability (Baumann-Pauly et al. 2017). As MSIs that target the manufacturing industry (FLA) and the information and communication technology industry (GNI), both the FLA and the GNI are assessed by their input and output legitimacy. With their findings, Baumann-Pauly et al. reveal the potential and the limitations of industry-specific MSIs as a governance model, and conclude:

> *"MSIs are viewed by some as a stop-gap measure for improving corporate respect for human rights, but increasingly it appears that MSIs are more of a long-term mechanism to fill governance gaps, and as such, it is critical to establish how and in what situations such private regulation can be most effective."* (Baumann-Pauly et al. 2017, 787)

Additionally, they highlight the need for further research on the legitimacy of industry-specific MSIs in order to enhance the understanding of these governance mechanisms (Baumann-Pauly et al. 2017, 785).

Mena and Palazzo, first applying their political science model of legitimacy, analyse and compare two MSIs in the forestry sector, the Sustainable Forestry Initiative and the Forest Stewardship Council (FSC), regarding their input and output legitimacy (Mena and Palazzo 2012). By analysing both MSIs on inclusion, procedural fairness, consensual orientation, and transparency (input legitimacy) as well as coverage, efficacy, and enforcement (output legitimacy), Mena and Palazzo examine that the FSC shows high input and output legitimacy, yet also identify several shortcomings and challenges of MSIs in general. According to them, further in-depth studies of MSIs are not only useful to adapt their designs accordingly, but also necessary to understand criticisms on MSIs (Mena and Palazzo 2012, 544f).

Glasbergen et al. discuss the deliberative capacity of roundtables as a specific multi-stakeholder approach (Glasbergen et al. 2012). Using the Roundtable on Responsible Soy (RTRS) and the Roundtable on Sustainable Palm Oil (RSPO) as examples, they show both the democratic potential of multi-stakeholder governance and its limitations based on three criteria: inclusiveness, authenticity and consequentiality. Analysing the degree of inclusion, both case studies reveal a limited variety of discourses. Regarding communicative processes, the RTRS and RSPO are assessed with rather high authenticity. However, the consequentiality lacks due to the voluntary character of Roundtables (Glasbergen et al. 2012, 49).

Also focusing on the RSPO, Bitzer et al. link the concept of multi-stakeholder partnerships with the concept of wicked problems and show how the Roundtable adapted over time to respond to the wickedness of its underlying problems (Bitzer et al. 2018). They derive the need to continuously assess MSIs and its included stakeholders and to adapt respective governance processes and structures (Bitzer et al. 2018, 351). The authors show that the RSPO has reacted to changing contexts (e.g., EU Renewable Energy Directive) by adapting its structures, governance processes and instruments (e.g., adoption of GHG emission criteria). The RSPO contributed to raising awareness on palm oil and developed a certification system, which acts as an indicator on sustainability concerns. Systemic change in the palm oil value chain, however, failed to materialise (Bitzer et al. 2018, 347).

Brown et al. deal with the question on how to improve the deliberative capacity of MSIs and introduce the idea of "collective stakeholder orientation" (Brown et al. 2019, 404). They show how collective stakeholder orientation in GVCs has the potential to overcome governance challenges and illustrate their theory by using the RSPO, the RTRS, and the FSC as examples. All three of them are identified as MSIs whose supply chain stakeholders fail to show compliance to the developed standards (Brown et al. 2019, 389). Despite recognised limitations, the authors see great potential in them as a vehicle for promoting standards and reacting to the complexities of nowadays supply chains (Brown et al. 2019, 406).

This work adopts the view of researchers like Brown et al. who argue that MSIs are – despite certain challenges – an "important phenomenon" (Brown et al. 2019, 374), and aims to respond to their call for more research. The brief review of MSI analyses in other sectors shows the wide variety of existing literature while also revealing the lack of literature on similar analyses for the battery sector. It sets the ground for selecting the analysis method and focus for the selected partnership in the global battery value chain sector.

1.3 Research objective and research question

The objective of this work is to explore the role and legitimacy of the GBA as a MSI and embed it into the concept of governing GVCs. Using an in-depth single-case study, the work aims to understand how, and by which means the GBA seeks to contribute to the regulatory governance of the global battery value chain. More precisely, the objectives of this work are the following:

First, this work creates thick descriptions of a recently emerged MSI in a rapidly evolving industry. Conducting a case study on the GBA shall reveal deep insights into its formation process and rationale, its mission and objectives, its governance and decision-making structure, its participating stakeholders as well as its activities and implementation mechanisms. This work shall examine how the GBA, a MSI that focuses on establishing a sustainable battery value chain until 2030, works towards its goal and how it addresses social and environmental challenges within the battery value chain. This objective is based on a precise screening and evaluation of publicly available data.

Second, based on the description, an assessment of the industry-specific MSI shall be conducted by focusing on its role as well as its input and output legitimacy. As shown in chapter 2.2, MSIs in the context of sustainable value chains can have different roles, i.e., providing learning platforms, developing behavioural standards, developing mechanisms of auditing and compliance of rules and/or issuing labels and certifications. The intensive examination of the

MSI allows a corresponding identification of its role. Drawing on a political science concept of legitimacy that has been operationalised by Mena and Palazzo (2012), the next step is the assessment of the Alliance's input and output legitimacy based on the available data.

Third, the accurate examination of the GBA shall serve as the foundation to situate the MSI into a broader context and show how MSIs like the GBA function as instruments for the regulatory governance of GVCs. Based on the assumption that neither public, private, nor social stakeholders alone are able to effectively manage social and environmental concerns within GVCs, this work aims at examining the potential of MSIs in providing respective governance. Emerged as a global solution, the GBA's potential shall be revealed by combining the discussion about its role and its legitimacy.

Forth, this work aims to contribute to several ongoing discussions and streams of academic literature. It contributes to the MSI literature, as it is the first academic analysis of the GBA to the knowledge of the author. This work offers a systematic analysis that aspires to be the starting point for more detailed analyses on the GBA as the largest MSI in the battery value chain. Additionally, this work contributes to the constantly growing literature on regulatory governance of GVCs. Academic as well as non-academic discussions about ways that drive responsible and sustainable GVCs have mushroomed. This paper focuses on a specific value chain that will become more important due to the battery's role in the mobility and energy transition. It shall reveal another governance solution, its potential and its limitations. By doing so, this work connects debates about GVC governance with the concept of MSIs and contributes to the literature on partnerships for GVCs.

The research objectives are guided by the following two-part research question:

What is the role and legitimacy of the Global Battery Alliance as a multi-stakeholder initiative and how does it contribute to the governance of global battery value chains?

The work will be predominantly descriptive, only attempting to be interpretive, classifying and evaluating in a second step. It is based on several assumptions. First, the main theoretical claim this empirical research roots on is that GVCs and its externalities are governed by private, public, and social actors and that MSIs are a governance instrument that unites a broad range of regulatory actors. The work assumes the need for stakeholder orientation in order to effectively manage social and environmental concerns along the global battery value chain. Due to the complex nature of GVCs and their exceeding of national jurisdiction, MSIs can play a

key role in identifying, addressing, mitigating, and monitoring social and environmental risks. The author defines the GBA as a MSI and attributes it with high relevance as a global solution.

1.4 Structure of work

The remainder of this work is structured as follows. The next chapter outlines the conceptual approach on which this work is based (chapter 2). Conceptually, this work draws on two pillars, namely the governance of GVCs (2.1) and the concept of MSIs as an instrument to govern GVCs (2.2). Chapter 3 presents the methodological approach, explaining the study design, data collection, data analysis, and limitations. Starting with the stages of global EV battery value chains (4.1), chapter 4 describes the case study background and additionally shows key concerns and challenges (4.2), the regulatory environment, and the need for cooperation (4.3) within the battery industry. Chapter 5 presents the analysis of the GBA, describing its formation and rationale (5.1), mission and objectives (5.2), governance and decision-making (5.3), stakeholder participation (5.4) and activities and implementation mechanisms (5.5). Based on this, chapter 6 focuses on answering the research question and embeds the findings in the conceptual frameworks. Here, first the role of the GBA is identified (6.1) and then its input and output legitimacy assessed (6.2). Finally, chapter 7 concludes with summarising the work (7.1), showing the work's limitations as well as the need for further research (7.2), and giving a short outlook on the future of battery value chains (7.3).

2 Conceptual approach

The work builds on several concepts that shall be elaborated briefly in this chapter.

First, as this thesis deals with an industry-specific GVC, the concept of *Global Value Chains* (GVCs) forms the fundamental framework. Defining GVCs, their emergence and characteristics shall clarify the terminology (chapter 2.1.1) and is the basis for understanding approaches of their regulatory governance that are presented afterwards (chapter 2.1.2). Identifying the nature of GVCs and their regulatory governance shall help to better understand the characteristics and dynamics associated with the battery value chain.

The second conceptual pillar is the concept of *Multi-Stakeholder Initiatives* (MSIs). Based on the idea that MSIs are an instrument for regulatory governance, they are introduced as a respective tool. For this, the terminology is defined, and characteristics outlined (chapter 2.2.1), different roles of MSIs are shown (chapter 2.2.2), and it is explained how these constructs

achieve input and output legitimacy (chapter 2.2.3). Moreover, strengths, weaknesses and success factors are outlined (chapter 2.2.4). The objective of this part is to provide insights into the nature of MSIs and to introduce the main conceptual framework that forms the starting point for the core part of this work, which is the analysis of an industry-specific MSI.

2.1 Global value chains and their regulatory governance

The literature on GVCs has evolved rapidly in the last decades. The GVC framework offers a holistic view and its description forms the basis for understanding dynamics in a given industry. The following part therefore defines GVCs, outlines their emergence and key characteristics, and identifies approaches of their regulatory governance.

2.1.1 Concept of global value chains

Since the 1990s, global trade has been largely shaped by GVCs (Dünhaupt and Herr 2021, 459). The concept of GVCs refers to the organisation of industries that is characterised by the externalisation of activities to different countries and regions, the geographic fragmentation of production, and the global expansion of value creation (Gereffi 2014, 434; 449). It addresses changes of the global economy, which occurred in the last several decades with the location of production shifting from local to global, the growing importance of cross-border trade of (intermediate) goods, and rising competition across countries (Gereffi 2014, 434ff). Where industries once operated independently and were dominated by domestic production and domestic competition, they have become globally interconnected, and their trade networks overlapped and characterised by complex interactions among various actors (Gereffi 2014, 438; OECD n.d.).

The era of these developments was shaped by falling trade barriers, the opening of countries for foreign direct investments, and the foundation of the World Trade Organization (Gereffi 2014, 437; Fischer et al. 2021, 57). Besides these political developments, technological advances contributed to the emergence of GVCs (Fischer et al. 2021, 57). For instance, decreasing transport costs through container shipping and enhanced communication through the internet can be seen as driving factors in GVCs becoming one of the defining features of today's global trade (Fischer et al. 2021, 56). In this respect, though, Fischer et al. point out that these political and technological developments did make GVCs possible, but they only became profitable due to the existing wage differentials between countries (Fischer et al. 2021, 57).

The dynamics have been accompanied by the specialisation of countries on certain industry segments in which they have a comparative advantage (Hummels et al. 2001, 75). The so-called vertical specialisation means that countries are specialised in a particular stage of the production process. Intermediate goods are transferred to other countries through export and import activities, and value is added during the different sequential stages (Hummels et al. 2001, 75ff). The trend goes to very dynamic comparative advantages, which means that the goods or tasks a country or region is specialised in, can change faster than in traditional trade systems (Draper and Freytag 2014, 1). For example, the "shift from fossil to renewable energy sources […] changes the locational advantages in many industries" (DIE 2022, 20). Dynamics such as decarbonisation efforts or circular economy solutions impact GVCs by changing competitive advantages and shorten the GVCs. While some countries, especially developing and emerging economies, are weakened in their GVC position due to a decreasing demand of fossil fuels or other natural resources, other economies are strengthened, especially those progressive in industries such as renewable energy, green hydrogen and those rich in minerals like lithium (DIE 2022, 21).

GVCs shifted production and trade shares and changed the structure of the world trading system (Fischer et al. 2021, 57). The trade of intermediate products, i.e., products not used for final consumption but for further usage in the production sequence, grew significantly, which implies that international labour division is no longer dominated by the exchange of end products (Fischer et al. 2021, 57). The shift from trade being dominated by finished goods to trade being dominated by intermediate goods led to an increased interconnectedness between countries at different levels of development (Kim et al. 2020, 1).

GVCs defined as sequences of productive stages involves value-adding. Added value can be understood as the difference between the market price of the produced good, i.e., the production value, and the purchased inputs from other companies (Fischer et al. 2021, 56). For instance, in industrial value chains, i.e., those that include the "acquisition and consumption of resources" (Braun et al. 2019, 1), raw materials are used as the primary inputs and gain value through a transformation process that leads to a final output (Braun et al. 2019, 1). A value-added chain is thus described by Kogut as "the process by which technology is combined with material and labor inputs, and then processed inputs are assembled, marketed, and distributed" (Kogut 1985, 15). Consumption lies at the end of these value-added activities (Fischer et al. 2021, 56).

Value is not captured in an even manner. While developing countries tend to be present and trapped in lower-value activities with only small profits and employment opportunities,

developed countries are more likely to be active in higher-value segments of GVCs (Fernandez-Stark and Gereffi 2019, 64). How and to what extent a country participates in GVCs differs enormously (DIE 2022, 92). Baldwin states this with speaking of "Factory North America", "Factory Europe" and "Factory Asia" (Baldwin 2012, 20), where GVCs have been centred on hubs like the United States, Germany, Japan, and China (Draper and Freytag 2014, 2).

Participation in GVCs and the degree of capturing the value is often seen as an essential factor in development – for economic development and for better work conditions, less employment and poverty – especially for low-income economies (Fernandez-Stark and Gereffi 2019, 54). The World Bank refers to this as follows:

> *"The gains from GVC participation are not distributed equally across and within countries. Inequalities arise in the distribution of firm markups across countries; in the distribution of capital and labor, between skilled and unskilled workers as well as between male and female workers; and geographically within countries."* (World Bank 2020, 66)

Hence, participation in GVCs is shaped by "local, national and international conditions and policies" and "local economic, social, and institutional dynamics" (Fernandez-Stark and Gereffi 2019, 64). Important factors include among others labour costs, skill level, access to education, financial and infrastructural resources, tax and labour regulation, and innovation policies (Fernandez-Stark and Gereffi 2019, 64). Fernandez-Stark and Gereffi outline five key factors that play a role in deciding whether a country can be competitive in GVCs or not, which are productive capacity, infrastructure and services, business environment, trade and investment policy and institutionalisation (Fernandez-Stark and Gereffi 2019, 64f).

Another element of GVCs are multinational enterprises (MNE) that have a high degree of power and can take the role of GVC governing lead firms through their production outsourcing behaviour, i.e., through setting up subsidiaries or subcontracting manufacturing orders (Brandl and Van Assche 2021, 137; Dünhaupt and Herr 2021, 459; Fischer et al. 2021, 57). Hence, GVCs come along with trade being highly "determined by strategic decisions of firms to outsource, invest, and carry out activities wherever the necessary skills and materials are available at competitive cost and quality" (OECD n.d.). Respectively, GVCs provide an instrument for MNEs to make use of location advantages and benefit economically from countries' vertical specialisation (Andersson et al. 2022, 99). In this regard, Brandl and Van Assche state:

> *"Sitting at the top of a hierarchical chain, they have the muscle to select which firms are included or excluded in GVCs, to determine the terms of supply-chain membership and to allocate where, when and by whom value is added. It is this power that has allowed MNEs to create GVCs and to use them to enhance productivity and efficiency."* (Brandl and Van Assche 2021, 137)

Through mergers and acquisitions, lead firms can strengthen their position and increase their market shares in global trade (Gereffi 2014, 439f). Along with "a growing recognition of the strategic vulnerabilities of global supply chains: the risk of single-source relationships and the danger of lead firms losing access to critical inputs and raw material supplies" (Gereffi 2014, 439), lead firms engage closer with suppliers. For example, concerns about the scarcity of raw materials lead to more strategic collaborations, which is especially apparent in the automobile and electronics industries (Gereffi 2014, 439f).

In distinction to the term "supply chain", value chains are "commonly associated with a non-linear perspective, thus postulating value creation through cross-sectional consideration of different value streams" (Braun et al. 2019, 1). Braun et al. further note that "this point of view is particularly required for raw-material related considerations of value chains, as these are usually not structured linearly and incorporate interlinkages on different levels" (Braun et al. 2019, 1). In contrast to this, the concept of supply chains predominantly assumes linearity between the stages and thus is rather not appropriate when looking at chains that involve raw materials (Braun et al. 2019, 1). Another closely related terminology is the concept of "global production network". It widens the perspective, considers the influence of social, cultural, and political factors, includes the macroeconomic environment (e.g., institutions) and a broader scope of stakeholders, and takes into consideration the interdependencies within a network (Coe et al. 2008, 272-280).

Various macro-level trends in recent decades and dynamics caused by the Covid-19 pandemic resulted in a momentum for the reconfiguration and regionalisation of GVCs. For instance, "protectionism, interventionist public policies, sustainability, and the use of digital technologies in manufacturing, suggests a move toward a certain degree of de-globalization" (Narula et al. 2021, 204). The application and extent of this trend, however, is industry-specific and depends amongst others on economic factors such as cost and scale economies:

> *"In industries where cost and scale economies are key competitive factors (e.g., textiles and apparel), a more global configuration remains the most efficient way of organizing, especially when distributors keep pushing for low prices and lean inventories […]. Other sectors in which key inputs are location-bound (e.g., industries that rely on extracted natural-resource inputs, such as mining, agriculture, and energy […] are also*

> *likely to be unaffected by regionalization trends. However, some non-economic factors, such as government policies to reinforce national security and competitiveness, are likely to play a prominent role in the re-routing of GVCs."* (Narula et al. 2021, 207)

Industries developing according to this trend tend to show less fragmented and shorter GVCs, as well as less linkages, are more local, and are likely to concentrate added value on particular stages. Motives for regionalisation arise out of the objective to achieve resilience, thus avoiding disruptions, shortages of critical products, price volatility of raw materials and products (Narula et al. 2021, 206f).

2.1.2 Approaches of regulatory governance

GVCs are associated with significant negative social and environmental externalities, and transnational corporations as well as governments have been increasingly criticised for not taking enough responsibility (Mena and Palazzo 2012, 527). Due to the cross-border nature of GVCs and thus the difficulty that operations go beyond the jurisdiction of a single country, a high number of social and environmental issues have remained unregulated or under-regulated. This has resulted in a variety of different regulatory actors for social and environmental risks along the GVC and the call for globalised regulatory mechanisms as well as cooperative actions between various actors (Mena and Palazzo 2012, 527; 531; Brandl and Van Assche 2021, 137).

The range of different regulatory governance mechanisms trying to mitigate social and environmental risks in GVCs is broad and ranges from voluntary to mandatory, from public-initiated to private-initiated, from local to international, from industry-specific to industry-overarching. A common classification in the GVC regulatory governance literature is the distinction in (1) private, (2) public, and (3) social governance, while all these types, in turn, can take many forms. This classification originates from the type of actors initiating the governance system.

(1) Private governance

Private governance is based on the growing pressure of companies to "ensure that their activities and sourcing patterns abroad do not contribute to environmental degradation and human rights abuses" (DIE 2022, 121). Private governance assumes that the power of MNEs cannot only be used to enhance the company's business performance but also to "dictate the social and environmental terms along the value chain" (Brandl and Van Assche 2021, 137). In this regard, MNEs are seen as actors in private governance that have the potential to close some gaps in global regulation (Brandl and Van Assche 2021, 137). By committing not only themselves, but

also their suppliers to adhere to strict codes of conduct and by making sustainability standards a condition for business relations, MNEs are – theoretically spoken – able to promote social and environmental standards along the value chain (Brandl and Van Assche 2021, 137). Therefore, a cascading effect can be created by passing on sustainability commitments to the upstream chain actors (Brandl and Van Assche 2021, 137). Respective instruments include voluntary self-regulating mechanisms such as certifications, standards, sustainability policies, supplier codes of conduct or internal guidelines and are often referred to under the terms of private compliance initiatives (PCIs) and Corporate Social Responsibility (CSR) (Gereffi and Lee 2016, 30; Lee 2016, 11f; Mai 2018, 244).

Even though private actors may have the economic power, and voluntary governance mechanisms have mushroomed enormously, their solutions lack effectiveness. A "common explanation for weak improvements to social justice and environmental stewardship in GVCs is that many MNEs are not motivated to use their power within GVCs for sustainable development" (Brandl and Van Assche 2021, 138). The limitations of private governance can be seen in its voluntary character, the assumed trade-off between economic and environmental or social performance that results in very low-ambition solutions, the failure in guaranteeing long-term compliance, inadequate accountability, and adverse effects (e.g., creating new challenges for small suppliers) (DIE 2022, 72f). In this context it shall also be added that although privately developed sustainability standards may have the potential of socio-economic and ecological benefits, i.e., inducing better production techniques, stimulating clean technologies and nudging the implementation of social and environmental standards in other industries/countries, they also have the power to exclude certain producers that are not able to bear the costs (e.g., smallholders and other producers with low capacities) (DIE 2022, 19; 121). Literature concludes that the impact of sustainability standards set by firms are rather limited, especially when they are voluntary, and rather risk (unintended) exclusion and unequal market access opportunities (DIE 2022, 19; 121).

(2) Public governance

Public governance is implemented by public actors on local, regional, national, and international levels. It covers laws, rules and regulations set by governments and organisations (e.g., United Nations (UN), International Labour Organization (ILO)) as well as bilateral and multilateral trade agreements (e.g., through social clauses). Measures taken by public actors in terms of GVC governance are manifold, and can also refer to competition policies, industrial

policies, investment regulations, and immigration policies that indirectly affect GVCs. National labour laws can directly affect working conditions and workers' rights within a country and also serve as an instrument to "manage and control labour administration, inspection and enforcement" (Mai 2018, 243). Moreover, public governance is also able to solve labour disputes and conduct legal proceedings when workers' rights are violated. Public governance is characterised by often being binding in nature with a legal basis, and by having the potential to affect a wide range of stakeholders. However, it is often less effective when it comes to regulating transnational activities as laws and regulations habitually apply within national boundaries (Gereffi and Lee 2016, 31; Lee 2016, 11; DIE 2022, 36-72; Mai 2018, 243).

To overcome this key weakness of a scope limited to national territory, due diligence laws in GVCs have evolved. After due diligence became mandatory in France as the first European country in 2017, the Netherlands and Germany implemented due diligence laws in 2019 and 2021 respectively, and at the time of this work, a corresponding law is being drafted at EU level (DIE 2022, 36-72). Due diligence obligations can be seen as a GVC governance instrument that requires "firms that operate in a national territory to identify, prevent, mitigate and account for violations that occur to legislatively defined sustainability standards all along their GVC" (Brandl and Van Assche 2021, 139). They go along with more traceability and transparency within a company's GVC and the obligation to identify and mitigate adverse social and environmental risks (Brandl and Van Assche 2021, 140).

On the international level, actors such as the UN, the Organisation for Economic Co-operation and Development (OECD) and the ILO have implemented several instruments to address human and workers' rights risks caused by business operations. The United Nations Guiding Principles for Business and Human Rights (UNGPs) from 2011, for instance, is the first global framework that addresses social risks in GVCs and defines business standards for transnational corporations and business enterprises. The OECD Guidelines for Multinational Enterprises (OECD Guidelines) can be named as a second example for enhancing responsible business operations. A major weakness of these mentioned instruments, however, lies in their voluntary and soft law character without binding force and sufficient enforcement mechanisms (Corvaglia and Li 2018, 4).

(3) S*ocial governance*

Social governance refers to governance that is initiated by civil society organisations (e.g., labour unions, non-governmental organisations (NGOs), non-profit organisations (NPOs)).

According to the ILO, social governance refers to the engagement of social partners, i.e., unions, firms, employers' organisations and other civil society actors at firm, industry, national or international level in order to jointly design governance instruments (ILO 2016, 57). Mai further suggests that social governance can be used to complement, implement, and improve public governance in GVCs. For instance, trade unions have an essential role in implementing and enforcing national labour laws and representing employees to secure and enhance workers' rights and standards (e.g., labour inspection systems) (Mai 2018, 244f).

Governance instruments such as petitions, boycotting, protests, or strikes can trigger positive change in GVCs, however, these forms of social governance are limited as they are rarely mandatory and their defined codes and standards require the implementation by private firms or governments. Apart from that, social governance is often claimed to lack transparency and inclusiveness (Gereffi and Lee 2016, 31; Lee 2016, 11f; Mai 2018, 244f). To improve the effectiveness of social governance, it "often takes a multi-stakeholder form in which public, private, and civil society actors pursue their common goals through joint action" (Gereffi and Lee 2016, 31).

The literature agrees that these private, public, and social governance mechanisms do not act in a vacuum and that governance is "'co-produced' by global and local, public, social and private actors" (Gereffi and Lee 2016, 34). As different actors have certain capabilities and certain limitations, governance types often co-exist, interact, and complement each other. Therefore, scholars suggest that enforcing social and environmental standards within global value chains requires a smart mix of public and private regulation, and additionally state that private regulatory initiatives often build on laws or arise out of pressure from public or civil stakeholders (Locke et al. 2013, 543).

Referring to the multiplicity and overlap of governance forms and meaning mutually reinforcing governance types – i.e., combining the strengths of different types and thereof mitigating their weaknesses, Gereffi and Lee use the terminologies "hybrid system of regulation or synergistic governance" (Gereffi and Lee 2016, 34). They acknowledge the challenge in achieving synergistic governance while also stating that

> *"it offers a promising pathway to bringing together corporate, governmental, and civil society actors in a global setting to achieve joint objectives, where active collaboration among GVC and industrial cluster actors is required in order to simultaneously achieve economic and social gains."* (Gereffi and Lee 2016, 35)

Posthuma and Rossi who analyse the role of the ILO in the governance of GVCs use the terminology of "coordinated governance" and mean by this "the interaction and complementary efforts of different public, private and social stakeholders" (Posthuma and Rossi 2017, 187). They acknowledge the difficulty in effectively formulating, regulating, and mitigating negative externalities arising from the cross-border character of GVCs, and identify the need for strengthened governance at a supranational level, especially with regard to "situations where individual nations are limited in their scope to address the transnational dynamics that can drive downgrading for workers" (Posthuma and Rossi 2017, 18).

Alford and Phillips also dedicate to this topic and describe "hybrid forms of governance shaped by the interactions of public and private forces" (Alford and Phillips 2018, 102). Public-private governance emerged from the assumption of private governance's ineffectiveness. For example, in the case of labour rights it has been proven that regulations are most effective when initiatives by non-state-actors are combined with state regulation, as they reinforce each other. "Much is deemed to depend on the 'intersection' of national governments' incentives and local firms' interests in protecting labour rights – and, as such, political institutions and political actors' interests remain critical" (Alford and Phillips 2018, 102).[2]

The variety of different types of governance actors and mechanisms and a lack of coherence or coordination between governance instruments at different levels make it difficult for involved stakeholders to comply with regulations and implement them (ILO 2016, 43). Due to the complexity of the issue literature agrees that single actors lack the capacity to improve social and environmental standards along the GVC (Brandl and Van Assche 2021, 138) and create governance gaps. Gilbert and Schrage argue that public, private, and social governance mechanisms "can both create and address gaps; they are part of the problem and part of the solution" (Gilbert and Schrage 2021, 658). They show that "MSIs provide an important arena for navigating and combining various single- and multi-actor governance mechanisms to address a gap" (Gilbert and Schrage 2021, 668). Engaging and collaborating with stakeholders is assumed to enhance transparency throughout the GVC, and inclusive, open, and broad stakeholder dialogue and deliberation have the potential to address more effectively social and environmental risks (Gilbert and Schrage 2021, 668).

[2] However, another strand of literature is more sceptical and finds evidence of tensions between public and private governance and questions its efficiency and effectiveness (Alford and Phillips 2018, 114)

The following figure illustrates the three forms of governance.

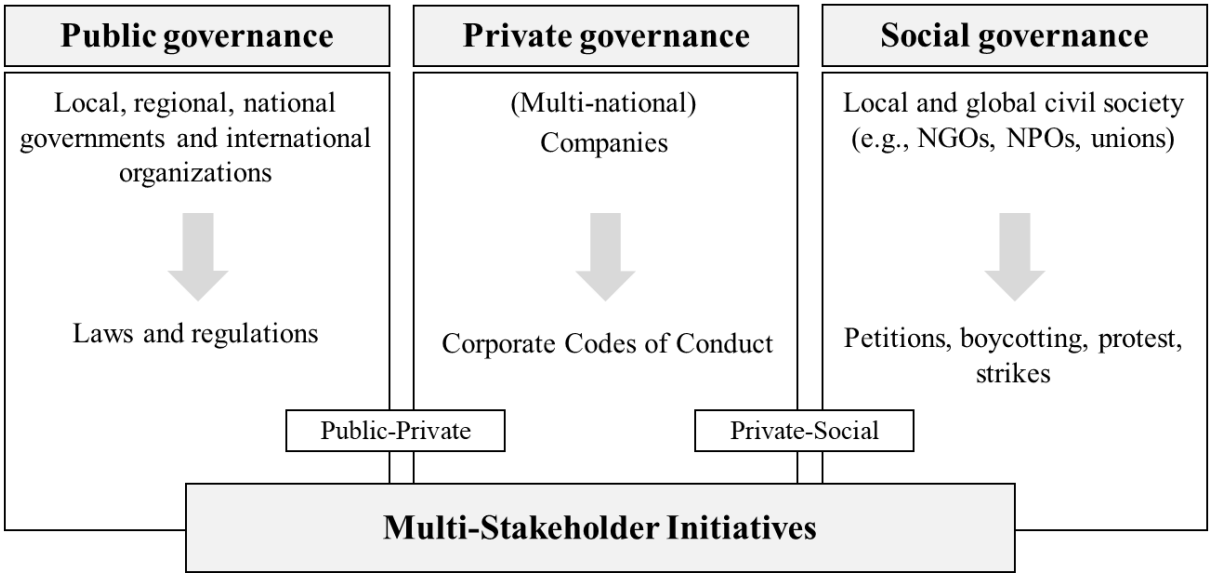

Figure 1: Governance types
Source: Own figure

2.2 Multi-stakeholder initiatives in global value chains

This work is based on the assumption that MSIs are a key governance instrument in GVCs. It adapts the perspective of various researchers across different disciplines that identify the important role of MSIs in responding to the "growing criticism of the environmental and social impacts of various globally organized industries and a perceived government failure to address these concerns, particularly in developing country sourcing contexts" (Coe et al. 2019, 211f), thus, acknowledging its role in addressing governance gaps (Baumann-Pauly et al. 2017, 772). The following chapter defines MSIs in the context of value chains and outlines the main framework used in this work.

2.2.1 Characteristics and rationales

MSIs can be understood as collaborative efforts of various stakeholders to address a common challenge or interest (Searcy 2017, 4). Mena and Pallazzo define MSIs as

> *"governance mechanisms involving corporations, civil society organizations, and sometimes other actors, such as governments, academia or unions, to cope with social and environmental challenges across industries and on a global scale."* (Mena and Pallazzo 2012, 528)

A slightly different definition is offered by Clarke et al. according to whom MSIs are

> *"cross-sector social partnerships that have more than one partner from each of the business, government, and non-profit sectors […]. These partnerships are typically formed when a social issue is considered too complex and multifaceted for a single organization or sector to address alone, thus necessitating joint-action across sectors.*" (Clarke et al. 2018, 409)

Over the last two decades and especially after the launch of the Agenda 21 at the Rio World Summit in 1992, MSIs have mushroomed and have become a common tool in sustainable supply chain management addressing a wide range of challenges (Searcy 2017, 5; Prescott and Stibbe 2016, 2). MSIs exist on industry-specific issues or on cross-industry issues, are designed at different geographic scales, vary in stakeholder inclusion, and differ in their form, binding nature, and institutionalisation (Searcy 2017, 5).

MSI examples in an industry-specific context are the Accord on Fire and Building Safety in Bangladesh, which aims at improving working conditions, and the BCI, which addresses environmental concerns in the apparel industry (Searcy 2017, 5). Similar MSIs also exist for other industries, such as the forestry sector (e.g., FSC), the fishing sector (e.g., Marine Stewardship Council) and the palm oil industry (e.g., RSPO). Respective MSIs differ in their geographical scope. Examples of multi-level MSIs include The Global Water Partnership, the Principles for Responsible Investment, and the Extractive Industries Transparency Initiative (EITI) (Searcy 2017, 5).

MSIs operating across various industries are manifold. In this context, for example, the International Organization for Standardization (ISO) can be mentioned. It identifies management system standards, which are broadly applicable from quality management to environmental management, and defines the so-called ISO standards, e.g., for occupational health and safety. Another example is the Global Reporting Initiative (GRI), which sets standards for sustainability reporting (Searcy 2017, 5).

Searcy states that both industry-specific and industry-overarching MSIs "have a clear relevance to supply chain sustainability" (Searcy 2017, 5) and summarises:

> *"Existing MSIs have undoubtedly helped advance sustainability in supply chains. For example, they have helped raise awareness throughout the supply chain, improved managerial practices, enhanced product traceability, and reduced clearly unsustainable behaviours."* (Searcy 2017, 5)

Albeit Searcy sees clear relevance of certain MSIs (e.g., Marine Stewardship Council for the fishing sector, the Kimberly Process for the mining sector), he criticises that existing MSIs in the supply chain field often fail to adequately address sustainability thresholds, what he defines

as a prerequisite for distinguishing between sustainable and unsustainable value chains (Searcy 2017, 72).

MSIs are based on the stakeholder theory of organisations (Searcy 2017, 4). According to Freeman, stakeholders of an organisation are individuals or groups that can influence or are affected by the achievement of the organisation's goals (Freeman 1984, 48). A value chain can have many stakeholders that are both within and outside the chain. Stakeholders within the chain include companies, employees, associations, customers, financial partners, and trade unions, whereas stakeholders outside the chain include communities, NGOs, and governments (Searcy 2017, 6).

The rationale of MSIs is that they bring together expertise, skills, and finance of a wide range of stakeholders, assuming that all relevant stakeholders have valuable experiences and each of them can exert influence (Searcy 2017, 4). This determines a core characteristic of MSIs, which is the active participation and collaboration of various stakeholders with different backgrounds. Scholars agree that both stakeholders within and outside the chain are essential, and can help to "define, implement, and enforce rules that direct corporations' behaviour with regard to social and environmental issues" (Searcy 2017, 2). As stakeholders come from different sectors and have diverse backgrounds, they bring a variety of resources that can be valuable for achieving a common goal. For instance, while firms matter because they cause many negative externalities due to their business operations, their economic power in the chain, and their access to infrastructure, NGOs often bring the technical knowledge about social and environmental issues, the passion and people-focus and can provide legitimacy in a MSI (Prescott and Stibbe 2016, 1). Governments as another stakeholder group have the unique power to set regulatory frameworks, define policies, set supporting infrastructure, and provide financial support. International agencies, like UN bodies, can contribute to MSIs with their resources of technical knowledge, global networks and political access while also being characterised as impartial, thus enhancing legitimacy (Prescott and Stibbe 2016, 1).

MSIs are characterised by active deliberation among stakeholders, which contains authentic dialogue and discourse and relies on inclusiveness, authenticity, and consequentiality. Brown et al. state that "a global supply-chain MSI with a high degree of deliberative capacity will encapsulate a wide variety of interests and discourses, exhibit reciprocity, and impact social outcomes through collective decision-making" (Brown et al. 2019, 390). The deliberative capacity and consequently the success of a MSI can be enhanced by overlapping stakeholder value and shared stakeholder responsibility. Overlapping stakeholder value means that the

motivation for cooperation between participants increases when they identify overlapping interests. It refers to the reason stakeholders engage with each other, is oriented on the utility or value stakeholders get through relationships or networks and assumes that "the utility or value created for one stakeholder is dependent on the behaviours of the firm's other stakeholders" (Brown et al. 2019, 393). Shared stakeholder responsibility means understanding the relevance of each individual's responsibility in the collective system, showing ownership and motivation to the envisioned outcomes that benefit all, and fulfilling key duties even in the absence of formal agreements (Brown et al. 2019, 394). Accordingly, MSIs need a collective stakeholder orientation that frames the problem as a shared one, its solution as benefitting for all participants, and responsibility as a common cause (Brown et al. 2019, 395).

Another core characteristic of MSIs is the high complexity of social or environmental challenges they aim to address, and the awareness that these cannot be solved solely by a single actor. By bringing together many stakeholders with different resources and experiences, by developing a collective understanding of the issue and creating innovative solutions, problem-solving shall be enhanced (Clarke et al. 2018, 411). Bitzer et al., for instance, find that MSIs can emerge in the area of wicked problems and address issues that are too challenging, complex and extensive to address them alone (Bitzer et al. 2018, 333). As of its nature of being difficult, if not impossible, to solve, uncertain in their development, and unpredictable over time, no single stakeholder can adequately address wicked problems independently from other stakeholders (Bitzer et al. 2018, 336). Thus, wicked problems require coordinated and cooperative approaches of governance, and researchers have suggested network governance with including multiple perspectives to respond more effectively to the multiple dimensions of wicked problems that affect all stakeholders (Bitzer et al. 2018, 336). For instance, Atela et al. find that MSIs can support in upscaling capacities to climate change adaptation by mobilising financial resources of the private sector to adaptation finance, by reducing dependence on public or donor financing, by developing holistic and innovative approaches to challenges that a single stakeholder cannot address, and by having flexible and inclusive structures that can be adopted to local contexts (Atela et al. 2021, 2).

As of the fragmented and global character and the regulation that goes beyond national legal jurisdiction, challenges in GVCs can also not be handled by a single stakeholder. More precisely, literature acknowledges that sustainability in GVCs is a complex problem, which requires long-term cooperative, coordinated and cross-sectoral action (Searcy 2017, 2). MSIs in GVCs are manifold and can have different objectives. For instance, they can aim at defining

standards to which chain participants need to comply, or at enhancing cooperation among stakeholders by providing mutual benefits and by creating a platform for dialogue (Brown et al. 2019, 386).

As an instrument for regulation, MSIs often attempt to tackle weaknesses of government regulations and corporate self-regulation. For instance, MSIs can be designed to support the implementation of "standard-setting, reporting, auditing, monitoring and verification procedures" (Utting 2002, 82). They thus attempt to close government gaps, "primarily by issuing soft law standards, which are non-binding and voluntary private rules, generally not enforced through governmental mechanisms" (Mena and Palazzo 2012, 528). For instance, Wickramasingha finds that MSIs can be an important vehicle to govern labour in global production networks and names the Accord on Fire and Building Safety in Bangladesh as an example in the apparel industry in the South Asian country. In this regard, he defines MSIs as "coordinated efforts between labour (workers and workers representatives), capital (lead firms and manufacturers), and the state" (Wickramasingha 2022, 9). He states that the Accord aimed at substituting missing regulations in Bangladesh to govern the building safety standards, however, it did not drive the state's adaption of labour laws and building safety standards as of its short-term design.

As they link a variety of different public, private, and social actors, MSIs can be seen as a form of networked governance, that include states, NGOs, unions, firms, international organisations and more (Baumann-Pauly et al. 2017, 774). MSIs are often found to develop soft law standards, which can be an appropriate instrument to implement certain practices and drive the implementation of respective laws and regulations on national and international levels and thus transforming them into hard law. A good example for this is the EITI, which normalised transparency in the extractive sector and led to respective law developments (Buxton 2019, 12).

2.2.2 Roles

A common differentiation of MSIs in the context of GVCs distinguishes four objectives: (1) providing learning platforms, (2) developing behavioural standards, (3) developing mechanisms of auditing and compliance of the rules and (4) issuing labels and certifications (Mena and Palazzo 2012, 536; Searcy 2017, 6-9).[3] MSIs can take on one specific role or cover

[3] The transnational institute offers a different distinction and distinguishes between standard-setting multistakeholder groups aiming at developing products or processes (e.g., FSC), policy-oriented multistakeholder groups aiming at setting policy goals (e.g., Scaling Up Nutrition, SUN) and project-oriented multistakeholder

several or even all of them.

First, MSIs can provide learning platforms. By bringing together different stakeholders from firms to civil society, MSIs act as an arena where discourses, exchanges, and deliberations take place, which can enable the development of "a common understanding of problems and potential solutions" (Palazzo and Scherer 2010, 237). Exchanging with other stakeholders makes mutual learning possible, e.g., learning from other strategies and mistakes. Regarding social and environmental concerns along a value chain, MSIs can help to identify key issues, strengthen their relevance, and increase awareness and understanding. They can be a learning platform for the development of environmental and social thresholds, by involving both the public and the private sector and enabling interaction and collaboration between these stakeholders. In a broader sense, MSIs can provide education and training about key environmental and social issues (Searcy 2017, 6f; Palazzo and Scherer 2010, 237).

Second, MSIs can develop standards. Responding to regulatory and governance gaps, MSIs can define standards "in order to tackle specific behavioural challenges […] or specific communication challenges" (Palazzo and Scherer 2010, 237). Examples include the definition of environmental and social standards for a sustainable value chain or the requirements for CSR reporting. The scope can vary and range from broadly applicable standards to industry-specific standards with consideration of special value chain needs. By setting performance-oriented instead of process-oriented standards, "MSIs can specifically define the upper or lower limits of performance that distinguish between sustainable and unsustainable supply chains" (Searcy 2017, 7). Developing standards and measuring a firm's performance can enable comparability (e.g., regarding GHG emissions, water consumption, working conditions) and stimulate action. Additionally, setting science- and ethics-based goals can "provide a basis for determining a supply chain's sustainability performance" (Searcy 2017, 7). However, due to the difficulty of measuring value chain sustainability, it is a challenge to identify appropriate thresholds. Hence, proxies for environmental and social thresholds (e.g., GHG emissions, diversity) need to be discussed and identified, a process which can be controversial (Searcy 2017, 3). Concepts from the environmental sciences, e.g., Planetary Boundaries, or from the social sciences and ethics, e.g., the Doughnut theory[4], can serve as the basis for identifying thresholds (Searcy 2017, 3).

groups aiming at implementing specific projects (e.g., Global Alliance on Vaccines) (Buxton 2019, 3).

[4] The Doughnut theory was developed by Kate Raworth and is a holistic framework for sustainable development. It suggests that by staying between social foundations (e.g., health, education) and ecological boundaries (e.g., climate change, biodiversity loss), thus within a doughnut, well-being for society can be achieved (Raworth 2017).

A MSI can help to address these challenges and can provide details on how to best implement the selected standards (Palazzo and Scherer 2010, 237; Searcy 2017, 7).

Third, MSIs can develop enforcement mechanisms. Joint enforcement mechanisms are essential in monitoring and enforcing performance-oriented standards as mentioned in the previous section, as well as for verifying compliance of involved stakeholders with certain expectations. This role covers various forms of auditing, as well as the monitoring of data collection, analysis and reporting of performance-oriented standards. As a tool of soft law, these control mechanisms must be credible and transparent and shall help to "hold those corporations that participate in the initiative accountable to the standards" (Palazzo and Scherer 2010, 238) as well as aim at avoiding "opportunistic behaviour or greenwashing" (Palazzo and Scherer 2010, 238). In this context, it is also necessary to clarify the roles and responsibilities of each participant in these joint enforcement mechanisms and clarify the consequences of non-compliance (Palazzo and Scherer 2010, 238; Searcy 2017, 8).

Fourth, MSIs can issue labels and certifications. Compliance with standards can be incentivised by issuing labels and certifications or establishing ratings for those companies that comply with them. By doing so, companies can show their responsibility to stakeholders and a distinction between sustainable and unsustainable value chains is enabled. In this context, the Rainforest Alliance, the Marine Stewardship Council, the FSC and certifications of the GRI can be mentioned. Issuing labels and certifications requires the establishment of minimal levels of performance on different criteria, the definition of thresholds, goals, and metrics, and enforcement mechanisms. Searcy adds to this:

> *"The critical point is that labels, certifications, and/or ratings for sustainable supply chains must be tied to context-based metrics that link the supply chain to the wider world. Self-referential or process-oriented metrics do not provide the resolution needed to identify whether a supply chain is sustainable or not. Any label, certification, or rating that does not make that distinction is insufficient."* (Searcy 2017, 9)

2.2.3 Input and output legitimacy

Researchers have highlighted the need for a MSI to have both input and output legitimacy for the sake of its effectiveness and credibility. Whether a MSI achieves its objective or not is deemed as dependent on its ability to create legitimacy, and Searcy points out that a MSI with a strong legitimacy has the potential to enhance sustainability in supply chains, while one without may have opposite effects (Searcy 2017, 5; Baumann-Pauly et al. 2017, 772). Mena

and Palazzo provide a commonly used conception of input and output legitimacy that shall be described in the following:

Accordingly, the input dimension focuses on the perception of the MSI about its internal and external accountability, which means that on the one hand, involved companies perceive the MSI as a "rightful authority over them" and on the other hand, other stakeholders perceive the MSI as "having a right to regulate" (Mena and Palazzo 2012, 536). Input legitimacy arises from four factors: (1) stakeholder inclusion, (2) procedural fairness of deliberations, (3) promotion of a consensual orientation, and (4) transparency of a MSI's structures and processes (Mena and Palazzo 2012, 536).

Stakeholder inclusion is defined as "the involvement of stakeholders affected by the issue" (Mena and Palazzo 2012, 538). Accordingly, all stakeholders that are impacted or touched by decisions and policies set by the MSI should ideally be included in its structure, processes, and activities (Mena and Palazzo 2012, 539). Consequently, a MSI with a large number of participants does not necessarily have a high input legitimacy if main relevant stakeholder groups are not involved. As for the EU Water Initiative that aims at providing water in sub-Saharan Africa, for instance, African stakeholders are strongly underrepresented, although they are significantly affected by the content of the MSI. Critics about MSIs often include the deficient inclusiveness of stakeholders of developing countries or less powerful actors. D'Haese et al. find that trade unions are massively underrepresented in MSIs, and even when they participate, they often fail to contribute (D'Haese et al. 2018, 19). Especially with regards to social concerns in GVCs, like labour rights issues, however, those stakeholders should have a voice. Membership and active participation in MSIs are often dependent on a stakeholder's resources and capabilities (Bitzer et al. 2018, 338).

Procedural fairness of deliberations as a criterion for input legitimacy means that affected stakeholders do not only participate in a MSI, but also have a voice and can influence the process and decisions. Thus, inclusive MSIs can lack legitimacy if certain stakeholders are marginalised in processes and deliberations. This criterion highlights the need for MSIs to balance power among stakeholders in deliberations in order to create an arena where everyone has the right to a voice and power inequalities are neutralised. Moreover, it is also significant where stakeholders are involved, whether in decision-making processes or only in consultation processes. The Ethical Trading Initiative, for instance, is a positive case as a diverse range of stakeholders are included in the Board of Directors (Mena and Palazzo 2012, 539). There is also the concern that powerful MNEs might use participation in MSIs to advocate for standards,

which create market access barriers for smaller competitors (Mena and Palazzo 2012, 540). The design of a MSI can support an equal participation of all stakeholders and create a level-playing field. This can be done by the definition of power-sharing rules, by public consultations, by clear procedures and voting systems, by impartial facilitators, and by ensuring equal access to information and technology (D'Haese et al. 2018, 2).

Consensual orientation as the third criterion also supports the input legitimacy of a MSI. MSIs are an arena where multiple stakeholders with different values, backgrounds, interests, resources, and objectives come together, making dissensus likely. However, for a MSI to be legitimate, consensual decisions are required.

> *"Such a consensus is important, because it signals the ability and willingness of the involved actors to change their position on the basis of convincing reasons. If participants are willing to potentially change their position, they would show that they are motivated to cooperate for the common ground."* (Mena and Palazzo 2012, 540)

Due to the pluralism of interests, opinions, and objectives, consensus is often difficult and contains bargaining and negotiating, making the better argument win. Even if there are differing positions, decisions that have been made, solutions that have been designed or standards that have been defined can still be reasonable when they are produced through collaboration under bargaining and negotiation (Mena and Palazzo 2012, 540).

Transparency as the fourth criterion is crucial for a MSI's input legitimacy, which means making its processes, motives, and activities knowable and accessible for interested parties. Transparency is increasingly demanded by external stakeholders and enables them to evaluate the MSI's performance and to "assess whether their preferences are respected" (Mena and Palazzo 2012, 540). Making critical information, e.g., voting results, decision-making processes, or the development of standards publicly available enhances a MSI legitimacy as it allows other people to "assess how a rule was decided upon and judge its appropriateness" (Mena and Palazzo 2012, 541).

The second dimension of legitimacy "relates to the capacity of governance mechanisms to effectively take a regulatory role" (Mena and Palazzo 2012, 536) and is termed as output legitimacy. It is acknowledged that MSIs can create a level-playing field, however, a general challenge arises out of their voluntary and non-binding nature. Output legitimacy includes three criteria, namely (1) coverage, (2) efficacy, and (3) guarantee of good enforcement and monitoring of their rules (Mena and Palazzo 2012, 537).

Coverage "measures the number of corporate actors bound by an MSI rule, and, as such, is directed toward the quantity of actors involved in standard implementation" (Mena and Palazzo 2012, 541). It can be a challenge that compliance to a MSI's rules is not being perceived as a competitive disadvantage or as cost intensive. Reaching as many firms as possible is necessary to attract further firms, to expand compliance to standards to competitors and suppliers, and to make non-compliance a competitive disadvantage. Mena and Palazzo further state that coverage partly depends on first-movers and can be increased through participation of highly visible MNEs while the more cooperations get involved, the more likely it gets that competitors and suppliers follow (Mena and Palazzo 2012, 541).

Efficacy refers to the appropriateness, fit and relevance of the rules and solutions a MSI creates regarding the challenge or problem it aims to address. A lack of efficacy can result from a situation where the proposed standard or rule does not appropriately address the problem, generates negative effects, or from a standard that sets its goal well below the needed solution. MSI are often criticised for having too few requirements, not bringing sufficient change and being a vehicle for green- and blue-washing by firms. As compliance to certain standards might be very costly for some firms, it can be necessary to adapt rule-targets and respective implementation guidelines. For example, standards that are developed by Western firms can be difficult to comply with for firms and producers in developing countries (Mena and Palazzo 2012, 542).

Enforcement as a third criterion for output legitimacy refers to a MSI's capacity to control compliance and implementation of rules in practice and to respectively sanction non-compliance. For soft regulation as in the case of MSIs, enforcement is difficult, as there are no executive or judicial organs. Monitoring mechanisms are a common instrument to control enforcement, however, they come along with certain challenges like high costs, the risk of over-controlling, and the risk of monitoring fatigue, and difficulties in comparing results due to industry- and company-specifics. Monitoring can be done by a firm itself, leading to low output legitimacy as it can possibly report incorrect information and external verification is difficult. On the contrary, monitoring done by the MSI or even by external auditors or independent actors can increase compliance and output legitimacy (Mena and Palazzo 2012, 543f).

The following table taken by Mena and Palazzo summarises the different criteria of both the input and the output dimension of legitimacy.

Table 1: MSI input and output legitimacy criteria

Dimension	Criterion	Definition	Key questions
Input	Inclusion	Involvement of stakeholders affected by the issue in the structures and processes of the MSI	Are the involved stakeholders representative for the issue at stake? Are important stakeholders excluded from the process?
	Procedural fairness	Neutralization of power differences in decision-making structures	Does each of these categories of stakeholder have a valid voice in decision-making processes?
	Consensual orientation	Culture of cooperation and reasonable disagreement	To what extent does the MSI promote mutual agreement among participants?
	Transparency	Transparency of structures, processes and results	To what extent are decision making and standard-setting processes transparent? To what extent are the performance of the participating corporations and the evaluation of that performance transparent?
Output	Coverage	Number of rule-targets following the rules	How many rule-targets are complying with the rules?
	Efficacy	Fit of the rules to the issue	To what extent do the rules address the issue at hand?
	Enforcement	Practical implementation of the rules and their verification procedures	Is compliance verified and non-compliance sanctioned?

Source: Mena and Palazzo 2012, 537

Searcy summarises the various dimensions of value chain MSIs and develops a framework, which highlights core characteristics of MSIs for sustainable supply chains. He illustrates the need for MSIs to "achieve input and output legitimacy with stakeholders, […] engage a wide range of stakeholders both within and beyond the supply chain, and […] play many interrelated roles in advancing supply chain sustainability" (Searcy 2017, 6). This work is guided by Searcy's framework as presented in the following figure.

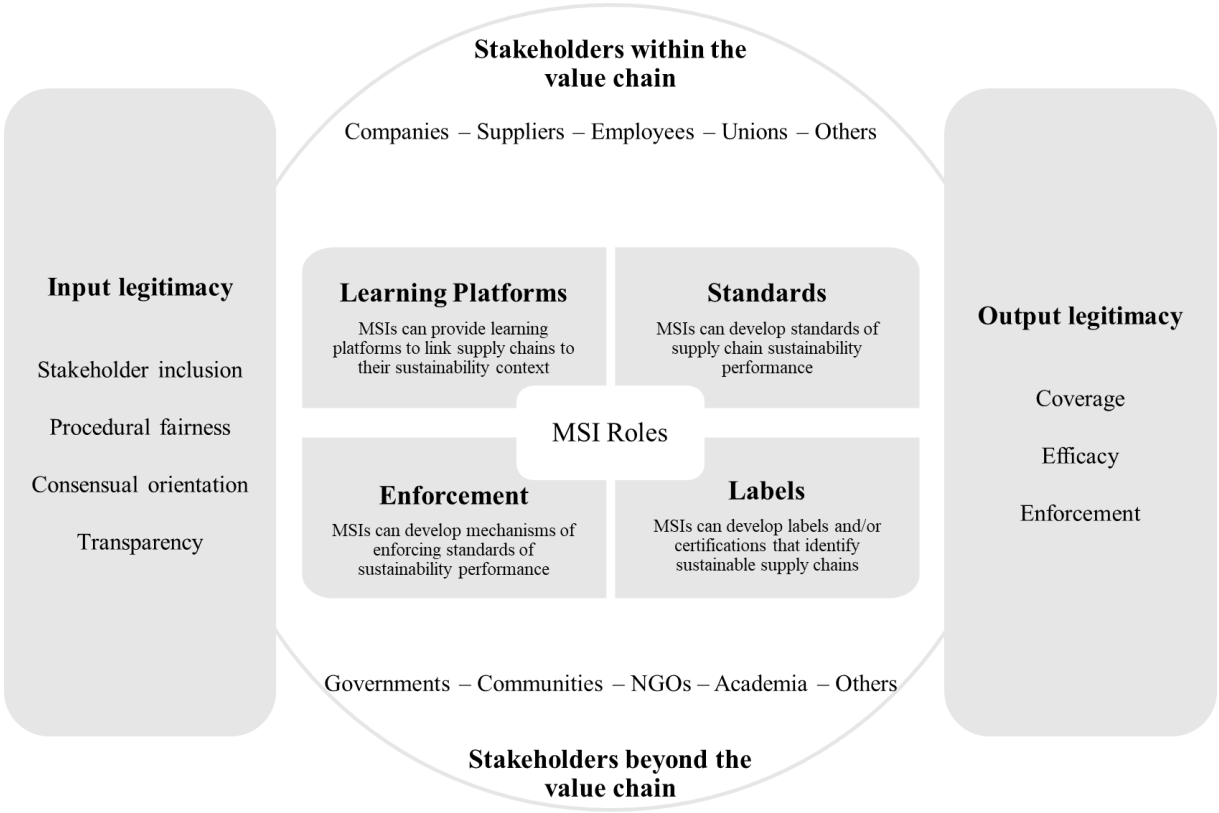

Figure 2: Conceptual framework
Source: Searcy 2017, 6; adapted by author

2.2.4 Strengths, weaknesses, and success factors

MSIs come along with various advantages that make them an appropriate actor for enhancing sustainability in GVCs. MSIs have the advantage that they can address a complex issue more effectively, resources of involved stakeholders can complement each other, results can have a broader ownership as they are designed in a collective manner, and the chance for systemic change is higher due to learning and cooperation (Brouwer and Woodhill 2015, 27). If designed and implemented in a good way, MSIs can encourage dialogue among stakeholders, show flexibility and legitimacy, and have the "ability to serve as watchdog" (Searcy 2017, 5). Potentially, they can be a vehicle that leverages valuable resources from different stakeholders to a certain issue, they can create innovative solutions and thus tackle a certain challenge that cannot be addressed by a single stakeholder alone (Prescott and Stibbe 2016, 2). Various researchers have discovered positive change in value chains, e.g., by the FLA or the Better Work Initiative, which have been drivers for better working conditions in the apparel chain (Searcy 2017, 2). Searcy summarises:

> *"MSIs can help identify shared expectations about the required level of sustainability performance in a supply chain context. MSIs can link supply chains to the broader sustainability context in which they exist. In particular, MSIs can help companies and other interested parties to identify the natural and social thresholds that form the basis for sustainability performance expectations and define whether or not a supply chain is sustainable. MSIs can also institutionalize those thresholds, particularly through establishing learning platforms, standards, enforcement mechanisms, and labels. Identifying and institutionalizing clear thresholds will provide a basis for evaluating steps towards supply chain sustainability."* (Searcy 2017, 2).

MSIs, however, are not without controversy in practice and in the literature. First, MSIs are time-consuming, resource-intensive platforms and require a high level of commitment of the involved stakeholders. Second, due to the complex nature of the issues MSIs seek to address, they are often not able to deliver quick solutions and work seems like an open-ended process. Also, success cannot be guaranteed when MSIs are designed. In order to achieve legitimacy and a broad ownership, stakeholders need to be addressed in a sufficient extent (Brouwer and Woodhill 2015, 20). However, MSI often lack stakeholder inclusion, and various researchers find that MSIs often show deficits in their deliberative capacity, which means for example that they are not inclusive enough and do not consider voices of important stakeholders (Brown et al. 2018, 390). MSIs can also result in poor outcomes and can be arenas of conflicts as they bring together a wide range of different stakeholders with different interests, cultures, values, and goals (Prescott and Stibbe 2016, 3).

Various research exists on how MSIs should be designed to be effective and successful. Pattberg and Widerberg (2014) identify nine aspects that influence the outcome of a MSI and categorise them into three blocks: actors, process, and context.

Actors: First, leadership – both from a structural, entrepreneurial, and intellectual point of view – plays an essential role in the design and success of a MSI. A good and proactive leadership can decisively navigate the MSI in the right direction, foster group cohesion, and create a shared spirit. Second, including the right partners and generating "a working mix of resources, knowledge and capabilities is necessary to exploit synergies and enable a fruitful division of labour" (Pattberg and Widerberg 2014, 15). Enabling open communication, creating transparent decision-making processes, and facilitating equal engagement can minimise asymmetries between participants and contribute to more effective outcomes.

Process: Third, a successful partnership requires precise goal setting. Partners need to have a clear idea of what should be achieved, ideally in a measurable form. A common vision needs to be developed, and partners need to show ambition working towards this goal. Precision in

goal setting is the basis for developing the appropriate measures and instruments, monitoring and evaluating the MSI's performance and to enhance legitimacy. Fourth, funding is essential for the stability and success of a partnership. Securing sufficient financial resources must be ensured at the very beginning of implementing the MSI and respective sources should be diversified in order to avoid dependence and enhancing resilience. Fifth, the management of a MSI highly influences its effectiveness. A clear internal structure, defined roles and responsibilities, strategic plans, joint rules, and effective communication systems can avoid wasting scarce time and resources and are part of effective management structures. Professional management can help to make the best possible use of the existing capacities. Sixth, monitoring, reporting, evaluation, and learning are key aspects affecting the efficiency of a MSI as they show its performance, reveal weaknesses and good practices, enable learning, and set the basis for adapting strategies. Moreover, monitoring, evaluation and reporting are essential for a MSI's legitimacy, both internal and external. Outlining a theory of change can help its participants as well as its external stakeholders to understand the logic of a MSI.

Context: Seventh, a MSI should see itself embedded in a large governance landscape and therefore take a meta-governance perspective. Creating coherence with other partnerships, aligning with international policy goals and the Sustainable Development Goals (SDGs), and acting not in isolation but as part of a complex governance architecture are essential features for a successful MSI. Eighth, the success depends on the problem-structure. Depending on the type of problem, different handling and MSI setups are required. In this regard, scholars distinguish between malign problems that have "high levels of complexity, competing interests and unclear solutions" and "'benign problems' where actors' interests and preferences converge and solutions are easier to identify" (Pattberg and Widerberg 2014, 30). MSIs addressing a specific problem should also be flexible to adapt to changing problem structures (e.g., less uncertainty because of advanced research)[5]. Ninth, the political and social contexts in which a MSI is embedded matter and determine its design and its outcomes. Understanding the local, national, and international context, existing governance structures and institutions and adapting to local contexts are essential for MSIs to thrive, and also for capacity building and mutual learning (Pattberg and Widerberg 2014, 13-33).

[5] Additionally to the need for flexibility, Searcy also highlights the need for MSIs in the chain context to be stable. This means that network ties need to be both persistent despite internal or external challenges, and flexible to adapt to changing environments and chain-specific characteristics and dynamics (Searcy 2017, 9).

The following figure summarises the nine success factors according to Pattberg and Widerberg (2014, 14).

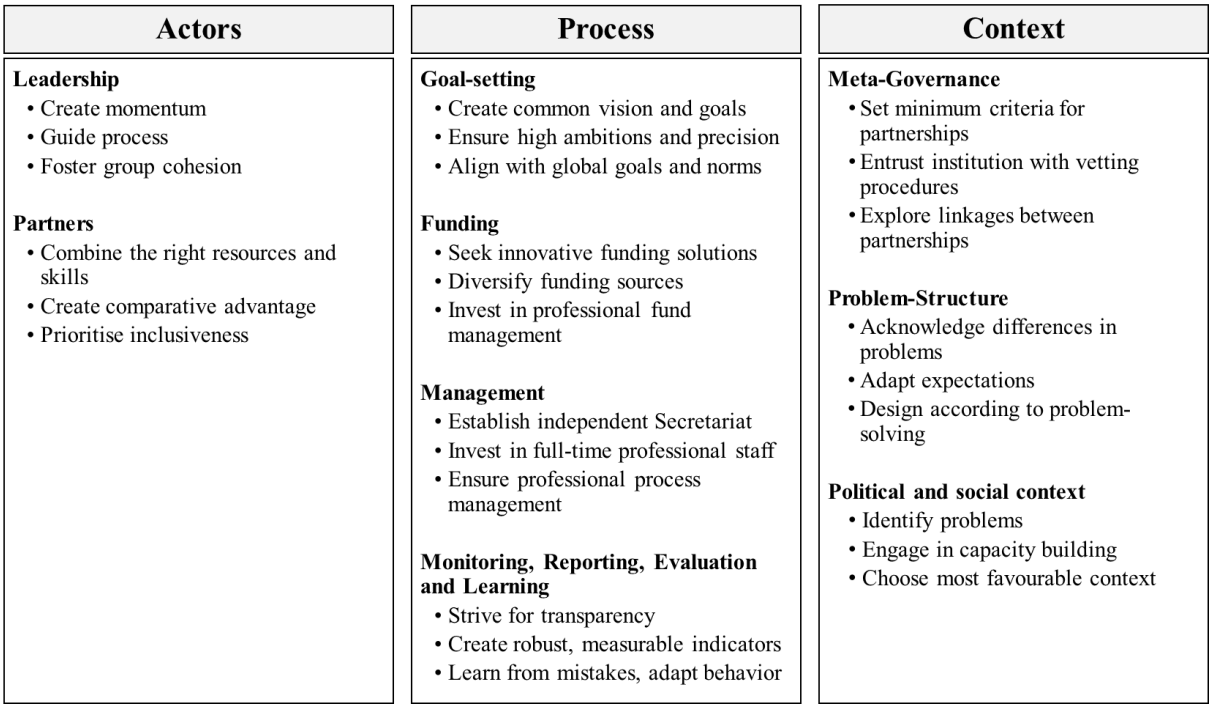

Figure 3: Success factors for partnerships
Source: Pattberg and Widerberg 2014; adapted by author

2.3 Main conclusions

The previous chapter discussed the theoretical and conceptual approach this work is based on and shall help to answer the main research question. The GVC framework provides the theoretical foundation, offers a holistic perspective, and shall set the basis for understanding the functioning, dynamics, and key characteristics of the global battery value chain. As of the highly geographically and functionally fragmented character of GVCs, thus referring to business activities that go beyond national borders and firm boundaries, its governance is complex, however, highly needed due to its immense negative social and environmental negative externalities. GVCs are embedded in a regulatory governance environment that consists of a diverse range of actors both of public, private, and social sectors. The central hypothesis of this work is that cooperation between a wide range of stakeholders is necessary to meet the complexity of governing GVCs. It thus introduces the concept of MSIs as a key instrument for regulatory governance within GVCs to address social and environmental concerns and sees MSIs as a vehicle to govern the global battery value chain. Introducing the concept of MSIs is essential, as the GBA can be defined as such. This theoretical-conceptual

foundation is to be kept in mind for the remainder of this work and will be used to analyse the role of the GBA as a MSI within the battery chain and its role regarding regulatory governance.

3 Methodological approach

The methodological approach is in line with the objectives of this work. The thesis' goal is to assess the role of an industry-specific MSI within the governance of a GVC. More precisely, this work conducts an empirical analysis of the GBA and embeds its existence into the regulatory governance of the EV battery value chain. To profoundly meet this objective, an extensive single-case study is carried out. The following part gives detailed insights into the methodological approach applied in this work, outlining the study design, data collection, and data analysis.

3.1 Study design

Due to the industry-specific character and the underlying research question, this work follows a single-case study approach. Case studies are frequently used in political science and aim at describing a subject, phenomenon, or dynamics in depth and in its full complexity. Thus, it roots in a positivistic assumption (Ruffa 2020, 1133). The case study approach allows for a detailed understanding of the GBA as a MSI operating in the global battery value chain. Although focusing on observing and describing a particular case, case studies often follow the objective to generalize the findings. Within this work, the GBA is used as an example for a MSI that also exists in other industries and GVCs.

Primarily, the case study conducted within this work has the function to (1) describe the GBA, i.e., its formation and rationale, its mission and objectives, its governance and decision-making structure, its participating stakeholders as well as its activities and implementation mechanisms, and (2) assess its role and input/output legitimacy. The work therefore follows a descriptive single-case study design with exploratory elements and an in-depth examination of the GBA. It aims to deliver accurate and detailed descriptions of the research object and identifies main characteristics of the GBA, therefore acquiring a holistic understanding. It is inductive in its research and applies a bottom-up approach, is exploratory and aims to gain insights into a still unexplored subject. This work is primary in nature as it is the very first academic work on the GBA and shall offer a starting point for further research.

The EV battery value chain was selected due to its present high relevance, from an economic, political, and socio-ecological perspective. The industry is currently recording a significant increase in demand and requires a scale-up along the entire value chain with the expansion of capacities along all its stages, including mining, raw material processing, cell component production, and battery cell/pack production (Ghadimi et al. 2022). The highly intertwined and fragmented nature of the battery value chain, its associated challenges and severe social and environmental concerns suggest that there are governance gaps that call for regulation and enhanced cooperation between different stakeholders (Ghadimi et al. 2022, 3; 9; Mayoral 2022, 16). Although academic literature on the battery value chain is very dynamic and burgeoning, literature regarding the regulatory governance is still limited. At the time of writing and according to the author's knowledge, there is no academic literature available on a stakeholder partnership operating in this industry.

The GBA as a MSI was chosen strategically due to several factors that were deemed as conducive for a case study with the mentioned research objectives (chapter 1.3). First, the GBA is the biggest partnership in the context of battery value chains and covers major stakeholders from the public, private, and social sector. In recent years, it has become a well-established partnership within the respective industry and an important construct on various dimensions, e.g., providing a platform for exchange and enhancing chain transparency. As MSIs in the EV battery sector are a quite recent phenomenon, the rapid development of the GBA is seen as a good reason to take a closer look. Second, despite only being founded in 2017, it has been highly active in the last years and offers enough data for a first research analysis. Third, this thesis defines the social and environmental challenges in the battery value chain as a global issue, and therefore, assumes the requirement of global solutions. Respectively, this work intended to choose a global partnership instead of existing regional partnerships as the unit of analysis.

Although the construct of MSIs has already been extensively examined and several multi-stakeholder approaches have been discussed (chapter 1.2), it is necessary to take a closer look at MSIs in this specific context. Analysing the GBA is relevant for distinct reasons and has the potential to add value on existing discussions:

First, every MSI operates in a specific context with its own characteristics and thus, the design of each MSI differs with respect to its objectives, geographical scope, relevant stakeholders, and developed approaches. As of its current scale, the battery value chain has evolved considerably, and has its own challenges, trends, and dynamics. This work assumes that

adopting the results from comparative analyses of partnerships to the battery industry is therefore only valid to a limited extent. Overcoming industry-specific challenges requires industry-specific strategies and, consequently, industry-specific MSI designs. Analysing a MSI in the evolving battery industry does not only have the potential to get a more nuanced understanding of MSIs but also to get deeper insights into the battery production landscape and its needs. Since there is no analysis of a MSI operating in the battery sector at the time of this work, the author attempts to close this gap.

Second, analysing the GBA allows to enhance the understanding of MSIs, its functioning, structures, features, and underlying mechanisms. Even though multi-stakeholder approaches have already been examined from various research areas, it is still necessary to analyse evolving or existing MSIs. Additional analyses have the potential to complement existing ones and to gain valuable insights into the complex concept of MSIs. Furthermore, analysing another MSI in a specific context provides an opportunity to capture recent developments, new practices, and emerging approaches. This work thus contributes to a more robust and up-to-date understanding of MSIs considering nuances and particularities of the MSI under examination.

Third, research on MSIs helps to identify success stories or failures and contributes to learning. Conducting an analysis on the GBA can reveal valuable insights both for the Alliance itself and for other partnerships. On the one hand, it helps to identify uncovered potential, limitations, areas for improvement and lessons-learned that can set the basis to actively shaping the GBA's work in the future. On the other hand, the analysis can serve as learning material for other multi-stakeholder approaches and as such guide future MSIs in this sector. Each analysis has the potential to reveal best practices and derive recommendations for designing effective and impactful multi-stakeholder approaches. Lessons can be learned from identified successful partnerships and their success factors can be transferred to other contexts. This potential for scalability and replication of best practices requires continuous analyses of new MSIs. Also, another analysis can uncover similarities to existing multi-stakeholder approaches and help to derive specific MSI patterns.

Forth, the GBA analysis should also be understood as a response to, as well as a contribution to, the rapidly growing debates on sustainability of GVCs. The very dynamic and multi-dimensional nature of this field requires ongoing knowledge creation and tracking of new challenges, trends, and innovations – thus, latest developments and approaches in this field. Analysing another MSI in this area can bring new perspectives, expand the existing knowledge base, and reveal innovative approaches on how to enhance sustainable practices in GVCs.

Additionally, analyses of MSIs contribute to a comprehensive understanding of different partnership models within the value-chain field, as well as to foster a better understanding of how diverse stakeholders cooperate for sustainable GVCs. Understanding cooperation to address complex global challenges like those in GVCs also contains the analysis of multi-stakeholder approaches and their underlying theory of change.

In summary, while there are existing analyses of MSIs in the field of sustainable GVCs, conducting up-to-date research of the GBA in its specific sector can provide a new perspective and valuable insights as well as knowledge about context-specific dynamics. Due to the uniqueness of each MSI, there is still potential in identifying and understanding additional nuances of MSIs.

This work is guided by Searcy's framework (chapter 2.3), which assumes different roles of MSIs for sustainable supply chains and illustrates the need for MSIs to achieve input and output legitimacy and to engage stakeholders both within and beyond the value chain (Searcy 2017, 6). This work adopts key terminologies, has the ambition to classify the GBA, and aims at giving a first assessment of the Alliance's legitimacy based on the framework's criteria.

3.2 Data collection

As often the case in political science and international relations, this case study relies on qualitative methods of data collection (Ruffa 2020, 1136). A qualitative research design can provide important insights that cannot be captured by quantitative methods and seems suitable for assessing the role of the GBA within the battery value chain and its regulatory governance as well as its legitimacy. The qualitative research approach combines well with a case study, as the case selection and approach are about generating detailed knowledge rather than providing an abstract overview as it is generally the case for quantitative approaches.

Aligned with the goal to explore the role of the GBA within the governance of GVCs, the qualitative research design consists of an extensive document analysis. Document analysis as a qualitative research method offers the advantage that a large variety of documents can be included as research objects (Bowen 2009, 27). In the case of the GBA, this covers publicly available data, which means press releases and publications on the initiative's website, the content of the website itself and postings on the platforms Twitter and LinkedIn. The purpose of the document analysis is the production of rich descriptions as well as its interpretation with regard to its role in the governance of the global battery value chain and the GBA's input and output legitimacy.

The major data source was the GBA website. Besides the information found directly on the website, 22 publications and 8 press releases that were published on the GBA website were main target objects for the analysis. The data covers vision and mission papers, white papers and consultation reports, explanations of developed "products" (e.g., GHG Rulebook, Battery Passport), and documents about the GBA itself such as the GBA Charter or the Guiding Principles. Except for one document, which is also published in two other languages (French and Chinese), all documents are published exclusively in English. The following tables shows the full list of analysed publications (Table 3) and press releases (Table 4). Because of its richness and variety and in alignment with the purpose of this work, the listed documents were deemed sufficient to provide an initial analysis of the GBA.

Table 2: Data collection: GBA publications

ID	Date	Title
Publ_1	Sep 19	A Vision for a Sustainable Battery Value Chain in 2030 - Unlocking the Full Potential to Power Sustainable Development and Climate Change Mitigation
Publ_2	Jan 20	10 GBA principles for a sustainable battery value chain - adopted by 42 organizations on 23 Jan. 2020
Publ_3	Sep 20	Overview
Publ_4	Nov 20	The Global Battery Alliance Battery Passport - Giving an identity to the EV's most important component
Publ_5	Dec 20	Annex – Comparative Analysis of Legal Frameworks - Community Paper
Publ_6	Dec 20	Consequences of a Mobile Future - White Paper
Publ_7	Jan 21	A Framework for the Safe and Efficient Global Movement of Batteries - White Paper
Publ_8	May 21	Closing the Loop on Energy Access in Africa - White Paper
Publ_9	Oct 21	Report from Stakeholder Consultations on the ASM Cobalt ESG Management Framework - Chinese
Publ_10	Oct 21	Report from Stakeholder Consultations on the ASM Cobalt ESG Management Framework - French
Publ_11	Oct 21	Report from Stakeholder Consultations on the ASM Cobalt ESG Management Framework - English
Publ_12	Sep 21	Climate conference of the Parties Roundtable on Data Governance (Summary Report) - Harmonized Principles for Data Authentication and Protection to Realize the Paris Goals
Publ_13	Dec 22	GBA Battery Passport Child Labour Rulebook
Publ_14	Dec 22	Child Labour and Human Rights Rulebooks Background & Glossary
Publ_15	Jan 23	Battery 2030: Resilient, sustainable, and circular
Publ_16	Apr 23	GBA Battery Passport Human Rights Rulebook
Publ_17	Apr 23	GBA Battery Passport Greenhouse Gas Rulebook
Publ_18	Apr 23	GBA Charter
Publ_19	Jun 23	GBA Battery Passport Tender Q&A Session Summary
Publ_20	n.a.	About the Human Rights Index and Child Labor Index
Publ_21	n.a.	About the Greenhouse Gas Rulebook
Publ_22	n.a.	GBA Battery Passport

Source: Own Table

Table 3: Data collection: GBA press releases

ID	Date	Title
Pres_1	Sep 17	Major Push to End the Hidden Human Toll and Pollution
Pres_2	Jan 20	42 Global Organizations Agree on Battery Guiding Principles
Pres_3	Jul 21	Global Battery Alliance Pledges to End Child Labour
Pres_4	Aug 21	Circular Battery Value Chain Crucial to Africa's Energy Access Goals and Economic Development
Pres_5	Oct 22	Launch of Greenhouse Gas Rulebook
Pres_6	Nov 22	COP27: Global Battery Alliance Announces New Board of Directors
Pres_7	Dec 22	Launch of Child Labour and Human Rights Rulebooks
Pres_8	Jan 23	Global Battery Alliance Launches World's First Battery Passport Proof of Concept

Source: Own table

As this work chose to analyse publicly available data, it considered also analysing Twitter postings. The GBA joined Twitter in August 2021, and has posted 25 tweets since then. The subjects of these tweets were mainly to share articles of The Guardian or the WEF, to give updates on their work with reference to the GBA's website (e.g., Battery Passport or launch of GHG Rulebook), and to share upcoming GBA events (GBA's inaugural All Members Meeting; public event on product carbon footprints and digital product passports).[6] After reviewing these tweets, it can be stated that they do not provide any insight value for the analysis underlying this work. This is why the analysis conducted in chapter 5 does not consider Twitter postings.

The same applies for data on LinkedIn. Although the GBA is more active on this platform, the content of its postings was neglected after conducting a rough screening. On LinkedIn, the GBA takes the role as a distributor of industry news, i.e., sharing and re-posting articles from the IEA, WEF, Cobalt Institute, its members, or other relevant stakeholders, and also as an informant and promoter of industry-specific events, such as public discussions, battery conferences, expert forums, or dialogue sessions. Additionally, it gives updates on its work and shares voices of GBA members.[7] A more detailed analysis of the LinkedIn postings is not considered necessary due to the work's scope.

3.3 Data analysis

The documents shall be analysed thematically and on a meta-level. Because of its advantage of high flexibility regarding the type of research question, the type and scope of data, the themes

[6] https://twitter.com/GBA_Org (02.08.2023)

[7] https://www.linkedin.com/company/global-battery-alliance/ (02.08.2023)

of interest and the underlying frameworks (Kiger and Varpio 2020, 853), this work applies a thematic analysis to the publicly available documents. Thematic analyses provide a flexible method for describing data and interpreting it while generating codes or themes. It offers the advantage to be applicable to a wide range of research questions, designs, and conceptual approaches (Kiger and Varpio 2020, 847). In this work, the themes or codes are not content-based but aim at a higher level of abstraction, thus interpreting data qualitatively. The aim of the thematic analysis is to analyse the selected documents according to various aspects. To analyse the various dimensions of interest and to have a structured approach for this work, five analysis criteria were chosen:

(1) Foundation and rationale
(2) Mission and objectives
(3) Governance and decision-making
(4) Stakeholder participation
(5) Activities and implementation mechanisms

(1) Formation and rationale: This analysis criterion focuses on identifying the context under which the partnership was formed and the rationale its formation is based on. It serves to answer the following questions:

– When, where, and by whom was the GBA established?
– Why was it established and what justifies its establishment?

(2) Mission and objectives: The next analysis criterion analyses the goals of the GBA and draws on its publications and press releases to reveal its objectives, mission, and vision. It serves to answer the following questions:

– What and until when does the GBA seek to achieve?
– Does the GBA set itself specific, quantifiable goals?
– What guides the actions of the GBA?
– What values are the ambitions based on?

(3) Governance and decision-making: Analysing this criterion shows the set-up of the GBA, its organisational structure and internal rules. For this purpose, the analysis draws primarily on the GBA Charter. It serves to answer the following questions:

– How is the GBA structured as an organisation?

- What are the GBA's bodies and what are their tasks?
- Which stakeholders are represented in which bodies?
- Which internal regulations are in place?

(4) *Stakeholder participation:* This criterion points out the composition of the partnership and analyses the GBA's current participant structure according to sectoral and geographical distribution. It serves to answer the following questions:

- How can stakeholders become part of the GBA?
- Which stakeholders participate in the GBA?
- Which sectors do participants represent and to what extent?
- Which countries do participants represent?

(5) *Activities and implementation mechanisms:* The last analysis criterion reveals how and with which instruments the GBA seeks to achieve its objectives. It shows its action partnerships and other activities. It serves to answer the following questions:

- How does the GBA seek to transform the battery value chain?
- Which projects are currently implemented?
- Which products have already been developed?
- How do these products seek to contribute to the GBA's objectives?

These five criteria guided the document analysis. The analysis results in a thick description of the GBA, which is the starting point for an assessment of its role and legitimacy. Following Searcy's framework of MSI roles within GVCs (chapter 2.2.2), this work first attempts to classify the GBA accordingly. Second, applying a legitimacy concept from political science that has been operationalised by Mena and Palazzo (chapter 2.2.3), the GBA's input and output legitimacy is assessed.

3.4 Limitations

Although the research approach as outlined in this chapter is argued to be suitable for addressing the research question, several limitations have to be recognised. From a research design perspective, although full-pledged case studies have various advantages like allowing in-depths insights and capturing phenomena that may remain invisible with other approaches, they are limited with regards to generalizations. In this work, analysing the GBA does not allow to draw conclusions for other MSIs. What may turn out to be a success factor in this case, does not

automatically need to be applicable to other MSIs. Thus, the external validity is limited, as this is a common limiting factor in case studies.

From a methodology perspective, the document analysis contained only data that is self-reported from the GBA, thus, leading to certain bias. It can be strongly assumed that these documents are presented in a positive and optimistic light to promote the partnership. The contents of the publications can be distorted and may well be viewed more sceptically by uninvolved experts than it is the case in the GBA documents. The author of this work did not have access to insider documents and meeting minutes and did not participate in internal meetings and voting sessions, which would have allowed for more valid statements. Furthermore, the selection of documents for this thesis does not claim to be complete as there exist more publicly available data to the GBA on other websites like the WEF or industry-specific websites. It is also acknowledged that complementary interviews with GBA participants and battery value chain stakeholders would have been an appropriate way to gain more valid insights and a thicker foundation to assess the Alliance's role and legitimacy. Due to the limited scope of this work and as it sees itself as a primary analysis, however, interviews were not conducted.

4 Case study background: The EV battery value chain

The battery market is extremely dynamic and so is its value chain (Harrison and Ludwig 2021, 28; Boon-Brett et al. 2017, 5). Since suppliers are currently not yet fully established, more and more battery producing companies are entering the market and the predicted demand is above the current supply, the value chain is characterised by high competitiveness and dynamism (Coffin et al. 2021, 1f). Formerly independent industries, i.e., mining, and automotive battery cell production are combined, which results in a new conception of a value chain and a nascent ecosystem (Braun et al. 2019, 2; Beck et al. 2022, 204). In this context, Coffin et al. define it as "a relatively new area of global competition" (Coffin et al. 2021, 1). A detailed understanding of the battery value chains is still scarce, and many stakeholder interfaces and relationships are just emerging (Beck et al. 2022, 203).

The following parts describe the stages in an EV battery value chain, key environmental, social, governance and economic challenges and the respective regulatory environment. In outlining patterns of the battery GVC and regulations, this chapter intends to provide contextual insights into the case study.

4.1 Stages in the EV battery value chain

The value chain of EV batteries is characterised by multiple stages encompassing the spectrum from raw material mining to battery recycling and is currently geographically concentrated in a small number of countries all around the world (IEA 2022, 21; Beck et al. 2022, 204). It is a comparatively complex value chain and can be conceptualised in several ways (IEA 2022, 21; Beck et al. 2022, 204; Elkind et al. 2022, 8). A wide range of different material combinations, sizes, and designs lead to differences in the concrete conceptualisation of a value chain (Braun et al. 2019, 1f). Many stages occur on an application-independent level, especially on the upstream chain, and are highly geographically concentrated (Braun et al. 2019, 5). The following part demonstrates the value chain of batteries by exemplary focusing on the lithium-ion battery (LIB), which is currently the dominant version on the market (Intrator et al. 2022, 489).

A LIB basically consists of multiple cells with each cell comprising a cathode and an anode, which are separated by an insulation layer, the so-called separator, and soaked with a liquid electrolyte (Bridge and Faigen 2022, 3).

Mining	Raw material processing	Cell component production	Battery cell/ pack production	EV production	Recycling/ Re-use
Extraction of raw ores/materials required	Processing and refining of raw materials into precursors	Manufacture of cathode and anode materials, electrolytes, separators and casings	Fabrication of battery cells, integration into battery pack incl. electronics, sensors and battery management system	Manufacture of vehicle, integration of battery and subsystem hardware	Recovery of critical materials, cathodes, anodes; re-use of batteries in storage applications

Figure 4: Stages of a battery value chain
Source: own figure, based on IEA 2022

As figure 4 illustrates, the value chain of EV batteries begins with the mining stage. Batteries require a substantial number of raw materials, whereby the most important ones are lithium, nickel, cobalt, graphite, and manganese (IEA 2022, 21; Beck et al. 2022, 204). How, where, and by whom the raw materials are extracted depends largely on the raw material itself. The extraction of lithium, for example, is geographically concentrated in a few countries, namely Australia, Argentina, Chile, and China (IEA 2022, 21; Kieckhäfer et al. 2019, 293; Elkind et al. 2022, 6). In 2022, more than 90% of the global lithium production took place in these four countries, and it is estimated that more than 75% of the reserves lie there (USGS 2023, 109). While in the South American lithium triangle (Argentina, Chile, Bolivia) the mineral is

extracted from concentrated brines with salt water, it is mainly hard rock mined in Australia and China (IEA 2022, 21; Kieckhäfer et al. 2019, 293).[8] According to the IEA, around half of the global lithium production is concentrated on five suppliers, which are mainly specialised large chemical and lithium mining companies (IEA 2022, 12).[9]

Another key mineral for many of today's LIBs is cobalt. Similar to lithium, cobalt extraction is concentrated in a small number of countries, with the Democratic Republic of the Congo (DRC) accounting for up to 60% of the global cobalt production and more than 50% of global cobalt reserves (Elkind et al. 2022, 3). Other smaller cobalt producing countries include Russia, Australia, Canada, China, Cuba, Madagascar, the Philippines, and Zambia (Kieckhäfer et al. 2019, 293; Elkind et al. 2022, 3). Two forms of cobalt mining can be distinguished, namely industrial/large-scale mining, which is done by large and government-licensed entities, and artisanal and small-scale mining (ASM), which is carried out by individuals or groups, often informally and with unmechanised techniques (Elkind et al. 2022, 4). ASM makes up around 10 to 20% of the cobalt production in the DRC (IEA 2022, 22). The largest global cobalt producer is currently the Swiss company Glencore (IEA 2022, 22).

Nickel is another essential component of many LIBs and geographically more diversified (Kieckhäfer et al. 2019, 293). Indonesia, the Philippines, and Canada rank among the top three of producing countries (Kieckhäfer et al. 2019, 293). The mineral is found in two types of deposits, namely sulphide and laterite (IEA 2022, 21). Whereas sulphide deposits have higher grade nickel and are mainly found in Russia, Canada, and Australia, Indonesia and the Philippines are dominated by laterite deposits, which are of lower grade (IEA 2022, 21). The production of nickel is less concentrated than the lithium production, with currently nine companies supplying half of global production capacity (IEA 2022, 21f).[10]

Graphite and Manganese are further key battery materials. Manganese is geographically widely distributed, available at rather low cost, and currently not associated with a risk of shortage (IEA 2022, 22). The leading producing country, which also holds the most reserves, is South Africa, followed by Gabon, Australia, and China (USGS 2023, 115). Graphite, the key material

[8] Besides these two currently mainly applied extractions forms, innovative technologies create more sustainable and effective ways of extracting the mineral, such as direct lithium extraction processes (IEA 2022, 63).

[9] Major companies include Sociedad Química y Minera de Chile SA (Chile), Pilbara Minerals (Australia), Allkem (Australia), Livent Corporation (United States), and Ganfeng Lithium Co. (China) (IEA 2022, 21).

[10] Leading companies include Jinchuan Group (China), BHP Group (Australia), Vale SA (Brazil), Tsingshan (China), Nickel Asia Corporation (Philippines) and Glencore (Switzerland) (IEA 2022, 21f).

for the anode, can be either found naturally or produced synthetically (IEA 2022, 22). Although reserves are distributed around the world, China is currently the dominant producer country, with a production of around 65% of the world mine production in 2022 (USGS 2023, 83).

The quality, property, and costs of value chains are determined greatly in the upstream part of the chain when it comes to the mineral extraction and its processing (Braun et al. 2019, 2). As batteries require materials of high purity, the next stage in the value chain is raw material processing whereby raw materials are converted into usable form (Elkind et al. 2022, 8). During industrial processes with heat and chemical treatment, the raw ores are refined into the required chemicals like lithium carbonate and hydroxide, or cobalt and nickel sulphate (IEA 2022, 22). The raw material processing stage is highly concentrated, both in a geographical sense and within a smaller number of companies (Kieckhäfer et al. 2019, 293). For instance, around 75% of the worldwide production of lithium carbonate and hydroxide is done by only five companies (IEA 2022, 22). Refining operations are often carried out by the same companies as the minerals' extraction as it is the case for the Chinese mining company Ganfeng or are carried out by processing companies that are mainly based in China (IEA 2022, 23). While the extraction of some minerals, like Manganese, is geographically spread over several countries, the processing is mainly concentrated in China. To name an instance, the country currently produces around 90% of the high-purity manganese sulphate (IEA 2022, 23). The added value in the processing stage is typically much higher than in the mining stage and further increases in the downstream chain (European Commission 2021, 77).

The precursors materials generated in the raw material processing stage are used for the cell component production. In this value chain stage, cathode and anode materials, electrolytes, separators, and casings are produced by advanced materials chemistry and engineering (IEA 2022, 23). Syntheses are used to create active materials for the cathode and anode. Regarding the cathode, the leading active minerals are lithium cobalt oxide, lithium nickel manganese cobalt oxide, lithium nickel cobalt aluminium oxide, and lithium iron phosphate. For this, only seven companies – mainly based in China – account for more than half of the global cathode material production capacity (IEA 2022, 23). Anode material production is dominated by graphite and requires sophisticated – but established – processing (IEA 2022, 23). It is even more concentrated, with six Chinese companies accounting for two-thirds of the global production capacity (IEA 2022, 23). The concentrated nature of production is also the case for separators, microporous membranes, and for the electrolytes, which are produced by synthesis

and mixing (IEA 2022, 24). A key characteristic in this value chain stage is that the majority of involved companies are specialised in only producing these elements (IEA 2022, 24).[11]

Following the cell component production, battery cell and pack production takes place. Battery cells are produced in a two-stage process covering electrode manufacturing and cell fabrication (IEA 2022, 24). Through energy-intensive processes and by applying mature technologies, cathode and anode active materials are mixed and electrodes produced, which are then further processed to cells (IEA 2022, 24). These steps are highly capital-intensive and characterised by a concentration, with three companies based in Asia accounting for 65% of global production in 2021 (IEA 2022, 24).[12] Cells are further assembled in module frames, and by integrating modules, the battery management system, electronics, and sensors manufactured into a final housing structure, which creates the battery pack (IEA 2022, 24). This step is either done by the cell manufacturer itself or by the vehicle maker (IEA 2022, 24) and is often done in large-scale facilities, so-called gigafactories (Bridge and Faigen 2022, 5).

The next stage within the EV battery value chain is the EV production, in which the EV manufacturer integrates the battery pack into the vehicle. As various upstream stages, this stage is also concentrated. In 2021, Tesla, Volkswagen Group, and BYD were the largest producers of EVs and accounted for a third of global EV production (IEA 2022, 25).

The battery chain concludes with the recycling or re-use stage. Due to safety risks and limited performance, batteries are dismantled from the EVs when their usable capacity reduces to 70 to 80% (Kumar et al. 2021, 2). They can be refurbished for other purposes, such as stationary storage (IEA 2022, 25). To this end, the battery pack needs to be dis-assembled, tested, and re-packaged (IEA 2022, 25). Although re-use offers the potential of additional value creation, it is currently associated with high costs resulting from the logistic expenditure, the batteries' testing and the physical new assembly and packaging, as well as with economic and regulatory challenges (IEA 2022, 25). Regarding the recycling, three methods, namely pyrometallurgy, hydrometallurgy, and direct recycling, can be distinguished (IEA 2022, 25). More than half of the current capacity for battery recycling is located in China, and the recycling is based on the

[11] Leading companies for cathode production include Sumitomo (Japan), Tianjin B&M Science and Technology (China), Shenzhen Dynanonic; (China), and Ningbo Shanshan (China). For anode production, Ningbo Shanshan (China), BTR New Energy Materials (China), and Shanghai Putailai New Energy Technology (China) are the key companies. Separators are mainly produced by Zhangjiagang Guotai-Huarong New Chemical Materials (China), Shenzhen Capchem Technology (China), and Ningbo Shanshan (China) (IEA 2022, 23f).

[12] The top three producers of battery cells in 2021 were CATL (China), LG Energy Solution (Korea) and Panasonic (Japan) (IEA 2022, 24).

reclamation of expensive minerals, such as nickel and cobalt, applying a mix of pyrometallurgy and hydrometallurgy (IEA 2022, 25). The recycling is mainly done by independent companies, however, more and more operated by original equipment manufacturers (OEMs), battery producers, miners, and processors, and leading to the creation of joint ventures for re-use and recycling initiatives (IEA 2022, 26).

In a nutshell, the global battery value chain is shaped by complexity and various stages dispersed all around the world. Bridge and Faigen summarise:

> *"Battery manufacturing is a classic 'global' assembly process that is organisationally and geographically distributed. A range of different material transformations and suppliers need to be co-ordinated for battery production to occur. Significantly, these techno-material steps are not all integrated within the structure of a single firm but involve co-ordination among a range of actors. The different stages of production are connected materially by physical trade of materials and components, and financially by cross-border and cross-sectoral investment flows. This produces a complex geography that is not reducible to international material flows or the national location of production."* (Bridge and Faigen 2022, 6)

A trend goes towards the localisation of battery value chains (Harrison and Ludwig 2021, 102). Aiming to ensure supply and to economically benefit from value creation, producers, and suppliers – pushed by governments – raise investments in order to increase the capacity of regional battery production (Harrison and Ludwig 2021, 102). For instance, leading battery manufacturers, such as the Asian players LG Energy Solution, Panasonic and CATL, are establishing production bases in Europe and North America (Harrison and Ludwig 2021, 13). Also, automotive manufacturers apply different business models in order to avoid supply bottlenecks, including building joint ventures with battery component suppliers, looking at vertical integration, and concluding purchasing agreements. In this way, they intend to get involved in upstream processes and gain more control in the value chain aiming at being able to better prepare and respond to chain disruptions (Harrison and Ludwig 2021, 13). Bridge and Faigen identified a "structuring tension currently shaping battery production networks between, on the one hand, continued efforts to reduce cost which drives a form of 'globalization'; and, on the other hand, efforts by states to regionalise and localise supply chains" (Bridge and Faigen 2022, 14).

Furthermore, Bridge and Faigen find evidence of increasing vertical integration and distinguish between integration through acquisition, thus, bringing certain processes in-house, and offtake agreements with downstream buyers (Bridge and Faigen 2022, 12). Vertical integration is a

strategic response that extends the sphere of influence on the whole manufacturing process and hence mitigates physical supply risks and commodity price volatility (Bridge and Faigen 2022, 12). In Asia, value chains are already vertically integrated to a significant extent, while manufacturers in North America and Europe establish similar structures (Bridge and Faigen 2022, 12). The emergence of gigafactories is a visible consequence of such strategic decisions and macroeconomic developments (Bridge and Faigen 2022, 12). The Chinese lead firm BYD, for instance, produces EVs, their key components like battery cells and also owns upstream operations such as mineral extraction and refining (Bridge and Faigen 2022, 12). Actors in the midstream value chain adopt similar strategies. Mergers between miners and refiners of lithium, nickel, cobalt, and manganese offer the advantage of mitigating supply concerns for refiners and increasing value, returns and market access for miners (Bridge and Faigen 2022, 12). The South-Korean conglomerate POSCI, for instance, got engaged with leading lithium producers in order to produce lithium hydroxide and carbonate (Bridge and Faigen 2022, 12).

4.2 Key concerns and challenges in the battery value chain

Actors from the scientific, civil, private, and public sector agree that battery value chains are associated with significant sustainability concerns (Harrison and Ludwig 2021, 13; SOMO 2023). The following part reveals these in short from a multidimensional perspective – containing economic, environmental, social, and governance aspects – all these aspects being highly interlinked.

Economic perspective

One major challenge for the LIB production from an economic perspective is the uncertainty in demand and variability in battery material demand estimations (Ghadimi et al. 2022, 3). While the original need for certain raw materials emerged from the consumer electronics industry and demand estimations are relatively reliable, demand estimations for EVs and stationary energy storage systems are highly speculative (Ghadimi et al. 2022, 3).

Apart from that, another major challenging factor is the dependence on raw materials. The production of LIBs depends highly on raw materials and their supply is associated with high risks of shortages and price volatility (Ghadimi et al. 2022, 2). The expected increase in demand for LIBs requires mining capacities to upscale enormously, which comes along with concerns over bottlenecks in supply (Beck et al. 2022, 204). Especially so-called critical raw materials, which have a high economic importance and a high supply risk, can be a limiting factor in LIB

production and its cost-efficient supply a challenging factor (Beck et al. 2022, 205; Boon-Brett et al. 2017, 7). Even when the raw material itself is not associated with scarcity, it remains uncertain whether the mining industry is able to scale up production in short-term to meet global supply demands (Ghadimi et al. 2022, 2f).

Environmental perspective

The environmental problems resulting from battery production and its value chain are evident both globally and locally (Butcher et al. 2022, 680). Especially in raw material mining, the environmental impacts are tremendous. For instance, due to its water-intensive process, mining of lithium comes along with water challenges for local communities. In areas in and around lithium extraction in the Lithium Triangle, ground water and brine levels drop, which results in the decrease of lower water table and challenges to local communities regarding access to potable water. Apart from that, the water quality suffers from toxicity and higher salinity (Butcher et al. 2022, 681). Besides water issues, the mining activities and especially the required infrastructure affects biodiversity and causes harm for animals by disrupting their habitats and migration routes. The (chemical) waste that comes as a by-product of lithium production is another challenge for the local environment (Butcher et al. 2022, 682). Hydrological balances and climate change assessments provide evidence that lithium production heightens the variability of precipitation and causes temperature increases, thus has effects on climate change (Butcher et al. 2022, 683).

Similar consequences are observed for other raw materials that are required for battery production. For instance, nickel extraction in Indonesia is associated with land-grabbing and environmental destruction, coal soot and hot water in the fishing hamlet, deforestation, pollution of rivers with toxic substances and, as a consequence, loss of income for local communities (Maulia 2022). The DRC, by far the largest mining country for Cobalt, suffers from the loss of vegetation, pollution of water and air, and reduced access to water (De Haan et al. 2016). Apart from that, the disposal of batteries is associated with toxicity impacts (Beck et al. 2022, 205).

Another challenging aspect is the high energy demand to produce batteries. Lifecycle assessments show that especially upstream activities, i.e., mining extraction/processing and cell manufacturing, consume a large amount of energy, which is often taken from fossil fuels like gas or coal, thus negatively affecting the carbon footprint (Ghadimi et al. 2022, 4f; Butcher et al. 2022, 681, 683). Hence, the batteries' GHG emissions and environmental impacts depend

largely on the energy mix and technology used, demanding energy optimisation solutions and technological advances (Ghadimi et al. 2022, 5).

Social perspective

Environmental issues within the battery value chain are directly linked to social issues. Again, the highest risks occur in the raw material stages (mining/processing), mostly researched for lithium extraction in South America and for cobalt extraction in the DRC (Beck et al. 2022, 210). The industry is characterised by violations of labour and human rights, precarious working conditions, and forced labour (Beck et al. 2022, 205). For instance, ASM in the DRC records high death rates, child labour in mining sites, and human rights abuses (De Haan et al. 2016, 37; Casas et al. 2018, 495).

Mining practices come along with significant health impacts for workers as well as local communities due to being exposed to toxic hazards. In the case of the DRC, "people are exposed to fumes, dust, noise, and effluent water generated by the mines, trucks, and processing facilities" (De Haan et al. 2016, 4). Researchers find a "highly significant correlations between the degree of cobalt enrichment of surface dust and cobalt levels in urine and blood of adult and children residents" (Casas et al. 2018, 499). Air, soil, and water pollution in these regions is proven to result in a higher risk of lung diseases, oxidative stress, and even DNA damage, which is especially harmful for children (Casas et al. 2018, 499; De Haan et al. 2016, 4).

Communities, in particular indigenous people, are highly affected by mining operations, not only with regard to health risks but also with regard to the disrespected autonomy over their territories (Dorn and Gundermann 2022, 342). For instance, water challenges in the lithium triangle lead to a highly restricted access to potable water for communities adjacent to mining sites and mining land use leads to involuntary displacement of local residents. Forced relocation often goes along with inadequate compensation and exposes already economically vulnerable people to additional risk (De Haan et al. 2016, 5). The loss of livelihoods affects farming and livestock activities and consequently results in income losses (De Haan et al. 2016, 4).

Social conflicts associated with mining activities are evident in many countries and can be traced back to inadequate social participation and insufficient consultation. In order to reduce social conflicts or adverse perceptions, open dialogue about concerns, participatory processes, a shared vision, and benefits for companies, governments, and communities alike are necessary and can enhance social acceptance and deliver a social license to operate (Beck et al. 2022, 683f).

Another critical issue is the lack of freedom of association and collective bargaining restrictions observed in various countries and stages involved in the battery production (Beck et al. 2022, 208). Furthermore, occupational health and safety (OHS) issues are major concerns in the production stage of the battery value chain (Beck et al. 2022, 205). On the battery consumer side, data security and product safety are key social concerns (Beck et al. 2022, 210).

Governance perspective

Regarding the governance perspective, it is important to mention that upstream stages within the battery value chain, particularly mining and raw material processing, often take place in countries with high political instability and high levels of corruption and bribery (Beck et al. 2022, 205). Cobalt mining in the DRC is frequently of informal nature and operated illegally without valid mining permits (Casas et al. 2018, 495; 501). Access to and control over resources are shaped by power struggles. Butcher et al. note that the "management of mineral royalties and issues around their rates and distribution to local communities is linked to challenges with gaining a social license to operate" (Butcher et al. 2022, 687).

Another challenge revolves around the high number of end-of-live LIBs, whereby currently, all three options – disposal, reuse, and recycling – are associated with challenges, starting with the dismantling of the EV, the collection and the transportation, which requires technical, personnel, logistical, and time resources (Ghadimi et al. 2022, 5). Besides problematic stockpiling and landfilling, disposal "leads to material loss, increase environmental risk and health hazards, and is a waste of economic opportunity" (Ghadimi et al. 2022, 5). Recycling is complicated due to non-standard products and because of the necessity of pre-treatment in the recycling process, as they vary enormously in their health and residual capacity (Boon-Brett et al. 2017, 55; Babbitt 2020, 1214). It is costly due to non-existent efficient, standardised collection, logistic and processing infrastructure and associated with safety concerns when stockpiling batteries, and health risks due to incorrect handling (Ghadimi et al. 2022, 5; Beck et al. 2022, 204). Thus, despite high potential for circular economy solutions for end-of-life LIBs, their widespread implementation is still limited (Beck et al. 2022, 204; Babbitt 2020, 1214). Chirumalla et al. summarise in this regard that the change from a linear to a circular business model is complicated "due to the complexity, business uncertainties, policy weaknesses, gap between the concept and its practical implementation, and many unanswered questions" (Chirumalla et al. 2022, 569).

Moreover, the current regulatory framework is very fragmented and existing frameworks often only address specific aspects, leading to confusion with regards to compliance with standards (Butcher et al. 2022, 687). Additionally, Butcher et al. observe that – for lithium extraction in the lithium triangle – the regulatory framework "cannot address sustainable development sufficiently" (Butcher et al. 2022, 690). Other governance issues refer to the deficit of sustainable management and risk management systems (Beck et al. 2022, 208).

Assessing the impacts of batteries is challenged by data scarcity and a lack of value chain transparency (Ghadimi et al. 2022, 4). For instance, lifecycle assessment studies often lack the integration of various mines and production sites (Ghadimi et al. 2022, 4). The newly created ecosystem for LIBs involves a wide range of stakeholders requiring exchange systems and interfaces that are not yet fully established (Beck et al. 2022, 211). Barriers for information gathering and information sharing are diverse (Beck et al. 2022, 212f). Besides data availability and validity concerns, a lack of upstream and downstream transparency, non-uniform understandings of standards and requirements, missing of data gathering, aggregation, and exchange technologies are still critical factors associated with this (Beck et al. 2022, 212f). Moreover, stakeholders can be unwilling to share (confidential) information due to the risk of losing market opportunities and governance do not have aligned rules of engagement (Beck et al. 2022, 212f). Beck et al. state with regard to the LIB supply chain (LIBSC) that:

> *"Particularly upstream stakeholders pointed out that transparency often only goes one way when powerful OEMs request data but are unwilling to share themselves. Moreover, LIBSC representatives acknowledged that current governance structures do not suffice to implement holistic sustainability assessment. For instance, the LIBSC ecosystem has not yet agreed on consistent rules and ways of interaction, which makes it cumbersome to align on information sharing practices with individual exchange partners one by one. Due to confidentiality concerns, particularly actors owning crucial intellectual property (such as battery (component) producers) are hesitant to share comprehensive data sets with other LIBSC actors or third parties if no transparent, permissioned data exchange structure is in place."* (Beck et al. 2022, 211)

4.3 Regulatory environment and the need for cooperation

The EV battery value chain is embedded in a regulatory environment that encompasses several regulatory actors from the private, social, and public sector, from the local and national to the international level. This chapter gives respective insights while not claiming to be exhaustive, instead it focuses on selected regulatory instruments.

Private regulatory mechanisms

As firms in the battery sector are under enormous pressure to take social and environmental responsibility and to mitigate risks along their value chain, companies develop voluntary self-regulating mechanisms for due diligence. For example, CATL, the largest EV battery producer in 2022, anchors in its Sustainable Supply Chain Management Policy the mission

> *"to build a sustainable ecological supply chain system, adhere to ethical and compliance management, continuously strengthen the communication of stakeholders, promote the harmonious development of the supply chain, ensure the sustainable development of the supply chain, and benefit our customers and society."* (CATL 2022a)

For this, CATL incorporates international norms such as Social Accountability 8000 International standard (SA8000), Universal Declaration of Human Rights, ISO45001, and the Electronic Industry Code of Conduct. Acknowledging the potential negative impacts of the mining industry, CATL commits to adopt the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict Affected and High-Risk Areas and to incorporate the Guidance in its contracts with mineral suppliers. In the case of child labour, life-threatening OHS issues, or infringement of land rights in its supplier's activities, CATL commits to suspend or discontinue these relationships (CATL 2022b). Following the OECD Due Diligence Guidance, the global player also established a grievance mechanism (CATL 2021). Moreover, it developed a Due Diligence Management Process of Responsible Mineral Supply Chains containing risk identification and evaluation, risk management, supervision and audit and information disclosure (CATL 2022c). In November 2022, CATL launched the so-called CREDIT transparency audit program on sustainable value chain that includes 135 ESG indicators and applies to all direct and indirect suppliers of CATL (CATL 2022c). On its website, CATL explains:

> *"The "CREDIT" program is the industry's first audit toolkit created by CATL for the lithium-ion battery supply chain based on multiple standard system frameworks and the actual situation of the industry chain. The big data-based "CREDIT" comprehensive evaluation is able to calculate indexes about the sustainability performance of enterprises across the supply chain, thus helping them explore their paths towards sustainability. CATL hopes that more partners will join in to realize the efficient utilization of resources in the entire supply chain and reduce their impact on the environment together, so as to enhance the overall competitive edge and contribute to the high-quality development of the new energy industry*." (CATL 2022d)

Another example for self-regulating private instruments is (strategic) partnerships between firms. For example, CATL cooperates with BASF regarding cathode active materials and

battery recycling with the objective of supporting a sustainable battery value chain and both companies' global carbon neutrality goals (BASF 2021).

Public regulatory mechanisms

On the EU level[13], the battery value chain is embedded in an extensive regulatory framework. A Regulation soon to enter into force is dedicated solely to the battery and aims to strengthen the EU domestic market, promote circularity, and reduce environmental and social impacts at all stages of the battery life cycle.[14] It follows the EU Battery Directive 2006/66/EC that only addressed the end-of-life stage. The new Regulation will apply to all battery types, including portable batteries, batteries for light means of transport, EV batteries, industrial batteries, and batteries for starter, lighting, or ignition, independent of their weight, volume, type, or other technical characteristics. Besides safety, labelling and transparency requirements, the new battery Regulation defines sustainability and due diligence requirements. Economic operators with an annual net turnover of more than 40 million EUR that produce or place batteries on the EU market, which contain cobalt, lithium, natural graphite, and/or nickel will be obliged to comply with due diligence requirements for social and environmental risks (see Appendix 1) (European Commission 2023).

The Regulation requires economic operators to develop due diligence policies and to define them as a top management priority (Article 45b (c)). Due diligence must be incorporated in contracts with suppliers and a grievance system including an early-warning risk-awareness system and a remediation mechanism must be established (Article 45b (e)). A risk management has to identify and assess risks along the entire value chain and risk strategies have to be designed and implemented in order to avoid, mitigate, and address adverse impacts (Article 45c). The requirements also dictate third-party auditing (Article 45d) and disclosure of information on due diligence policies (Article 45e). The Regulation goes so far as to allow the

[13] This work chose to focus on the EU Battery Regulation due to recent developments and its battery-specific character. It should be noted, however, that the EU Battery Regulation is only one example of other existing public regulatory mechanisms.

[14] The EU Commission published its draft in December 2020 after extensive consultation rounds with a wide range of stakeholders. The Committee on the Environment, Public Health, and Food Safety (ENVI) then debated and came to an agreement in March 2022. After four rounds of trialogues between Commission, Parliament and Council of Ministers, a provisional agreement was reached in December 2022. On 14.06.2023, during the planetary sitting, the EU Parliament agreed with a large majority on the new battery Regulation. The Regulation has to be confirmed by the representation of the member states. It is expected that it will come into force at the beginning of 2024 (European Parliament n.d.).

market surveillance authority to require the product to be removed from the market if it fails to comply (Article 69a) (European Commission 2023).

Furthermore, the Regulation requires that, for the sake of transparency, light means of transport batteries, industrial batteries with a capacity of 2kWh, and EV batteries shall have a digital battery passport that informs the public, remanufacturers, second-life operators, and recyclers about the health state, carbon intensity of its manufacturing process, the origins of materials, and, amongst others, the composition of a battery. The provided information in the electronic record shall be tailored according to the recipient, for example providing the public with information on the battery's sustainability requirements and sensitive commercial data only for those that need this information. The economic operator that places the battery on the market is responsible for the compliant provision of the digital battery passport (Article 65) (European Commission 2023).

The EU Battery Regulation refers to a wide range of international instruments that also cover social and environmental risks along the value chain. These include the International Bill of Human Rights, the UN Guiding Principles for Businesses and Human Rights, the OECD Guidelines for Multinational Enterprises, the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, the OECD Due Diligence Guidance for Responsible Business Conduct, and the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (European Commission 2023).

Besides the Battery Regulation, financial market rules on disclosure related to ESG as well as trade rules also significantly shape the battery value chain, e.g., through local content requirements and social clauses (Bridge and Faigen 2022, 13).

Social regulatory mechanisms

Stakeholders from the social sector also function as regulatory actors to reduce environmental harm and human rights abuses in the battery value chain. For instance, Amnesty International can be named here. The NGO has developed the so-called "Principles for Businesses and Governments in the Battery Value Chain" (see Appendix 2) that are supported by a wide range of other human rights and environmental organisations, e.g., Bread for All, Caritas Zambia, Diakonia, Friends of the Earth Europe, Germanwatch, PowerShift, and the Deep Sea Mining Campaign. The principles can be seen as an instrument to trigger positive change in the battery value chain by formulating demands to businesses and governments. In their guideline,

Amnesty and Co demand businesses to enhance transparency in their chains, to consult with communities that are negatively affected by their operations, and to reduce the battery carbon footprint to no more than 30 kg CO2 per kWh per battery produced. In order to enhance environmental and human rights standards, Amnesty and Co demand businesses to comply with ILO labour standards and to adhere to the UNGPs and to those set by EITI. On the government side, Amnesty demands legally required due diligence obligations, the provision of guidance on mineral- or location-specific risks, enhancing labour and environmental protection laws and enforcing higher lifetime for batteries (Amnesty International 2022, 1-12).

The need for cooperation

Against the backdrop of the highly interconnected value chain connecting different countries and continents, voices arise that a strengthened cooperation between producer and consumer countries and between a broad range of stakeholders is necessary to enhance environmentally and socially sustainable practices (IEA 2022, 4; Ghadimi et al. 2022, 3; 9; Mayoral 2022, 16). For instance, Chirumalla et al. claim that

> *"stakeholders in the EV battery value chain need additional support in the early phases of collaboration, where they can clearly see and map the business opportunities and benefits of circularity through visualization, thereby reducing cultural and institutional challenges for the transition to a circular business model"* (Chirumalla et al. 2022, 570)

and note that

> *"moving toward sustainability and developing circular business models require a multi-stakeholder perspective, including collaboration, cooperation, and communication, in which value can be created, delivered, and captured."* (Chirumalla et al. 2022, 578)

Intense cooperation between stakeholders has the potential to overcome information sharing and gathering barriers, which is necessary to conduct holistic sustainability assessments for the battery value chain and ensure reliability and validity. Therefore, for instance, close cooperation and interlinkages are a prerequisite for reliable and valid battery passports that aim for product transparency (Beck et al. 2022, 214). Beck et al. also outline that extensive consultation and information sharing among LIB value chain stakeholders is essential for "developing meaningful legislation" (Beck et al. 2022, 215).

Calls for close stakeholder engagement and exchange of information also exist for certain upstream stages, particularly in the mining sector. Therefore, referring to socio-ecological concerns in the cobalt mining, Baumann-Pauly concludes that "companies in the battery supply

chain, the DRC government, other governments, and other stakeholders need to come together to develop common standards on mine safety and child labor" (Baumann-Pauly 2023, 13). With regard to ESG concerns in the lithium triangle, Bucher et al. propose that a

> *"sustainable perspective for lithium extraction in the region requires continuous and informed dialogues among government, industry and community stakeholders and participatory processes that reduce the asymmetries of power and knowledge."* (Butcher et al. 2022, 695)

In order to move towards sustainable lithium value chains and assess the sustainability performance, consistent data across different stakeholders is necessary. This requires transparency, which can be achieved by strengthened collaboration and exchange of information. Also, standards to measure and assess social and environmental risks should be developed in a cooperative way with engagement of industry, government, communities, and other value chain actors. Bucher et al. put special attention to the need of societal participation, especially local communities, and indigenous people. A collective vision of sustainable development demands that their needs and interests are appropriately taken into consideration in open and ongoing dialogues and permanent reflections (Butcher et al. 2022, 693f). Summarising, Butcher et al. conclude that

> *"effective and inclusive multistakeholder participation is essential to enhance transparency, accountability and sustainability in a holistic way. The participatory processes and society perceptions and expectations are important components of such a holistic approach."* (Butcher et al. 2022, 691)

4.4 Main conclusions

This chapter revealed the complexity of EV battery value chains, which consist of various steps from mining to recycling and involve business activities all around the world. The boom of battery demand is clearly linked to severe economic, environmental, social, and governance challenges with local and global impacts. The risks and costs resulting from battery production are not shared equally, as most of them occur in the mining and raw materials processing stages that are highly concentrated in a few countries (e.g., DRC, Chile), which further cements social-ecological inequalities (Dorn 2021, 14). Various regulation mechanisms from private, public, and social actors address these issues, however, due to the overall weakness and fragmentation, they fail to mitigate negative externalities from battery value chains sufficiently. This is why voices arise for a strengthened cooperation and interaction between stakeholders.

The GBA can be defined as an exemplary approach for stakeholder cooperation along the global battery value chain and is analysed in depth in the following part.

5 Case study: Analysing the Global Battery Alliance

The Global Battery Alliance (GBA) is currently the world's largest partnership in the battery value chain sector (Pres_8). The objective of this chapter is to gain an in-depth understanding of what the GBA is, who it is, what it seeks to achieve, and how it works towards its objectives. Therefore, an analysis of the GBA is conducted. Five analysis units structure this part and help to understand the various dimensions of the partnership: (1) formation and rationale, (2) mission and objectives, (3) governance and decision-making, (4) stakeholder participation, and (5) activities and implementation mechanisms.

5.1 Formation and rationale

The GBA was launched on 19th September 2017 on the initiative of the WEF during the Sustainable Development Impact Summit, which took place in New York from 18th to 19th September 2017 (Pres_1). It became independent in 2021 when it was incorporated as a not-for-profit organisation located in Belgium. The multi-stakeholder partnership brings together a diverse set of stakeholders along the entire global battery value chain – ranging from businesses, international organisations and NGOs to academia and research institutes, and covering the mining, chemical industries, manufacturing, electronics, automotive, and energy sector. It defines itself as “pre-competitive, technologically and company agnostic” (Publ_19).

The GBA was founded as a response to the rapidly growing battery market, especially induced by enormous demand for EVs and renewable energy storage systems. Besides the high market potential, the battery industry is associated with severe human and environmental costs (e.g., child labour, hazardous working conditions, soil, water, and air pollution as well as environmental destruction). The rationale behind the GBA’s foundation is the assumption that a transformation of the battery value chain is necessary in order to drive sustainable development, climate change mitigation, a low-carbon economy, and the clean energy revolution (Publ_1, 5, Pres_1).

In September 2019, the GBA and the WEF published an insight report called “A Vision for a Sustainable Battery Value Chain in 2030” (Publ_1). In this document they outline the urgent need for action in the transport and power sector in order to realise the 2°C goal defined in the

Paris Agreement to limit the consequences of climate change. Considering the battery as a key technology that can contribute to sustainable development and to climate change mitigation, the GBA sees a vehicle in it to drive GHG neutrality in both the transport and the power sector. The report highlights the salient function of batteries by stating that

> "*batteries could enable 30% of the required reductions in carbon emissions in the transport and power sectors, provide access to electricity to 600 million people who currently have no access, and create 10 million safe and sustainable jobs around the world*." (Publ_1, 5)

The salient function of batteries lies on the premise that "the right conditions [are] in place" (Publ_1, 5). The GBA expresses the need for a systemic approach that covers both the economic, the social, and the environmental dimension and identifies key conditions to mitigate current challenges from the mining to the battery use and end-of use stage. According to the GBA, these challenges require collaborative efforts along the entire value chain (Publ_1, 5). Respectively, the GBA seeks to provide a "platform to enable this collaboration" (Publ_1, 5).

Benedikt Sobotka, Chief Executive Officer of the Eurasian Resources Group, explains in 2017 that the Alliance will have a "critical role to play" (Pres_1) in moving towards child labour elimination in cobalt mining. When launching the guiding principles of the GBA in 2020, Dominic Waughray, Managing Director of the WEF, argues:

> *"We all need batteries to power the clean revolution. However, we must ensure violations of human rights do not occur anywhere in the value chain, that local communities benefit and that battery production is sustainable. These guiding principles are an important first step to build a value chain that can deliver on this promise while supporting societies and economies at the same time."* (Pres_2)

Hence, the rationale behind the GBA's field of action arises out of the battery's potential as a de-carbonisation instrument, enabler for energy transition, a job creator, and a driver for economic value (Publ_1, 6). Its potential, however, is deemed to not being realised if the chain develops along its current trajectory. Acting now is required to not run out of carbon budget before 2035, to mitigate social and environmental impacts, and to make use of the environmental, social, and economic benefits of the battery value chain (Publ_1, 6). A transformation of the battery value chain is necessary and requires "policy reform, corporate commitments, and a community-based development strategy." (Pres_3, Stephen D'Esposito, CEO of Resolve). Also, the private sector is stated to look increasingly for guidance and best practices on how to procure raw materials responsibly (Pres_2, quote of Rob Lederer, Executive Director of Responsible Business Alliance).

Keeping the vital role of batteries in mind, the GBA seeks to shape the emerging value chain in the right direction, strengthen environmental, social, and governance obligations, set benchmarks, create transparency, and track and validate performance while also protecting proprietary interests (Publ_1, 11; Publ_4). Summarising, the GBA states:

> "*Batteries will be indispensable for the green energy transition and the achievement of the Paris goals. Throughout its full lifecycle – from raw material, to production processes, use and recycling – the battery value chain has the potential for both harm and good. The GBA seeks to identify and address harmful risks, and maximize the potential of batteries to spur sustainable development."* (GBA 2023b)

5.2 Mission and objectives

The GBA defines itself as a "multi-stakeholder, pre-competitive partnership that seeks to accelerate the scale-up of the battery value chain sustainably and responsibly" (Publ_18) with the objective to realise its vision for 2030, the vision "that batteries power sustainable development" (Publ_18). Its mission is threefold: First, the GBA aims for "generation, mapping and pooling of information", thus give insight, second, it aims to "promote informed dialogue and wide-ranging partnership", thus create partnership, and third, "catalyse, accelerate and scale-up collaborative action" (Publ_18), thus foster action.

The vision is formulated as moving towards a "circular battery value chain as a major driver to meet the Paris Agreement" (Publ_1, 6) and contains three pillars: emission reduction, job and value creation, and human rights safeguarding and development in line with the UN SDGs. The GBA underlines its vision with specific numbers. Referring to the battery's role as a major driver for achieving the Paris Agreement, the GBA seeks to reduce emissions in the transport and power sector for 30% and in the battery value chain for 50%. Regarding the vision to create new jobs and economic value, the ambition is to create 10 million additional jobs, 150 billion USD economic value, and a 35% increase in battery demand. Aiming at safeguarding human rights and economic development in line with the UN SDGs, 600 million additional people shall have access to electricity and safe working conditions, and anti-corruption practices and the elimination of child/forced labour are targeted (Publ_3, 3).

In 2020, 42 organisations including businesses from the automotive, mining, chemicals, and energy sector defined ten principles for a sustainable battery value chain that guide the actions of the GBA, shall be pursued by the partnership, and that refer to three main objectives:

First, the GBA aims to push circularity in the battery value chain as aligned with the Paris Agreement. In order to move towards this objective, first-lifetime batteries shall be maximised in their productivity, their second life use shall be productive and safe, and battery materials shall recover and be recycled in a sense of circular economy. Second, the GBA thrives for a low-carbon value chain, job creation, and additional economic value. Besides enhancing transparency in GHG emission and decreasing it, the partnership advocates for the use of renewable energy, supports the creation of high-quality jobs, and promotes skills development. Third, the GBA envisions the strengthening of human rights and economic development aligned with the UN SDGs. One pillar for this objective is the elimination of child and forced labour, the strengthening of communities and the advocacy for the human rights of employees along the whole battery value chain. Further, pollution shall be minimised in order to protect public health and the environment. Additionally, the GBA aims at strengthening responsible trade and anti-corruption practices, creating local value, and diversifying the economy (Pub_2; Pres_2). The following table lists the ten guiding principles.

Table 4: GBA guiding principles

Establish a circular battery value chain as a major driver to achieve the Paris Agreement	
(1)	Maximizing the productivity of batteries in their first life
(2)	Enabling a productive and safe second life use
(3)	Ensuring the circular recovery of battery materials
Establish a low-carbon economy in the value chain, create new jobs and additional economic value	
(4)	Disclosing and progressively decreasing greenhouse gas emissions
(5)	Prioritizing energy efficiency measures and substantially increase the use of renewable energy as a source of power and heat when available
(6)	Fostering battery-enabled renewable energy integration and access with a focus on developing countries
(7)	Supporting high quality job creation and skills development
Safeguard human rights and economic development consistent with the UN Sustainable Development Goals	
(8)	Immediately and urgently eliminating child and forced labour, strengthening communities and respecting the human rights of those employed by the value chain
(9)	Fostering protection of public health and the environment, minimizing and remediating the impact from pollution in the value chain
(10)	Supporting responsible trade and anti-corruption practices, local value creation and economic diversification

Source: GBA 2023a

It is argued that these guiding principles lead to more alignment among key players in the battery value chain and create the foundation for a transparent accountability system (Pres_2). Already when publishing the guiding principles in 2020, the GBA called for endorsement of these guiding principles by additional organisations along the battery value chain to participate and adapt them in order "to realize the full ambition of these principles" (Pres_2).

Besides these guiding principles, the GBA's action shall be guided by certain values, which include innovation, respect, common good, long-term sustainable value creation, impact, transparency, accountability, integrity, and collaboration. The following figure briefly describes these values.

Innovation	**Respect**	**Common good**
promote and demonstrate innovative value chain partnerships in support of inclusive and sustainable economies	promote equity and dignity of the human being as defined by the United Nation's Guiding Principles and the GBA Principles	act in good faith, in full compliance with any applicable laws and regulations and promote practices that are impartial – transcending the singular interest of individuals or organizations
Long-term sustainable value creation	**Impact**	**Transparency, accountability, integrity**
promote socioeconomic development in accordance with the Sustainable Development Goals set by the United Nations	achieve results that are proportionate to the collective resources, capacity, and leverage of the Alliance and its Members	promote transparency, accountability and integrity in the Alliance's actions, membership and funding

Collaboration
promote inclusivity, collaboration and partnership, both within the Alliance, as well as with those individuals and organizations external to the Alliance whose purpose and vision are aligned with the Alliance's Purpose and Vision

Figure 5: GBA guiding values
Source: Own figure, based on Publ_18, 3f

5.3 Governance and decision-making

The authority of decision-making within the partnership is governed by the GBA Charter. The organisational structure of the GBA consists of the following bodies: Board of Directors, Executive Committee, Supervisory Council, Action Partnerships/Working Groups and Secretariat/Executive staff. Except for the Secretariat, participants of governing bodies do not get a remuneration (Publ_18, 8).

The Board of Directors consists of between five and 20 stakeholders that represent the civil society, government, and the private sector across the entire battery value chain. Members are voted by mail ballot and by a simple majority vote for two years (with the possibility to renew

the appointment for one additional term) and the exact composition is determined in the Annual General Assembly. The Chair of the Board of Directors is elected for one year, is assigned to chair and moderate the meetings of the Board of Directors, to facilitate outreach and to review any relevant material in advance of each meeting of the Board of Directors. The Board of Directors meets at least three times a year and constitutes a quorum if at least half of all Board members are present (Publ_18, 9f). Its tasks are defined in Article 6.1.1 of the GBA Charter (see Appendix 3) and include reviewing and approving of the GBA's Strategic Plan, budget, and annual reports, promoting the GBA's work, facilitating of exchange between key stakeholders, hiring of GBA staff, and establishing consultation processes with non-members of governments and civil society. From April 2023 to December 2024, the GBA's Board of Directors consists of 20 members from ten corporate stakeholders[15] and ten non-corporate stakeholders[16] across the whole battery value chain, including major international companies as well as the public and non-governmental sectors (Publ_18).

The Chair of the Board of Directors is also the Chair of the Executive Committee, which comprises the Officers of the Board of Directors, a representative of the Secretariat and – if needed – further members. Similar to the Board of Directors, the Executive Committee represents a balanced representation form the private, public, and social sector. It raises and discusses topics, which affect the GBA, acts on behalf of the Board of Directors, and meets on a monthly basis. The meetings are logged. Decisions made in the Executive Committee must be ratified by the Board of Directors. The tasks of the Executive Committee and its Chair, Vice Chair and Treasurer are governed in Articles 7.1.2 and 7.1.3 of the GBA Charter (see Appendix 3). For example, the Executive Committee is responsible for the supervision of the Secretariat's and the Action Partnerships' work, and the Chair is assigned to be one of the spokespeople for the Alliance, to ensure the work's alignment to the GBA's vision and mission, and – in shared responsibility with the Secretariat, Treasurer, and Board of Directors – to track the performance of the MSI's achievements, goals and financial situation. The Treasurer is responsible for the Alliance's budget, financial practices, and financial performances, and is assigned to develop a financial risk mitigation plan (Publ_18).

[15] BASF, CATL, Cobalt Institute, Eurasian Resources Group, Freyr Battery, Glencore, LG Energy Solution, Responsible Business Alliance, Tesla and Umicore.

[16] Drexel University, GIZ, IndustriAll Global Union, International Institute for Sustainable Development, Investissement Québec, Pure Earth, RESOLVE/Regeneration, Transport & Environment, World Bank Group, and WEF.

The Supervisory Council also represents members of the private sector, government and civil society and consists of the heads of the GBA member organisations. The Chair is held jointly by a representative of the private and the civil society sector (Co-Chairs) and is elected by the members of the Supervisory Council. Meetings of the Supervisory Council are logged and shared with the Board of Directors. Its tasks include the overall guidance and promoting of the MSI, the participation in events, as well as the facilitating of engagement and dialogue between stakeholders. They are governed in Article 8.1 of the GBA Charter (see Appendix 3) (Publ_18).

Action Partnerships/Working Groups are set up by the Board of Directors, shall also represent the different sectors and operate under pre-defined agreements, decision-making rules, reporting obligations and governance structure in order to develop and implement projects that are aligned with the GBA's mission, vision, purpose, values, and principles. The tasks of the Chair of Action Partnerships/Working groups are governed in Article 9.4.2 of the GBA Charter (see Appendix 3). The GBA currently implements three action partnerships, namely one for the development of a Battery Passport, the second for addressing concerns and challenges regarding critical minerals, and the third for topics about energy access and circularity (Publ_18).

The Secretariat implements and facilitates the GBA's work. Its composition is determined by the Board of Directors to whom it directly reports. The tasks of the independent third party are governed in Article 10.1.4 of the GBA Charter (see Appendix 3). They include the day-to-day management of the Alliance, drafting of the Strategic Plan and Budget, organising meetings, tracking the progress of the GBA's work, fundraising, and member recruitment. An Annual General Assembly organised by the Secretariat outlines the current state of the GBA purpose, vision, mission, principles, and values, fosters partnership, commitment and awareness, is a platform for knowledge and best practices exchange, and provides reports on the current state of the GBA. All members are eligible to participate in the General Assembly (Publ_18).

The GBA Charter also governs confidentiality, contains a gifts policy, entails directives in the case of conflicts of interest, and includes competition law and antitrust guidelines as well as intellectual property rights and branding articles. The Charter concludes with a confidentiality and privacy note and a whistleblower policy (Publ_18).

5.4 Stakeholder participation

According to the website of the GBA, all legal entities from the private, public, and civil society sector (firms, NGOs, governments, civil society organisations, academia, or any other legal entity) are eligible to become part of the GBA when they have a stake at the battery value chain.

Becoming a member requires commitment to the ten GBA guiding principles and compliance to due diligence measures and to the GBA Charter (GBA 2023c). The GBA Charter clarifies the rights, obligations, the appointment, and removal of members (Publ_18, 6).

Stakeholders that want to become a member of the GBA need to go through an application process. It starts with the submission of an application form that needs approvement by the Board of Directors. The Secretariat is the responsible authority reviewing the application, and therefore conducts due diligence, and assesses whether the applicant's interest is aligned with the GBA's purpose, vision, and mission. It then gives a recommendation to the GBA Board of Directors, which approves the due diligence assessment process and gives the final approval or rejection of an application. The membership can voluntarily be withdrawn or be revoked in the case of a "Removal Event" when three-quarters of the Board of Directors agree on this (Publ_18, 6f). Such an event can occur in the case of material breach of obligations determined by the GBA, actions that bring the GBA into disrepute, bankruptcy/insolvency, when organisations are affected by embargos/sanctions, or when they show missing willingness to support the GBA's purpose, mission, principles and/or values (Publ_18, 7).

At the time of this analysis, 141 organisations are part of the GBA. They cover the whole global battery value chain and include stakeholders throughout its whole lifecycle, from mining, raw material processing, to cell component, battery cell and EV production and to recycling and re-use. Moreover, companies of different sizes are represented. While on the one hand, important industry giants support the GBA, small and medium-sized firms are also part of the Alliance. For instance, in the mining and raw material processing sector, Glencore as one of the world's largest natural resource companies as well as Nornickel, the largest nickel and one of the largest copper producers worldwide, participate in the GBA. One of the world's leading companies in mining and processing of natural resources, namely Eurasian Resources Group, and the leading graphite processing company Urbix are members. On the other hand, also Vulcan Energy, a small German company focused on the production of lithium hydroxide monohydrate chemical product with a neutral carbon footprint, joined the GBA. In battery material production, Ascend Elements, ChemX Materials and Euro Manganese, which are advanced battery material producers, joined the GBA. Additionally, world's largest battery producers like CATL, CALB, LG Energy Solution, and Samsung SDI as well as small battery producers like the French company Gouach specialised in the manufacturing of sustainable batteries partner within the MSI. Supporters in the automotive sector include leading companies like BMW, Tesla, Volkswagen as well as Volvo Group and Hyundai Motor Group. Other battery application

companies cover Henkel, Microsoft, and Hitachi High-Tech Europe, and from the energy and chemistry sector, BP, ENEL, Oerlikon and LG Chem participate in the GBA. As the Alliance covers participants along the entire battery lifecycle, major recycling companies like Umicore, GLC Recycle, Botree, and Huayou Recycling Technology are also part of the partnership. The share of GVC companies represented in the GBA is 42,6% (60 organisations).

Besides businesses that operate within the global battery value chain, industry and trade associations are part of the GBA. They represent almost 9,9% (14 organisations) of all GBA participants. In this regard, the China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC), the European Carbon and Graphite Association (ECGA), the International Lithium Association (ILiA) and the Battery Metals Association of Canada (BMAC) can be mentioned. Furthermore, the world's largest industry coalition for responsible business in GVCs, namely the Responsible Business Alliance, as well as the Association of European Automotive and Industrial Battery Manufacturers, Eurobat, are part of the GBA.

Moreover, the Alliance includes private companies that are indirectly part of the value chain by providing technology or services (consultancy, certification, investment, law), amounting for 18,4% (26 organisations) of the total GBA participants. First, focused on digital product passports (e.g., Circularise Spherity), material traceability solutions (e.g., Optel, Kezzler, Inexto), blockchain solutions and lifecycle assessments (e.g., Arxum, Minviro) or value chain due diligence software (e.g., iPoint Systems), the GBA partners with a wide range of private small and big (e.g., SAP) technology and IT companies. Second, consultancy firms for sustainable battery innovation (e.g., Battery Associates), for ESG and sustainability strategies (e.g., Infyos) and for responsible production and sourcing (e.g., RCS Global) are also represented in the Alliance, as well as organisations for testing and certification services (e.g., Shenzen Precise Testing Technology, GS1, National Physical Laboratory and TuV). Third, investment firms like Resource Capital Funds, the Green Finance Institute, Impact Facility and Investissement Québec are listed as GBA supporters. Additionally, the globally operating law firm White & Case participates in the MSI.

The scientific sector is represented with a share of 7,8% (11 organisations), covering both representatives of academia and of research institutes. For instance, the Chinese Xiamen University, the US-American Harvard Kennedy School, NYU Stern, UC Davis, and the private Drexel University, as well as the Turkish Sabancı University Nanotechnology Research and Application Center deliver scientific input through their partnership. Moreover, research

centres like the Future Battery Industries CRC Ltd, the IIED, IISD, and the World Resource Institute constitute scientific partners.

From the social sector, NGOs, and foundations like APEDDH, ClimateWorks Foundation, Fundacion Chile, Good Shepherd International Foundation, Pact, Pure Earth, Resolve and Transport & Environment participate in the GBA. As a representative of workers in the mining, energy and manufacturing sectors, IndustriAll Global Union has to be mentioned. NGOs, foundations, and unions have a share of 6,4% (9 organisations) of all GBA supporters.

Furthermore, various associations covering public-private, private-social or MSIs are part of the GBA, with a share of 7,1% (10 organisations). The Alliance for Responsible Mining with its objective to transform the ASM sector into a socially and environmentally responsible one, the Extractive Industries Transparency Initiative (EITI) for addressing governance issues in the extractive sector, the World Business Council for Sustainable Development (WBCSD) and the Responsible Battery Coalition can be mentioned here.

Last, public and international organisations are part of the Alliance, and amount for 7,8% (11 organisations). Besides organisations of the UN (UNECA, UNEP, UNICEF), the OECD, World Bank Group, and the WEF support the GBA. Apart from that, governmental entities, like the Government of British Columbia, the Natural Resources Canada (department of the Government of Canada for natural resources, energy, minerals, and metals), and the German Federal Ministry for Economic Affairs and Climate Action as well as the GIZ as the German development cooperation agency joined the Alliance. Another supporter is the African Development Bank.

The following table gives an overview of different stakeholder categories and their quantitative representation in the GBA.

Table 5: GBA participants by sector

Stakeholder category	**Organisations**	
	Nr.	in %
Industry	60	42,6%
Industry associations	14	9,9%
Technology and services provider	26	18,4%
Associations	10	7,1%
NGOs, foundations, unions	9	6,4%
Public and international organisations	11	7,8%
Academia and research	11	7,8%
Total	**141**	**100%**

Source: Own table based on own analysis

When analysing the stakeholder structure by country of the entity's headquarter, it can be shown that the participants represent stakeholders from 29 countries across North and South America, Europe, Asia, and Australia. Taking a closer look reveals that the largest part of GBA participants headquarter in the USA, amounting for 28 organisations (19,9%). It is followed by the UK with 17 organisations (12,1%) and Germany with 13 organisations (9,2%). Organisations from Canada and China are represented with 11 (7,8%) and 10 (7,1%) entities. Together, these five countries amount for more than half (56%) of all GBA participants. In contrast, certain countries that were identified as crucial countries within the global battery value chain, e.g., Chile, Argentina, or DRC, are represented with less or no entities. The following table shows the geographical dimension of GBA stakeholders in more detail.

Table 6: GBA participants by country

Country (Headquarter of organisation)	**Organisations**	
	Nr.	in %
USA	28	19,9%
UK	17	12,1%
Germany	13	9,2%
Canada	11	7,8%
China	10	7,1%
Belgium	7	5,0%
Switzerland	7	5,0%
France	6	4,3%
Australia	5	3,5%
South Korea	5	3,5%
Netherlands	4	2,8%
2 organisations per country: Chile, Denmark, India, Italy, Japan, Luxembourg, Norway, Singapore, Sweden, Turkey	20	14,2%
1 organisation per country: Brazil, Colombia, Côte d'Ivoire, Ethiopia, Finland, Ireland, Russia, Rwanda	8	5,7%
Total	**141**	**100,0%**

Source: Own table based on own analysis

5.5 Activities and implementation mechanisms

The GBA has a wide range of activities and implementation mechanisms, starting with identifying the risks associated with the battery value chain and its stages and defining success factors to overcome these. Based on the findings, action partnerships are formed that aim at realising progress through developing projects. Additionally, the GBA uses its range,

knowledge, and stakeholder network to advocate and promote recommendations. The activities and implementation mechanisms follow the GBA's mission to give insight, create partnership and foster action (see chapter 5.2).

5.5.1 Identifying risks, levers, and success factors

In its initial report "A Vision for a Sustainable Battery Value Chain in 2030" (Publ_1) the GBA shows key challenges for the battery value chain, which include the significant GHG footprint of battery production, the social, environmental and integrity risks throughout the value chain as well as the uncertainty of the viability of battery-enabled applications. For each risk category, it shows main debates, also referring to value chain stage and country specifics (Publ_1).

Based on assumptions, proprietary databases, and models from McKinsey and SYSTEMIQ as well as on stakeholder discussions, existing research papers and expert interviews, the report that was published by the WEF and the GBA in 2017 shows levers to achieve the vision of a sustainable battery value chain in 2030. The twelve levers are grouped in three blocks, namely circular value chain, sustainable business and technology, and responsible and just value chain (Publ_1, 10; 13). For each of the twelve levers, potential target state aspirations were developed and simulations for their GHG emission and value chain impacts performed. In order to achieve a circular value chain, the GBA identifies the need to increase electric shared mobility, smart charging and vehicle-to-grid, refurbishment, and repair, and to enhance repurposing and recycling of EV batteries. Regarding sustainable business and technology, four levers are identified, namely switching to cleaner battery production through renewables, innovating the battery technology, improving application technology, and supporting value creation for local communities. Last, a responsible and just value chain is defined as driven by complying with internationally accepted social and environmental norms, by implementing best practices, and by providing access to electricity (Publ_1, 7f). The analytic study from 2017 with these identified levers is seen as the starting point to determine appropriate actions for realising the vision of a sustainable battery value chain in collaboration with stakeholders (Publ_1, 10).

In a study with McKinsey, the GBA identified ten transformational success factors that can drive a resilient, sustainable, and circular battery value chain until 2030 while respecting planetary boundaries and human, product, and economic needs (Publ_15). These are:

- Increasing energy efficiency and electrification share,
- Minimizing environmental impacts beyond climate,
- Creating positive, just, and inclusive social impact,

- Sourcing 24/7 low-carbon electricity and heat,
- Establishing full supply-chain transparency and compliance,
- Embracing technology innovation and flexibility,
- Securing raw material and machinery supply,
- Excelling in cost and regional execution,
- Harmonising international standards and regulation, and
- Establishing value chain circularity (Publ_15, 14).

5.5.2 Implementing action partnerships

The GBA currently implements three action partnerships: (1) Battery Passport, (2) Critical Minerals, and (3) Energy Access and Circularity. This work focuses on the Battery Passport partnership since it is the flagship initiative of the GBA, and only briefly presents the other two partnerships as they are less developed and in an earlier implementation stage.

(1) Battery Passport Partnership

The Battery Passport is the flagship initiative of the GBA and seeks to create a digital representation of a battery that integrates technical, provenance, and sustainability performance data at the product level of an individual physical battery (Pres_7). Trusted data shall be collected, exchanged, collated, and reported among all value chain and lifecycle stakeholders. The Passport is based on a comprehensive definition of a sustainable battery. At the WEF's Annual Meeting in Davos on 18th January 2023, the GBA launched the proof of concept for its Battery Passport. Stakeholders from the private, social, and public sector have been developing it over three years (Pres_8) and it is now prototyped by Audi and Tesla and their value chain partners. [17, 18]

Linked to the rationale that the globalised battery value chain requires a global multi-stakeholder approach, the GBA aims to connect and engage businesses, IT solution providers, regulators, auditors, public, international, and non-governmental organisations to design

[17] From the private sector Audi, BASF, CATL, Eurasian Resources Group, Glencore, LG Energy Solution, Umicore, Tesla, Volkswagen AG, and IT solution providers were involved. From the social sector the trade union federation IndustriALL Global Union, Pact, Transport & Environment, UNEP, UNICEF, and many others participated and from the public sector, the German Ministry for Economic Affairs and Climate Action, and Natural Resources Canada engaged (Pres_8).

[18] At the current state, the quality of the data in the passports is limited, not fully verified, and can be based on estimations. Also, the data covers so far only selected materials (Pres_8).

collectively a battery passport infrastructure (Publ_22). In a press release from 18th January 2023, the GBA explains:

> *"The GBA's Battery Passport is unique as it is a key instrument to implement a global vision of sustainable, responsible and circular battery value chains, based on data that is standardized, comparable and auditable. Its ultimate goal is to provide end-users with a quality seal based on the battery's sustainability performance, according to reporting rules agreed by stakeholders from industry, academia, non-governmental organisations and government."* (Pres_8)

Hence, in the long term, the GBA seeks to create an instrument that certifies whether a battery was produced ethically and in an environmentally friendly way, thus, providing a quality seal for enabling intuitive comparisons of batteries (Publ_4). It shall provide customers with trusted data and shall serve as a basis for benchmarking (Pres_7). The ambition of the Battery Passport is to cover a wide range of ESG principles, which cover environmental (GHG footprint, water and waste, energy management), social (human rights, labour practices, community relations), and governance (reporting, business ethics, board composition) indicators as well as battery identity data (Pres_3).

The Battery Passport aims for threefold objectives. First, it shall create transparency along the entire value chain for all relevant stakeholders. Second, it provides a framework for benchmarking batteries by identifying minimum standards. Third, it shall help to validate and track progress to a sustainable and responsible battery (Publ_4). For this, it aims to create a globally applicable solution that goes beyond national or regional regulatory requirements (Publ_19). In the long term, a quality seal (e.g., a digital certificate, sticker on the battery, etc.) shall indicate when companies go further than regulatory requirements and shall be used as an incentive for companies (Publ_19).

The efforts for a battery passport are aligned with the new EU Battery Regulation that makes digital battery passports compulsory for industrial batteries with a capacity of more than 2 kWh and for EV batteries (European Commission 2023). Keeping in mind the global perspective of the GBA and that laws and regulations vary according to national jurisdictions, the GBA bases on the approach that it does not define mandatory data as this is seen as the task of regulators.[19] However, it seeks "to provide a "common language" for ESG performance measuring and a tool to ensure structured data collection" (Publ_19).

[19] To this date, the GBA does not define mandatory data. However, to a later stage, it may consider own mandatory data for awarding quality seals (Publ_19).

Prior to the launch of the battery passport proof of concept, several working groups representing stakeholders from mine to OEM and Track & Trace partners tested the approach and checked the applicability of the rulebooks, the automatic data aggregation, and identified prerequisites for a trustworthy interplay among companies, Track & Trace providers and the GBA (Publ_22, 2). Ensuring conformity among the three pilots, the GBA ran training and Q&A sessions, ensured proper communication and coordination, and developed data collection templates and guidelines for company reporting (Publ_22, 3).

At the time of finalising this work, the companies are not obliged to give information on all indicators (Publ_20), verification of collected data is not yet necessary and the data is based on a self-assessment of reporting entities (Publ_22, 2). Moreover, due to "reservations about sharing any data which could be commercially sensitive", "pilot participants agreed with the GBA to share realistic data instead of real data" (Publ_22, 4). Consequently, current data does not reflect the actual performance of participating entities (Publ_22, 6f). Regarding this, the GBA acknowledges the challenge to enhance the willingness and ability of companies and other stakeholders throughout the battery value chain to contribute and share information (Publ_4).

Three developed guidelines serve as key performance indicators for the Battery Passport and shall be updated after consultations and pilot feedbacks. These are the Greenhouse Gas Rulebook, the Human Rights Index, and the Child Labour Index:

On the 5th October 2022, the GBA launched the Greenhouse Gas Rulebook that is linked to the digital Battery Passport. It is the "first framework of its kind to facilitate the collection of standardised, auditable, and comparable GHG data for batteries" (Pres_5) and was developed to calculate and track GHG emissions of lithium-ion batteries in EVs. The GHG Rulebook incorporates a variety of existing standards and guidelines (e.g., from the EU and ISO) and "goes beyond these to set globally harmonised rules for batteries, paving the way for more reliable, accessible and consistent GHG data on batteries" (Pres_5). It defines around 80 rules that shall be incorporated by industry actors and shall be usable in a practical way (Publ_21).

With its rulebook, the GBA seeks to "set globally harmonized rules that make "cradle-to-gate plus recycling" Battery Carbon Footprints transparent" (Publ_17). It provides a methodology by which data can be generated and collected considering process-specifics and includes detailed instructions for data collection (primary and secondary data), cluster specific rules for the mining and refining stage, for the pCAM and CAM manufacturing stage, for anode materials, for electrode cell and module manufacturing and for the battery assembly as well as

the recycling stage. Moreover, it includes the formula for GHG calculation and information on verification, review, and audit. For now, the use phase of the battery is not covered, neither are additional cathode chemistries (Publ_17).

The GBA GHG Work Group consisted of around 45 individuals from 41 GBA members that represented the full EV battery value chain (80%), the civil society (12%) and governmental bodies (7%). The GBA explicitly states that "proportionate representation was ensured throughout the process" (Publ_17). Additional external consultation shall enable a widespread adoption of the Rulebook, also beyond GBA members.

On the 8th December 2022, the GBA launched the Human Rights Index (HRI) and Child Labour Index (CLI) for the Battery Passport. They were developed in a participatory process by Levin Sources with input and consultation of private, public, and social stakeholders along the entire battery value chain. The GBA itself states that these "indices are the world's first frameworks to measure and score the efforts of any company or product specific to the battery value chain towards supporting the elimination of child labour and respecting human rights" (Pres_7). Linked to the concern that battery value chains are characterised by severe child labour and human rights violations, more than 100 indicators shall enable reporting entities to assess their performance across their value chain. In order to reduce the burden, "indicative standard equivalency assessments for commonly used responsible mining and sourcing standards" (Pres_7), are included. GBA's indices incorporate international standards and frameworks, even go beyond them in their ambition, and are applicable for entities that both only start building a human rights due diligence system by offering a checklist, and those already having one by enabling them to run a "health check" (Pres_7).

For the sake of simplicity and feasibility, both the HRI and CLI are self-assessment tools and contain questions that can be answered with "yes" or "no". The scope covers both the company's own operations and the ones of its value chain for any goods or services (Publ_14, 4f). Indicators in the HRI and CLI include those to support regulatory compliance (e.g., EU Battery Regulation, Corporate Sustainability Due Diligence Directive) and voluntary compliance (i.e., existing voluntary standards), to conform with major private sector principles and guidelines (Publ_14).

The HRI incorporates the UNGPs (2012), the OECD Responsible Business Conduct Guidance (2018), and the OECD Minerals Guidance (2016) (Publ_14, 3), and includes 57 operating indicators and 45 value chain indicators. The CLI contains six core expectations and 43

additional expectations. It incorporates UNICEF and ILO Principles, as well as OECD guidance (Publ_14, 4).

(2) Critical Minerals Partnership

In summer 2022, the GBA launched the so-called Critical Minerals Advisory Group (CMAG) that builds on a MSI, which was already implemented between 2020 and 2021, namely the Cobalt Action Partnership (CAP). Within a range of collaborative online sessions facilitated by the Battery Associates, the CMAG makes it its mission to discover key issues with critical minerals, map and prioritize them, and develop an Action Plan. Behind this Partnership lies the rationale that minerals like cobalt, nickel, lithium, and graphite are essential for the transport and energy sector transition and that rapidly expanding production is necessary to meet the growing demand. The GBA

> *"is working with its members across the value chain on ensuring that critical materials are produced, sourced, processed, transported, manufactured and recycled in a responsible and sustainable manner which minimizes environmental harm, respects human rights and creates benefits for stakeholders along the supply chain."* (GBA 2023d)

The CAPs vision is the immediate elimination of child and forced labour within the cobalt value chain, the contribution to sustainable development of communities, and the respect of human rights. On 1st October 2021, the CAP published a report from stakeholder consultations on the ASM Cobalt ESG Management Framework. It is based on public consultations with stakeholders in the DRC and across the global cobalt value chain. The extensive consultations were led by the NGOs IMPACT and RESOLVE and engaged 145 organisations in the DRC and internationally (Publ_11).

Within the initiative, the CAP focused on three actions. First, by developing a framework based on a common set of expectations for a responsible cobalt value chain, the CAP supported the responsible production and sourcing of Congolese cobalt. Second, it supported the formalisation of the cobalt ASM industry in the DRC by investment projects, identification of best practices, and stakeholder engagement. Third, it sought to harmonise initiatives by facilitating dialogue, learning, sharing, and cooperation in order to achieve greater impact (GBA 2023d).

(3) Energy Access & Circularity Partnership

The Partnership on Energy Access & Circularity is based on the rationale that batteries are a crucial instrument for driving Africa's energy access goals and that the increased need and deployment of batteries require recycling and repurposing solutions. The Alliance aims at

> "*promoting circular design improvements; harmonization of national and international rules to improve lifecycle management and end-of-life treatment; and improving the enabling environment to provide market incentives toward circularity.*" (GBA 2023b)

By creating technical and regulatory guidelines for closed-loop recycling, publishing best practices, by supporting the scale-up of proven systems, by engaging policy leaders, and by developing model frameworks for a circular economy of EV batteries, the GBA aims to provide "a roadmap for public-private interventions to address the barriers for energy access via batteries and recycling capacity" (Publ_3) and aims to optimise the transboundary flow of batteries and drive circularity. It covers the energy access potential and key barriers, an effective recycling and end of life system, and the tracing of batteries through end-of-life management.

Under this Partnership three papers were published: In December 2020, Pure Earth, the Responsible Battery coalition, and the International Lead Association published the white paper "Consequences of a Mobile Future" (Publ_6), which gives recommendations for policy makers for a safe and environmentally friendly management of recycling of lead-acid batteries. Published in January 2021, another white paper under the title "A Framework for the Safe and Efficient Global Movement of Batteries" gives recommendations for public and private stakeholders to enable a transboundary flow of batteries (Publ_7). The third published white paper refers to the GBA's objective to enable access to electricity for 600 million additional people. Under the title "Closing the Loop on Energy Access in Africa" (May 2021) and developed in cooperation of WEF, the Energy Storage Partnership, the Faraday Institution, Vivid Economics and Öko Insitut e.V., recommendations are given for public and private stakeholders on how to scale-up the deployment of batteries in Africa in order to meet the growing energy needs (Publ_8, Pres_4). The Alliance argues that

> *"Access to clean, reliable electricity is one of the greatest challenges to sustainable development in Africa, with nearly 550 million people lacking access to electricity and an additional 150 million facing unreliable connections. Batteries are crucial to supporting Africa's energy access goals, particularly in sub-Saharan Africa where energy infrastructure is lacking. Improvements in energy access over the next decade will drive an estimated seven- to fourteen-fold increase in stationary battery capacity in the region, to 83 GWh. Meeting this growing battery demand with lower economic, environmental and human costs will require high-quality recycling and repurposing,*

which is currently non-existent across most African countries. High-quality recycling and repurposing also create additional benefits, through employment and upskilling opportunities." (Pres_4)

The recommendations given by the GBA include enhanced stakeholder cooperation with African governments, industry, civil society, academia, battery-using sectors, and financial institutions and implementing pilots, regulation, standards, enforcement, and incentives (Pres_4).

5.5.3 Advocating and promoting recommendations

Besides giving insights and creating partnerships, the GBA fosters action for a sustainable battery value chain by giving a set of recommendations to value chain stakeholders, and by acting as an advocator, e.g., through participation in events.

In order to stimulate change in the battery value chain, the GBA provides recommendations for both governments and the private sector. In its insight report published in 2019, the GBA lays out ten recommendations that are based on the identified levers to achieve a sustainable battery value chain in 2030. For the development of a circular value chain, these concrete actions are the implementation of design and systems for life extension and end-of-life treatment, the implementation of V1G and V2G and the scale-up of electric shared and pooled mobility. Referring to sustainable business and technology, it recommends increasing the share of renewable energies and energy efficiency, to accelerate the roll-out of V1G infrastructure, to adjust regulation for battery-enabled renewables as a dispatchable source of electricity for the grid, and to finance sustainable expansion and support value creation and economic diversification in local communities. With regard to a responsible and just value chain, the GBA recommends ensuring consistent performance and transparency on social, environmental, and economic sustainability norms and principles along the battery value chain, establishing GHG disclosure and emission regulations, and supporting the deployment of batteries for energy access (Publ_1, 8f).

Besides giving recommendations, the GBA organises and participates in industry-specific events such as public discussions, battery conferences, expert forums, or dialogue sessions. For instance, a public debate about product carbon footprints and digital product passports in June 2023 brought together stakeholders both within and outside the GBA and highlighted the need for increased chain transparency and GHG reduction (GBA 2023e).

Moreover, announced on 8th June 2021 and as a contribution to the International Year for the Elimination of Child Labour, the GBA developed the 2021 Action Pledge to End Child Labour in the Battery Supply. To contribute to this goal, four areas of action are in the focus. First, the digital Battery Passport shall bring transparency, requiring companies to demonstrate that child labour does not exist in their chain by reporting and monitoring child labour indicators. Second, the GBA supports the CAP, which supports the implementation of mining standards in the DRC, including the prohibition of child labour. Third, a GBA collaboration called "The Fund for the Prevention of Child Labour in Mining Communities" aims to raise financial resources from public and private stakeholders in order to address child labour in the DRC. Fourth, the GBA contributes to child labour elimination by engaging with policymakers to accelerate the adoption of best practices in order to drive formalisation of lead-acid battery recycling, as this is a field where children are exposed to high risks (Pres_3).

5.6 Main conclusions

The analysis in the previous chapters explored the formation and rationale, the mission and objectives, the governance and decision-making structure, the stakeholder participation as well as activities and implementation mechanisms of the largest MSI in the battery sector. It revealed the extensive inclusion of stakeholders within and outside the global battery value chain, from the private, civil, and social sector. The GBA provides a platform for dialogue and mutual learning, follows a project approach with currently having three action partnerships to achieve its vision of a sustainable and responsible battery value chain in 2030, and it collaboratively develops globally applicable standards. A Charter document does not only define the organisational structure but also internal roles, responsibilities, and rules. The following table summarises main characteristics of the GBA.

Table 7: GBA main characteristics

	Global Battery Alliance
Governance type	Multi-Stakeholder initiative
Objective	Establishing a sustainable and responsible battery value chain
Scope	Global value chain
Multi-stakeholder dimension	Industry and industry associations Technology and services providers NGOs, foundations, unions, and associations Public and international organisations Academia and research institutes
Participants	141 organisations
Time horizon	2017 – 2030
Governance structure	Board of Directors Executive Committee Supervisory Council Action Partnerships/Working Groups Secretariat
Action Partnerships	Battery Passport Partnership Critical Minerals Partnership Energy Access & Circularity Partnership
Approach	Dialogue approach Learning approach Project approach Standard setting approach

Source: Own table

6 Discussion

From a GVC perspective, the pattern of the battery value chain is characterised by functional and vertical fragmentation as well as wide-spread geographical dispersion of activities. In accordance with the characteristics of GVCs presented in chapter 2.1.1, the battery value chain shows intertwined and complex interactions among various actors and high cross-border trade in intermediate products. Spanning various segments from mining to recycling, the economic activities along the battery value chain, dominantly in the mining sector, evoke social and environmental externalities that call for regulatory governance. The GVC framework and its core concept of governance (chapter 2.1) have served to better understand the challenges and actors with regard to the regulation of these externalities. The regulatory environment for batteries is fragmented, encompasses private, public, and social actors, and ranges from voluntary self-commitments of firms to pressure and demands of civil society organisations, and to legally binding rules (chapter 4.3). Due to the cross-border nature of the battery value chain and thus the difficulty that operations go beyond the jurisdiction of a single country, globalised regulatory mechanisms and cooperative actions between various actors are

necessary. On the EU level, for instance, the EU Battery Regulation and the Corporate Sustainability Due Diligence Directive (CSDDD) aim to address risks that evolve along the entire value chain on a global scale. Involving private, public, and social actors, multi-stakeholder governance is another way to deal with the challenging endeavour to address negative externalities of the battery production. The GBA as a MSI emerged as a possible global solution and was subject of the case study analysis in chapter 5.

The following part presents the analysis results from chapter 5 and links them to the conceptual foundation developed in chapter 2. This allows to answer the research question:

What is the role and legitimacy of the Global Battery Alliance as a multi-stakeholder initiative and how does it contribute to the governance of global battery value chains?

By defining its role, this chapter first situates the GBA within the concepts of MSI and GVC governance. Second, it assesses the initiative's input and output legitimacy.

6.1 Role of the Global Battery Alliance

As an institutionalised partnership with more than 140 stakeholders from the private, public, and social sector and the shared vision to establish a sustainable and responsible global battery value chain, the GBA can be defined as an industry-specific MSI. Since its foundation in 2017, it has clearly made itself a name in the ecosystem of the battery value chain. The results of the case study indicate that the GBA takes various roles as a MSI and can support the battery's regulatory GVC governance in several ways:

(1) Situating the problem and creating a collective understanding
(2) Providing a platform for exchange
(3) Carrying knowledge and disseminating information
(4) Fostering trust and a level-playing field
(5) Promoting value chain transparency and aggregating data
(6) Linking and interacting with regulatory governance actors
(7) Defining standards and thresholds

Each of these identified roles is explained in more detail below.

(1) Situating the problem and creating a collective understanding

The GBA situates the concerns and challenges associated with the battery production and creates a collective understanding of terminologies and current dynamics. In its first publication (Publ_1), it works with knowledge partners to identify major critical issues along the global

battery value chain, raises awareness, and acknowledges the urgent need for action. By consulting with stakeholders both within and beyond the battery value chain, it identifies industry and stakeholder needs. It thus lays the groundwork for a common understanding. When publishing reports, it precisely defines terminologies (e.g., Publ_17) so that misunderstandings or different interpretations are avoided and a collective understanding is maintained. By doing so, it draws on international standards and guidelines, such as the ISO, and creates alignment with them. Additionally, a common language for ESG performance assessments, as envisioned by the GHG Rulebook, the HRI and CLI, as well as jointly agreed upon guiding principles further contribute to a shared understanding.

(2) Providing a platform for exchange

Another key role of the GBA is to provide a platform for exchange between actors that have a stake in the global battery value chain. As an arena for dialogue, it brings together industry representatives from the mining and raw material processing stage, from cell component and battery cell/pack production, from EV production, and from the recycling/re-use industry, as well as representatives from the public and social sectors. The exchange both takes place within the GBA's action partnerships as well as within the annual General Meetings. The internal organisation in Board of Directors, Executive Committee, Supervisory Council, Action Partnerships/Working groups, and Secretariat further anchors interchanges between public, private, and social stakeholders. Organising industry-specific events and consultation rounds additionally creates an arena for exchange also with external stakeholders or interested parties that are not part of the GBA. Providing a platform for exchange, discourse, and deliberations gives the opportunity to create a collective understanding, promote industry-solutions/good practices (e.g., digital battery passports), share concerns (e.g., regarding data sensitivity) and make mutual learning possible.

(3) Carrying knowledge and disseminating information

By being a platform for exchange among a large number of stakeholders, each with their own expertise, the GBA accumulates knowledge from a broad range of actors inside and beyond the global battery value chain. Additionally working with knowledge partners (research institutes, researchers) enables the GBA to be up-to-date with industry-specific developments. These valuable insights make the GBA an enormous knowledge carrier. Through its projects and the participation in events (public discussions, battery conferences, expert forums, or dialogue sessions), the GBA uses its position to contribute to current debates and share its knowledge.

This makes it a key player in industry discussions and – due to its expertise – gives it a key role in political and industrial agenda-setting (e.g., raising awareness for the need of data governance). Additionally, by disseminating information it enables capacity building both among its participants and further stakeholders. This is demonstrated for example in the training and Q&A sessions held by the GBA as part of the development of the battery passport.

(4) Fostering trust and a level-playing field

As the GBA is defined as a pre-competitive partnership that grounds on a common vision and is based on formerly agreed-upon principles and values, the MSI supports the creation of trust among its members. A platform that counts on collaborative efforts reduces the fear of losing competitive advantages (e.g., by sharing sensitive information that goes beyond regulatory requirements) and establishes arms lengths relations and a level-playing field. Getting trust is a difficult, yet crucial, issue in the context of sustainable value chains (Galaskiewicz 2011, 5). The GBA itself states on this:

> *"Establishing a trust-worthy interplay proved the most significant challenge to address to ensure a sustainable outlook for the first ever battery passport ecosystem. Neither common language (metrics, instruments, rules), standardization nor common principles of data collection, protection and exchange are sufficient by themselves to create trust in battery passports. The whole ecosystem needs to be enhanced while bearing in mind the interests of all the stakeholders to make it scalable and lasting."* (Publ_22, 10)

Establishing trust is a prerequisite for the battery passport as it involves data-sharing along the entire value chain. Being connected by a joint vision and exchange formats with regular and open dialogue, create a trust-building and trust-promoting setting where relationships are strengthened and social ties formed. As Galaskiewicz says, "social network ties among parties at the boundaries of organizations within the chain are important in building trust among actors that can facilitate information exchange, cooperation and coordination" (Galaskiewicz 2011, 5).

(5) Promoting value chain transparency and aggregating data

As outlined in 4.3, a lack of upstream and downstream transparency and barriers for data sharing challenge sustainable governance of the global battery value chain. By providing an arena for exchange and by working jointly based on a consensus of transparency, the GBA promotes value chain transparency. Due to the complexity of the GVC, its organisation in various tiers across different continents and the rather recently evolved battery ecosystem with players outside traditional value chains and information interfaces not yet fully established, it

can be difficult to holistically identify all relevant stakeholders. However, to enable sustainability assessments and to drive sustainability performance, require extensive data sharing. This is where the GBA serves as a platform that aggregates data from a multitude of stakeholders across all levels of the battery value chain. The Battery Passport proves an important milestone for transparency enhancement. Jyothish George, Marketing Head of Copper, Cobalt, and Zinc metals at Glencore states in this regard, that we "now have the umbrella framework for a powerful tool for transparency in the battery supply chain" (Pres_8). Transparency and data sharing along the value chain is facilitated by the GBA's role to promote trust. Rhian-Mari Thomas OBE, CEO of the Green Finance Institute, for instance, states:

> *"For the green transition to be successful, it is essential for investors to have transparency on the sustainability of supply chains. By allowing a record to be kept of an individual battery's constituent parts, battery passports make it possible for financiers to verify their investments in the supply chain as being ESG compliant, mitigating the risk of greenwashing."* (Pres_8)

In this context, it must be mentioned that along with transparency comes the question of how to manage a large amount of (sensible) data. This calls for data governance for value chain related data and will require further multi-stakeholder dialogue as well as regulatory action (Publ_22, 10).

(6) Linking and interacting with regulatory governance actors

Another role of the GBA can be seen in its linking of public, private, and social stakeholders, which are – as outlined in chapter 2.1.2 – key actors of regulatory value chain governance. The GBA does not only encompass market actors involved in the battery production but also NGOs, a trade union, as well as government agencies and international organisations. The GBA thus provides a bridge between public, private, and social efforts to enhance the sustainability of batteries and their value chain. Evidence that already shows aligned ambitions and the dynamic between soft and hard law can be seen in the battery passport. As an element in the labelling and transparency requirements of batteries set by the EU Battery Regulation (chapter 4.3), the GBA supports the implementation of a battery passport in practice (chapter 5.5). In this context, Mena and Palazzo identify the challenge for governments to find ways to connect with MSIs "to better align their own national regulatory activities with those private actors on the global playing field" (Mena and Palazzo 2012, 549). The direct participation of governmental bodies in the GBA facilitates this connecting requirement. Jonathan Wilkinson, Canada's Minister of Natural Resources, states:

> *"The Government of Canada welcomes this milestone achievement for the Global Battery Alliance's Battery Passport. We support strong multi-stakeholder efforts that promote responsible and sustainable global battery supply chains […]. Canada looks forward to continued collaboration with the GBA and its partners."* (Pres_8)

(7) Defining standards and thresholds

Defining a sustainable value chain and distinguishing between sustainable and unsustainable ones require clear environmental and social thresholds (Searcy 2017, 3). In accordance with findings from literature that MSIs "can establish and institutionalize these thresholds in the context of a supply chain" (Searcy 2017, 6), the GBA takes on the role of identifying clear thresholds in consideration of the unique circumstances of the battery value chain. By bringing a wide range of stakeholders together, sustainability proxies, such as GHG emission, human rights indices and child labour indices have been developed. These indicators are science- and ethics-based and provide the foundation for determining the sustainability performance of the battery value chain. Besides the development of the indicators, the GBA provides details on how to best implement them, which is crucial for a MSI to effectively meet its role as a standard developer (chapter 2.2.2). CEO of SK Innovation, Jun Kom, states that "we believe accurate measurement is the very first step in building momentum and credibility for a sustainable value chain." (Pres_2). Bearing in mind the jointly developed rules by stakeholders from industry, academia, international organisations, and governments, Martin Brudermüller, CEO of BASF, adds that the GBA is a frontrunner for setting credible rules towards sustainable value chains (Press_5). Although not yet implemented, there are plans to expand this role to issuing a quality seal for end-users based on the developed battery passport (chapter 5.5.2). This can serve to incentivise companies to comply with standards, to inform end-users about the battery's sustainability performance and to enable benchmarking (chapter 2.2.2).

Hence, the GBA performs several roles and partly fulfils and goes beyond those identified by Searcy (chapter 2.2.2). It does provide a learning platform and develops standards but does not yet issue labels and certifications or develop mechanisms of auditing and compliance of the rules. Given the complexity of GVC governance, the GBA functions as a regulator that promotes coherence and uniformity of regulatory requirements on a global scale. It leverages the regulatory capacity of public, private, and social actors, and both supports the implementation of already existing legally binding requirements (e.g., EU Battery Regulation and Battery Passport) and identifies needs for further tightening of legal requirements based on interactions with stakeholders from the private and social sectors. Beck et al. mention in this

regard the MSI's "substantial scope to influence policymakers in further regulation demands for coordinated action among industry representatives and NGOs" (Beck et al. 2022, 214). For instance, the GBA reveals the need for data sharing and can advocate for "harmonizing and clarifying incentivization structures for information sharing, repeal impedimental antitrust regulations (or at least formulate exceptions), or establish an overall taxonomy for accepted standards and frameworks for sustainability assessment" (Beck et al. 2022, 215). Thus, the GBA can help to address and close governance gaps and function as a catalyst for regulatory governance within the battery industry's GVC. This is in line with findings from literature that argue – e.g., for the human rights context – that "the industry-specific MSI model has the greatest potential" (Baumann-Pauly et al. 2017, 775) in doing so.

Ultimately, the GBA can contribute to social and environmental upgrading of the global battery value chain. As Gereffi and Lee outline for the social dimension, a multi-stakeholder path can drive processes "of improving the rights and entitlements of workers as social actors and enhancing of the quality of their employment" (Gereffi and Lee 2016, 26; 30). The findings of the case study show that the GBA strives for a circular, low-carbon battery value chain that safeguards human rights and promotes decent jobs (chapter 5.2). Respective activities and implementation mechanisms (chapter 5.5) are designed to work towards social upgrading and also environmental upgrading, which is the process of achieving positive or less negative environmental outcomes through modification or adaption of production operations.

Having identified key roles of the GBA as a MSI and regarding the regulatory governance of the battery value chain, the next chapter assesses the Alliance's input and output legitimacy based on the concept outlined in chapter 2.2.3.

6.2 Input and output legitimacy of the Global Battery Alliance

As shown in chapter 2.2.3, MSIs need to have both input and output legitimacy in order to unfold effectiveness and credibility. It is argued that only when showing strong legitimacy, the GBA can meet its roles and support the regulatory governance of battery value chains, subsequently leading to more sustainability. This section assesses the Alliance's legitimacy by applying the operationalisation developed by Mena and Palazzo (2012).

6.2.1 Input legitimacy

(1) Stakeholder inclusion

The case study revealed a large number of GBA participants that cover the public, private, and social sector. The representatives reflect main relevant stakeholder groups including industry operators in the global battery value chain, technology and services providers, industry and other associations, NGOs, foundations and a trade union, public and international organisations, and representatives from academia and research (chapter 5.4). The inclusive approach of the GBA makes sure that different perspectives, interests, and concerns are considered, various expertise is incorporated, and voices from private, public, and social actors are heard.

However, although a lot of stakeholders affected by the issue are involved both in the structure and in the processes and the GBA actively engages stakeholders from various regions, it fails to show a balanced representation of all those that have a stake at the global battery value chain. Certain stakeholder groups are strongly underrepresented or excluded from the partnership, yet significantly affected by the issue.

First, encompassing only nine entities (6,4%) from the social sector (NGOs, foundations, trade unions), human rights and environmental NGOs are largely underrepresented. Although an industrial trade union and NGOs do participate, the number of such stakeholders remains small. Especially those people that bear most of the costs of negative externalities along battery value chains, namely local communities and indigenous groups, are highly underrepresented. As the GBA aims to strengthen communities, it should for legitimacy reasons include voices of those people living near mining sites, manufacturing facilities, or affected by battery-related activities. Input from and collaboration with local communities helps to better understand the on-the-ground impact of battery production and mining activities and can contribute to long-term and sustainable outcome. Hence, human rights and environmental NGOs specialised in the living of local communities could be an important stakeholder group.

Second, major actors in the upstream chain, namely small-scale miners and artisanal workers are not represented in the partnership. Especially in cobalt extraction, a significant portion of the raw materials is produced through ASM. Characterised by severe health and safety hazards, exploitation and environmental damage makes it necessary to include voices of workers working in this field. However, the GBA focuses on the inclusion of giant players like Glencore or Nornickel. This does not sufficiently reflect the full reality of the mining stage of battery

value chains. Even though the GBA does not directly target the ASM sector, transforming the battery value chain will require substantial improvements in ASM sector conditions.

Third, with regard to the private sector, the GBA primarily involves giant corporations with high market share and underrepresents less powerful actors like small and medium-sized companies. Instead, the partnership includes many industry giants, which risks further concentration of power and pushing smaller companies and alternative approaches into the background.

Fourth, the GBA does not include representatives of end-users, e.g., consumer associations. As the battery passport is meant to inform consumers about the battery's (sustainability) performance, it should be considered what they actually wish to know, which data is useful and in which way the data should be made transparent. Moreover, customers are relevant stakeholders because of product safety reasons. In this respect, consumer associations could be useful advocates and endorse more ambitious transparency goals.

Fifth, having analysed the current stakeholder structure according to a geographical dimension, the case study clearly shows an over-representation of entities based in the Global North, especially of the USA, the UK and Germany. As major parts of the battery value chain are located in less developed countries or emerging countries in the Global South, the GBA shows deficits in the involvement of relevant stakeholders. The inclusion of representatives of developing countries' governments could counteract this deficit and reveal insights from the ground. The participation of the multilateral development finance institution, African Development Bank, does, for instance, not sufficiently represent African stakeholders of the battery value chain.

(2) Procedural fairness

Chapter 5.3 shows that each GBA body represents stakeholders from the public, private, and social sector. This indicates that affected stakeholders do not only participate in the MSI but also have a voice and the ability to influence the processes and decisions. Active participation of the GBA's diverse members and representation in decision-making bodies is anchored in the GBA Charter, which supports an equal participation of all stakeholders and sets the basis for a level-playing field.

As an example, the Board of Directors, a major decision-making body within the GBA, shows a balanced representation of diverse stakeholders. It does not only include BASF and CATL as

major industry giants, but amongst others IndustriAll Global Union, research entities and the World Bank Group. In addition to the composition, voting held on a regular basis also ensures neutralisation of power differences in decision-making structures. The balanced representation shows exemplary that a wide range of stakeholders are not only included in consultation processes but also in decision-making processes.

Further proof of active participation is found when looking at the stakeholders who contributed to the development of the GBAs "products" (e.g., GHG Rulebook, HRI, CLI). For instance, as outlined in chapter 5.5.2, the GHG Working Group shows proportional representation of members from the various sectors (industry: 80%; civil society: 12%, governmental bodies: 7%).

A limiting factor is the voices not heard by important stakeholders that are excluded as identified within the previous assessment criteria. Thus, although active involvement of its participating stakeholders is ensured, the GBA fails to include major voices in decision-making processes with global implications (e.g., local communities in mining regions). With regard to the procedural fairness, it must also be noted that the GBA represents a wide range of interests, which is automatically connected to find common ground through trade-offs. To what extent certain stakeholders are actually able to influence decision-making and incorporate their perspective remains within the scope of this work open and its assessment requires insider insights.

(3) Consensual orientation

The analysis results suggest that the GBA succeeds in creating a culture of cooperation. When the Alliance was founded in 2017, there were already diverse stakeholders with different interests on board. Despite this diversity, it managed to develop key principles and a range of mutual values that since then have guide the GBA's work and that all participating stakeholders agree upon. Having analysed the public available documents, it seems like a variety of stakeholders welcome the GBA's actions. This is not only the case for representatives of the private sector, but also applies to rather marginalised stakeholder groups, such as NGOs or trade unions. Also, important industry giants (e.g., Audi, BASF, Umicore) welcome the foundation of the GBA, applaud its efforts and are willing to promote its projects (Pres_2). They acknowledge the need for industry cooperation and, for instance, see the establishment of the ten guiding principles as a "key milestone for the battery community" (Pres_2, Robert MacLeod, CEO of Johnson Matthey).

Despite the impression that stakeholders seem motivated to cooperate on a common ground, it is to be mentioned that the pluralism of perspectives makes consensus difficult. Conflicting interests and values are part of MSIs and thus unavoidable also for the GBA. Due to missing insights into bargaining and negotiation processes, it remains open to what extent the GBA manages to promote mutual agreements among participants, and how reasonable disagreement leads to mutual agreements. However, in general, there seems to be consensus among stakeholders that the instruments developed by the GBA can significantly enhance the sustainability performance of batteries. Regular meetings and consultation phases support the promotion of a consensual orientation.

(4) Transparency

The GBA is committed to transparency and anchored this as a core guiding value in the GBA Charter. After the analysis of publications and press releases, it can indeed be concluded that the Alliance provides regular updates on its projects and outcomes and ensures that stakeholders are informed about the organisation's work. However, a significant shortcoming is that potential critical information, like internal processes, voting results, or decision-making processes are not made publicly available. External stakeholders therefore cannot sufficiently assess how products like the GHG Rulebook, the HRI or the CLI have been developed, whose preferences have been included/excluded and which perspectives incorporated/neglected. A lack of transparent and frequent reporting about the Alliance's activities leads to the difficulty of evaluating progress and its performance as a MSI. The publication of meeting minutes and voting results could not only enhance the GBA's transparency, but also reveal power imbalances. In this respect, it should also be noted that more transparency is required when the GBA acts as a certificatory of quality seals as transparency is the foundation for its credibility.

This work understands transparency also as the degree to which external stakeholders are engaged. In this regard, it can be stated that the GBA's public consultation phase concerning the GHG generic rules positively affects the MSI's transparency performance. Also, within the Critical Materials Partnership, public consultations were included.

For the sake of enhanced transparency and accountability, it is suggested that the GBA should publish more information on its work and internal processes. This could include annual reports with updates (e.g., changes in governance structure), evaluation reports to share the progress on project implementation including challenges and lessons learned, internal meeting minutes, and a financial disclosure that reveals sources of funding, expenditures, and budget allocation.

At a later stage, when the GBA shows more tangible outcomes, impact reports are recommended. The transparency performance could also be increased by publishing a communication strategy that informs external stakeholders about the GBA's approach of how to share achievements, challenges, impacts, and updates.

6.2.2 Output legitimacy

(1) Coverage

The findings of the case study suggest that there is potential for broad endorsement of GBA definitions, methodologies, and rules among stakeholders along the global battery value chain and high coverage. Having the major industry players in mining, raw material processing, battery manufacturing and EV production on board, the variety of stakeholders points to the ability that a large share of batteries placed on the market can potentially be influenced by the GBA's sustainability requirements. Besides covering the full battery value chain with regard to its functional segments, the GBA works on a global scale going beyond specific regions or countries. Seeking to reach out to battery producing and consuming regions across various continents suggests a global reach and thus high coverage potential. When piloting the Battery Passport, the GBA itself states that

> *"The group of battery producers who participated in this piloting exercise represent over 53% of the global EV battery cells market share […]. The participating OEMs represent 67% of the US Electric Vehicle market […]. The three cobalt producers who participated in the GBA pilots, represent the top three cobalt producers in the world in 2022 with 36% share in mine production."* (Publ_22, 4)

This indicates that already a high number of corporate actors is directed towards working with the GBA and shows willingness to actively implement solutions developed by the GBA.

By defining itself as a pre-competitive partnership, already participating stakeholders are motivated to not seeing compliance to GBA rules as a competitive disadvantage or as cost intensive. The fact that industry leading MNCs visibly participate in the GBA can further contribute to high coverage as smaller and medium-sized companies will follow due to potential competitive disadvantages when not taking part. By seeking to make non-compliance a competitive disadvantage, the GBA aims to include even more stakeholders. In this regard, Markus Duesmann, Chair of the Board of Management of Audi AG, states that "going forward, we hope many other organizations, regulators and industry players will join to make the Battery Passport a real shared global standard" (Pres_8).

Another aspect that promises high coverage is the GBA's partnership approach, which means that the GBA's supporters also include other initiatives like the EITI. This can leverage not only expertise and resources, but also the global reach. With multiple partnerships working together on a shared objective, the author argues that progress can be accelerated.

Even though the GBA shows potential for high coverage, at the time of writing, it is too early to assess its actual performance with regard to this output legitimacy criteria. The GBA does not yet act as a certifying body, evaluating the number of rule-targets following the GBA rules is thus not yet possible. This remains open for future research.

(2) Efficacy

The case study conducted in chapter 5 revealed the GBA's commitment to address key concerns within the battery value chain as shown in chapter 4.2. The activities and implementation mechanisms of the GBA are directed towards social and environmental upgrading and thus towards driving sustainability in battery production. Each of the three Action Partnerships contributes to this in a specific way.

With the Battery Passport Partnership, the GBA develops an instrument that enhances transparency, enables benchmarking, and allows progress tracking. Based on the rationale "what you measure, you can manage and what you manage, you can improve", the GBA identifies indicators for social and environmental performance. Both the GHG Rulebook, the HRI, and the CRI directly address concerns that are highly present in the battery value chain: GHG emissions, child labour, and human rights violations. The development of uniform indicators can significantly speed up the process of alignment. As the GBA defines what a sustainable battery value chain means, it provides clarity to distinguish between sustainable and unsustainable value chains. In doing so, a commonly criticised shortcoming of MSIs, namely that "few current MSIs explicitly address the natural and social thresholds in which the supply chain operates" (Searcy 2017, 5), does not apply. The identification of such indicators can thus be seen as an indication that the problem and challenges are identified correctly and can be a starting point to induce social and environmental change. Stakeholders also welcome the indices. For instance, Inga Petersen, Executive Director of the GBA, said:

> *"These are the first universally applicable indices to measure and score companies' efforts to control risks and drive positive impacts in relation to child labour and human rights in battery supply chains. The indices are applicable to every enterprise that participates in our flagship Battery Passport or is involved in the production, trade or transportation of battery components. We hope that they will help meaningfully reduce*

> *the likelihood and severity of human rights violations and child labour in the battery value chain."* (Pres_7)

Tom Einar Jensen, CEO of FREYR, adds:

> *"For many new companies like FREYR, the GBA Human Rights and Child Labor Indexes provides both insights as well as guidance on how to secure the rights of all people. We have already learned from this work and will implement the steps and requirements into our processes, contracts and conversations."* (Pres_7)

Referring to the Battery Passport, Robert Habeck, German Minister for Economic Affairs and Climate Action, states:

> *"The Battery Passport proof-of-concept presented today is a very impressive first tangible result of the GBA, which my ministry has been supporting since 2019. The Battery Passport is a pivotal embodiment of the digital and green "twin transition" – it utilises the digital world to facilitate the decarbonisation of the real world and to promote circularity. We believe that global progress in green technologies is most efficient when we rely on globally compatible standards and a level playing field to minimize frictions between different markets in the industries we need to transform. Therefore, GBA's work as an international actor is so important."* (Pres_8)

The Critical Minerals Partnership, which encompasses the Critical Minerals Advisory Group and the Cobalt Action Partnership, directly addresses concerns and risks associated with the mining stage of batteries. By defining a common set of expectations for a responsible cobalt value chain, by facilitating dialogue/learning, and sharing best practices amongst key stakeholders, it can be assumed that the GBA follows an appropriate approach to address challenges in the mining stage. This has the potential to induce social and environmental upgrading and to bring change to the global battery value chain. Albeit the partnership is directed at relevant issues, the efficacy performance cannot be assessed properly due to limited data about respective activities or progress in this field. This also applies to the third action partnership.

Under the Energy Access and Circularity Partnership, the GBA creates technical and regulatory guidelines for circular battery value chains which drives the reduction of currently existing challenges and barriers and promotes circularity. Given recommendations for public and private stakeholders can stimulate regulatory change and drive the creation of a circular-favourable environment. It remains to be seen, how this Action Partnership can unfold impact on the world's battery industry.

Accordingly, it seems like the GBA creates appropriate, suitable, and relevant solutions for the challenges it aims to address. Bringing together a variety of involved stakeholders is a crucial

element for complex issues (chapter 2.1.2) like the challenges associated with the global battery value chain (chapter 4.3). The GBA has already created awareness and alignment, a common vision and therefore sets the ground for collaborative efforts. With the Battery Passport pilot, it shows the feasibility of the digital product passport concept and the "readiness of industry to absorb standardized approaches" (Publ_22, 9). It also follows a policy advocacy approach by supporting the creation of policies that foster sustainable battery production and recycling. However, defining and setting standards does not automatically lead to a more sustainable performance of battery value chains, and nor does pure dialogue and consultation. An adequate fit to the issue needs more extensive action and the translation of recommendations into concrete actions. Whether current implemented activities unfold impact on the ground remains to be seen. Only then, the extent to which the developed GBA rules address the issue at hand can be evaluated properly. It is also too early to examine if the GBAs efforts affect the stages of the battery value chain and whether they lead to progress towards sustainability.

(3) Enforcement

At the time of writing this work, it is not possible to evaluate the enforcement criteria for output legitimacy. The GBA does not yet implement rules to the degree that verification procedures are required. However, to a later stage of the GBA's work, it must be evaluated if, how, and by whom compliance to rules is verified and non-compliance sanctioned. When acting as a certification body, the GBA needs to evaluate whether self-monitoring by the firm, monitoring by the GBA or monitoring by a third independent certification body shall examine the firm's compliance to the rules.

Experiences from other MSIs reveal that enforcement is a critical issue within MSIs. Other MSIs, such as the RSPO, RTRS, and FSC show failures in sufficiently complying to certain standards or only show compliance on the surface (Brown et al. 2019, 389). As already stated in chapter 2.2.3 it can be difficult for MSIs to implement enforcement mechanisms as MSIs by nature are an instrument of soft regulation. However, for industry-specific MSIs like the GBA, standards developed by a MSI can have the effect of being perceived as the industry standard and thus as "no longer truly voluntary but de facto binding" (Baumann-Pauly et al. 2017, 776).

Summarising the input and output legitimacy performance, the GBA can be assessed as a MSI with strengths and weaknesses. On the input side, a strong consensual orientation based on mutually agreed-upon principles and values sets the basis for legitimacy. The inclusive

stakeholder representation covering a wide range of public, private, and social sectors, including those typically marginalised in MSIs (e.g., trade unions) supports the Alliance being perceived as a rightful authority with the ability to regulate. This is further strengthened by statements of participating stakeholders that were found in the analysed publications and press releases. As diverse stakeholders do not only support the Alliance but are included in decision-making, have active roles, and jointly develop the GBA's projects, the input legitimacy is fostered, too. Major deficits, however, are found in the under-representation or exclusion of several stakeholder groups, and in the weak transparency regarding internal procedures. On the output side, first tangible results like the Battery Passport including the developed GHG Rulebook, CLI, and HRI point to the GBA's capacity to take a regulatory role. The assessment shows that the GBA is perceived as a MSI that can create a level-playing field and accelerate alignment among stakeholders. The currently implemented three action partnerships are targeted towards addressing major concerns in the global battery value chain and suggest that the problems have been identified correctly. However, it is still too early to evaluate whether the GBA's activities will unfold impact. The current state of the Alliance (i.e., its limited tangible outcomes and the lack of implementation of its certification activities) allows only a limited assessment of its output legitimacy and calls for a follow-up analysis.

6.3 Main conclusions

This section discussed the results of the analysis conducted in chapter 5 under consideration of the conceptual framework outlined in chapter 2 and the case study background as pointed out in chapter 4. The research question that guided the work is:

What is the role and legitimacy of the Global Battery Alliance as a multi-stakeholder initiative and how does it contribute to the governance of global battery value chains?

As a MSI that has evolved rapidly since its foundation in 2017, the GBA is the largest multi-stakeholder approach committed to enhancing sustainability in the battery value chain sector. By practicing several roles, it can be defined as an actor in the regulatory governance of the global battery value chain. In this work, seven roles were identified. These are (1) situating the problem and creating a collective understanding, (2) providing a platform for exchange, (3) carrying knowledge and disseminating information, (4) fostering trust and a level-playing field, (5) promoting value chain transparency and aggregating data, (6) linking and interacting with regulatory governance actors, and (7) defining standards and thresholds.

Given the complexity of regulating a complex GVC like the battery's, this work argues that a cooperative approach can address governance gaps, which are indicated by social, environmental, economic, and governance concerns. The strength of the GBA with regard to its regulatory capacity lies in its ability to bring together a wide range of regulatory actors, to support the implementation/to push the development of public governance measures, to consider the pressure of social actors, and to trigger change in the private sector. As a MSI, the GBA engages with policymakers and different regulators to advocate for sustainable battery production, use, and recycling. Through its cooperative approach, it can influence and shape the global regulatory environment of battery value chains.

This work argues that a prerequisite for the GBA's potential to contribute to the regulatory governance is legitimacy. Both from the input and output legitimacy point of view, the GBA shows strengths and weaknesses. Weaknesses identified as above need to be addressed in order to reach credibility and effectiveness and strengths need ongoing assessment.

Summarising, the GBA contributes to the governance of global battery value chains by applying an inclusive cooperative approach and by taking several roles whose ability to do so is affected by its degree of legitimacy.

The work also discovers that the GBA shows several success factors for a MSI as outlined in chapter 2.2.4. It creates a shared spirit and mechanisms for broad engagement of a diverse range of stakeholders that drive the GBA's work towards a common vision. Goals are not only known and jointly developed among all stakeholders, but also clearly defined with a time dimension (until 2030) and in a measurable way (as far as possible). A clear internal structure and defined roles and responsibilities can further contribute to the MSI's success and strengthen broad ownership. Moreover, being coherent with other partnerships and aligned with international principles and guidelines, the partnership seems to be a promising complement to the existing regulatory framework for the battery industry. However, it is necessary to continuously observe the political, social, and economic context and being able to flexibly adapt to changing environments and problem-structures (e.g., entry into force of new legislation, need for new raw materials through innovative battery solutions, emergence of new local or global risks). The success of the GBA will depend on many factors, including an ongoing understanding of local, national, and international contexts, a large commitment amongst its stakeholders, and the leadership and its ability to develop feasible solutions for the whole wide-ranging industry. Monitoring and evaluation processes are needed to track its progress and development.

In a nutshell, the work discovers the potential for the GBA to be a good-practice example for a MSI that can drive positive change in the battery value chain. As the battery value chain also includes stages that apply to other industries (e.g., raw material mining), the GBA has high leverage potential for other industries.

7 Conclusion

The goal of this thesis was to explore the role of the GBA as a MSI and embed it into the concept of governing GVCs. It intended to address the research gap on the GBA as a MSI within the regulatory governance of the global battery value chain. The last chapter summarises this work (7.1), reveals its limitations as well as the need for further research (7.2), and gives an outlook on the discussed industry (7.3).

7.1 Summary

This work conducted a single-case study within the context of a specific GVC and analysed an industry-specific MSI that aims at enhancing sustainable practices in the global battery value chain. The underlying research question was:

What is the role and legitimacy of the Global Battery Alliance as a multi-stakeholder initiative and how does it contribute to the governance of global battery value chains?

For the purpose of answering the research question, the work began with introducing two conceptual pillars. First, the framework of *Global Value Chains* and its key concept of regulatory governance revealed the complex nature of GVCs and their need, yet challenge, of governance. Because of the immense social and environmental risks resulting from geographically and functionally fragmented business activities, several regulatory actors develop mechanisms that aim at mitigating negative externalities. The regulatory environment of GVCs is diverse and ranges from public, private to social actors, from voluntary to mandatory instruments, from public-initiated to private-initiated, from local to international, and from industry-specific to industry-overarching. Still existing governance gaps suggest the need for cooperative governance solutions. Hence, the work introduced in its next step the concept of *Multi-Stakeholder Initiatives* as an instrument of cooperative governance. Defined as collaborative efforts of various stakeholders working towards a common challenge, MSIs can be seen as vehicles to enhance sustainability in GVCs. When designed properly, they leverage resources from a diverse range of stakeholders (e.g., governments, NGOs, companies,

international organisations, academia) for the purpose of achieving a common goal. MSIs are associated with several roles, e.g., they provide learning platforms, develop behavioural standards, develop mechanisms of auditing and compliance of rules, and issue labels and certifications. The concept is based on the rationale that no stakeholder alone can solve a complex issue such as the governance of GVCs, but instead it needs both governments, companies, the civil society, and researchers.

The need for cooperation in the battery value chain context is revealed in the next step. Clearly associated with severe economic, environmental, social, and governance challenges with impacts ranging from the local to the global level, especially in the raw material mining stage, indicates that existing public, private, and social governance instruments lack effectiveness and call for collaborative efforts in order to enhance the sustainability of the global battery value chain. The need for a global multi-stakeholder approach is further reinforced by the complexity of EV battery value chains, which consists of sliced production processes, stages from mining to recycling and business activities all around the world, and its still evolving character. Based on the assumption that the multi-dimensionality and global nature of problems requires multi-dimensional and global solutions, the Global Battery Alliance was selected as a research object.

Based on an extensive document analysis and using publicly available data, a single-case study on the GBA as the largest MSI in the battery value chain area was conducted. In a first step, thick descriptions gave insights into the GBA's formation and rationale, mission and objectives, governance and decision-making, stakeholder participation, and activities and implementation mechanisms. The intensive examination of the MSI set the basis for assessing its role, as well as input and output legitimacy. The author identified several roles of the GBA as a MSI in the context of regulatory GVC governance. Accordingly, the GBA situates the problems with regard to the battery value chain and supports a collective understanding. It creates a space where a wide range of stakeholders come together and can exchange and mutually learn from each other. The GBA also functions as a knowledge carrier, disseminates industry-specific information, and serves as an actor that fosters trust and a level playing field. In doing so and by jointly working towards a digital battery passport, it promotes transparency and aggregates data along the entire battery value chain, which was identified as a key requirement for sustainability assessments. Bearing in mind its vision to create a sustainable battery value chain by 2030, the GBA defines standards and thresholds both for the environmental (GHG emissions) and the social (child labour, human rights) perspective. Last, the partnership links public, private, and social governance actors, interacts with them and creates a space for mutual

exchange, which can facilitate alignment and enhancement of the regulatory framework in which the battery is situated.

Following the holistic identification of the roles, the GBA's input and output legitimacy was evaluated based on a political science concept operationalised by Mena and Palazzo (2012). Regarding the input dimension, the GBA shows strong procedural fairness, extensive but partly deficient stakeholder inclusion, a promising consensual orientation, but a lack of transparency. Regarding the output dimension, it is too early for a precise evaluation, as the GBA is not yet acting as a certifier and measures are still under development or in the early stages of implementation. However, the analysis reveals promising chances as its action partnerships are directed towards addressing major concerns in the global battery value chain and as it succeeded in getting many different stakeholders, including industry giants, on the same board.

In a nutshell, the GBA shows promising strengths with regard to its regulatory capacity because of its ability to bring together a wide range of regulatory actors. As a MSI, the GBA engages with different regulators including policymakers, companies, and the social sector and works together with knowledge partners to advocate for sustainable battery production, use, and recycling. Through its cooperative approach, it shows potential to influence and shape the global regulatory environment of battery value chains. According to the author, the GBA shows potential in being perceived as a rightful authority to support the regulation of the global battery value chain and has the ability to do so. Regarding theoretical discussions about MSIs, the author identifies the potential of the GBA in being defined as a good-practice example.

7.2 Limitations and need for further research

This work is subject to several limitations. Regarding the conceptual chapter, it must be mentioned that the literature on GVCs and MSIs is too vast to cover all its details. Therefore, the work focuses on selected aspects and presents existing debates in a simplified form. The regulatory governance of GVCs and the role of public, private, and social actors, for instance, are topics widely discussed in academic literature. Regarding the methodology, besides the shortcomings already mentioned in chapter 3.4, the work recognises that its industry focus does not deliver findings for MSIs operating for sustainable GVCs in general. The GBA operates in a sector with special characteristics, such as the extraction of raw materials or the concentration on certain companies and countries. Due to industry- and GVC-specific contexts and needs, the results do not allow conclusions for other MSIs, however, may indicate the need for research on other initiatives. Additionally, the work recognises its limitation that an in-depth evaluation

could not be conducted due to the GBA's still early phase. Defining the ultimate role of the GBA and its legitimacy is an ongoing process and goes beyond the scope of this work. The work, thus, sees its obtained findings as first insights and as a starting point for further research.

The work recommends strengthening the academic literature on public-private cooperation in the battery value chain. As of its dynamic nature, burgeoning market prospects, and immense sustainability concerns, the battery industry is likely to remain high on the political, economic, social, and academic agenda. Further empirical research is needed to discuss effective ways to govern the global battery value chain and to close regulatory governance gaps. The author also suggests research on the interlinkage between public, private, and social regulatory mechanisms in this industry and investigations to find whether and how they are mutually reinforcing.

7.3 Outlook

The battery is crucial for the energy and mobility transition and has opened a door to decarbonise transport and energy, thus combating climate change. Its industry is experiencing an immense flow of resources and investments, and simultaneously attracts investors due to its high market potential (Wood 2021). For example, the entire lithium-ion battery value chain is estimated to annually grow over 30% from 2022 to 2030, which then could lead to a value of more than $400 billion and a capacity increase from 700 GWh in 2022 to 4,700 GWh in 2030 (Publ_15). The mobility sector is predicted to account for the largest part of the expected market growth, followed by the stationary storage sector (Publ_15). The "imperative to reduce climate change through electrification of mobility and the broader energy transition" (Publ_15) is expected to further drive the global demand for batteries and revise estimated market figures upwards. Favourable government policies, e.g., the European Green Deal with its envisioned decarbonisation of the energy system and emission reduction in the transport sector as well as the EU's strategic action plan on batteries, also contribute to this trend (ECA 2023, 4).

The battery value chain, especially the mining stage, currently relies on environmental and social harming practices, and its market growth is expected to be limited by the supply of essential raw materials like cobalt or lithium. Large-scale investments in research and development address these challenges and shall drive advancements in battery science and technology. For instance, new technologies like solid-state batteries aim at increasing the energy density of batteries and extend their lifetime (Wood 2021). There are also efforts to reduce the demand for critical materials, as evident from the sodium-ion technology, which

does not rely on scarce resources like lithium but uses widely available and less cost intensive resources like sodium-salt (Campbell 2022).

The rising demand of battery goes along with emerging business models like "battery as a service" (BaaS) (Bridge and Faigen 2022, 14). By offering battery leasing rather than selling them through the EV purchase, companies intend to lower the price for vehicle consumers, enhance battery performance by swaps, gain access to data such as battery use and health, and get minerals, which can be used for reuse, recycling or repurposing at the batteries' end-of life (Bridge and Faigen 2022, 14). Nissan, for instance, is able to use EV batteries for street lighting and energy-storage systems (Bridge and Faigen 2022, 14). The "evolution of value capture strategies around batteries, from a product offer to a service, aligns with increasing concerns about access to minerals and governance of their environmental and social impacts" (Bridge and Faigen 2022, 15).

In order to reduce reliance on mining and respectively dependence on raw materials, the battery value chain needs to develop from a linear to a circular value chain. Keeping materials in circulation does not only protect the environment from further degradation but also brings economic benefits like additional value creation and resilience against supply bottlenecks and price volatility (Publ_15). Besides re-use, the recycling of batteries is crucial, both from an environmental and a material perspective (Wood 2021). Millions of tonnes of lithium-ion batteries are expected to retire until 2030, which does not only result in a vast amount of electronic waste but also in safety and environmental concerns and a lot of capacity left at the end of first-use batteries. The recycling industry is booming and start-ups dedicated to disassembling batteries and extracting valuable metals are mushrooming (Lim 2021). However, challenges due to the complex designs of batteries require further research and development as well as supporting legislation. For instance, the EU Battery Regulation already sets ambitious requirements for recycling and levels of recovered material, which supports closing the loop for the materials contained in the battery (European Commission 2023). Ultimately, circularity in the battery value chain requires both an advanced regulatory framework and cross-industry collaboration that stimulate data transparency and harmonised standards (Publ_15). The EU Battery Regulation and the Global Battery Alliance offer a promising outlook (Barkhausen et al. 2022, p. 1).

Summarising, current discussions about sustainability and transparency in the battery value chain are highly likely to continue in the future as the industry and its manufacturers are under even more public scrutiny than other industries (Betz et al. 2020, 22). Downstream value chain

actors are responsible for addressing the challenges and concerns in the upstream stages, while also acknowledging the civil society's relevance of exerting pressure and the public sector's role to define a legislative framework that supports sustainability and circularity of the entire global battery value chain.

Last, it should be critically noted that initiatives like the Global Battery Alliance support the framing of the battery as a per se good technology that enables a sustainable future and green growth. However, the author claims that a truly just transition requires the reduction of the material footprint, which in the case of the mobility sector means more public transport and a systemic change in our attitudes towards cars. The Global Battery Alliance, however, is "pushing to further scale up the production and consumption of EVs" (SOMO 2020, 45). This should also be kept in mind when evaluating the role and legitimacy of the Global Battery Alliance.

This work concludes with an urgent call for increased efforts to mitigate social and environmental risks along the battery value chain. Only then can the battery contribute to sustainable development and a just energy and mobility transition.

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Appendix

Appendix 1: Risk covered by due diligence requirements of the Battery Regulation

Risk category	Further specification
(a) environment, climate, and human health considering direct, induced, indirect and cumulative effects, including but not limited to:	- air, including but not limited to air pollution, including greenhouse gas emissions - water, including seabed and marine environment and including but not limited to water pollution, water use, water quantities (flooding or draughts) and access to water - soil, including but not limited to soil pollution, soil erosion, land use and land degradation - biodiversity, including but not limited to damage to habitats, wildlife, flora and ecosystems, including ecosystem services - hazardous substances - noise and vibration - plant safety - energy use - waste and residues
(b) human rights, labour rights and industrial relations, including but not limited to:	- occupational health and safety - child labour - forced labour - discrimination - trade union freedoms
(c) community life, including that of indigenous peoples	

Source: European Commission 2023, Annex

Appendix 2: Civil Society's Principles for Businesses and Governments

Business	**Governments**
1. Respect human rights and the environment	1. Legally require businesses to respect human rights and the environment
2. Recognize the wide range of human rights that could be impacted	2. Enforce regulations to ensure respect for rights
3. Find solutions, do not run away	3. Enforce environmental protection laws
4. Be transparent	4. Investigate and respond to human rights and environmental abuses, ensuring access to remedy
5. Respect and work with affected communities and indigenous peoples	5. Work jointly to address human rights and environmental risks linked to business activities
6. Respect the rights of workers	6. Eliminate and penalize corruption
7. Businesses should regard environmental and human rights defenders as allies, not opponents	7. Oppose deep sea mining activities
8. Business must conduct assessments of the human rights risks linked to their security arrangements	8. Support policies to reduce reliance on car travel and the number of cars on the road
9. Do not pay bribes, tackle corruption	9. Set deadline to end sales of new internal combustion engine vehicles in line with science-based 1.5-degree emissions reductions targets
10. Refuse minerals from the seabed	10. Set standards for energy efficiency of products and vehicles to save electricity and resources
11. Pursue resource efficient design, repair, and reuse	11. Enforce minimum lifetime requirements for batteries
12. Work towards maximum recycled content in batteries and safe design and recycling	12. Mandate repair, collection and recycling
13. Transition from the Internal Combustion Engine (ICE) as soon as possible	13. Ensure a rapid transition to 100% renewable energy grid
14. Support rapid transition towards 100% renewable energy grid	14. Require battery carbon footprint reporting and set minimum thresholds

Source: Amnesty International 2022, 1-12

Appendix 3: GBA bodies and its tasks

Body	Tasks
Board of Directors	– reviewing and approving the Strategic Plan and Budget and, as needed from time-to-time, reviewing and approving any material changes to the approved Strategic Plan and Budget; – reviewing and approving the draft Policies; the Policies will not be effective unless approved by the Board of Directors; – review and approve amendments of this Charter; – reviewing and commenting on the Annual Reports, which are prepared in accordance with section 10.1.3(h); – promoting the work of the Alliance where appropriate; – actively participating in events organized under the auspices of the Alliance (as relevant); – facilitating the engagement of and the dialogue between key stakeholders to further the work of the Alliance; – facilitating the fundraising efforts of the Secretariat (as relevant); – appointing a service provider and/or the hiring of GBA staff; – establishing a process for consulting with non-member governments and civil society; – mandating the conduct and reviewing the results of an annual financial audit of the GBA.
Executive Committee	– reviewing the draft of the Strategic Plan and Budget prepared by the Secretariat for final review and approval by the Board of Directors and as needed, reviewing any material changes to the Strategic Plan and Budget for final review and approval by the Board of Directors in accordance with the process set out in section 11; – supervising the work of the Secretariat; – monitoring the activities of the Action partnerships/Working Groups to ensure that they are consistent with the approved GBA Strategic Plan and Budget; – commenting on Annual Reports prepared by the Secretariat with respect to the Alliance's performance and the impact of the Alliance's work against its Purpose, Vision, Mission, Principles, and Values; – reviewing and recommending for approval by the Board of Directors any amendments of this Charter. **Chair:** – chairs meetings of Executive Committee after developing the agenda with the Secretariat; – raises key issues and builds consensus with the Board of Directors; – in conjunction with the Secretariat, Treasurer, and Board of Directors, tracks the performance of the Alliance's achievement of goals and financial health; – leads the Board of Directors and Executive Committee with the Vice Chair, Treasurer, and Immediate Past Chair (At-large position when there is no Immediate Past Chair), and Secretariat; – helps guide and mediate Executive Committee and the Board of Directors actions with respect to organizational priorities; – serves as one of the spokespeople for the Alliance in alignment with its vision, mission and purpose; – along with the Board of Directors and Secretariat, ensures the Alliance's strategy aligns to the agreed-upon vision and ensures that the strategy is being followed over time; – leads the performance review process for the Secretariat.

	Vice Chair: – serves on the Executive Committee with the Chair, Treasurer, Secretariat and Immediate Past Chair (At-large position when no Immediate Past Chair); – participates closely with the Chair to develop and implement leadership transition plans. **Treasurer:** – works with Secretariat and the Budget Committee to present annual budget to the Board of Directors; – ensures development and Board of Directors review of financial policies and procedures; – in conjunction with Secretariat, develops a financial risk mitigation plan; – serves on the Executive Committee with the Vice Chair, Secretariat and Immediate Past Chair (At-large position when no Immediate Past Chair); – serves as Chair of the Budget Committee with Board members and at--large members; – oversees the completion of financial reports; – oversees the audit of the organization's financial practices and financial performance.
Supervisory Council	– overall guidance and stewardship; – promoting the Alliance; – actively participating in events organized under the auspices of the Alliance; – supporting the engagement of and the dialogue between key stakeholders to further the work of the Alliance; – supporting the fundraising efforts of the Secretariat.
Action Partnership/ Working group	**Chair:** – reporting to the Board of Directors any matters concerning the Action partnership/Working Group, the relevant Project and any other information which may be relevant to other Action Partnership/Working Groups or the Alliance; – establishing task forces, committees, or other best practice groups to carry out the work of the Action Partnership/Working Group; – moderating meetings of the Action Partnership/Working Group.
Secretariat	– the day-to-day management of the Alliance; – on-going communications to membership on the status and affairs of the GBA – conducting Due Diligence and making recommendations regarding approval of a member to the Board of Directors in accordance with the process set out in section 3.2; similarly, investigating the potential occurrence of a Removal Event in relation to any Member and making a recommendation to the Board of Directors about such removal (as required) in accordance with the process set out in section 3.5; – drafting the Strategic Plan and Budget for the Executive Committee to review before it is submitted to the Board of Directors for its approval in accordance with the procedure set out in section 11; – proposing to the Executive Committee expenditures outside of an approved Budget during the year for the Executive Committee to review and, if it deems appropriate, submit to the Board of Directors for its approval; – organizing the virtual and in-person meetings of the Board of Directors, the Executive Committee, and the Working Groups, including working with the Chairs on the agenda for such meetings, sending invitations to participants, preparing the minutes of these meetings, distributing them for comments and finalizing and circulating such minutes to the relevant stakeholders; – organizing the Annual General Assembly and other regional Alliance events;

	– tracking and documenting the progress of the work of the Alliance for the Board of Directors and collating this information annually into a report to be shared with the relevant stakeholders (“Annual Report”); – fundraising; – facilitate the engagement of members and stakeholders; – member recruitment.

Source: Publ_18

Abstract

The rapidly growing battery industry for electric vehicles is associated with increasing concerns regarding its value chain. Global social and environmental risks, especially in the raw material mining and processing stages, call for regulation and cooperative efforts of stakeholders both within and outside the global value chain. Multi-stakeholder initiatives as regulatory governance instruments bring together public, private, and social actors potentially serving as a vehicle for addressing risks and challenges within the complex nature of global value chains. The objective of this paper is to gain an in-depth understanding of the Global Battery Alliance as the world's largest partnership in the battery value chain sector aiming at creating a sustainable global value chain. Conducting a single-case study and based on an extensive document analysis, this work analyses the partnership by focusing on five dimensions: (1) formation and rationale, (2) mission and objectives, (3) governance and decision-making, (4) stakeholder participation, and (5) activities and implementation mechanisms. Producing rich descriptions sets the foundation for exploring the role of the Global Battery Alliance as a multi-stakeholder initiative and for assessing its input and output legitimacy. The work builds on two conceptual pillars, namely on the concept of governing global value chains and on multi-stakeholder initiatives as an instrument for regulatory governance.

Key words: multi-stakeholder initiative, global value chain, regulatory governance, battery industry, input and output legitimacy

Zusammenfassung

Die rasant wachsende Batterieindustrie für Elektrofahrzeuge geht mit zunehmenden Bedenken hinsichtlich ihrer Wertschöpfungskette einher. Globale soziale und ökologische Risiken, insbesondere in der Phase der Rohstoffgewinnung, erfordern eine Regulierung und kooperative Bemühungen von Akteuren innerhalb und außerhalb der globalen Wertschöpfungskette. Multi-Stakeholder-Initiativen als Regulierungsinstrumente bringen öffentliche, private und soziale Akteure zusammen und können als Instrument zur Bewältigung von Risiken und Herausforderungen innerhalb der komplexen Natur globaler Wertschöpfungsketten dienen. Ziel dieser Arbeit ist es, ein tieferes Verständnis der Global Battery Alliance, der weltweit größten Partnerschaft im Bereich der Batteriewertschöpfungskette mit dem Ziel der Schaffung einer nachhaltigen globalen Wertschöpfungskette, zu erlangen, Im Rahmen einer Einzelfallstudie und auf der Grundlage einer umfassenden Dokumentenanalyse wird die Partnerschaft anhand von fünf Dimensionen analysiert: (1) Gründung und Grundprinzipien, (2) Mission und Ziele, (3) Governance und Entscheidungsfindung, (4) Beteiligung von Interessensgruppen und (5) Aktivitäten und Umsetzungsmechanismen. Detaillierte Beschreibungen bilden die Grundlage für die Untersuchung der Rolle der Global Battery Alliance als Multi-Stakeholder-Initiative und für die Bewertung ihrer Input und Output Legitimität. Die Arbeit stützt sich auf zwei konzeptionelle Säulen, einerseits auf das Konzept der Governance globaler Wertschöpfungsketten und andererseits auf Multi-Stakeholder-Initiativen als entsprechendes Governance Instrument.

Schlüsselwörter: Multi-Stakeholder-Initiative, globale Wertschöpfungskette, Governance, Batterieindustrie, Input- und Output-Legitimität