An Assessment of Whether the Critical Minerals Boom and Green Transition Can Be Leveraged for Zambia's Industrialisation and Economic Development: Spotlight on the Copper Mining Sector

By

Victor Amedzo Kanyama

(KNYVIC001)

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PLAGIARISM DECLARATION

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Student number	KNYVIC001
Student name	VICTOR AMEDZO KANYAMA
Signature of Student	Signed by candidate
Date:	02/07/2025

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ABSTRACT

This study assesses whether Zambia can leverage the critical minerals boom and the global green transition to drive its industrialisation and economic development. As a major copper producer, Zambia holds strategic importance in supplying minerals essential for renewable technologies such as electric vehicles, solar panels, and energy storage systems. However, the country's ability to capitalise on this demand hinges on strengthening productive linkages, integrating into regional and global value chains, and navigating geopolitical competition. The research examines historical policy shifts, the structural barriers that have limited Zambia's economic diversification, and the role of governance and industrial policy in unlocking value addition. The study evaluates Zambia's forward and backward linkages, identifying challenges such as weak local beneficiation, foreign dominance in mining procurement, and policy inconsistencies that constrain industrial growth. Regional collaboration, particularly through Zambia's partnership with the DRC, is explored as a potential avenue for enhancing midstream processing and attracting investment into battery precursor production. Additionally, the geopolitical landscape—marked by competition between the United States, China, and emerging investors—is analysed in relation to Zambia's strategic positioning in the global copper supply chain. Using semi-structured interviews and document analysis, the study outlines actionable policy pathways for Zambia, including industrial strategy refinement, local content enforcement, and institutional reforms. It argues that with coherent policy implementation, infrastructure investment, and a balanced geopolitical approach, Zambia can transition from a raw material exporter to a key player in mineral-based industrialisation, securing long-term economic benefits from the green transition.

Key words: Critical minerals, Green transition, Mineral-Based Industrialisation (MBI), Productive linkages, Downstream, Upstream, Global Value Chains (GVCs), Regional Value Chains (RVCs).

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LIST OF ABBREVIATIONS AND ACRONYMS

8NDP	Eighth National Development Plan
AAC	Anglo American Corporation
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AI	Artificial Intelligence
ANRC	Africa Natural Resources Management and Investment Centre
BSAC	British South Africa Company
COP	United Nations Climate Change Conference
CORFO	Chile's Economic Development Agency
COVID-19	Coronavirus Disease 2019
CSIS	Centre for Strategic and International Studies
CSO	Central Statistics Office
DA	Development Agreement
DRC	Democratic Republic of Congo
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
FQM	First Quantum Minerals
GDP	Gross Domestic Product
GVC	Global Value Chain
IEA	International Energy Agency
IMF	International Monetary Fund
IRP	Integrated Resource Plan
ITA	International Trade Administration
KCM	Konkola Copper Mines
LCP	Local Content Policies
MCM	Mopani Copper Mines
MoU	Memorandum of Understanding

MMD	Movement for Multi-Party Democracy
NIP	National Industrial Policy
PBO	Parliamentary Budget Office
PF	Patriotic Front
PPP	Public-Private Partnership
RST	Roan Selection Trust
RVC	Regional Value Chain
SADC	Southern African Development Community
SAIPAR	Southern African Institute for Policy and Research
SIAZ	Solar Industry Association of Zambia
TA	Thematic Analysis
TVET	Technical Vocational Education and Training
UAE	United Arab Emirates
UCT	University of Cape Town
UNCC	United Nations Climate Change
UNIP	United National Independence Party
UPND	United Party for National Development
US	United States
ZAM	Zambia Association of Manufacturers
ZNBC	Zambia National Broadcasting Corporation
ZCCM-IH	Zambia Consolidated Copper Mines Investments Holdings
ZCM	Zambia Chamber of Mines
ZDA	Zambia Development Agency
ZIMCO	Zambia Industrial and Mining Corporation

CHAPTER 1
INTRODUCTION

1.1 Introduction

Copper mining has long been a cornerstone of Zambia's economy, contributing significantly to the country's Gross Domestic Product (IMF, 2023). Ranked seventh among the world's largest copper producers according to ITA (2022), Zambia's copper reserves are not only economically vital but also critical for the global green energy transition. In the context of renewable energy, Zambia's copper industry has the potential to play a transformative role in regional and global value chains.

Zambia can strengthen its copper industry's role in industrialisation and economic development by shifting from an export-oriented model to one that fosters effective upstream and downstream linkages. These linkages would support the production of value-added goods, such as components for renewable energy technologies like solar panels and wind turbines. This approach would enhance local content, create jobs, and improve Zambia's position in global value chains. In the current landscape, Zambia can strategically leverage its copper resources by capitalising on the critical minerals boom driven by the global green transition.

The global push for a green transition or drive towards renewable energy gained momentum in 2015 with the Paris Agreement, where nations committed to addressing climate change (UNCC, 2022). This commitment was reinforced at subsequent summits, including COP26, where industrialised nations pledged to achieve net-zero carbon emissions by 2050 (Bouckaert, et al., 2021). At COP28 in Dubai, countries agreed to gradually phase out fossil fuels, marking a significant step towards an equitable green energy transition (UNCC, 2023). These agreements underscore the urgent need to adopt renewable energy and present opportunities for all nations to contribute to this shared objective.

Despite being the lowest global carbon emitter, Africa is the most vulnerable to climate change (AfDB, n.d.). Within this context, Zambia has a crucial role in driving the green energy transition. The government aims to increase annual copper production to three (3) million tonnes by 2030 (Vandome, 2023a). Resolving long-standing operational issues with major copper mines in Mopani and Konkola Copper Mines (KCM) is a key step towards achieving this goal (Musokotwane, 2023).

During the 2024 budget address, the Minister of Finance and National Planning announced investment pledges facilitated by the Zambia Development Agency (ZDA), totalling over US$5 billion across various sectors. Key areas of interest included electric vehicle (EV) battery manufacturing, renewable energy in wind and solar, pharmaceutical production, and electric motorcycle assembly (Musokotwane, 2023). These investments, with a focus on domestic production and industrialisation, position Zambia strategically within global renewable energy and manufacturing markets.

This study further analysed these investment pledges, in addition to Zambia's copper mining and industrialisation-related efforts, through semi-structured interviews with key informants and desktop reviews of relevant documents. These methods offered valuable context for evaluating Zambia's potential to engage with the opportunities presented by the "critical" or "strategic" minerals boom and the green energy transition, as well as for assessing whether the country can leverage these prospects for its own industrialization and development.

1.2 Statement of the Problem

For years, Zambia, like many developing nations, has predominantly exported its valuable mineral resource, copper, in its raw form, missing out on significant revenue that could have been generated through value addition or beneficiation. Moreover, the country has not actively engaged in regional and global value chains associated with resource-based industrialisation. In contrast, countries such as Chile in South America, which has developed robust copper refining and smelting industries, and China in East Asia, known for its large-scale mineral processing and manufacturing industries, demonstrate the potential benefits of adopting strategic approaches to leveraging mineral resources. (Leiss & Yeluri, 2021; Castillo & Purdy, 2022).

However, the world is now standing at the threshold of a profound green energy transition, driven by the imperative to shift towards cleaner energy sources and reduce carbon emissions. The global demand for copper is projected to surge by approximately 600 percent by 2030 (Vandome, 2023a). Conversely, the IEA's Global Critical Minerals Outlook 2024 forecasts a 50 percent increase in copper demand by 2040 under the Net Zero Emissions by 2050 scenario, driven by a significant surge in battery deployment for EVs and grid storage (IEA, 2024). As earlier stated, this could largely be attributed to the COP26 pledge for countries, especially those that are highly industrialised, to reach net-zero carbon emissions by the year 2050

(Bouckaert, et al., 2021). This global shift creates a remarkable opportunity for Zambia to assume a pivotal role in renewable energy value chains, leveraging its abundant mineral resources such as copper, cobalt, lithium, and manganese, all of which are crucial for the transition to renewable energy.

These minerals play a critical role in the development of renewable energy infrastructure, including EV batteries, solar panels, battery storage systems, and wind turbines (Snowdon, Sharp, & Currie, 2021). By actively participating in the value chains associated with these technologies, Zambia can capitalise on its mineral resource endowments and position itself as a key player in the global renewable energy sector. This presents a transformative opportunity for the country, not only to unlock economic potential but also to contribute significantly to the global effort in combatting climate change and achieving sustainable development goals.

Zambia, in collaboration with the United States (US) Government, aims to develop an integrated value chain with the Democratic Republic of Congo (DRC) to establish an EV battery manufacturing plant, following the signing of a Memorandum of Understanding (MoU) in December 2022 (CSIS, 2023). However, progress on this initiative has been slow, with concrete steps towards implementation still pending. This delay highlights the inherent challenges of regional collaboration, including logistical, political, and economic obstacles. Additionally, the initiative reflects the broader geopolitical tensions surrounding critical minerals, particularly the rivalry between the US and China, which complicates efforts to foster cooperative frameworks in the region. Moreover, the United Kingdom and China, along with several other governments, have equally expressed their commitment to investing in large-scale renewable energy projects in Zambia, due to its abundant copper reserves (ZNBC, 2024; Reuters, 2023).

The potential establishment of an EV battery manufacturing plant and proposed investments in large-scale renewable energy projects in Zambia represent a significant opportunity to harness the country's capacity to contribute to the global green energy transition. If realised, these initiatives could enable resource-rich African nations like Zambia to shift their focus from the traditional model of raw material exports toward more value-added and sustainable approaches, aligning their economic strategies with global renewable energy goals. By strategically positioning themselves within global value chains, they can rewrite the prevailing narrative of resource-based industrialisation that has often been associated with the "resource curse" in many resource-rich African countries

Nevertheless, the success of establishing downstream green industries, such as the EV battery manufacturing initiative and other renewable energy technology production initiatives, hinges on several key factors. The quality of institutions and governance, existing policies, access to finance, infrastructure availability, technological advancements, and the presence of skilled manpower are critical for these ventures to thrive. However, realising these ambitions requires a robust foundation in upstream activities, including effective local content policies, enhanced regulatory frameworks, and infrastructure development, as highlighted in Zambia's National Critical Minerals Strategy (2024–2028). Strengthening local supply chains, fostering regional partnerships with countries like the DRC, and ensuring spill-over effects through technology and knowledge transfers from foreign partnerships can create synergistic linkages between upstream and downstream industries. Strong political will, along with sustained economic and political stability, will remain pivotal in ensuring Zambia's ability to leverage its copper mining sector to support the global renewable energy transition.

1.3 Objectives of the Study

The main objective of the study was to assess whether the green energy transition and its copper intensity can be leveraged for Zambia's industrialisation. This included an assessment of the possibility of domestic production of renewable energy technologies and opportunities to enhance local content in mining supply industries.

The objective of the study can be broken down as follows:

i. To assess Zambia's copper production potential, examine its productive linkages, and assess its role in meeting global demand driven by the critical minerals boom and the transition to renewable energy;
ii. To determine whether and to what extent regional cooperation might facilitate critical mineral-based industrialisation in Zambia;
iii. To identify opportunities and challenges for Zambia to expand copper production, evaluate strategies to enhance the value of local content through improved policies and supplier-side conditionalities, and deepen value chain participation with a focus on renewable energy technologies; and
iv. To provide targeted recommendations for Zambia to maximise the benefits arising from its role in the global green energy transition.

1.4 Research Questions

i. Can Zambia leverage the critical minerals boom and the green energy transition to foster its domestic industrialisation and economic development? What concrete plans exist to achieve this, and what challenges and opportunities are currently present?
ii. How can local content be enhanced through conditionalities on new copper investments in Zambia, especially in the context of the critical minerals boom and its geopolitics? Are there ongoing strategies to facilitate this enhancement, and how feasible are these plans? What challenges and opportunities are being encountered?
iii. Are regional solutions viable for Zambia, and is there interest in pursuing them? If so, what steps are being taken to implement these solutions?

1.5 Significance of the Study

The significance of this study lies in understanding how the critical minerals boom and the global green transition can be leveraged to promote domestic industrialisation and economic development in resource-rich countries like Zambia. While there is an extensive body of literature on critical mineral mining and its role in the global renewable energy shift, limited research has specifically examined Zambia's potential and challenges in this area. This study seeks to fill that gap by providing insights into how Zambia can leverage its mineral resources—copper in particular—for domestic industrialisation.

Moreover, the study aims to contribute to policy formulation by providing evidence-based recommendations on how Zambia, as a resource-rich country, can effectively engage in the global green energy transition. This study, therefore, seeks to identify actionable strategies for fostering sustainable economic development and advancing mineral-based industrialisation by focusing on Zambia's copper industry and its linkages to both upstream and downstream sectors,

1.6 Research Methodology

1.6.1 Research Approach

This study employed a mixed-method approach, incorporating semi-structured interviews with diverse stakeholders encompassing key informants from the mining sector, renewable energy sector, sector-related manufacturing industries, government agencies, associations, civil

society organisations, and academia. Furthermore, it involved a comprehensive analysis of relevant secondary data sources relevant to the mining and renewable energy sectors, such as policy documents, press reports and private sector materials. Finally, the paper includes a brief case study examining renewable energy technology value chains, highlighting lessons from Australia, China, Japan, and Korea, along with a discussion on a regional value chain approach, specifically focusing on the Zambia-DRC EV battery chain alliance. It is important to note that semi-structured interviews complemented the policy analysis. Additionally, outreach to some stakeholders was limited due to the political sensitivities surrounding this research topic.

1.6.2 Data Sources

This study deployed a diverse range of data sources, encompassing both primary and secondary data. Primary data was gathered through semi-structured interviews, while secondary data sources encompass various government databases such as the Central Statistics Office (CSO) in Zambia, as well as institutions like the International Monetary Fund (IMF), World Bank, and the International Energy Agency (IEA). Additionally, relevant sector ministries and government agencies were consulted, and publications such as academic journals, research papers, government reports, and policy documents pertaining to the copper mining and energy sectors were considered.

1.6.3 Data Analysis Methods

The data was analysed using thematic analysis (TA), a method that has become increasingly popular for analysing qualitative data in several social science disciplines (Ritchie, Lewis, Nicholls, & Ormston, 2014). This involved the collating and coding of responses derived from the semi-structured interviews. The collated responses subsequently underwent a comprehensive analysis, culminating in the identification and presentation of emerging themes in a concise manner.

1.6.4 Sampling Techniques

The study utilised the purposive sampling technique, which involves a deliberate selection of sampling components from a population based on their extensive knowledge of the elements or characteristics of interest (Guarte & Barrios, 2006). This technique is particularly well-suited for this study as it allows for the targeted selection of stakeholders who are most relevant to

the subject matter at hand. The study aimed to include a diverse range of participants from various sectors, including the mining and energy sectors, government agencies, academia, civil society organisations, associations, and cooperating partners. The target number of participants for this study was ten (10). However, eleven (11) stakeholders participated in the study. These are presented below:

Table 1. *Stakeholder Participation and Representation in the Study*

S/N	Stakeholder Title
1.	Zambia Association of Manufacturers (ZAM) Representative
2.	Zambia Chamber of Mines (ZCM) Representative
3.	National Assembly Parliamentary Budget Office (PBO) Representative
4.	Local Content Expert
5.	Historian and Political Economy Specialist from the Southern African Institute for Policy and Research (SAIPAR)
6.	First Quantum Minerals (FQM) Representative
7.	Zambian Economic Development and Policy Expert from the University of Cape Town (UCT)
8.	Ministry of Energy Representative
9.	Solar Industry Association of Zambia (SIAZ) Representative
10.	Ministry of Mines and Minerals Development Representative
11.	Ministry of Commerce, Trade and Industry (MCTI) Representative

1.6.5 Ethical Considerations

The study adheres to the University of Cape Town's (UCT) policy guidelines regarding the use of primary and secondary data. Ethical research standards were strictly followed, ensuring that all primary research participants were treated with utmost respect, dignity, and fairness. The researcher diligently sought ethical approval from the University and other relevant bodies to conduct this research in accordance with established protocols.

1.7 Thesis Structure and Summary of Findings

This thesis examines Zambia's industrialisation potential within the global copper value chain, particularly in the context of the green energy transition. Chapter 1 introduces the research objectives, methodology, and significance of the study. Chapter 2 provides historical and contemporary insights into Zambia's copper sector, tracing policy shifts and structural challenges that have shaped the industry. Chapter 3 presents the theoretical framework and literature review, drawing on Mineral-based Industrialisation (MBI) and Global Value Chain

(GVC) theory as alternatives to Resource Curse Theory to contextualise Zambia's position in the global mining economy. Chapter 4 explores productive linkages, focusing on downstream beneficiation, local supplier integration, and barriers to industrial growth. Chapter 5 examines regional and geopolitical dimensions, analysing Zambia's participation in regional value chains and the strategic influence of global powers such as the US, China, and Middle Eastern investors. Finally, Chapter 6 synthesises the findings and provides policy recommendations on how Zambia can leverage its copper resources for sustainable industrialisation and economic diversification.

The study finds that Zambia remains constrained by a resource-export model, where limited local beneficiation and weak supplier integration continue to hinder industrialisation (Fessehaie, Rustomjee, & Kaziboni, 2016). Despite rising global demand for copper, challenges such as high production costs, infrastructure deficits, energy instability, and weak policy enforcement prevent the country from moving up the value chain. Downstream beneficiation remains underdeveloped, with most copper exported as raw or semi-processed material rather than refined products or manufactured components. While initiatives like the Zambia-DRC EV Battery Chain Alliance present opportunities for industrial upgrading, concerns over financing, policy inconsistencies, and limited technical expertise must be addressed for meaningful value addition. Similarly, backward linkages remain weak, with foreign firms dominating mining supply chains. Local content policies have lacked strict enforcement, limiting domestic supplier participation (Fessehaie, 2021). Comparative lessons from Chile and Indonesia highlight the need for stronger policy implementation, industrial financing, and supplier development programs to enhance local production capacity. Additionally, high electricity costs and unreliable energy supply remain major constraints to beneficiation, making Zambia less competitive than other refining hubs such as China and Indonesia.

On the regional front, Zambia's collaboration with the DRC offers potential for developing regional value chains, particularly in battery precursor manufacturing. However, policy misalignment, governance weaknesses, and infrastructure bottlenecks raise concerns about the feasibility of regional industrialisation. Geopolitically, Zambia is at the centre of increasing competition for critical minerals, with the US, China, and Middle Eastern investors all vying for access to its copper resources (Andreoni & Roberts, 2022). The US-led Minerals Security Partnership (MSP) and China's entrenched influence in Zambia's mining sector create both

opportunities and risks. If not strategically managed, Zambia could remain a passive supplier of raw materials rather than an active participant in global value chains (Vandome, 2023a). The Lobito Corridor, positioned as a key infrastructure project to improve regional trade routes, presents an opportunity for enhanced copper logistics. However, its long-term benefits will depend on whether it is strategically integrated into industrialisation efforts rather than reinforcing an extractive export model (Olan'g & Scurfield, 2023).

Zambia stands at a crossroads, with an opportunity to leverage the global green energy transition for industrial development. Achieving sustainable economic transformation will require stronger enforcement of local content and beneficiation policies, strategic investments in energy and industrial financing, and a careful balancing of geopolitical interests to ensure that foreign partnerships align with long-term industrialisation goals (Barron et al., 2024). Additionally, Zambia must enhance policy coordination in regional industrialisation efforts, ensuring that initiatives like the Zambia-DRC EV Battery Chain Alliance deliver equitable benefits and do not reinforce economic asymmetries. While challenges persist, Zambia's copper resources provide a strong foundation for industrial growth, provided the country implements a coherent industrial strategy that prioritises domestic value addition and economic diversification.

CHAPTER 2
HISTORICAL AND CONTEMPORARY CONTEXT

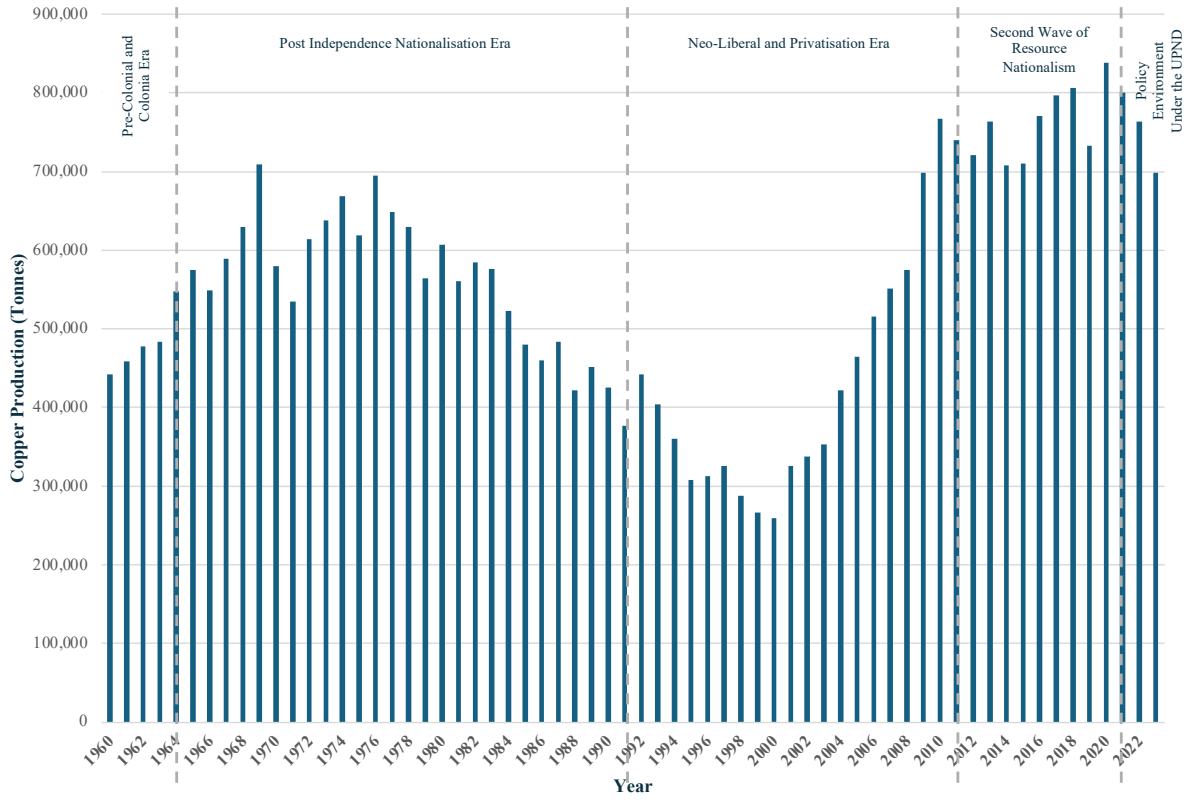
2.1 Introduction

This chapter explores the historical development of Zambia's copper mining sector, which has been a defining element of the country's economic trajectory and remains central to its role in the global energy transition. As a key mineral for green energy technologies, copper places Zambia in a strategically advantageous position to contribute to the worldwide shift toward renewable energy and decarbonisation. However, despite its abundant copper reserves, Zambia has struggled to fully harness its mineral wealth for sustainable economic transformation, largely due to economic, political, and institutional constraints.

To contextualise these challenges and opportunities, this chapter traces the evolution of Zambia's mining sector across five key historical phases, which include the Pre-Colonial and Colonial Era (1908–1964); the Nationalisation Period (1964–1991), the Neoliberal and Privatisation Era (1991–2011), the Second Wave of Resource Nationalism (2011–2021), and the Current Policy Environment under the United Party for National Development (UPND) (2021–present). Each phase is examined in relation to fluctuations in global copper demand, shifts in mining policies, and the impact of governance structures on economic outcomes.

This historical analysis is essential for understanding Zambia's contemporary policy landscape and its efforts to position itself in the emerging global green economy. Figure 1. Zambia's Copper Production Trends (1960–2023) in Tonnes illustrates Zambia's copper production trends from 1960 to 2023, highlighting periods of growth, stagnation, and decline.

***Figure 1**. Zambia's Copper Production Trends (1960–2023) in Tonnes*



Source: Author's compilation using Zambia Statistics Agency (ZamStats) Copper Production data.

Note: Retrieved from https://www.zamstats.gov.zm/wp-content/uploads/2023/12/COPPER-PRODUCTION-1960-2023MAY_-ALL-YEARS.xlsx

The sector has benefited from commodity booms but has also faced challenges such as declining local beneficiation, fluctuating investment levels, and weak resource governance. Understanding these historical trends provides critical insights into Zambia's current industrial strategy and its potential to leverage the critical minerals boom for long-term economic development.

2.2 Historical Overview of Zambia's Copper Mining Sector

2.2.1 Pre-Colonial and Colonial Era (1908 – 1964)

The period from 1908 to 1964 marked the foundation and expansion of Zambia's copper mining sector within the broader context of British colonial rule. Copper mining in Zambia, then known as Northern Rhodesia, was initially driven by European exploration efforts that intensified following British indirect rule in 1889. Archaeological evidence suggests that local

populations had engaged in small-scale copper mining and smelting for centuries before colonial intervention, primarily for trade and domestic use (Chitonge, 2021).

However, large-scale mining activities commenced in the early 20th century under the administration of the British South Africa Company (BSAC), which controlled mineral rights across Northern Rhodesia from 1890. Despite the knowledge of copper deposits, early mining activities were minimal, with only a few ventures, such as the Bwana Mkubwa Mine near Ndola, operating before the 1920s (Sikamo, Mwanza, & Mweemba, 2016). The completion of the railway from Broken Hill (modern-day Kabwe) to the Congo border in 1909 facilitated mineral exports but did not immediately result in large-scale copper production.

By the 1920s, following the discovery of significant copper deposits in what would later become the Copperbelt, European mining companies increased their investment in the region. Between 1921 and 1931, approximately £25 million was invested in Northern Rhodesia's copper industry, marking a shift toward industrialised extraction (Chitonge, 2021). These investments were primarily driven by British and South African firms, which developed extensive mining operations and introduced advanced technologies. The mining industry quickly became a key driver of economic activity, attracting European settlers and large numbers of African labourers who migrated from rural areas in search of employment. This transformation led to increased urbanisation, as new mining towns emerged around major operations.

Despite the growing economic significance of copper mining, the benefits were largely reaped by foreign entities, with limited reinvestment into local industrialisation. The colonial government maintained a laissez-faire economic approach, allowing private mining firms to dominate the sector while failing to establish linkages between mining and other industries (Chitonge, 2021). As a result, the mining sector functioned as an enclave economy, with most of its outputs exported and minimal local processing or beneficiation of raw materials. African workers in the mines were subjected to poor working conditions and racial discrimination, receiving significantly lower wages than their European counterparts. (Sikamo, et al., 2016). This extractive economic structure reinforced inequalities and hindered the broader development of the Zambian economy.

Copper production increased dramatically during the 1930s, rising from approximately 6,000 tonnes in 1930 to nearly 140,000 tonnes by 1934, driven by rising global demand (Chitonge,

2021). The surge was particularly influenced by industrial expansion in Europe and North America, as well as the build-up to World War II, which increased the need for copper in military production. However, the volatility of global copper prices exposed the vulnerabilities of the colonial economy's reliance on copper exports. The Great Depression of the early 1930s, for instance, led to a collapse in demand, forcing several mines to shut down temporarily, causing widespread unemployment and economic instability (Sikamo, et al., 2016). This volatility led some colonial officials and settlers to advocate for economic diversification, but little effort was made to develop secondary industries that could reduce the economy's dependence on copper.

The British colonial government's industrial policies in Northern Rhodesia were primarily designed to serve the economic interests of Britain rather than foster local industrial development. The administration was hesitant to implement policies that would encourage manufacturing, as this would have reduced Britain's access to cheap raw materials and potentially fostered economic self-sufficiency in the colony (Chitonge, 2021). European settlers, particularly those engaged in business and mining, recognised the risks associated with an undiversified economy. While there were some calls for local industrialisation, these efforts were largely overshadowed by British economic priorities, which maintained Northern Rhodesia as a raw material supplier for British industries (Chitonge, 2021).

By the time Zambia gained independence in 1964, it was one of the world's leading copper producers, accounting for about 12 percent of global copper output (Sikamo, et al., 2016). However, the economic structure inherited from the colonial era was heavily reliant on copper exports, with little investment in value addition or economic diversification. The delayed implementation of an industrial policy meant that, even after independence, Zambia struggled to fully leverage its mineral wealth for broader economic transformation. The extractive nature of colonial economic policies entrenched structural constraints that Zambia has since sought to overcome in its pursuit of economic diversification and sustainable development (Chitonge, 2021).

2.2.2 Nationalisation during the Post-Colonial and Post-Independence Era (1964 – 1991)

Following Zambia's independence in 1964, the government, under President Kenneth Kaunda and the United National Independence Party (UNIP), pursued a nationalisation policy aimed at

asserting control over the country's economic resources, particularly the copper mining industry. At the time, Zambia's economy was heavily dependent on copper exports, but the industry remained dominated by foreign-owned companies, primarily Roan Selection Trust (RST) and Anglo American Corporation (AAC) (Ng'ambi, 2023). The rationale for nationalisation was rooted in the broader post-colonial drive for economic sovereignty, as well as the need to address the economic disparities and structural legacies of colonial rule (Chitonge, 2021).

The nationalisation process began with the Mulungushi Reforms of 1968, which mandated 51 percent state ownership of major industries, excluding mining, under the newly established Industrial Development Corporation (INDECO) (Sikamo, et al., 2016). This was followed by the Matero Reforms of 1969, which extended state control to the mining sector, requiring a 51 percent government shareholding in RST and (AAC). By 1973, the government had consolidated all mining operations under the Zambia Industrial and Mining Corporation (ZIMCO), making Zambia's mining sector one of the most state-controlled in the world at the time (Sikamo, et al., 2016).

Initially, nationalisation was accompanied by economic growth and extensive social investments. Mining revenues were used to fund major infrastructure projects, provide free education, and improve social services. By 1972, the mining sector directly employed 62,000 people, contributing to a national growth domestic product (GDP) growth rate exceeding 5 percent annually between 1964 and 1970 (Sikamo, et al., 2016). The state's developmental role was evident in the extensive welfare programs implemented through the mines, including subsidised housing, education, and public services, which significantly improved living standards in mining communities (Ng'ambi, 2023).

However, the long-term sustainability of nationalisation was challenged by external economic factors and internal inefficiencies. The 1973 oil crisis and subsequent global recession led to a decline in copper prices, placing significant financial strain on the Zambian economy. The mines, which had been nationalised in a period of high copper prices, now struggled to generate sufficient revenue to support the state's ambitious economic programs. Declining productivity, bureaucratic inefficiencies, and limited reinvestment in mining infrastructure further exacerbated the situation (Chitonge, 2021). By 1984, copper production had fallen to 523,000 tonnes from a peak of 709,000 tonnes in 1969, and by 1991, it had dropped further to 377,000 tonnes as shown in Figure 1. Zambia's Copper Production Trends (1960–2023) in Tonnes.

The nationalisation policy also faced challenges related to governance and institutional capacity. Acemoglu & Robinson (2012) argue that nationalised industries often suffer from the presence of extractive political institutions, where power is concentrated among political elites, leading to inefficient resource allocation and economic mismanagement. In Zambia, political interference in the management of state-owned enterprises, coupled with the lack of technical expertise, resulted in declining efficiency and mounting losses in the mining sector.

By the 1980s, Zambia's economic difficulties had deepened, leading to widespread public dissatisfaction with the government's handling of the economy. Mounting debt and pressure from international financial institutions such as the IMF and the World Bank led to the adoption of structural adjustment programs, which encouraged economic liberalisation and a shift away from state-controlled industries (Ng'ambi, 2023). In 1991, following multiparty elections, President Kaunda was succeeded by Frederick Chiluba of the Movement for Multi-Party Democracy (MMD), marking the beginning of the privatisation era and a significant departure from the nationalisation policies of the Kaunda administration (Cheelo & Hinfelaar, 2021).

In retrospect, Zambia's nationalisation policy had both positive and negative implications. While it played a crucial role in fostering economic self-determination and improving social welfare, it also highlighted the limitations of state-controlled economic models in resource-dependent economies. The inefficiencies associated with centralised management, combined with external commodity price shocks, ultimately led to the decline of the mining industry and the eventual shift toward privatisation in the 1990s.

2.2.3 The Neoliberal Era and Privatisation (1991 – 2011)

Zambia's transition from a nationalised economy to a neoliberal framework began in 1991 with the election of the MMD, replacing UNIP. This shift marked the adoption of economic liberalisation policies in response to the severe economic downturn of the 1980s, characterised by declining copper prices, escalating debt, and a stagnating industrial sector (Ng'ambi, 2023). Under the leadership of President Frederick Chiluba, the government pursued privatisation, economic liberalisation, and structural adjustments as dictated by the International Monetary Fund (IMF) and the World Bank.

A central feature of the MMD's economic policy was the privatisation of the copper mining sector, which was previously controlled by Zambia Consolidated Copper Mines (ZCCM). The

Mines and Minerals Act of 1995 set the legal framework for privatisation, offering incentives such as reduced corporate taxation and guaranteed repatriation of profits to attract foreign direct investment (FDI). Consequently, ZCCM was unbundled and sold to various multinational corporations, including Anglo American, Glencore, and Vedanta Resources, between 1997 and 2000 (Ng'ambi, 2023).

However, the privatisation process was met with significant controversy. Many assets were perceived to have been sold at a fraction of their true value. A notable example was the sale of Konkola Copper Mines (KCM) to Vedanta Resources in 2004 for only $25 million, a price widely considered to be below market value (Musonda & Larmer, 2023). Additionally, while foreign investors benefited from these transactions, the Zambian government initially struggled to generate substantial tax revenue from the sector due to the over-concessionary development agreements (DAs) signed with mining companies.

Privatisation led to an initial decline in copper production, which fell from approximately 400,000 tonnes in 1990 to a low of 250,000 tonnes by 2000 due to falling global copper prices and underinvestment (Mining for Zambia, 2020). However, rising global demand, particularly from China and India in the early 2000s, spurred a recovery (Bova, 2012). By 2010, copper production had rebounded to 767,000 tonnes, surpassing levels last seen during the nationalisation era in the 1970s.

Despite the increase in production, the broader economic benefits of privatisation were mixed. Foreign companies reaped substantial profits, while the Zambian government struggled to generate revenue due to generous tax incentives granted during the privatisation process. Additionally, thousands of Zambian workers were laid off as private companies sought to streamline operations and reduce costs (Ng'ambi, 2023).

In 2001, President Levy Mwanawasa succeeded Chiluba and adopted a more assertive approach to mining governance. He sought to renegotiate mining contracts and implemented the Mines and Minerals Development Act of 2008, which increased royalties and corporate taxes on mining companies (Caramento, Hinfelaar, & Cheelo, 2023). This marked the beginning of what scholars refer to as the "second wave of resource nationalism" in Zambia. The introduction of a windfall tax in 2007 aimed to capture a larger share of the profits from the commodity boom. However, the policy was met with resistance from multinational corporations, and its implementation was short-lived as President Rupiah Banda, who

succeeded Mwanawasa after his passing in 2008, reverted to pro-investor policies (Caramento, et al., 2023). The neoliberal economic policies of the MMD contributed to growing political and social discontent. While privatisation attracted foreign investment and increased production, many Zambians felt excluded from the economic gains, as job losses and reduced government control over the sector fuelled resentment (Ng'ambi, 2023).

By 2011, discontent with the MMD's pro-investor stance had grown significantly. Michael Sata's Patriotic Front (PF) capitalised on this sentiment by advocating for increased state intervention and higher taxation of mining companies (Ng'ambi, 2023).. His victory in the 2011 elections marked the end of the neoliberal era and the beginning of a new phase of resource nationalism.

The neoliberal era represents a transformative yet highly contested period in Zambia's economic history. While privatisation attracted investment and revitalised copper production, it also exposed vulnerabilities related to dependence on foreign capital, loss of state control, and inequalities in wealth distribution. By the end of this era, public discontent with neoliberal policies had set the stage for a more interventionist approach to resource governance.

2.2.4 The Second Wave of Resource Nationalism (2011 – 2021)

The transition to the second wave of resource nationalism in Zambia was catalysed by the rise of the PF government in 2011. Michael Sata's campaign rhetoric heavily criticised the previous neoliberal policies, which had led to widespread dissatisfaction over foreign mining firms' dominance. His populist approach resonated with Zambians who felt that privatisation had failed to deliver tangible economic benefits, particularly for mining communities in the Copperbelt (Musonda & Larmer, 2023).

Despite Sata's strong rhetoric, his administration implemented only marginal reforms in the mining sector. Rather than instituting structural overhauls, he relied on populist gestures, such as revising mining tax regimes and increasing pressure on foreign firms to invest more in corporate social responsibility programs (Ng'ambi, 2023). However, the broader taxation framework remained largely in favour of foreign investors, limiting the government's ability to capture substantial revenues from the booming copper market.

Sata's presidency was cut short by his death in 2014, leading to Edgar Lungu's succession. Lungu took a more aggressive approach to resource nationalism, particularly through the direct state intervention in mining operations. In 2016, his government initiated the takeover of KCM from Vedanta Resources, citing mismanagement and failure to reinvest profits into mine development Similarly, in 2021, the government took over Mopani Copper Mines (MCM) from Glencore, justifying the decision on claims of illicit transfer pricing and underreporting of profits (Musonda & Larmer, 2023).

While these moves were framed as reclaiming national control over key mineral resources, they lacked a comprehensive industrial strategy. The state's capacity to effectively manage and invest in these assets was limited, leading to operational inefficiencies and declining production levels. As illustrated in Figure 1. Zambia's Copper Production Trends (1960–2023) in Tonnes, copper production stagnated between 2016 and 2021, despite high global demand. The inability to ensure operational efficiency in KCM and MCM further exacerbated Zambia's economic distress.

By 2020, Zambia's economic situation had deteriorated significantly. The country's external debt soared, and in November of that year, Zambia became the first African nation to default on its sovereign debt in the post-COVID-19 period (Vandome, 2023a). The worsening macroeconomic environment, combined with continued mining sector inefficiencies, reduced investor confidence and further weakened the PF's grip on power.

Public discontent with Lungu's administration intensified, particularly in the Copperbelt province, which had historically been a stronghold for PF. The failure to translate resource nationalism policies into improved economic outcomes led to a significant shift in voter sentiment. In the 2021 elections, Hakainde Hichilema's UPND won by a landslide, marking a decisive rejection of the PF's economic policies (Reuters, 2021).

The second wave of resource nationalism, while intended to rectify the perceived failures of privatisation, ultimately struggled to deliver on its promises. Without a well-defined industrial policy and state capacity to manage nationalised assets effectively, Zambia's mining sector remained vulnerable to economic shocks and investor uncertainty. The collapse of Sata and Lungu's resource nationalist agenda illustrates the challenges of balancing state intervention with sustainable economic governance.

2.3 Contemporary Context

2.3.1 The Current Policy Environment under UPND

Since assuming office in 2021, the UPND under President Hakainde Hichilema has pursued a policy framework that prioritises economic diplomacy, foreign direct investment, and market-led development in Zambia's mining sector. This approach marks a departure from the previous PF government's resource nationalist stance, with an emphasis on fostering investor confidence while ensuring that Zambia derives tangible benefits from its mineral wealth (Vandome, 2023b). The government's mining policy is underpinned by a commitment to increasing copper production to three million tonnes annually by 2032, aligning with global demand for green transition minerals (Vandome, 2023a). This ambition is being pursued through a mix of legislative and structural reforms, including tax incentives, regulatory adjustments, and policies designed to attract private-sector investment. Notably, the introduction of the "free carry" policy ensures that the government secures equity stakes in new mining ventures without excessive state interference, balancing state interests with the need to attract foreign capital (Vandome, 2023b).

Despite its market-driven focus, the UPND's approach is not a simple continuation of 1990s neoliberalism but represents a more nuanced model that incorporates elements of state participation. While the administration encourages foreign direct investment, it has also explored state involvement in key sectors through ZCCM-IH, Zambia's state-owned mining investment vehicle. Plans for a government-led copper trading initiative and discussions around state-led beneficiation projects further illustrate this blended approach. Public-private collaboration is another key pillar of the government's mining policy, as evidenced by its efforts to engage both international investors and local stakeholders. This strategy contrasts with past approaches that either leaned heavily on privatisation, as seen during the MMD era, or direct state intervention, as attempted under the PF. The administration's economic strategy is thus best characterised as a hybrid model that seeks to maximise Zambia's benefits from the mining sector while maintaining a stable investment climate (Vandome, 2023b).

A defining feature of the UPND's foreign policy is its emphasis on "positive neutrality," a term used to describe Zambia's efforts to engage multiple global powers while safeguarding its own economic interests (Vandome, 2023a). Unlike past administrations that either leaned heavily towards China, such as the PF, or the West, such as the MMD, Hichilema's government has

sought to maintain a balanced relationship with various global actors. This includes fostering closer ties with Western partners such as the US and the European Union (EU) while also sustaining Zambia's longstanding relations with China and regional neighbours like the DRC. Zambia's role in the US-DRC-Zambia tripartite agreement on the EV battery value chain exemplifies this economic diplomacy in action. This initiative aims to leverage Zambia's mineral wealth for industrial development while securing strategic foreign partnerships that promote value addition within Africa rather than exporting raw materials (Vandome, 2023a).

The 2024 Budget Speech reaffirmed the government's commitment to achieving the three-million-metric-tonne copper production target by 2032 (Musokotwane, 2023). The government has acknowledged that achieving this goal requires an integrated economic vision that extends beyond mining, including infrastructure investment, skills development, and downstream beneficiation. A high-resolution countrywide geophysical survey was set to commence in 2024 to accelerate mineral exploration, with a focus on key mining regions such as the Copperbelt, Lusaka, Northwestern, Southern, and Western provinces. Furthermore, the government is enhancing the regulatory environment through the establishment of the Minerals Regulation Commission to address challenges related to production reporting, mineral content analysis, and illegal mining activities (Musokotwane, 2023).

The increase in copper production is expected to serve as a catalyst for Zambia's broader industrialisation agenda. By leveraging its position as a key supplier of critical minerals essential for the global green transition, Zambia aims to stimulate economic development through value addition, local manufacturing, and increased exports of refined copper products. This aligns with the broader vision of transforming the mining sector from a raw-materials-export model to an integrated industrial base that supports job creation and sustainable economic growth. However, the realisation of these goals depends on overcoming key challenges, including addressing external debt burdens, improving infrastructure, and ensuring that the benefits of increased mining revenues translate into tangible socio-economic gains for Zambians (Musonda & Larmer, 2023).

While the UPND's policy direction presents significant opportunities, several challenges remain. Chief among them is Zambia's external debt burden, which constrains public investment in infrastructure and social programs. The government has pursued debt restructuring agreements through the G20 Common Framework to create fiscal space for its industrial and economic development goals (Vandome, 2023a). Another key challenge is

ensuring that mining-led economic growth translates into tangible benefits for Zambians. The administration must navigate the historical grievances of mining communities, which have long felt excluded from the benefits of copper revenues. Policies aimed at increasing local content, skills development, and downstream beneficiation will be critical in addressing these concerns.

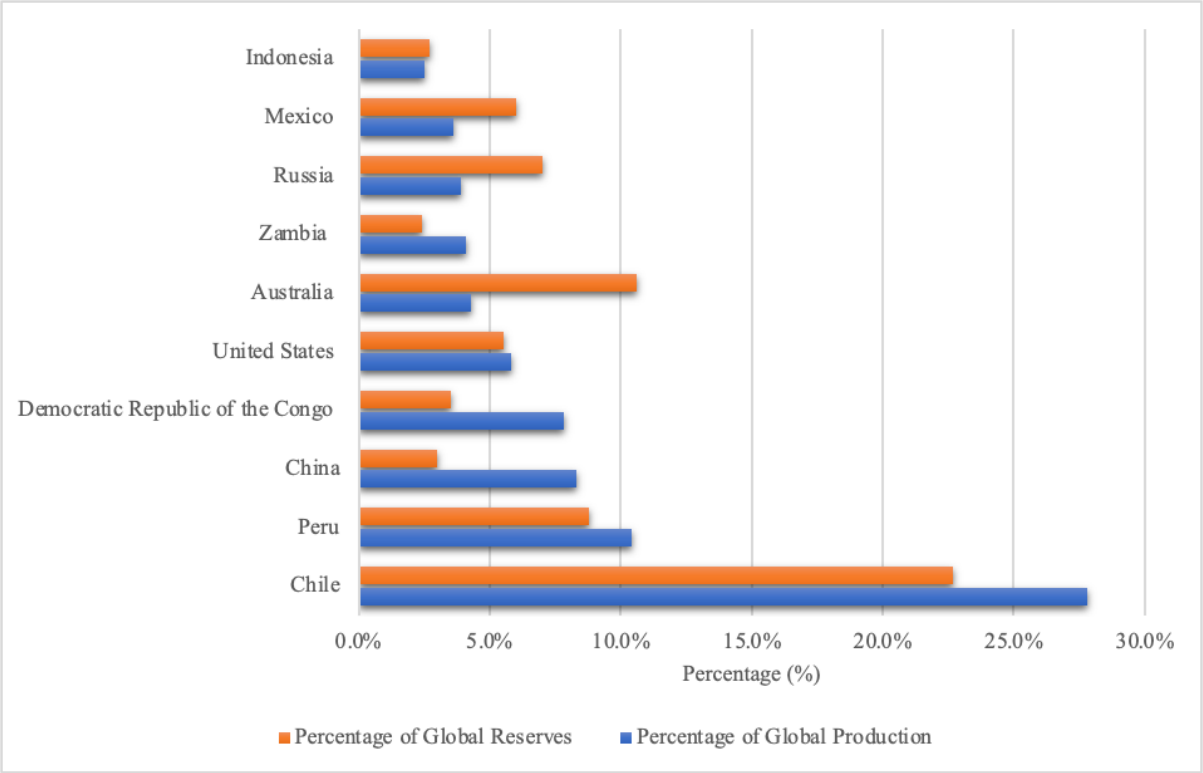
The UPND's policy environment reflects a pragmatic shift towards market-oriented mining development, blended with strategic state participation and proactive economic diplomacy. By maintaining "positive neutrality" in global relations, securing foreign investment, and leveraging Zambia's rich mineral resources, the government aims to position the country as a key player in the global green transition while ensuring sustainable economic benefits for its citizens. However, the long-term success of these policies will depend on their implementation, institutional capacity, and the ability to balance investor confidence with national development priorities.

2.3.2 Copper in the Global Green Transition

The accelerating global transition to renewable energy has elevated the strategic importance of copper, making it one of the most sought-after critical minerals. Unlike previous cycles of demand, where copper's relevance was largely tied to industrial expansion, today's demand is driven by its centrality in clean energy technologies. As a key component in wind turbines, solar panels, EVs, and energy storage systems, copper is fundamental to achieving global decarbonisation goals (Snowdon, Sharp, & Currie, 2021).

Zambia, holding approximately 2.4 percent of global copper reserves and contributing 4.1 percent to global copper production, is strategically positioned to benefit from this paradigm shift as shown in Figure 2. Top Ten Copper Producing Countries Worldwide, 2020. However, its capacity to fully capitalise on the green transition requires a deliberate policy approach that fosters domestic value addition, enhances infrastructure, and ensures that mineral wealth translates into broad-based economic development.

Figure 2. *Top Ten Copper Producing Countries Worldwide, 2020*



Source: Author's compilation using US Geological Survey 2022 data.

Note: Retrieved from https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-copper.pdf.

The evolving geopolitical competition for critical minerals introduces both opportunities and risks for Zambia. As Western nations seek to reduce dependency on China's mineral refining capacity, Zambia's position as a producer of unrefined copper places it in a critical juncture to negotiate more favourable trade terms and attract investments into midstream and downstream processing (Andreoni & Roberts, 2022). The country's ambition to scale up copper production to 3 million metric tonnes by 2032 is indicative of its intent to leverage this momentous shift.

A key strategic imperative is the development of a vertically integrated copper value chain. The current heavy reliance on exporting raw copper undermines Zambia's ability to maximise the economic benefits of its mineral wealth. For Zambia, leveraging its mineral wealth in this evolving landscape requires navigating complex global pressures while addressing domestic challenges to foster industrialisation and sustainable growth (Harvey, 2019).

In addition, the National Critical Minerals Strategy (2024–2028) articulates a vision to increase domestic beneficiation and value addition, emphasising the need for research and development, public-private partnerships, and policy alignment to strengthen Zambia's position in global copper supply chains (Ministry of Mines and Minerals Development, 2024). This aligns with

Vandome's (2023b) argument that Zambia's economic diplomacy, particularly under the UPND administration, must extend beyond investment attraction to fostering long-term industrial growth.

While the green transition presents a promising opportunity, Zambia faces significant challenges, including the need for infrastructural investments, enhanced technical capabilities, and a regulatory environment that supports both local businesses and foreign investors. The success of its copper-driven industrialisation will depend on its ability to navigate these complexities while positioning itself as a leading global supplier of sustainably sourced copper.

2.3.3 Chapter Summary

This chapter provided a historical and contemporary overview of Zambia's copper mining sector, tracing its evolution through five key phases. The colonial and pre-independence era established Zambia as a major copper producer but left an extractive economic structure that hindered industrialisation. Nationalisation (1964–1991) increased state control and social investment but struggled with declining prices and mismanagement. Neoliberal reforms (1991–2011) reversed nationalisation, attracting foreign investment but sparking controversy over tax incentives and ownership. The second wave of resource nationalism (2011–2021) sought greater state influence but faced operational and investor confidence challenges. The current UPND policy (2021–present) pursues a hybrid model, balancing foreign investment with strategic state participation.

The chapter underscores the persistent tension between state control and market-driven policies, shaped by external forces like commodity prices and global demand. These historical insights are crucial for understanding Zambia's positioning in the green transition. The following chapters build on this foundation, exploring how Zambia can enhance productive linkages, regional cooperation, and geopolitical strategy to maximise its mineral wealth.

CHAPTER 3
THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.1 Introduction

This chapter provides the theoretical and conceptual foundation for analysing Zambia's ability to leverage its copper resources for industrialisation and economic development. It explores key frameworks that have shaped scholarly debates on resource-rich economies, particularly the resource curse theory, the mineral-based industrialisation (MBI) approach, and the global value chain (GVC) framework. The resource curse theory has been widely used to explain why many resource-rich countries, including Zambia, struggle with economic stagnation, weak governance, and limited industrialisation despite their wealth in natural resources. However, recent critiques argue that resource dependence does not inherently lead to economic underperformance; rather, policy choices, governance structures, and institutional capacity play a decisive role.

In response to these critiques, scholars have proposed alternative frameworks, including the MBI approach, which emphasises how resource wealth, when strategically managed, can drive broader economic transformation. MBI highlights the role of backward and forward linkages, where domestic industries supplying inputs to mining (backward linkages) and value-added processing of minerals (forward linkages) serve as catalysts for industrialisation. Furthermore, the GVC approach provides an additional lens through which Zambia's copper sector can be analysed. This framework explores how countries can integrate into international production networks beyond mere resource extraction by upgrading their roles in regional and global supply chains. Therefore, this chapter critically examines these theories and their relevance to Zambia, providing a foundation for understanding how the country can shift from its historical dependence on raw copper exports to a more diversified and value-added industrial economy.

3.2 The Resource Curse Theory

3.2.1 Origins of the Resource Curse Theory

The resource curse, also referred to as the "paradox of plenty," describes the phenomenon in which resource-rich countries experience slower economic growth and weaker development outcomes compared to resource-scarce nations. Sachs and Warner (2001) attribute this phenomenon to factors such as commodity price volatility and the crowding out of other productive sectors. Zambia, with its historical reliance on copper exports, seems to align with

this narrative. This theory has frequently been applied to Zambia, where copper has dominated the economic landscape for over a century. Despite benefiting from periodic copper price booms, Zambia has struggled to diversify its economy and remains vulnerable to external shocks (Siwale & Werker, 2023). Weak governance structures, inefficiencies in revenue management, and underinvestment in economic transformation have contributed to Zambia's inability to fully leverage its resource wealth for sustainable development.

However, this interpretation presents an oversimplified view of Zambia's economic challenges. Saad-Filho and Weeks (2013) offer a counterargument, emphasising that resource wealth does not inherently lead to poor economic performance. They argue that governance structures, policy choices, and economic strategies ultimately determine whether a resource-rich country thrives or falters. Rather than being an inevitable curse, resource abundance can be a developmental asset when managed effectively. This perspective challenges the deterministic nature of the resource curse theory and opens the door for alternative frameworks that emphasise industrialisation and strategic economic planning.

3.2.2 Critiques and Limitations of the Resource Curse Theory

While the resource curse framework provides a useful lens for understanding the vulnerabilities of resource-dependent economies, scholars have increasingly challenged its deterministic assumptions. Di John (2011) critiques the theory for oversimplifying the relationship between resource wealth and economic outcomes, arguing that it often fails to account for broader political, historical, and institutional dynamics. Many resource-rich countries, including Norway, Canada, and Australia, have successfully harnessed their natural resource wealth to drive industrialisation and long-term economic growth (Badeeb, Lean, & Clark, 2017). These examples suggest that the effects of resource abundance are not inherently negative but are contingent on governance structures, policy interventions, and institutional capacities.

A significant limitation of the resource curse theory is its failure to explain why some nations escape the so-called curse while others remain trapped. The theory tends to treat resource wealth as a singular variable without adequately considering country-specific conditions. Similar to Badeeb et al. (2017), Ross (2015) asserts that institutional quality, investment in infrastructure, and the capacity to implement economic policies, for instance, all play a crucial role in shaping development trajectories. Neglecting these factors risks the resource curse

framework painting an overly deterministic and reductionist picture of economic development in resource-rich states.

Morris, Kaplinsky, and Kaplan (2012) offer a compelling challenge to the traditional resource curse framework by introducing the concept of Mineral-based Industrialisation (MBI). This approach suggests that resource wealth, when strategically managed, can serve as a driver for broader industrialisation through backward and forward linkages. These linkages or types of economic interdependence, which underpin MBI, stem from Hirschman's concept of linkages (Noman, 2012). The backward linkages of resource extraction refer to the development of domestic industries that supply inputs to the mining sector, such as equipment manufacturing, services, and infrastructure development. If effectively nurtured, these linkages can generate employment, enhance local technological capabilities, and create a broader industrial ecosystem. Forward linkages, on the other hand, involve the processing and value addition of extracted minerals. In Zambia's case, this would mean moving beyond raw copper exports to the production of refined copper, copper wires, and other high-value products used in renewable energy technologies (Noman, 2012). Rather than viewing resource wealth as a constraint on development, the MBI perspective emphasises how countries can leverage their extractive industries to stimulate industrial growth.

Despite the promise of MBI, its success is far from automatic. The development of linkages requires deliberate policy interventions, including investment in infrastructure, skill development, and industrial policies that encourage local content participation. Additionally, global market dynamics and multinational corporate interests often shape how resource-rich countries integrate into global value chains (Morris et al., 2012). If these dynamics are not carefully managed, resource-rich nations may continue to experience economic vulnerabilities despite efforts to pursue industrialisation.

3.2.3 The Resource Curse, the Green Energy Transition, and Zambia's Prospects

The growing global demand for critical minerals due to the green energy transition presents an opportunity for Zambia to move beyond traditional resource dependency. Copper is an essential component of renewable energy infrastructure, including EVs, solar panels, and wind turbines, and is expected to experience sustained demand growth in the coming decades. This shift offers Zambia a potential pathway to industrialisation by integrating into global green supply chains rather than merely exporting raw materials.

However, the extent to which Zambia can capitalise on this opportunity depends on several factors. The country must address structural barriers, such as weak infrastructure, limited technological capabilities, and an overreliance on foreign investment for resource extraction. Additionally, governance and policy coherence will be critical in ensuring that the benefits of increased copper demand translate into tangible economic transformation rather than reinforcing existing patterns of raw material dependency (Siwale & Werker, 2023).

3.3 Alternatives to the Resource Curse Framework

3.3.1 Mineral-Based Industrialisation (MBI) Framework

The conventional resource curse framework has been widely critiqued for its deterministic approach, which assumes that resource abundance inevitably leads to poor economic performance, governance failures, and structural economic weaknesses. While empirical evidence supports some of these claims, scholars such as Morris et al. (2012) have provided alternative perspectives that highlight the potential for resource wealth to be harnessed for industrialisation and long-term economic transformation. Their work suggests that mineral resources, when managed effectively, can become a foundation for economic development through strategic linkages with other sectors. This section explores the mineral-based industrialisation (MBI) framework as a response to the resource curse theory, examining its potential to drive Zambia's economic diversification and industrial development.

Morris et al. (2012) challenge the conventional resource curse thesis by arguing that natural resource wealth, if strategically managed, can act as a catalyst for industrialisation rather than a hindrance. They introduce the Mineral-Based Industrialisation (MBI) framework, which proposes that extractive industries can stimulate economic diversification through backward and forward linkages. Rather than solely focusing on the challenges of resource dependency, this framework underscores the potential of mining-led growth when properly integrated with domestic supply chains, knowledge transfers, and technological advancements.

A key element of MBI is the creation of linkages between the mining sector and other economic activities, ensuring that extractive industries contribute to broader industrial and economic transformation. Backward linkages facilitate the growth of local supply chains, where domestic firms provide inputs such as equipment, chemicals, and logistics to mining operations. Forward linkages, on the other hand, encourage the processing and beneficiation of minerals, ensuring that resource-rich countries like Zambia move beyond raw material exports and engage in

value-added manufacturing. These two components form the cornerstone of sustainable mineral-based industrialisation, allowing nations to escape the traditional boom-and-bust cycles associated with resource dependence.

Zambia's copper sector provides a compelling case for the application of MBI principles. Despite being one of the world's leading producers of copper, Zambia has historically remained heavily dependent on exporting unprocessed copper, missing opportunities to capture greater value along the supply chain. The limited development of downstream industries such as copper smelting, refining, and manufacturing of copper-based products has constrained Zambia's ability to reap the full economic benefits of its mineral wealth. Implementing MBI requires a policy shift that encourages local content development, industrial investment, and skills enhancement to facilitate both backward and forward linkages in the copper industry.

Despite the push for backward linkages in Zambia's copper sector, efforts to implement local content policies (LCPs) have faced significant structural and institutional challenges. As Kragelund (2020) notes, Zambia's Local Content Strategy (2018-2022) was designed to enhance domestic participation in mining supply chains but has been largely ineffective due to the inability of local suppliers to meet the stringent quality requirements of transnational mining corporations. Furthermore, the influence of international financial institutions, such as the World Bank's Doing Business Indicator, has pressured the Zambian government into adopting policies that inadvertently undermine domestic market formation. The imbalance of power between mining conglomerates and the state further constrains Zambia's ability to leverage local content for mineral-based industrialisation. These challenges highlight the importance of designing MBI policies that not only promote linkages but also address capability-building, supplier development, and policy coherence.

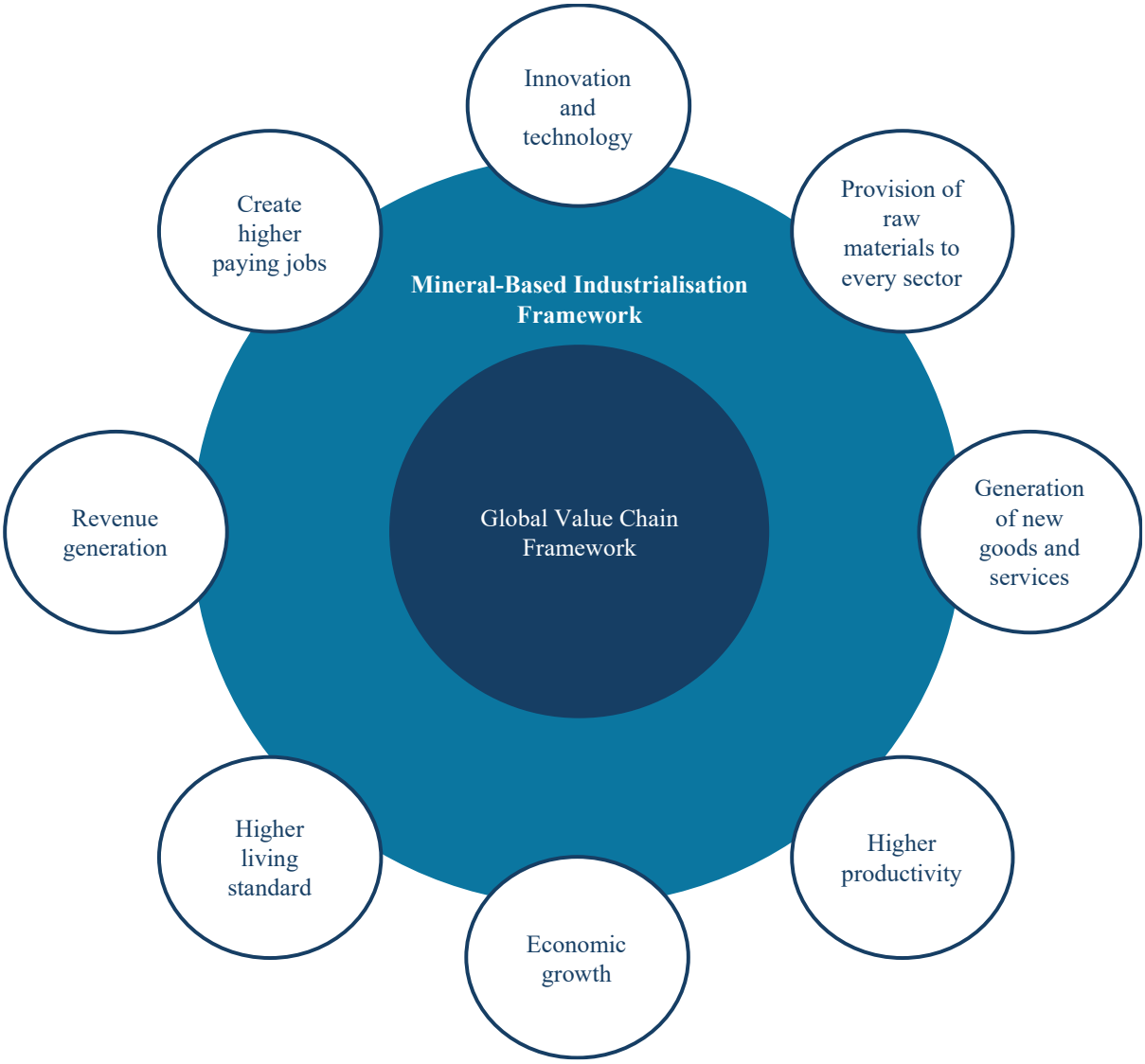
The need for Zambia to transition from raw material exports to local mineral value addition is further reinforced by broader trends across resource-rich economies. Mavhunga (2023) argues that Africa's historical role as a supplier of raw materials is a legacy of colonial-era economic structures that persist today. In contrast, contemporary policies in countries like Zimbabwe and the DRC have sought to break this cycle through policies that promote domestic processing of minerals such as lithium, cobalt, and chrome. These experiences highlight the necessity for Zambia to adopt a deliberate industrialisation strategy rather than remain dependent on external markets for its mineral exports.

A significant contribution to the MBI literature comes from Li and Zhou (2024), who developed a Mineral-Based Industrialisation Conceptual Framework (Figure 3. Mineral-Based Industrialisation Conceptual Framework) to illustrate how mineral-based industries can drive economic growth while addressing environmental and financial considerations. Their study, which focuses on Canada's mineral industrialisation model, demonstrates that leveraging mineral wealth for industrial growth requires a multidimensional approach that integrates economic, financial, and sustainability factors. One of the key takeaways from their research is that while mineral-based industrialisation has historically contributed significantly to economic growth, it must also account for environmental sustainability to ensure long-term viability.

While Li and Zhou (2024), framework is useful for understanding the economic potential of MBI, it does not fully capture the role of global value chains (GVCs) in mineral-led industrialisation. This is a critical oversight, particularly in the context of resource-rich developing countries like Zambia, where integration into global production networks is essential for enhancing competitiveness, technology adoption, and market access. To address this gap, this study incorporates the GVC framework into the MBI approach, ensuring that mineral-based industrialisation is not only domestically sustainable but also globally competitive.

Figure 3. Mineral-Based Industrialisation Conceptual Framework below illustrates how MBI, when embedded within the broader GVC framework, can contribute to key economic outcomes such as higher productivity, job creation, innovation, and economic diversification. The framework shows that by moving beyond raw material extraction, resource-rich countries can generate new goods and services, integrate technological advancements, and improve living standards.

Figure 3. *Mineral-Based Industrialisation Conceptual Framework*



Source: Adaption from the Role of mineral-based industrialisation in promoting economic growth: Implications for achieving environmental sustainability through financial management, Li and Zhou (2024: 5) and Author

Indonesia's mineral-based industrialisation offers key lessons on resource nationalism. As Warburton (2024) explains, the government's ban on raw nickel exports forced foreign companies, mainly from China, to invest in local smelting and processing. This boosted industrial activity, export revenues, and Indonesia's role in the EV battery supply chain. However, rapid growth has led to 'nationalist enclaves'—industrial hubs controlled by politically connected actors—limiting broader economic benefits while raising concerns about environmental harm, labour conditions, and weak regulations. For Zambia, Indonesia's

experience highlights both the potential and risks of resource-driven industrialisation, emphasising the need for inclusive growth, strong governance, and environmental safeguards.

The global shift to clean energy offers Zambia a chance to strategically leverage its mineral wealth, akin to lithium-producing countries in Latin America. Johnson et al. (2024) note that despite high demand for lithium from electric vehicle manufacturers, states in the Lithium Triangle (Chile, Argentina, Bolivia) have struggled to nationalise production and integrate into higher-value supply chain segments due to institutional constraints and historical foreign capital dominance. Zambia faces similar challenges in its copper sector, where multinational companies dominate the value chain. To address this, Zambia could pursue strategic partnerships, enforce local value-addition policies, and build targeted industrial capabilities to avoid being a mere raw material supplier in the green transition.

As Fang (2024) explains, the intensifying demand for these minerals underscores the strategic importance of resource-rich nations in the transition to cleaner energy systems. However, simply extracting and exporting these minerals does not guarantee sustained economic transformation. Instead, forward linkages need to be strengthened through local processing and the development of industrial capabilities. This aligns with the MBI framework, which advocates for value addition within the mining sector to ensure that resource wealth translates into long-term industrial growth rather than short-term economic gains.

A comparison with Chile, one of the largest copper producers, offers valuable insights for Zambia. Leiss and Yeluri (2021) note that while Chile dominates the global copper market, its limited domestic processing capacity means most production is exported as raw material. Despite representing 28 percent of global copper output, Chile faces challenges like declining ore grades, long mine development cycles, and policy uncertainties, such as proposed tax reforms that delay foreign investment. Additionally, energy security and the carbon intensity of mining operations hinder efforts to maximise mineral value. The study highlights the importance of strategic governance and targeted investments in local beneficiation and technology, areas from which Zambia can learn from Chile's experiences.

The Africa Natural Resources Management and Investment Centre (ANRC) underscores the need for regional cooperation to maximise the benefits of critical mineral exploitation (ANRC, 2022). A key challenge to mineral-based industrialisation in Africa has been the lack of regional value chains and fragmented policies that limit economies of scale. The African

Continental Free Trade Area (AfCFTA) presents an opportunity to develop a coordinated regional industrial strategy, enabling African nations to process their mineral wealth domestically rather than exporting raw materials to global markets. For Zambia, this approach could support local beneficiation and copper processing within Africa, fostering greater economic transformation. Andreoni and Avenyo (2023) reinforce this argument, noting that the development of strong regional backward and forward linkages in mineral value chains can enhance industrial competitiveness, facilitate technology transfer, and generate employment opportunities, driving broader economic transformation.

Brazil provides another useful case study for mineral-based industrialisation. As De Tomi, Loredo, and Santos (2024) discuss, Brazil has defined strategic minerals through national policies and has pursued public-private partnerships to enhance its domestic mining sector. Their study underscores the importance of aligning mining policies with broader industrialisation and sustainability objectives, an area where Zambia could improve through more coordinated frameworks. However, Brazil also faces substantial challenges, including infrastructure bottlenecks and governance constraints, which have hindered the full realisation of its mineral potential. These insights reinforce the importance of strategic planning, investment in infrastructure, and institutional reforms to support long-term mineral-led industrialisation.

Despite the opportunities that mineral-based industrialisation presents, several challenges remain. Signé and Johnson (2021) highlight that while mining contributes directly to employment, its most significant economic impact comes through backward and forward linkages with other industries. However, quantifying the indirect employment generated by mining—particularly in manufacturing, services, and technology—remains a key challenge. To address this, a more integrated industrial strategy that prioritises local content development, knowledge transfer, and sectoral linkages is necessary to maximise mining's broader economic benefits.

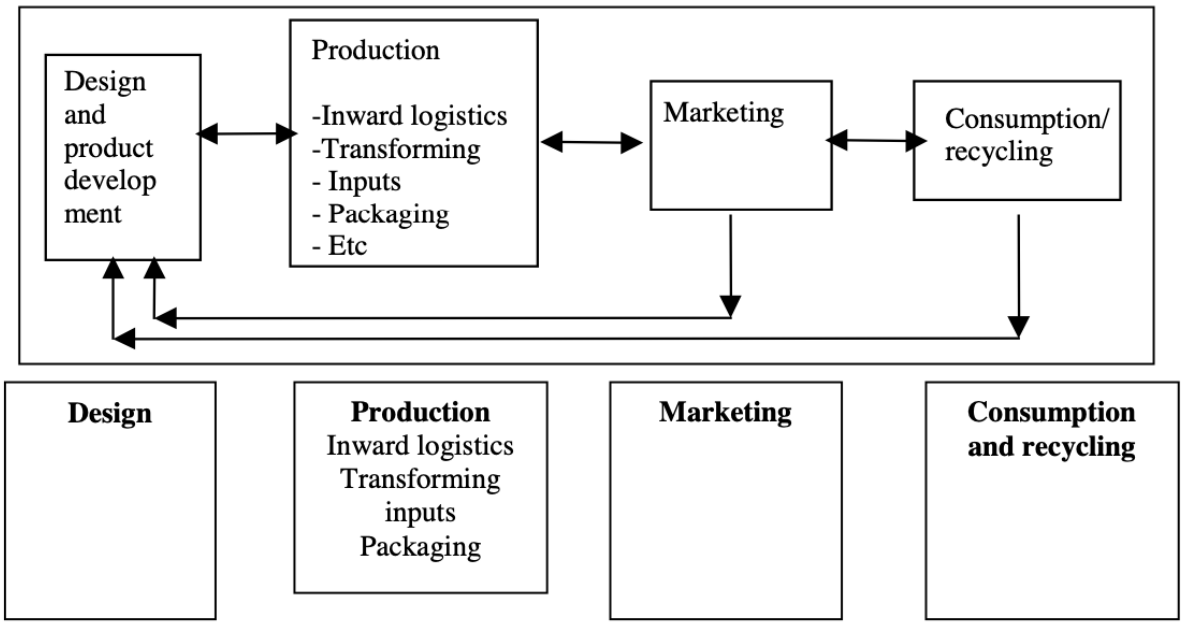
Finally, the MBI framework, when integrated with the Global Value Chain approach, offers a transformative strategy for resource-rich countries like Zambia to harness their mineral wealth for sustainable and inclusive economic growth. By strengthening backward and forward linkages, promoting local content policies, and leveraging regional cooperation, Zambia can shift away from a reliance on raw material exports and position itself as a key player in mineral-driven industrialisation.

3.3.2 Global Value Chain (GVC) Approach

The Global Value Chain (GVC) approach provides a sophisticated alternative to the conventional resource curse framework by emphasising how global production networks can drive economic transformation and industrial development in resource-rich countries. Rather than viewing natural resource wealth as a deterministic factor that leads to economic stagnation, the GVC perspective offers a dynamic lens that reveals how nations can strategically position themselves within international production systems to capture more value. This is particularly relevant for Zambia, whose copper sector has historically been characterised by an overwhelming dependence on the extraction and export of raw materials with minimal domestic processing or manufacturing. Applying the GVC framework can help Zambia develop policies aimed at deepening integration into global production systems, moving beyond raw commodity exports toward industrial upgrading, economic diversification, and sustainable development.

Kaplinsky and Morris (2000) introduced a simple four-link value chain model that outlines the stages of value addition in a production system, consisting of product design, production, marketing, and finally, consumption and recycling, as shown in Figure 4. Simple Four-Link Value Chain Model.

Figure 4. *Simple Four-Link Value Chain Model*



Source: Adapted from A Handbook for Value Chain Research, Kaplinsky and Morris (2000: 4)

This framework provides a useful structure for understanding how Zambia's mining sector currently functions within the broader global copper value chain and where opportunities for deeper integration exist. While Zambia has remained entrenched in the production phase—focused primarily on mineral extraction—significant gaps exist in the country's ability to capture value through downstream processing and manufacturing. Leveraging insights from the GVC approach can enable Zambia to identify strategies for advancing along the value chain by enhancing both backward and forward linkages.

As was earlier stated, backward linkages involve industries that supply goods and services to the mining sector, such as machinery manufacturing, chemical production, and logistics. These linkages are crucial for fostering domestic industrialisation by creating demand for local suppliers and encouraging technology transfer. However, Zambia's backward linkages in mining are weak, with most inputs still imported. This presents both a challenge and an opportunity—enhancing domestic manufacturing and supporting local suppliers could create jobs, boost knowledge transfer, and reduce reliance on imports. Fessehaie (2021) argues that strengthening these linkages in Southern Africa requires a robust mining capital equipment industry to enhance competitiveness. Regional value chains can facilitate knowledge spillovers, economies of scale, and local firm participation in mining supply chains. Fessehaie (2021) further emphasises that capital equipment fosters technological innovation, skills development, and employment, particularly in aftermarket services. In Zambia, where mining capital equipment imports totalled around $4.4 billion from 2006 to 2015, a local engineering services sector has emerged to provide maintenance and repairs, allowing firms to sustain capabilities and diversify into sectors like construction, forestry, and utilities during economic downturns.

Forward linkages, on the other hand, pertain to the transformation of extracted minerals into refined and manufactured products—an area where Zambia has yet to realise its full potential. Despite being one of the world's leading copper producers, the country continues to export the vast majority of its copper as raw cathodes, concentrates, or blister copper, with little domestic processing into higher-value products such as copper cables, wiring, or components for renewable energy technologies. This is a missed economic opportunity, as global demand for processed copper products is surging, particularly in industries tied to the energy transition, such as EVs, solar panels, and wind turbines.

Barron, et al. (2024) argue that Zambia's efforts toward value addition in the mining sector are hindered by three interrelated challenges—the dominance of foreign-owned businesses, an unfavourable landscape for local company participation, and a lack of an enabling environment for value addition. Despite policy ambitions, local entrepreneurs struggle to establish copper processing and manufacturing ventures due to barriers such as limited access to raw materials, high capital costs, and a policy landscape that favours large multinational corporations. The study highlights that even Zambia's few existing value-adding copper companies are foreign-owned, reinforcing concerns that local economic benefits from downstream processing remain marginal. This insight underscores the need for Zambia's industrial strategy to go beyond GVC participation and focus on domestic capacity-building to ensure that the benefits of value addition remain within the local economy.

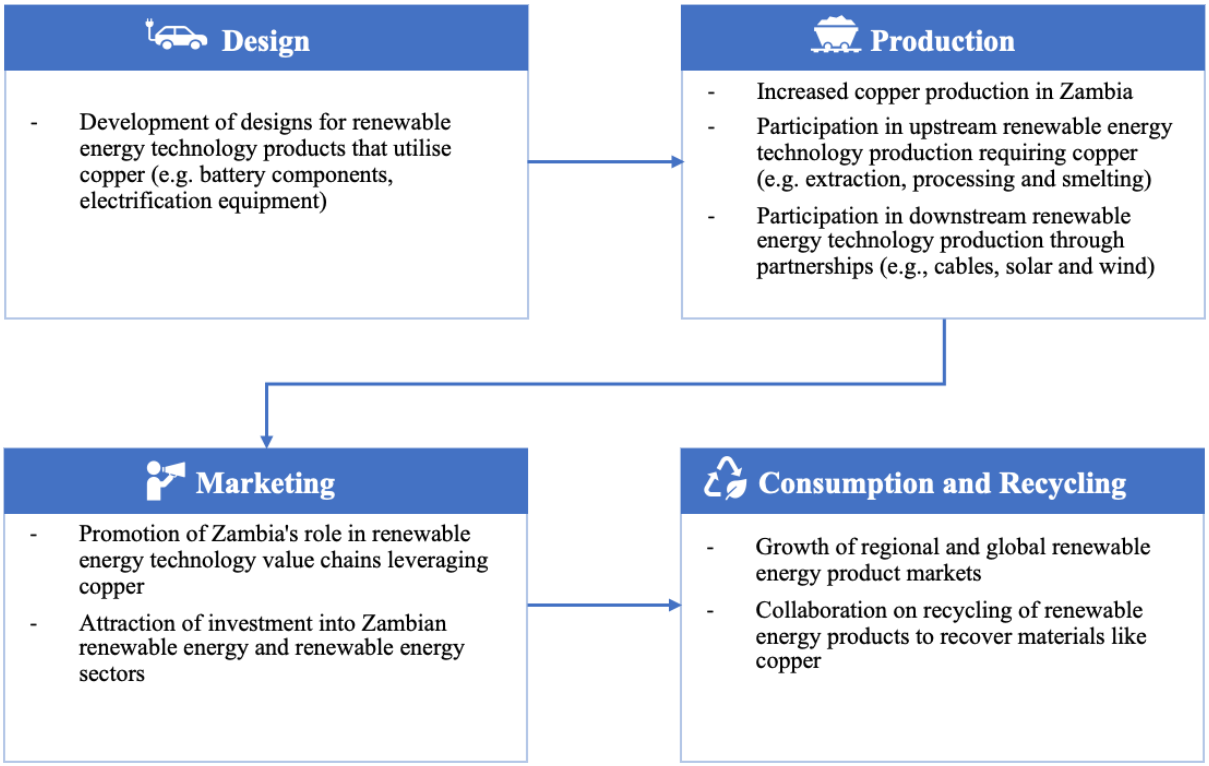
The relevance of the GVC framework to Zambia's copper sector extends beyond theoretical considerations—it also informs practical strategies for industrial policy and economic development. The GVC approach provides a clear roadmap for identifying key constraints to value chain upgrading, such as inadequate infrastructure, lack of technological capabilities, and weak institutional frameworks. Kaplinsky and Morris (2016) emphasise that countries seeking to move up the value chain must focus on targeted interventions that address these bottlenecks, such as improving trade logistics, investing in technical education, and fostering innovation through public-private partnerships. In Zambia's case, policy measures aimed at supporting local content development in mining supply chains, streamlining export procedures, and incentivising downstream investment in copper processing can enhance the country's integration into global markets.

The determinants of GVC participation are essential for understanding Zambia's positioning within international production networks. Fernandes, Kee, and Winkler (2022) identify several key factors that influence a country's ability to engage in GVCs, including industrial capacity, trade policies, FDI, and macroeconomic stability. Zambia's relatively strong endowment of mineral resources provides a natural advantage, but its industrial and policy environment needs significant improvements. For example, weak infrastructure—particularly unreliable electricity supply—has been a major constraint to expanding copper processing industries, as smelting and refining require large amounts of energy. Similarly, policy inconsistencies and regulatory uncertainty have deterred foreign and domestic investment in value-added copper production.

One of the critical insights from the GVC literature is that participation alone is not sufficient—what matters is how a country integrates into the value chain and whether it can upgrade over time. Gereffi and Lee (2016) highlight the distinction between economic upgrading, which involves moving into higher-value activities through improved technology, knowledge, and skills, and social upgrading, which refers to better working conditions, wages, and labour rights. However, they caution that social upgrading does not automatically follow economic upgrading and requires active governance to ensure broad-based benefits. In Zambia's mining sector, economic upgrading would involve increasing local processing and manufacturing capacity, while social upgrading would require improving labour conditions and reducing wage disparities. Both forms of upgrading are necessary to ensure that GVC integration fosters inclusive economic development rather than reinforcing existing inequalities

Kaplinsky and Morris' (2000) four-link value chain model can be adapted to illustrate Zambia's role in the global copper industry, as shown in Figure 5. Simple Four-Link Value Chain Mapping Model: Copper Mining and the Green Energy Transition

Figure 5. *Simple Four-Link Value Chain Mapping Model: Copper Mining and the Green Energy Transition*



Source: Author's compilation

Note: A modified adaptation from A Handbook for Value Chain Research, Kaplinsky & Morris (2000: 4)

While this model provides a useful visualisation of Zambia's position in the global copper value chain, its placement within this analysis should align with a discussion on the challenges and prospects for industrial upgrading. As noted earlier, some scholars have suggested that this type of value chain mapping is best suited for a later section that delves deeper into the barriers and opportunities associated with value addition in Zambia. A thorough examination of how Zambia can shift from raw material exports to high-value copper-based industries would benefit from further empirical analysis, including case studies of successful industrial policies in other mineral-rich nations.

Despite the potential benefits of GVC participation, latecomer countries like Zambia face significant structural challenges in integrating into higher-value segments of global production networks. Ighobor (2016) highlights that one advantage latecomers have is the ability to 'leapfrog' traditional industrialisation pathways by adopting modern technologies and capitalising on emerging global trends. The green energy transition presents one such opportunity. As countries worldwide invest in clean energy solutions, the demand for copper-intensive technologies is increasing. This shift offers Zambia a strategic opening to move beyond raw copper exports and expand its role in producing processed copper components for renewable energy markets, aligning with broader green industrialisation goals.

However, the risks of remaining locked in extractive activities remain high. Many resource-rich countries struggle with policy incoherence, rent-seeking behaviour, and limited technological capacity, all of which hinder industrial upgrading. Zambia's experience with policy reversals in the mining sector—such as fluctuating tax regimes and shifts in ownership models—has created an unpredictable business environment that discourages long-term investment in processing and manufacturing (Cheelo & Hinfelaar, 2021). To address these challenges, Zambia must adopt a stable and predictable policy framework that promotes long-term industrial development while ensuring that mining revenues are reinvested into infrastructure, education, and technological innovation.

Mulimbika and Karim (2018) argue that local content policies can play a crucial role in facilitating industrial upgrading in resource-rich economies. By requiring mining companies to source a higher proportion of goods and services from domestic suppliers, these policies can stimulate demand for locally manufactured products, enhance backward linkages, and contribute to broader industrial development. In Zambia, strengthening local content requirements—alongside targeted incentives and capacity-building measures—can help

develop local supplier capabilities, improve value addition in mining supply chains, and enhance the country's participation in GVCs.

The Global Value Chain approach, therefore, presents a compelling alternative to the resource curse framework by demonstrating how Zambia's copper sector can be leveraged for broader industrialisation. Strengthening both backward and forward linkages, investing in regional value chain development, and implementing policies that promote industrial upgrading will enable Zambia to transcend its reliance on raw material exports and emerge as a significant player in global copper production. This approach not only offers a pathway for economic diversification but also aligns with global trends toward green industrialisation and sustainable development.

3.4 Chapter Summary

This chapter has examined key theoretical frameworks that provide insights into Zambia's economic trajectory and potential pathways for industrialisation. While the resource curse theory highlights the challenges of resource dependence, its deterministic assumptions have been challenged by scholars who argue that governance, policy choices, and institutional capacity ultimately determine development outcomes. The mineral-based industrialisation (MBI) approach presents an alternative perspective, emphasising the potential for economic transformation through backward and forward linkages in the mining sector. Similarly, the global value chain (GVC) framework provides a broader understanding of how Zambia can position itself in international production networks to capture more value from its copper sector.

CHAPTER 4
PRODUCTIVE LINKAGES

4.1 Introduction

This chapter examines productive linkages in Zambia's copper mining sector, focusing on forward linkages (value addition through refining and manufacturing) and backward linkages (local supplier integration). These linkages are crucial for industrialisation, helping resource-rich economies move beyond raw material exports, diversify, and retain more local value (Morris, Kaplinsky, & Kaplan, 2012). Strong linkages drive job creation, infrastructure development, and technology transfer, positioning Zambia to benefit from rising global copper demand in green energy technologies.

Despite Zambia's vast copper reserves, limited local beneficiation and weak supplier integration constrain industrial growth. Most copper is exported raw or semi-processed due to inadequate incentives and infrastructure for local refining and manufacturing. Meanwhile, foreign suppliers dominate mining procurement, limiting opportunities for local firms due to cost, quality, and financing challenges. These issues stem from policy inconsistencies, high energy and transport costs, weak infrastructure, and an unstable investment climate (Andreoni & Roberts, 2022). While energy reliability—exemplified by recurring power outages—clearly underpins all industrial activity, Zambia's Eighth National Development Plan (8NDP) 2022–2026 explicitly elevates both 'energy sector reforms' and 'value-addition through industrialisation' as co-equal strategic pillars, signalling a deliberate policy choice to pursue productive-linkage incentives in parallel with efforts to stabilise power supply (Government of Zambia, 2022).

This chapter critically assesses Zambia's approach to productive linkages, examining policy gaps, structural barriers, and opportunities for industrial upgrading. Drawing on experiences from Chile, Indonesia, and South Africa, it identifies key policy interventions to strengthen local beneficiation and supplier participation. The chapter concludes with a policy evaluation, outlining necessary reforms to enhance Zambia's industrial competitiveness and long-term economic development.

4.2 Downstream Beneficiation (Forward Linkages): Opportunities and Challenges

Zambia's position as one of the world's leading copper producers presents an immense opportunity to leverage the global green energy transition for industrial development. However, while copper demand is surging due to its critical role in renewable energy technologies—such as EVs, wind turbines, solar panels, and energy storage systems (Snowdon et al., 2021)—Zambia continues to function primarily as an exporter of raw or semi-processed copper. This reliance on exporting unprocessed mineral wealth reflects deep structural constraints that have hindered efforts to develop robust forward linkages and move up the value chain.

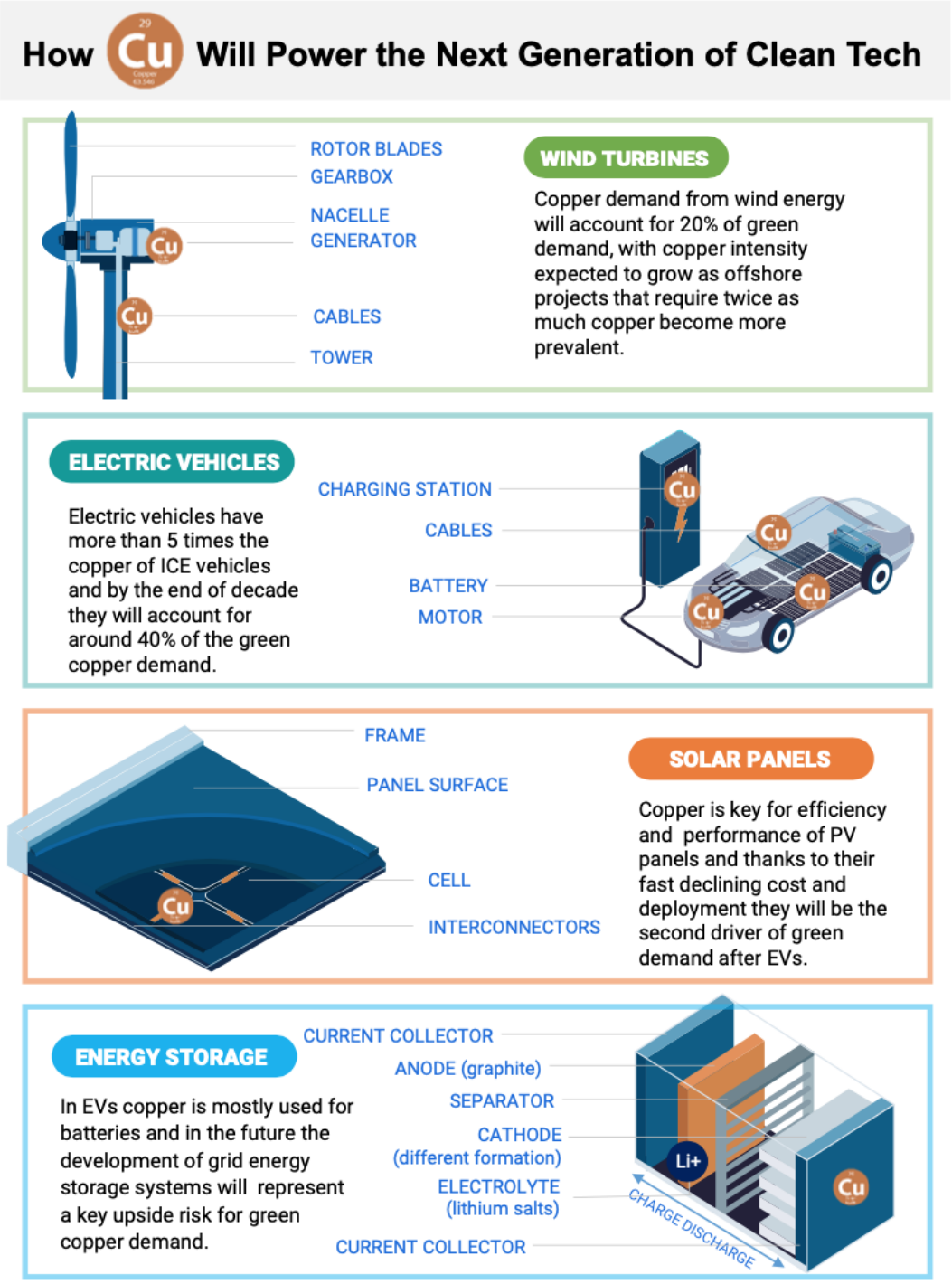
The lack of progress in downstream beneficiation is not merely a matter of technical or financial constraints but is deeply rooted in Zambia's economic structure, policy direction, and integration into global mining value chains. Historically, the country has been locked in a resource extraction model, where weak local content policies, foreign-dominated mining operations, and an export-oriented approach have limited incentives for local processing and manufacturing. This is a well-documented pattern in resource-dependent economies, where multinational corporations control extraction and prioritise value addition outside the host country, often due to cost efficiencies, global supply chain integration, and policy gaps in domestic industrialisation strategies (Morris, Kaplinsky, & Kaplan, 2012).

Zambia's case is emblematic of broader structural challenges faced by many mineral-rich developing nations. While the National Critical Minerals Strategy (2024–2028) and other policy frameworks have acknowledged the need to enhance beneficiation, there is little evidence that these policies have significantly altered the country's industrial trajectory (Ministry of Mines and Minerals Development, 2024). In contrast, other resource-rich nations like Indonesia have implemented deliberate measures to enforce in-country processing through various strategies. In 2014, Indonesia imposed a strict ban on raw nickel exports, compelling major foreign investors—especially Chinese firms—to establish smelting and refining infrastructure. This policy has rapidly expanded nickel processing and significantly boosted export revenues. However, much of the investment has been concentrated in a few corporate-dominated industrial parks, raising concerns about limited local benefits, environmental degradation, and labour conditions (Warburton, 2024).

A critical analysis of Zambia's current trajectory reveals that its beneficiation efforts remain largely aspirational rather than substantive. Without major reforms in industrial policy,

investment incentives, and infrastructure development, the country risks remaining a low-value commodity exporter, failing to capture the transformative economic benefits associated with forward linkages. Figure 6. Copper Use Cases in Clean Technology: Wind, EVs, Solar, and Energy Storage below, derived from Snowdon et al. (2021), showcases the potential use cases and downstream opportunities for Zambia to capitalise on its copper reserves. By doing so, the country can tap into the critical minerals boom and the global shift toward green energy, thereby advancing its industrialisation and development goals.

Figure 6. *Copper Use Cases in Clean Technology: Wind, EVs, Solar, and Energy Storage*



Source: Adapted from Green metals: Copper is the new oil, Snowdon et al. (2021: 7)

In addition to the mentioned use cases, Zambia could explore several other low-hanging opportunities for forward linkages, such as expanding local smelting and refining facilities for higher-grade copper and developing manufacturing of copper wire and tubing.

This section assesses the feasibility of expanding Zambia's copper value chain by critically examining its current refining and processing capacity, the structural barriers to beneficiation, and strategic pathways that could make industrial upgrading a reality.

4.2.1 Zambia's Copper Processing and Refining Capacity: Missed Opportunities and Systemic Weaknesses

Zambia possesses some smelting and refining capacity, primarily through operations at MCM, KCM, and First Quantum Minerals (FQM). However, despite these facilities, the country remains a net exporter of copper concentrates rather than refined copper products (Musonda & Larmer, 2023). This paradox highlights the structural deficiencies that continue to undermine Zambia's ability to fully capitalise on its mineral wealth.

A major impediment to Zambia's copper value addition is the structural dominance of foreign-owned mining firms, which control production, exports, and pricing mechanisms, limiting local enterprises' ability to participate in refining and manufacturing. These firms prioritise exports under long-term off-take agreements, selling copper at London Metal Exchange (LME) benchmark prices, which effectively prices out local processors. Without structured policies to allocate a portion of copper to domestic manufacturers at competitive rates, similar to Chile's preferential pricing model for lithium, Zambian firms will continue to face significant barriers to scaling value-added production (Barron et al., 2024).

Chile, a leading copper producer, has leveraged policies to enhance its copper sector, prioritising energy efficiency, decarbonisation, and resource integration into global supply chains (Leiss & Yeluri, 2021). However, domestic copper manufacturing remains minimal, with most production exported as raw material. Despite significant reserves and potential for downstream development, policy shifts and regulatory uncertainties have influenced investment. In contrast, Zambia has struggled with policy fragmentation and limited industrial growth, lacking Chile's focus on attracting investment and integrating local industries into global value chains (Harvey, 2019).

The failure to expand domestic refining and manufacturing is compounded by infrastructural and economic constraints. The high cost of electricity in Zambia has made copper processing less competitive compared to global refining hubs, such as China, where economies of scale enable lower production costs (Andreoni & Roberts, 2022). The country's unreliable power

supply further discourages investment in energy-intensive industries, limiting the prospects for sustained beneficiation growth. Representatives interviewed from First Quantum Minerals (FQM), the Southern African Institute for Policy and Research (SAIPAR), and the Ministry of Mines and Minerals Development noted that power shortages and high tariffs have made it difficult for manufacturers to maintain consistent production output.[1] Moreover, weak logistics infrastructure—including high transportation costs and outdated railway networks—adds to the costs of domestic copper processing, making exports of unprocessed copper a more attractive option for mining firms.[2]

4.2.2 Key Constraints to Expanding Copper Beneficiation

Zambia's ambition to enhance downstream beneficiation in the copper sector is hindered by a range of systemic constraints that have historically undermined industrialisation efforts. While capital intensity, infrastructure deficits, and skills shortages are widely acknowledged as major barriers, other critical factors—including the country's ongoing energy crisis, weak policy implementation, economies of scale limitations, and the broader investment climate—also play a significant role. Without addressing these challenges, Zambia risks remaining trapped in its historical pattern of resource extraction without sufficient value addition.

Capital Intensity and Industrial Infrastructure Deficits

Copper beneficiation is an extremely capital-intensive process, requiring massive investments in smelting, refining, and fabrication facilities. The cost of setting up a fully integrated copper value chain—from smelting to the production of finished goods like wiring and battery precursors—demands both long-term financing mechanisms and a robust industrial infrastructure, which Zambia currently lacks.

Despite possessing some existing smelting capacity at MCM and Konkola Copper Mines (KCM), Zambia has not significantly expanded beyond basic refining into higher-value manufacturing. In contrast, countries like Indonesia have used state-driven incentives and enforced local processing mandates to attract private sector investment into nickel and mineral

[1] Interview with First Quantum Minerals (FQM) Representative, June 6, 2024; interview with Historian and Political Economy Specialist from the Southern African Institute for Policy and Research (SAIPAR), June 7, 2024; and interview with Ministry of Mines and Minerals Development Representative), June 7, 2024.
[2] These sentiments were expressed during interviews with representatives from ZAM on March 28, 2024, SAIPAR, and the Local Content Expert on June 3, 2024.

beneficiation (Warburton, 2024). Zambia's failure to establish a structured investment model that incentivises long-term industrial growth—either through tax benefits, infrastructure support, or targeted subsidies—has meant that foreign investors often prefer to export raw copper rather than process it locally.

Additionally, Zambia's poor transportation network, particularly outdated rail infrastructure and high-cost road transport, raises logistical costs for domestic processing facilities, making beneficiation less competitive. The lack of a well-developed industrial cluster around mining operations further discourages investment in copper value-added production. Without major improvements in transportation, electricity, and manufacturing infrastructure, beneficiation will remain economically unviable.

The Energy Crisis: A Major Constraint to Beneficiation

One of the biggest barriers to expanding copper beneficiation in Zambia is the country's energy crisis. Smelting and refining require massive amounts of electricity, and Zambia's power supply remains unreliable, with frequent blackouts and inconsistent energy pricing structures undermining industrial operations. The crisis has been exacerbated by drought-induced reductions in hydropower output, given Zambia's heavy reliance on hydropower, which makes up the bulk of its electricity generation. As a result, copper-processing facilities face operational disruptions and higher energy costs, making local refining and value addition less competitive compared to processing hubs in China and Europe, where industrial electricity is more reliable and affordable.

Efforts to diversify Zambia's energy mix— including solar, wind, and thermal power—have been slow due to weak investment incentives and a lack of financing for alternative energy projects. While the government has introduced the Integrated Resource Plan (IRP) to stabilise the electricity supply, implementation remains a challenge, particularly given the country's constrained fiscal position (Ministry of Energy, 2023). Until Zambia resolves its power crisis, beneficiation projects will continue to face serious cost disadvantages, making industrial growth difficult to sustain.

Skills Deficit and Technological Limitations

Zambia's limited technical expertise in metallurgy, materials science, and copper fabrication presents another major hurdle to downstream industrialisation. While copper mining has been the backbone of Zambia's economy for over a century, the absence of strong research and development (R&D) institutions dedicated to mining-related innovation has meant that the country lacks advanced capabilities in metallurgical engineering and high-tech copper processing.

The technical and vocational education and training (TVET) system remains weak, and partnerships between industry and educational institutions have not been sufficiently developed.[3] This is in stark contrast to countries like South Korea and China, where government-supported R&D programs have fuelled industrial upgrading in high-value manufacturing. The lack of skilled labour is further compounded by outdated quality standards. Even for basic value-added copper products such as cables and rods, Zambian firms struggle to meet global export standards, limiting access to international markets. Without significant investments in skills development, technological innovation, and industrial research, Zambia will find it difficult to compete in the more advanced segments of the copper value chain.

Weak Policy Implementation and Inconsistent Industrial Strategies

Despite government commitments to beneficiation, Zambia's industrial policies have been marked by inconsistencies, lack of enforcement, and frequent policy reversals, which discourage long-term investment in value-added processing. Over the past three decades, Zambia has oscillated between privatisation, resource nationalism, and free-market policies, creating an unstable regulatory environment for potential investors in copper refining and manufacturing (Ng'ambi, 2023).

Unlike Botswana, which has successfully negotiated local beneficiation commitments with diamond mining companies, Zambia has failed to impose similar requirements on copper producers (Morris et al., 2012). Multinational mining firms continue to export raw copper without significant obligations for local processing, reflecting the weak enforcement of local content policies. While the National Industrial Policy (2018) and the National Critical Minerals Strategy (2024–2028) acknowledge the need for value addition, implementation remains

[3] Interviews with the National Assembly Parliamentary Budget Office (PBO) Representative on May 29, 2024, and the Solar Industry Association of Zambia (SIAZ) Representative on July 2, 2024, identified significant skills gaps as a barrier to developing downstream beneficiation.

fragmented across different ministries, limiting their effectiveness (Ministry of Mines and Minerals Development, 2024).

Economies of Scale Limitations and Global Market Pressures

Another significant constraint to beneficiation is Zambia's limited market size. Copper-based manufacturing operates on economies of scale, where high production volumes are necessary to achieve cost competitiveness. However, Zambia's domestic demand for refined copper and finished copper products is too small to justify large-scale investment in value-added industries (Fessehaie et al., 2016).

Even in potential export markets, Zambia faces fierce competition from countries like China and India, where large-scale production enables significantly lower unit costs (Seck et al., 2020). For instance, China has become the world's largest copper refiner, processing the majority of the world's copper cathodes and fabricating end-use products like wiring and battery precursors at globally competitive prices.

The Investment Climate: Political and Economic Risks

Zambia's broader macroeconomic instability, external debt burden, and political risks also deter long-term investment in beneficiation. The 2020 sovereign debt default raised concerns about Zambia's fiscal sustainability, while frequent changes in mining taxation and regulatory frameworks have created uncertainty for investors (Vandome, 2023a). Despite efforts by the current administration to stabilise the investment climate, some stakeholders remain wary of the country's inconsistent policy track record.[4] The absence of large-scale industrial financing mechanisms, coupled with perceived political risks, means that many international investors prefer to engage in mining extraction rather than beneficiation.

4.2.3 Comparative Study: Lessons for Zambia on Industrialisation Strategies in Mineral Beneficiation from Chile and Indonesia

Zambia's quest for mineral-based industrialisation can draw important lessons from countries that have successfully expanded their downstream beneficiation industries. Chile and Indonesia offer contrasting, yet instructive examples of how resource-rich economies have pursued value

[4] Virtual interview with Zambia Chamber of Mines (ZCM) Representative, May 24, 2024.

addition in their mining sectors. While Chile has leveraged state-led policies and institutional stability to build a sophisticated copper industry, Indonesia has adopted a resource nationalist approach, compelling in-country processing through strict policy measures. These two case studies illustrate different pathways that Zambia could consider in its own drive toward copper beneficiation.

Chile: Market-Driven Industrialisation and Policy Consistency

Chile, the world's largest copper producer, remains heavily reliant on raw copper exports rather than domestic manufacturing (Leiss & Yeluri, 2021). State-owned Codelco plays a central role in reinvesting copper revenues into infrastructure and skills development, but most production is exported in unprocessed form (Leiss & Yeluri, 2021). Policy shifts and regulatory uncertainties have influenced investment, while efforts to promote value addition through refining and manufacturing have been limited. Unlike Zambia, which faces policy fragmentation, Chile has maintained relative policy stability, attracting long-term investment in its mining sector (Seck et al., 2024).

Indonesia: Resource Nationalism and Export Restrictions as Industrialisation Levers

Indonesia has aggressively pursued resource nationalist policies to drive mineral beneficiation, particularly in nickel. In 2014, the government imposed an export ban on raw nickel ore, forcing foreign companies—especially Chinese firms—to invest in domestic smelting and refining (Warburton, 2024). This intervention aimed to move Indonesia beyond raw exports and integrate its mining sector into higher-value industrial activities, especially in EV battery production (Fang, 2024).

Despite initial resistance from multinational firms, Indonesia maintained its stance, offering tax breaks, energy subsidies, and investment incentives to encourage local processing (Warburton, 2024). As a result, the country attracted billions in FDI from Chinese, Japanese, and South Korean firms, rapidly expanding its nickel refining and battery precursor industries (Fang, 2024). Indonesia is now the world’s largest nickel processor, positioning itself as a key supplier for global EV manufacturers.

However, challenges remain. The nickel processing sector is dominated by foreign firms, limiting the benefits for local businesses (Warburton, 2024). Additionally, environmental

concerns—including deforestation, carbon emissions, and industrial pollution—have escalated as nickel smelting expands.

Lessons for Zambia: Finding a Balanced Approach

Chile and Indonesia offer contrasting lessons for Zambia's industrial strategy. Chile has relied on policy stability and strategic incentives to support value addition, while Indonesia has enforced strict export restrictions to drive local beneficiation (Leiss, 2024; Warburton, 2024). However, both models have limitations—Chile exports most of its refined copper rather than using it for domestic manufacturing, while Indonesia's approach has led to foreign dominance and environmental risks. For Zambia, a phased beneficiation strategy could blend Chile's policy stability with Indonesia's selective intervention. Policy consistency is essential to attract long-term investment, while targeted incentives—such as preferential pricing for domestic manufacturers—could encourage local value addition. Additionally, regional industrial integration, such as Zambia's partnership with the DRC on EV battery precursors, could enhance economies of scale and attract midstream processing investment (Andreoni & Roberts, 2022). While Indonesia and Chile offer instructive cases, their scale, state revenue structures, and bargaining positions differ markedly from Zambia's. Lessons from their value-chain policies must therefore be adapted to Zambia's smaller market size and distinct fiscal constraints. Moreover, Lwazi (2022) recommends that Zambia establish its own sovereign stabilisation fund—modelled on Chile's Economic and Social Stabilisation Fund, which is financed by surplus copper revenues—to smooth price shocks and ensure a steady financing stream for downstream linkages, thereby strengthening Zambia's far more constrained fiscal buffers.

4.3 Backward Linkages (Upstream): Strengthening Local Supply Chains

4.3.1 The Role of Backward Linkages in Mining-Driven Industrialisation

Zambia's copper mining sector remains the backbone of its economy, but the extent to which it drives broader industrialisation depends significantly on the strength of its backward linkages. These linkages refer to the integration of domestic firms into mining supply chains, encompassing local procurement of goods, services, and capital equipment required for mining operations. When effectively developed, backward linkages can stimulate industrial diversification, promote technology transfer, and create high-quality employment opportunities beyond the mining sector. However, despite the long-standing presence of multinational

mining firms in Zambia, local supplier participation remains weak, constrained by policy inconsistencies, lack of industrial capacity, and global value chain dynamics that favour established international suppliers.

This section critically examines the status of backward linkages in Zambia's mining sector, assessing opportunities, structural barriers, and policy gaps. Drawing on insights from the mineral-based industrialisation (MBI) framework and the GVC approach, it evaluates the effectiveness of existing policies aimed at enhancing local supply chains and considers comparative lessons from other resource-rich economies. Stakeholder perspectives provide supplementary insights into the practical challenges faced by local suppliers and the strategies needed to integrate them more effectively into mining supply networks.

4.3.2 The Current Status of Local Suppliers in Zambia's Mining Sector

Despite Zambia's long history of copper mining, the development of a strong local supplier base has been limited. A large proportion of the goods and services required by mining companies—ranging from drilling equipment and processing chemicals to transport logistics and engineering services—continue to be sourced from foreign firms, particularly South African, Chinese, and European suppliers. According to Fessehaie (2021), mining capital equipment imports to Zambia totalled $4.4 billion between 2006 and 2015, reflecting the country's heavy reliance on foreign-manufactured inputs. More recent data show that imports of commodity group 8430 ("Other moving, grading, levelling, scraping, excavating, tamping, compacting, extracting or boring machinery for earth, minerals or ores") into Zambia totalled $34 million in 2023 (TrendEconomy, n.d.). While some local firms provide basic services such as catering, security, and transportation, their participation in more sophisticated supply chain segments remains minimal.

A major reason for this weak local integration is the lack of an advanced industrial base capable of producing high-quality mining inputs. Many domestic firms struggle to meet the stringent quality and technical standards required by multinational mining corporations, limiting their competitiveness against established international suppliers.[5] This challenge is exacerbated by the absence of large-scale industrial zones and inadequate access to finance, which prevent local firms from scaling up production to meet mining industry demands.

[5] Virtual interview with the Zambia Association of Manufacturers (ZAM) Representative, March 28, 2024.

4.3.3 Challenges in Scaling Up Local Content in Mining Supply Chains

The weak integration of local suppliers into Zambia's mining sector can be attributed to several interrelated factors. A key constraint is the country's limited manufacturing and industrial capacity. Zambia lacks large-scale industrial plants capable of producing critical mining inputs, such as processing chemicals, pumps, drilling equipment, and conveyor systems. Without local manufacturing capacity, mining firms are compelled to source these products from established international suppliers, locking Zambia into a dependency on imported inputs. This situation contrasts sharply with countries like South Africa and Chile, where strong industrial ecosystems support robust mining supply chains. South Africa, for instance, has successfully developed local engineering and manufacturing firms that supply capital equipment to the mining industry, reducing reliance on imports and fostering local technological advancement (Fessehaie et al., 2016). Zambia's failure to establish similar capabilities means that even as copper production expands, local firms remain largely excluded from supplying the sector with high-value inputs.

Access to finance remains a major challenge for local suppliers, severely constraining their ability to expand production and meet mining industry standards. High-interest rates—reaching up to 30 percent in Zambia—along with stringent collateral requirements and limited government-backed financing options, prevent small and medium enterprises (SMEs) from scaling their operations to compete with established international suppliers (Barron et al., 2024). In contrast, Chile's Economic Development Agency (CORFO) has successfully bolstered local supplier development by providing concessional financing and grants to mining-related SMEs, enabling them to upgrade production capacities and integrate into supply chains (Leiss & Yeluri, 2021). Without similar financial support structures, Zambian suppliers struggle to break into higher-value segments of the mining supply chain.

Policy inconsistencies and weak enforcement of local content regulations further hinder the growth of backward linkages. While Zambia has introduced various local content initiatives, enforcement remains weak. Mining companies often bypass procurement requirements by sourcing from foreign-owned firms registered in Zambia, creating an illusion of local participation without actual value addition.[6] The absence of a dedicated Local Content

[6] Virtual interview with a Zambian Economic Development and Policy Expert from the University of Cape Town (UCT), June 11, 2024.

Regulatory Unit to monitor compliance further undermines these policies. Comparatively, Indonesia's local content policies in the nickel sector provide useful lessons. The government mandated that foreign mining companies source a minimum percentage of their inputs from local firms, backed by a robust monitoring and enforcement framework (Warburton, 2024). Zambia's failure to establish a similarly strict regulatory environment has resulted in weak enforcement, limiting the impact of its local content policies.

4.3.4 Strengthening Backward Linkages in Zambia's Mining Sector

To effectively enhance local content and backward linkages, Zambia must adopt a multi-pronged approach. Strengthening industrial policy is crucial to support supplier development, and this requires targeted investments in industrial parks dedicated to mining-related production. Enhancing access to finance for local suppliers should be prioritised through concessional financing schemes, possibly in collaboration with development finance institutions, to help bridge funding gaps.[7] Creating a Local Content Regulatory Unit would be essential in ensuring that mining firms comply with procurement obligations and source a minimum percentage of inputs from domestic suppliers. Encouraging strategic partnerships with global suppliers can also facilitate technology transfer, capacity building, and integration of local firms into international supply chains.

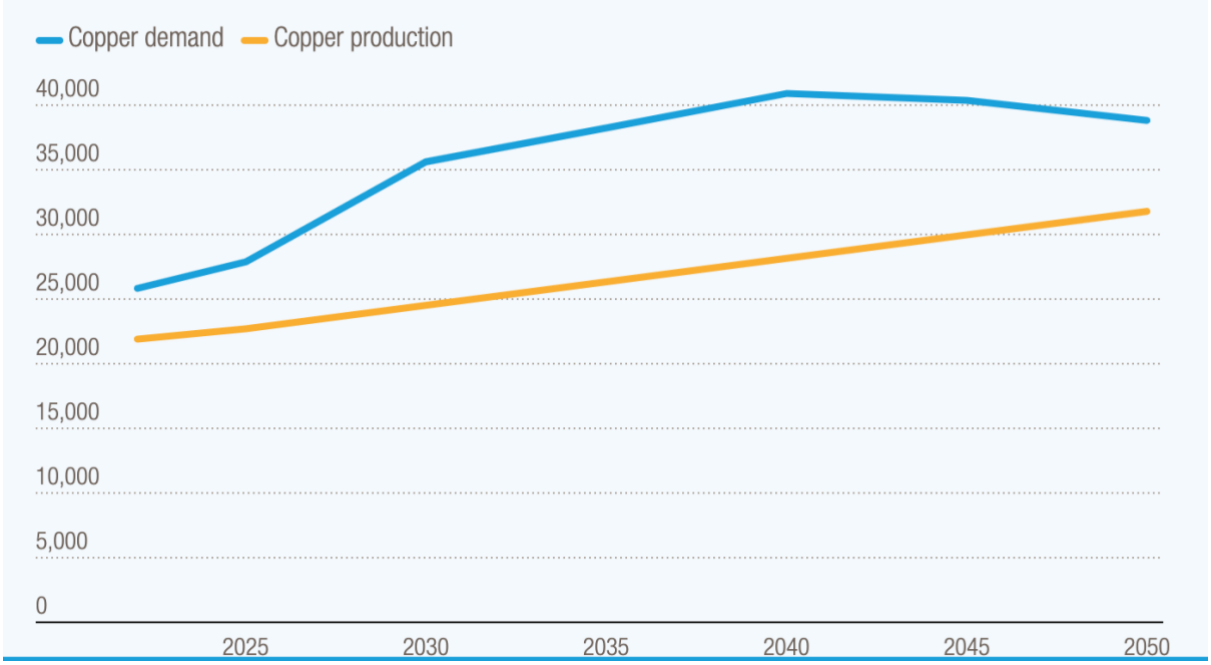
4.3.5 Prioritising Backward Linkages for Sustainable Industrial Growth

While Zambia has made efforts to promote local content, its backward linkages in the mining sector remain weak due to structural constraints, policy inefficiencies, and GVC dynamics. Addressing these challenges requires a strategic approach that combines industrial policy reforms, financial support mechanisms, and strong enforcement frameworks. By prioritising backward linkages, Zambia can create a more inclusive mining sector that drives long-term industrialisation and economic diversification. In terms of opportunities for backward linkages, Zambia could support local steel fabricators to make mining components, chemical producers for processing reagents, and service firms for equipment maintenance. Figure 7 below from UNCTAD (2023) provides projections for copper demand and copper production, which are

[7] This was a proposal by representatives from FQM, the Ministry of Mines and Minerals Development, the Ministry of Commerce, Trade and Industry, ZAM, and the Zambian Economic Development and Policy Expert from the University of Cape Town (UCT).

anticipated to increase to 38,817.62 metric tons and 31,788.11 metric tons, respectively, by the year 2050 due to the global transition to renewable energy.

Figure 7. *Projected Copper Demand and Production by 2050 Amid the Renewable Energy Transition*



Source: Adapted from Critical minerals boom: Global energy shift brings opportunities and risks for developing countries, UNCTAD (2023)

4.4 Policy Evaluation: Strengths, Weaknesses, and Future Directions

4.4.1 Assessing Zambia's Productive Linkage Policies: Strengths and Weaknesses

Zambia has long pursued policies aimed at leveraging its copper resources for economic transformation, yet its success in fostering productive linkages—both downstream (beneficiation) and upstream (local supply chain development)—has been limited. Over the years, the country has introduced various policy initiatives, such as the National Industrial Policy (NIP), the Local Content Strategy (2018–2022), and the recently formulated National Critical Minerals Strategy (2024–2028), all of which emphasise value addition and local supplier participation in the mining sector. However, these policies have often struggled with weak implementation, policy inconsistencies, and limited institutional capacity (Fessehaie et al., 2016; Weldegiorgis et al., 2021).

Compared to international best practices, Zambia's approach has been reactive rather than strategic. Countries such as Chile and Indonesia have successfully implemented mineral

industrialisation policies that enforce local beneficiation and ensure stronger backward linkages. Chile, for example, has developed a robust mining services and equipment manufacturing industry through targeted state interventions and investment incentives, allowing it to integrate local firms into the copper value chain (Leiss & Yeluri, 2021). Indonesia, on the other hand, has leveraged resource nationalism policies, such as its ban on raw nickel exports, to force foreign companies to establish domestic smelting operations (Warburton, 2024). In contrast, Zambia's policies lack strict enforcement mechanisms, with foreign firms continuing to dominate high-value mining supply chains while the country remains largely dependent on raw copper exports (Fessehaie et al., 2016).

One of Zambia's key policy strengths has been its open investment climate, which has attracted significant FDI into the mining sector (Vandome, 2023b). The government has implemented tax incentives and regulatory frameworks designed to encourage foreign participation, such as the Minerals Regulation Commission Bill of 2024 and fiscal reforms that provide mining firms with operational stability.[8] Additionally, recent efforts under the UPND government's economic diplomacy strategy have focused on securing international partnerships, including the Zambia-DRC EV Battery Initiative, which aims to move beyond traditional copper exports and integrate the country into the electric vehicle supply chain (Vandome, 2023b). While promising, these initiatives remain at a conceptual stage, with significant barriers to effective execution, including infrastructure limitations, policy instability, and uncertain financing mechanisms.

Despite these policy efforts, several structural weaknesses persist. A major limitation is the lack of enforcement capacity—local content policies, for instance, often lack clear regulatory oversight, allowing mining firms to circumvent procurement obligations by sourcing from foreign-owned subsidiaries (Kragelund, 2020). Additionally, Zambia has not effectively linked its mining sector to broader industrialisation goals, with minimal incentives for local firms to move up the value chain. Unlike Brazil and Canada, which have invested heavily in R&D and technology transfer programs to support domestic mining innovation, Zambia's policy framework remains underdeveloped in fostering long-term skills and technological capacity (De Tomi, Loredo, & Santos, 2024). To ensure long-term industrial upgrading, Zambia must

[8] The Government of the Republic of Zambia, through parliament in 2024, passed the Minerals Regulation Commission Bill of 2024, https://www.parliament.gov.zm/sites/default/files/documents/bills/THE%20MINERALS%20REGULATION%20COMMISSION%20BILL%2C%202024.pdf

transition from fragmented policy interventions to a coordinated value-addition strategy. The current lack of clear institutional ownership over beneficiation has resulted in policy inconsistencies and weak implementation (Barron et al., 2024). Establishing a centralised "Value Addition Task Force"—similar to Indonesia's dedicated oversight mechanism for in-country processing—would help streamline policy execution, enhance investor confidence, and drive local industrial growth.

4.4.2 Restructuring Zambia's Approach for Greater Value Retention

To maximise value retention from its copper sector, Zambia must adopt a more strategic and interventionist approach. First, the government should strengthen enforcement mechanisms for local content policies, ensuring that mining firms source a mandated percentage of their inputs from domestic suppliers. This would require establishing a Local Content Regulatory Unit to monitor compliance and support supplier development programs. The Ministry of Mines and Minerals Development is already making strides in this direction following a study it undertook in collaboration with the African Development Bank (AfDB) in 2022 to consider various options for establishing a Local Content Regulatory Unit for the mining sector (AfDB, 2022).

Second, Zambia should prioritise industrial policy coordination, linking mining with broader manufacturing and technological development initiatives. This involves fostering industrial parks and special economic zones (SEZs) that can attract investment into copper processing, cable manufacturing, and renewable energy technology production. For example, Indonesia's success in integrating nickel into the electric vehicle supply chain was facilitated by targeted incentives for domestic refining industries, an approach Zambia could replicate with its copper resources (Warburton, 2024).

Finally, regional integration must be a cornerstone of Zambia's industrialisation strategy. The Zambia-DRC Battery Initiative presents a unique opportunity to co-develop a regional value chain, but this requires harmonised policies, infrastructure investments, and strategic partnerships with downstream industries in South Africa and global battery manufacturers. The AfCFTA could serve as a vehicle for promoting regional processing of copper and other critical minerals, helping Zambia scale production and improve competitiveness in global markets (Signé & Johnson, 2021)

4.4.3 The Role of Public-Private Partnerships and Foreign Investment in Building Linkages

Public-private partnerships (PPPs) and foreign investment will play a crucial role in addressing Zambia's industrialisation constraints (Mulimbika & Karim, 2018). However, these partnerships must be structured to ensure local value capture, rather than simply reinforcing the dominance of multinational firms (Barron et al., 2024). For instance, joint ventures between mining companies and local suppliers should be encouraged, with conditionalities requiring knowledge transfer and local workforce development. This model has been successfully implemented in Botswana's diamond sector, where government-mandated beneficiation policies ensured that foreign mining firms supported domestic cutting and polishing industries (Signé & Johnson, 2021).

Additionally, foreign investment in copper beneficiation must be aligned with Zambia's long-term industrialisation goals. Countries like China and the US are increasingly looking to diversify their critical mineral supply chains amid rising geopolitical tensions. Zambia can leverage this demand by negotiating investment agreements that prioritise local processing rather than raw material exports.

To ensure that PPPs contribute to technology transfer and industrial upgrading, the government should introduce performance-based incentives for foreign firms that invest in local manufacturing. This could include tax breaks or preferential procurement contracts for companies that meet local content targets. Lessons from Brazil's mining sector, where foreign investors are required to engage in local skills development programs, demonstrate the effectiveness of such an approach in fostering domestic capability-building (De Tomi, Loredo, & Santos, 2024).

4.5 Chapter Summary

This chapter analysed Zambia's productive linkages in copper mining, highlighting limited downstream beneficiation and weak supplier integration as key industrialisation constraints. Despite policy efforts, high energy costs, infrastructure deficits, and inconsistent regulations continue to hinder value addition and local supply chain participation (Fessehaie et al., 2016). Comparative insights from Chile and Indonesia underscore the importance of policy stability, enforcement of local content requirements, and targeted industrial incentives (Harvey, 2019;

Warburton, 2024). To address these challenges, Zambia must strengthen local content enforcement, improve industrial financing, and enhance regional cooperation to scale up beneficiation and supplier development. The next chapter examines regional and geopolitical factors affecting Zambia's capacity to develop strong productive linkages, particularly in the context of critical mineral supply chains and global green energy transitions.

CHAPTER 5
REGIONAL AND GEOPOLITICAL DIMENSIONS

5.1 Introduction

Regional and geopolitical factors play a pivotal role in shaping Zambia's mining sector, influencing its industrialisation trajectory and trade policies. As global demand for critical minerals rises, Zambia faces key strategic choices. Regional value chains, particularly through collaboration with the DRC and the Southern African Development Community (SADC), offer potential for industrial upgrading, but policy misalignment and infrastructure deficits remain major challenges. Geopolitically, Zambia's position in the global copper supply chain is shaped by competition between the US, China, and emerging investors from the Middle East. How Zambia navigates these competing interests will determine whether it secures meaningful economic benefits or remains a raw material supplier. This chapter examines Zambia's regional integration strategies, economic diplomacy, and the broader geopolitical contest for its mineral resources.

5.2 The Case for a Regional Approach to Copper Value Chains

Zambia's vast copper reserves position it as a critical player in the global green energy transition, yet its industrialisation prospects remain constrained by historical structural limitations, weak domestic beneficiation, and dependency on raw material exports. As demand for critical minerals like copper and cobalt intensifies, particularly for EVs, renewable energy technologies, and battery storage, Zambia faces a strategic imperative—whether it should pursue national beneficiation strategies to develop an independent industrial base, or whether it should integrate into regional value chains (RVCs) to leverage economies of scale, infrastructure synergies, and collective bargaining power.

The regionalisation of mining-related industries is increasingly seen as an avenue for resource-rich but industrially underdeveloped African nations to break free from the traditional raw-material-export model. The Zambia-DRC EV Battery Initiative, which aims to process copper and cobalt into battery precursors, represents a bold attempt to shift from extraction to value addition. However, the success of this initiative is far from guaranteed, given the institutional, economic, and geopolitical challenges of regional industrialisation. This section argues that while regional collaboration offers tangible benefits, Zambia must ensure that its participation

is structured strategically to prevent economic asymmetries and retain sufficient national control over its industrial trajectory.

The Global Value Chain (GVC) and Mineral-based Industrialisation (MBI) frameworks offer complementary perspectives on how mineral-rich economies like Zambia can transition from resource extraction to industrial upgrading. The RVC approach suggests that resource-endowed nations can enhance industrial development by integrating their economies regionally rather than attempting to industrialise in isolation (Kaplinsky & Morris, 2016). This is particularly relevant for critical minerals, where production often involves multiple stages—from extraction and refining to component manufacturing—that require significant capital investment, infrastructure, and technological expertise. By sharing industrial responsibilities, countries like Zambia and the DRC can pool resources, attract investment, and negotiate collectively with external players rather than being mere price-takers in global markets.

Proponents of national beneficiation argue that relying on regional partners can expose Zambia to economic vulnerabilities, particularly if larger economies dominate the value chain. The MBI framework emphasises the development of strong local backward and forward linkages, suggesting that Zambia should prioritise domestic processing capacity before fully committing to regional integration (Morris, Kaplinsky, & Kaplan, 2012). If Zambia becomes overly reliant on regional initiatives that do not sufficiently localise production, it risks being reduced to a supplier of raw or semi-processed materials, while value-added activities are captured elsewhere.

Zambia faces significant constraints in developing standalone copper beneficiation. Its manufacturing sector remains underdeveloped, largely due to high production costs, unreliable energy supply, and limited capital investment. Industrialising copper production is particularly energy-intensive, with smelting and refining requiring large, stable electricity supplies, an area where Zambia has struggled. The Ministry of Commerce, Trade, and Industry advocates for a regional approach to industrial development, emphasising collaboration with the DRC to overcome constraints. Such partnerships enhance resource efficiency, promote technology exchange, and drive market expansion by pooling energy infrastructure, establishing joint processing zones, and sharing investment incentives, ultimately enabling economies of scale.[9]

[9] Submission by a senior official from the Ministry of Commerce, Trade and Industry, July 22, 2024.

For instance, the Zambia-DRC EV Battery Initiative proposes the development of joint Special Economic Zones along their shared border, where processing and refining can occur closer to extraction sites. If executed effectively, this could reduce transport costs, increase efficiency, and attract foreign investment from companies seeking secure, localised supply chains for critical minerals (AfDB, 2025). The initiative also aligns with the AfCFTA, which presents an opportunity for Zambia to capitalise on intra-African trade in copper and battery components. Developing a regional copper-processing hub could enable Zambia to supply growing industrial centres within Africa rather than relying solely on Western and Asian markets.

Despite these advantages, regional industrialisation presents several risks that must be carefully managed. One of the primary concerns expressed by some stakeholders is that larger or more industrially advanced partners may dominate, capturing the most lucrative segments of production while leaving weaker partners with low-value activities. A key risk for Zambia is South Africa's dominance in regional manufacturing. Historically, South Africa has been the primary industrial hub in Southern Africa, with most value-added activities concentrated in its economy.[10] If the Zambia-DRC initiative is not carefully structured, there is a risk that refining and high-value manufacturing could be redirected to South Africa, leaving Zambia and the DRC in a lower-tier supply role.

Policy misalignment and institutional weaknesses further complicate Zambia's ability to integrate effectively into regional value chains. While the government has emphasised the need for regional cooperation, actual implementation has been hindered by fragmented policies and inconsistent regulatory frameworks. The success of regional industrialisation depends on policy coherence, stable investment conditions, and regulatory alignment between participating countries. However, Zambia and the DRC have historically struggled with policy inconsistencies, unclear mining regulations, and investment volatility. For instance, despite signing MOUs on battery precursor manufacturing, Zambia and the DRC have yet to establish harmonised tax regimes, environmental standards, and investment policies, which are critical for joint ventures and industrial collaboration. Without policy synchronisation, investors may hesitate to commit capital, fearing regulatory unpredictability.

[10] Interview with Historian and Political Economy Specialist from the Southern African Institute for Policy and Research (SAIPAR), June 7, 2024

Some scholars argue that Zambia should first build its own beneficiation capacity before engaging in regional industrialisation (Musonda & Larmer, 2023). If Zambia commits too early to regional structures without solidifying domestic manufacturing, it risks being locked into an auxiliary role. A phased approach—where Zambia develops its own smelting, refining, and component manufacturing infrastructure before deep regional integration—could ensure that it retains more economic benefits and reduces vulnerability to external shocks.

Despite the potential benefits of RVCs, remaining locked in extractive activities remains a major risk. Many resource-rich countries struggle with policy incoherence, rent-seeking behaviour, and limited technological capacity, all of which hinder industrial upgrading. Zambia's experience with policy reversals in the mining sector—such as fluctuating tax regimes and shifts in ownership models—has created an unpredictable business environment that discourages long-term investment in processing and manufacturing. [11]

While regional value chains offer clear advantages, Zambia must be strategic in its engagement, ensuring that regional partnerships enhance, rather than hinder, national industrial ambitions. A hybrid approach is necessary—investing in domestic beneficiation while selectively engaging in regional integration where clear benefits exist. This would allow Zambia to develop its own refining and manufacturing capabilities, preventing overreliance on regional partners, leverage regional synergies for infrastructure and investment without becoming structurally dependent, and ensure that regional agreements favour Zambia's interests, with clear policies that prevent economic asymmetries. Adopting such a balanced approach, Zambia can move beyond raw material exports, participate meaningfully in the green transition, and secure a sustainable industrialisation pathway within regional and global copper value chains.

5.3 Economic Diplomacy and Geopolitical Competition for Zambia's Copper

Zambia's vast copper reserves, coupled with the global push for energy transition, have placed the country at the centre of intensifying geopolitical competition over critical minerals. As industrialised nations seek to secure stable supplies of copper for EVs, renewable energy infrastructure, and digital technologies, Zambia has become an arena for competing economic and strategic interests, particularly from the US, China, and Middle Eastern investors. This shifting landscape presents both risks and opportunities for Zambia, raising critical questions

[11] Virtual interview with Zambia Chamber of Mines (ZCM) Representative, May 24, 2024.

about how the country is positioning itself diplomatically to maximise its economic gains while safeguarding national sovereignty.

Zambia's foreign policy under the UPND has been characterised by "positive neutrality", a term used to describe its balancing act between global powers while maintaining strategic autonomy (Vandome, 2023a). This approach marks a departure from the previous administration's policies, which oscillated between overreliance on Chinese investments and attempts to court Western financial institutions. Under President Hakainde Hichilema, Zambia has sought to reposition itself as a reliable but independent partner in global mineral supply chains, engaging with multiple foreign actors while avoiding exclusive alignment with any single power. The challenge, however, is whether Zambia has been able to translate this neutrality into tangible economic and industrial benefits or whether it remains a passive supplier in a highly asymmetric global market.

5.3.1 The US-China Competition and Zambia's Position

One of the defining features of Zambia's external engagements in the mining sector has been its strategic balancing between Chinese and American interests. Over the past two decades, China has dominated Zambia's mining industry through state-owned enterprises such as China Nonferrous Metal Mining Group (CNMC) and Jiangxi Copper. Chinese firms have played a crucial role in revitalising Zambia's mining output, particularly during the commodity boom of the early 2000s. However, their investments have been accompanied by criticisms of exploitative labour practices, environmental degradation, and limited value addition within Zambia (Musonda & Larmer, 2023).

On the other hand, the US has recently increased its focus on Zambia as part of its broader strategy to reduce reliance on China for critical minerals. The 2022 US-Africa Leaders' Summit highlighted Zambia as a key partner in the Biden administration's efforts to secure non-China-dependent supply chains for EV battery materials. This was further reinforced by the US-DRC-Zambia tripartite agreement aimed at promoting regional value addition in the electric vehicle battery supply chain (Vandome, 2023a). While this presents an opportunity for Zambia to develop its processing and manufacturing capacity, there are concerns about whether these agreements will translate into real industrial gains or merely serve as a means for Western economies to secure alternative raw material sources. As Zambia and the DRC seek to integrate into global supply chains for critical minerals, the Zambia-DRC Battery Chain Alliance has

emerged as a landmark initiative aimed at capturing greater value from their vast copper and cobalt resources. While initially framed within the EV transition, the alliance has broader strategic implications, particularly in light of evolving US interests in securing critical minerals and infrastructure developments like the Lobito Corridor.

5.3.2 The Zambia-DRC Battery Chain Alliance, US Strategic Interests, and Infrastructure Policy Implications for Zambia

Strategic Considerations for Zambia's Industrial Policy

Zambia faces a critical choice in structuring its engagement in the battery value chain—whether to prioritise a bilateral partnership with the DRC or pursue a multilateral regional approach through SADC. The bilateral approach offers immediate synergies, as Zambia and the DRC collectively control a significant amount of the world's cobalt supply and substantial copper reserves (Deberdt, 2024). This strategy enables focused industrial cooperation, particularly in developing refining and precursor materials facilities. However, relying solely on a bilateral agreement risks strategic vulnerabilities, such as regulatory inconsistencies, political instability in the DRC, and overdependence on a single regional partner (Barron et al., 2024).

Alternatively, a multilateral strategy that includes SADC members could provide a more stable policy framework, access to additional markets, and infrastructure financing. South Africa's advanced manufacturing capabilities and Tanzania's transport corridors could facilitate downstream beneficiation and reduce Zambia's reliance on external partners. However, a multilateral approach also introduces complexities related to policy harmonisation, revenue sharing, and potential dilution of Zambia's bargaining power within the regional framework (Morris et al., 2012).

US Interests in Critical Minerals and the Implications of a Trump Administration

Despite former US President Donald Trump's scepticism toward EVs and climate change, the US remains strategically focused on securing critical minerals, including copper and cobalt, for applications in defence, electronics, and advanced manufacturing (Herbert Smith Freehills, 2024). This suggests that while direct support for EV battery supply chains may diminish under a renewed Trump administration, the US will likely maintain engagement with African nations like Zambia and the DRC to ensure access to these essential resources.

Zambia's participation in the US-led battery minerals alliance could provide opportunities for investment in mineral extraction and refining infrastructure. However, geopolitical tensions between the US and China—China being the dominant player in the DRC's mining sector—could complicate Zambia's position in global supply chains (Andreoni & Roberts, 2022). The Zambian government must carefully balance its relationships with both Western investors and Chinese partners to maximise economic benefits while avoiding geopolitical entanglements.

Managing Foreign Investments in the Mining Sector

One of the primary risks associated with foreign investments in Zambia's mining sector is the potential for exploitative agreements that favour external investors over national interests. The country's historical experience with copper mining, where multinational corporations benefited disproportionately while local economies remained underdeveloped, underscores the need for a more assertive investment policy (Barron et al., 2024). Lessons from Indonesia's nickel export ban, which successfully attracted investment in local processing facilities, suggest that Zambia could implement similar policies to encourage in-country beneficiation (Warburton, 2024).

Additionally, Zambia must ensure that joint ventures in the battery chain alliance include knowledge and technology transfers to build local capacity. Without such provisions, Zambia risks remaining a supplier of unprocessed raw materials while value addition occurs elsewhere. Policymakers must therefore negotiate agreements that guarantee skills training, infrastructure development, and a fair revenue-sharing model between the state and private investors (Deberdt, 2024).

Infrastructure Challenges and the Lobito Corridor's Role

The success of the Zambia-DRC battery alliance depends heavily on the availability of efficient transport infrastructure. Currently, Zambia's mineral exports rely on overland trucking routes that are costly and inefficient. The proposed Lobito Corridor, which would connect Zambia and the DRC to the Angolan port of Lobito, presents a transformative opportunity to enhance regional trade logistics (Olan'g & Scurfield, 2023). Backed by US and European financing, the corridor is intended to reduce transport costs, expedite export timelines, and provide a non-South African alternative for mineral shipments.

However, the Lobito Corridor project faces uncertainties. While the US has pledged significant investment, the primary aim appears to be the extraction of minerals from Africa, with limited plans for local refinement and processing. This approach may limit the project's benefits for regional industrialisation (Africa Confidential, 2024). Moreover, the project's reliance on Chinese-made locomotives and the transportation of minerals mined by Chinese companies highlight the complex geopolitical landscape in which Zambia must navigate.

Realising the full benefits of the Lobito Corridor requires coordinated investment in Zambia's internal transport infrastructure, including rail and road networks. The government must also ensure that infrastructure development aligns with its broader industrialisation goals, preventing the corridor from becoming merely an export route for raw materials rather than a facilitator of local value addition. This is particularly crucial as Zambia seeks to integrate further into regional and global supply chains while avoiding the pitfalls of past infrastructural investments that have largely served extractive industries rather than fostering manufacturing capacity (Harvey, 2019).

Navigating the Complexities of Industrialisation

The Zambia-DRC Battery Chain Alliance offers a rare opportunity for Zambia to move beyond raw material exports and integrate into a high-value global industry. However, the success of this initiative hinges on strategic policy decisions that prioritise value addition, negotiate equitable investment agreements, and develop critical infrastructure. Zambia can maximise the long-term benefits of its copper and cobalt resources by fostering regional cooperation, enhancing its influence in global trade negotiations, and securing technology transfers from international partners. Without these strategic interventions, there is a significant risk that Zambia will remain merely a resource exporter, hindering substantial domestic industrial growth. Moreover, without a clearly defined regional market for EV battery precursors, the Alliance risks insufficient demand undermining its long-term viability.

5.3.3 Leveraging Global Interest: Is Zambia Getting Better Deals?

A key question is whether Zambia is successfully leveraging global interest in its copper sector to secure better terms for industrialisation and economic transformation. Historical patterns suggest that Zambia has often been on the weaker end of negotiations, accepting terms that

prioritise foreign investor profits over national industrial objectives. The current geopolitical climate, however, offers an opportunity to shift this dynamic.

Zambia has taken some steps to improve its bargaining position. The government's introduction of the "free carry" policy, which ensures that Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH) retains a stake in new mining ventures, is an attempt to increase national benefits from mining activities (Vandome, 2023b). Additionally, the push to develop regional value chains—such as the Zambia-DRC battery initiative—reflects a strategic move to capture more value domestically rather than relying solely on raw copper exports.

However, the implementation of these policies remains inconsistent. For instance, despite the rhetoric around local beneficiation, most copper produced in Zambia is still exported in its raw form. Foreign investors continue to benefit from generous tax incentives, while Zambian firms struggle to access capital for downstream processing. One stakeholder argued that Zambia must complement investment attraction efforts with stricter local content requirements.[12]

One of the key weaknesses in Zambia's economic diplomacy is its fragmented institutional coordination. While the Ministry of Mines, Ministry of Commerce, and Ministry of Finance all play roles in negotiating mining agreements, there is often a lack of unified strategy. A representative from the Ministry of Energy noted that Zambia's multi-agency approach leads to inconsistencies in mining policies, weakening its negotiating power.[13] Countries like Indonesia, which have successfully leveraged resource nationalism to force foreign firms to invest in local smelting and refining, provide a useful model for Zambia to consider (Warburton, 2024). If Zambia does not adopt a more coherent industrial policy, it risks remaining locked in a cycle of extraction without substantial economic transformation.

5.3.4 A Strategic but Cautious Approach Needed

Zambia's copper wealth has placed it at the centre of global geopolitical competition, with the US, China, and Middle Eastern investors all vying for access to its resources. The country's "positive neutrality" approach offers diplomatic flexibility, but it must be translated into concrete economic gains rather than merely balancing external interests. While geopolitical

[12] Interview with the Zambian Economic Development and Policy Expert from the University of Cape Town (UCT), June 11, 2024
[13] Interview with the Ministry of Energy Representative, June 24, 2024

competition provides opportunities to secure better deals, Zambia must ensure that foreign engagements align with its industrialisation ambitions rather than reinforcing its role as a raw material supplier. Key to this will be strengthening domestic policy coherence, enforcing stricter local content and value-addition policies, and negotiating foreign partnerships that prioritise long-term economic transformation. By taking a proactive rather than reactive stance in the critical minerals boom, Zambia can position itself as a strategic actor in the global green transition rather than a passive supplier in external value chains.

5.4 The Limits of Regional Industrialisation: Feasibility Challenges

The integration of Zambia's copper value chains into regional industrialisation initiatives presents both opportunities and structural constraints that shape the country's ability to benefit from collective industrial strategies. While regional integration through SADC and the AfCFTA is often cited as a mechanism for accelerating industrialisation, the realities of infrastructure limitations, policy misalignment, and the uneven economic dominance of South Africa raise concerns about the feasibility of such an approach. Without addressing these structural barriers, Zambia's role in regional industrialisation risks being constrained to raw material extraction rather than active participation in beneficiation and value-added manufacturing.

A major obstacle to the viability of regional value chains is the underdevelopment of infrastructure essential for the movement of goods and services across borders. In theory, regional integration should facilitate efficient copper processing and manufacturing, yet logistical bottlenecks—ranging from inadequate road and rail networks to unreliable electricity supply—severely limit Zambia's competitiveness. The North-South Corridor, designed to enhance trade between Zambia, Zimbabwe, and South Africa, has yet to overcome major transport inefficiencies, with delays in road and rail freight undermining the ability of firms to participate in time-sensitive global supply chains. The critical minerals sector, particularly copper, requires seamless logistics infrastructure to ensure the cost-effective movement of ore, concentrates, and finished products. However, the absence of large-scale investment in Zambia's transport networks results in higher operational costs relative to more industrialised economies like South Africa, where established rail and port facilities provide a comparative advantage.

The Lobito Corridor, as earlier highlighted, has been identified as a potential game-changer in enhancing regional logistics for the copper sector. By providing an alternative export route to global markets via Angola's Port of Lobito, this corridor reduces dependency on South African ports and opens up new opportunities for trade diversification. However, its full potential remains unrealised due to slow infrastructure upgrades, regulatory inconsistencies, and financing constraints. The absence of a comprehensive strategy for optimising this corridor has also led to fragmented policy implementation, reducing its immediate effectiveness in supporting regional industrialisation efforts.

Beyond physical infrastructure, policy misalignment within SADC poses a major barrier to regional industrialisation. The regulatory frameworks governing mining, trade, and investment remain highly fragmented, preventing a coherent industrial strategy from taking root (Kaplinsky & Morris, 2016). While SADC has adopted policy frameworks such as the SADC Industrialisation Strategy and Roadmap (2015–2063), implementation has been inconsistent, with individual states prioritising national interests over regional coordination. Zambia's investment incentives, tax policies, and industrial regulations differ significantly from those of neighbouring countries such as the DRC and Mozambique, making cross-border industrialisation efforts unpredictable for investors. The lack of a harmonised tariff structure further exacerbates the problem, as companies engaged in regional processing must navigate multiple regulatory environments, increasing transaction costs and reducing competitiveness. Without a binding regulatory framework that ensures a uniform approach to industrialisation, regional economic cooperation remains more aspirational than practical.

The dominance of South Africa in regional industrialisation efforts adds another layer of complexity. South Africa possesses the most advanced industrial base in the region, with established mining supply chains, strong financial institutions, and advanced technological capabilities (Andreoni & Roberts, 2022). This structural advantage enables South African firms to set the terms of regional value chains, often at the expense of smaller economies like Zambia. In many cases, rather than fostering regional industrial collaboration, South African firms integrate upstream suppliers from the region into their supply chains while keeping the most lucrative beneficiation activities within South Africa itself. This dynamic has led to concerns that South Africa's economic strength limits the capacity of other SADC nations to develop their own downstream industries.

However, this dominance does not necessarily preclude Zambia from leveraging South Africa's industrial strength as an opportunity. Rather than attempting to compete directly in high-value manufacturing segments where South Africa already holds a strong position, Zambia could seek complementary industrial strategies. A negotiated industrial framework that allows Zambia to specialise in intermediate copper-based products—such as semi-processed cathodes, copper cables, or battery precursors—could create a more balanced regional industrial ecosystem. This would require South African firms to commit to sourcing processed copper inputs from Zambia rather than relying on global supply chains. Without such strategic agreements, Zambia's integration into regional value chains will remain marginal, as local beneficiation will struggle to compete with South Africa's well-established processing industries.

Despite these structural barriers, Zambia continues to advocate for regional industrialisation through initiatives such as the DRC-Zambia EV Battery Chain Alliance. This initiative seeks to create a regionally integrated supply chain for EV battery production, leveraging the combined copper and cobalt resources of Zambia and the DRC. However, its success remains uncertain, as the project faces major institutional and logistical challenges. A lack of coordination between Zambia and the DRC on investment policies, taxation frameworks, and infrastructure development has slowed progress, making it difficult to establish a seamless value chain. Additionally, the initiative lacks clear mechanisms to ensure equitable value distribution between the two countries, raising concerns that one partner could capture a disproportionate share of the economic benefits. The experience of past regional industrialisation efforts suggests that without strong institutional frameworks and enforceable agreements, such initiatives risk becoming politically appealing but economically ineffective.

Given these constraints, the feasibility of regional industrialisation in Zambia's copper sector depends on strategic interventions that address infrastructure deficits, policy inconsistencies, and regional power imbalances. One necessary intervention is targeted investment in transport and energy infrastructure to ensure that Zambia can support competitive copper processing industries. Without reliable infrastructure, efforts to integrate into regional supply chains will remain constrained, as high operating costs discourage investment in beneficiation activities. Equally important is the need for stronger policy coordination within SADC to create a harmonised industrial strategy that incentivises regional processing rather than simply exporting raw materials. A regulatory framework that mandates local value addition across

multiple countries would reduce competitive distortions and create an environment where regional industrialisation can take root.

Zambia must also develop a more strategic approach to negotiating its role within regional value chains. Rather than passively engaging in regional industrial initiatives, Zambia should actively push for joint ventures, technology transfer agreements, and financing mechanisms that ensure its participation in high-value processing activities. This requires a shift from reactive trade policies to a proactive industrial strategy that aligns regional cooperation with national development objectives. The DRC-Zambia EV Battery Chain Alliance, for instance, could serve as a test case for future regional industrialisation efforts, but only if governance structures are strengthened to prevent dominance by more industrially advanced partners.

Ultimately, while regional industrialisation offers a pathway for Zambia to move beyond raw material exports, its feasibility is contingent on resolving structural barriers that currently limit meaningful value chain integration. Infrastructure investments, policy harmonisation, and strategic negotiations with dominant regional actors are essential to transforming the aspirations of regional industrialisation into tangible economic outcomes. Without these interventions, Zambia risks being trapped in a cycle where regional cooperation remains rhetorical rather than an effective mechanism for industrial transformation.

5.5 Chapter Summary

Zambia’s efforts to integrate into regional value chains face major obstacles, including infrastructure limitations, fragmented policies, and South Africa’s dominance in manufacturing. While initiatives like the Zambia-DRC Battery Chain Alliance present opportunities for beneficiation, their success depends on stronger institutional coordination and investment in processing capacity. On the geopolitical front, Zambia’s "positive neutrality" seeks to balance engagements with global powers, yet foreign investment continues to favour extraction over local value addition. To strengthen its bargaining power, Zambia must negotiate better trade agreements, enforce local beneficiation policies, and align infrastructure investments—such as the Lobito Corridor—with its industrialisation goals. Achieving this balance will determine whether Zambia moves up the value chain or remains locked in raw material exports.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The global green transition and critical minerals boom present a unique but complex opportunity for Zambia. As demand for copper surges—driven by its role in renewable energy, EVs, and energy storage—Zambia's vast reserves position it as a key player in global supply chains. However, the real question is not whether Zambia can support the green transition, but whether it can strategically leverage this moment for industrialisation and long-term economic development.

This study has explored how Zambia can move beyond raw material exports and integrate into higher-value activities along the copper value chain. Chapter 4 highlighted the importance of productive linkages, both upstream and downstream, in transforming mining into a driver of industrialisation. However, Zambia's weak local supplier base, limited beneficiation capacity, and infrastructural constraints have historically hindered its ability to capture greater economic value. Without decisive policy action, the country risks remaining a passive exporter while industrialised economies reap the benefits of value addition.

Chapter 5 examined the role of regional and geopolitical dynamics in shaping Zambia's industrial trajectory. Regional collaboration—particularly through the Zambia-DRC EV Battery Chain Alliance—offers a pathway for beneficiation and manufacturing but faces challenges such as policy misalignment, infrastructure bottlenecks, and economic asymmetries with industrially dominant partners like South Africa. Geopolitically, Zambia must navigate growing competition for its copper from China, the US, and emerging Middle Eastern players while balancing investment attraction, fair engagement, and long-term industrial benefits.

Given these dynamics, this chapter synthesises key findings and outlines strategic policy recommendations to help Zambia transition from a raw material supplier to an industrial hub within the global copper value chain. The recommendations focus on strengthening productive linkages, enhancing regional cooperation, and navigating geopolitical competition to secure sustainable economic benefits in the green transition era.

6.2 Summary of Key Findings

The findings from Chapters 4 and 5 reveal critical insights into Zambia's position within the global copper value chain, highlighting both opportunities and structural limitations. While the ongoing global transition to renewable energy has intensified demand for copper, Zambia's ability to leverage this boom for industrialisation and economic development remains constrained by weak productive linkages, policy inconsistencies, and geopolitical competition over its mineral wealth.

6.2.1 Weak Local Content and the Limits of Beneficiation

Despite being one of the world's largest copper producers, Zambia continues to function primarily as a raw material exporter, with limited domestic beneficiation. Chapter 4 underscores that local content efforts in mining supply chains remain weak, and beneficiation policies, though widely discussed, have yet to be meaningfully implemented (Fessehaie et al., 2016). The country lacks the necessary infrastructure, technological capacity, and policy enforcement mechanisms to compel mining firms to process copper locally.

The failure to move up the copper value chain is attributed to several key constraints. High energy costs and an unreliable power supply have made domestic smelting and refining uncompetitive, with frequent disruptions undermining the feasibility of establishing value-added industries. Limited access to finance for local suppliers further exacerbates the problem, as high borrowing costs and weak financial support structures prevent Zambian firms from meeting the quality and efficiency standards required by multinational mining companies (Barron et al., 2024). Additionally, Zambia's industrial base remains underdeveloped, with the absence of strong backward and forward linkages hindering the country's ability to integrate into higher-value manufacturing processes (Fessehaie et al., 2016).

Comparative evidence from Indonesia and Chile demonstrates how policy intervention can drive in-country beneficiation. Indonesia's decision to impose an export ban on raw nickel forced multinational companies to invest in domestic processing infrastructure, leading to a surge in industrial activity (Warburton, 2024). Similarly, Chile's long-term investment in smelting and refining capacity has positioned it as a global leader in copper value addition (Leiss & Yeluri, 2021). By contrast, Zambia's reliance on voluntary commitments rather than binding policies has allowed mining firms to continue exporting raw copper with minimal local

processing (Andreoni & Roberts, 2022). Without decisive policy enforcement and targeted investment in beneficiation infrastructure, Zambia risks remaining locked in its historical pattern of resource extraction without capturing the full economic benefits of its copper reserves.

6.2.2 Regional Industrialisation: A Double-Edged Sword

The findings in Chapter 5 reveal that regional collaboration, particularly through the Zambia-DRC Battery Chain Alliance, could offer a pathway to industrialisation by leveraging shared resources, economies of scale, and collective bargaining power. However, the practical constraints of regional industrialisation present significant challenges that must be addressed if Zambia is to fully benefit from cross-border value chain integration.

One of the most pressing issues is policy misalignment and institutional weaknesses between Zambia and the DRC. Despite signing agreements on battery precursor manufacturing, the two countries have yet to harmonise their tax regimes, regulatory frameworks, and investment policies, creating uncertainty for potential investors. Infrastructure deficits further complicate regional industrialisation efforts. The lack of efficient transport corridors and energy supply systems has made it difficult to establish seamless cross-border processing hubs. While the Lobito Corridor has been identified as a potential game-changer in enhancing Zambia's logistical competitiveness, slow implementation and unclear financing mechanisms have limited its immediate impact (Olan'g & Scurfield, 2023).

Economic asymmetries within SADC present additional barriers. South Africa's dominance in regional manufacturing raises concerns that high-value processing activities will be concentrated there, relegating Zambia and the DRC to the role of raw material suppliers rather than active participants in industrial upgrading. Without structured agreements ensuring that value-added activities are equitably distributed, Zambia risks becoming a passive player in regional industrialisation efforts. While regional cooperation presents an opportunity to scale up beneficiation and increase Zambia's competitiveness, the current structural barriers indicate that without significant policy coordination and investment in domestic capabilities, Zambia's role within the regional value chain will remain marginal.

6.2.3 Economic Diplomacy and Geopolitical Competition for Zambia's Copper

Zambia's copper reserves place it at the centre of global geopolitical competition, with major powers—including the US, China, and Middle Eastern investors—seeking to secure access to its critical minerals. Chapter 5 highlights how Zambia's economic diplomacy strategy aims to balance competing interests while maximising national benefits. However, the findings suggest that while Zambia has increased foreign engagement, actual industrial gains remain limited.

The US-China competition over critical minerals is a defining feature of Zambia's external engagements in the mining sector. While China remains the dominant player, controlling large-scale operations, infrastructure, and supply chains, the US has positioned itself as an alternative partner, particularly through initiatives like the US-Zambia-DRC EV battery supply chain agreement (Herbert Smith Freehills, 2024). However, concerns remain that Western involvement could merely serve as a means for securing alternative raw material supplies rather than fostering meaningful local beneficiation.

Middle Eastern investors have also emerged as key players, particularly from the United Arab Emirates (UAE) and Saudi Arabia. While these investments could provide Zambia with much-needed capital inflows, they have so far been focused on securing long-term copper supply contracts rather than supporting domestic industrialisation. Moreover, policy fragmentation in Zambia's approach to mining agreements continues to undermine its negotiating power. While efforts such as the introduction of the "free carry" policy, which ensures that Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH) retains a stake in new mining ventures, represent a step toward increasing national benefits, mining incentives still overwhelmingly favour foreign firms, often at the expense of local beneficiation.

Zambia's diplomatic engagements have expanded its investment base, but without stricter local content requirements and stronger policy enforcement, the country risks remaining a raw material supplier rather than an integrated player in the global green economy.

6.2.4 The Limits of Zambia's Current Industrialisation Strategy

While Zambia has recognised the need to leverage the critical minerals boom for economic transformation, the findings from Chapters 4 and 5 suggest that its industrialisation strategy remains fragmented and inadequately enforced. Weak policy implementation, shifting mining

taxation structures, and inconsistent regulatory frameworks have created uncertainty for investors and hindered long-term commitments to local beneficiation. Additionally, limited institutional coordination has resulted in overlapping mandates across government agencies, reducing policy effectiveness (Barron et al., 2024).

Foreign investment in Zambia's mining sector has increased, but most of these investments remain focused on extraction rather than copper processing and manufacturing. If Zambia does not adopt a coherent and well-enforced industrial policy, it risks missing out on the economic opportunities presented by the global energy transition, instead remaining locked into its historical role as an exporter of raw materials.

6.2.5 A Pivotal Moment for Zambia's Copper Sector

The findings in Chapters 4 and 5 underscore a central tension in Zambia's industrialisation efforts: while global demand for copper presents a historic opportunity, the country has yet to implement the necessary policy, infrastructure, and governance reforms to fully capitalise on it. Weak enforcement of local content policies, the structural challenges of regional industrialisation, and the complexities of geopolitical competition all suggest that without strategic interventions, Zambia could once again find itself on the periphery of the global copper value chain, capturing only a fraction of the potential economic benefits.

However, the findings also highlight a clear opportunity. If Zambia prioritises investment in infrastructure, strengthens policy enforcement, and takes a more assertive approach to economic diplomacy, it can transition from being a passive supplier of raw copper to an active participant in the global green economy. The next chapter provides actionable policy recommendations aimed at ensuring that Zambia makes the most of this pivotal moment in its economic history.

6.3 Policy Recommendations: Practical Steps for Zambia

For Zambia to effectively leverage the critical minerals boom and the green transition for its industrialisation and economic development, a strategic and well-structured approach is required. The country cannot afford to remain a passive supplier of raw copper while global players capture the most lucrative value-added opportunities. Based on the findings from Chapter 4 on Productive Linkages and Chapter 5 on Regional and Geopolitical Dimensions,

Zambia's strategy should be grounded in three key pillars—first, refining its industrial strategy, second, enhancing regional and global positioning; and third, implementing institutional and governance reforms. These recommendations outline the practical steps Zambia must take to transition from a resource-dependent economy to an industrialised player in the global green transition.

6.3.1 Refining Industrial Strategy: Scaling Up Local Supply Chains Before Prioritising Downstream Beneficiation

One of the central findings from the analysis of Zambia's productive linkages is that the country's industrialisation efforts must first focus on strengthening upstream and midstream value chains before making an ambitious push for downstream copper beneficiation. While forward linkages, such as refining and manufacturing, remain a long-term objective, the immediate priority should be developing robust backward linkages to enhance domestic supplier participation in mining-related industries.

Zambia must address its reliance on imported mining inputs by scaling up local supplier integration. The findings highlight that foreign suppliers dominate procurement in the mining sector, limiting opportunities for Zambian firms to supply capital equipment, chemicals, and services (Fessehaie et al., 2016). To reverse this trend, the government must enforce local content requirements with clear compliance mechanisms. While Zambia has local content policies in place, enforcement remains weak. Mining companies often bypass these regulations by sourcing from foreign-owned suppliers registered locally. A dedicated Local Content Regulatory Unit should be established to audit procurement practices, penalise non-compliance, and provide incentives for mining firms that prioritise local suppliers.

Access to finance remains a key barrier for Zambian firms trying to scale up operations and meet the quality standards required by mining firms. The government must establish a Mining Supplier Development Fund, backed by a mix of public resources and development finance institutions, to offer low-interest credit and grants for SMEs engaged in mining-related production. Furthermore, Zambia must mandate joint ventures between multinational mining firms and local suppliers to ensure technology transfer, skills development, and knowledge-sharing. Indonesia has successfully implemented such measures in its nickel sector, compelling foreign firms to invest in local supplier development (Warburton, 2024). Zambia can adopt a similar approach by negotiating conditionality agreements with international mining investors.

Infrastructure constraints, particularly energy reliability and transport inefficiencies, continue to undermine Zambia's competitiveness in value addition. High electricity costs and unstable power supply have discouraged investment in refining and manufacturing. The government must accelerate investment in energy security for industrial use by fast-tracking alternative energy sources such as solar, thermal, and hydro under the IRP to ensure that smelters and refineries have uninterrupted power supply at competitive rates. Additionally, transport bottlenecks remain a major challenge for domestic copper processing. The Lobito Corridor, backed by US and EU investments, presents an opportunity for Zambia to develop cost-effective export routes for semi-processed copper products. However, as highlighted in the findings, if poorly structured, this corridor risks becoming another raw material export channel rather than a facilitator of industrialisation (Olan'g & Scurfield, 2023). Zambia must negotiate its role to ensure that logistics infrastructure supports value addition and processing, rather than just facilitating unprocessed copper exports.

Establishing SEZs for copper processing could also enhance local beneficiation. Industrial parks focused on copper refining and semi-processing can attract targeted investment. These SEZs should provide tax incentives for firms investing in copper processing, subsidised energy costs for companies involved in semi-processing, and infrastructure support to reduce transport and logistics costs. By prioritising upstream development first, Zambia can lay the groundwork for sustainable beneficiation, ensuring that the country moves up the value chain in a phased and realistic manner.

6.3.2 Enhancing Regional and Global Positioning: Leveraging Partnerships Without Losing Control

Zambia's geopolitical positioning in the global copper value chain presents both opportunities and risks. Regional industrialisation and foreign investments are essential, but Zambia must avoid becoming overly dependent on external players who may prioritise their own supply security over Zambia's industrialisation ambitions.

The Zambia-DRC Battery Chain Initiative provides a platform for Zambia to integrate into regional processing, yet policy misalignment and institutional weaknesses between the two countries could undermine Zambia's share of value addition. To ensure fair benefits, Zambia must push for harmonised industrial policies within the DRC-Zambia Battery Chain Initiative by aligning tax incentives, investment policies, and environmental standards with the DRC to

prevent regulatory arbitrage, where investors favour one country over the other. The lack of harmonised tax regimes has already delayed infrastructure development for the initiative.

While the bilateral model with the DRC is promising, a multilateral SADC framework could provide additional financing and technological expertise from South Africa's advanced manufacturing base and Tanzania's port access. Expanding regional integration beyond the DRC could also reduce Zambia's overreliance on one partner, ensuring that its industrialisation efforts remain diversified and sustainable.

Zambia's economic diplomacy must be structured to secure long-term industrial gains rather than merely attracting foreign capital for raw copper extraction. Competition between the US, China, and Middle Eastern investors could replicate past patterns where Zambia plays a peripheral role in global supply chains. To mitigate this risk, Zambia must introduce investment conditionalities that mandate local value addition. Foreign mining firms must allocate a portion of refined copper to domestic manufacturers before export, while investors in the EV battery supply chain must commit to technology transfer and local employment targets.

Zambia must also strengthen its role in global copper pricing and trading. Establishing a Zambian Copper Trading Hub, similar to Chile's strategy, would allow the country to influence global pricing and reduce reliance on London Metal Exchange benchmarks.

6.3.3 Institutional and Governance Reforms: From Policy Rhetoric to Implementation

A key weakness identified in the findings is Zambia's policy inconsistency and weak enforcement capacity. Many policies exist on paper but are poorly implemented due to fragmented coordination between ministries and a lack of institutional oversight. While Zambia has developed numerous industrial policies aimed at enhancing local beneficiation and productive linkages, these initiatives have often fallen short due to weak institutional frameworks and inadequate policy coordination. If Zambia is to effectively transition from a resource-dependent economy to an industrialised one, it must move beyond policy rhetoric and focus on institutional capacity-building and governance reforms.

One of the most pressing institutional reforms is the establishment of a Central Industrialisation Authority that will act as a coordinating body to streamline industrial policies across different government ministries. Industrialisation efforts currently fall under multiple agencies,

including the Ministry of Mines and Minerals Development, Ministry of Commerce, Trade, and Industry, and Ministry of Energy, leading to fragmented decision-making and poor execution. Furthermore, a "Value Addition Task Force" should be created within this authority to align policy implementation, ensure enforcement of local content regulations, and oversee beneficiation initiatives. This would reduce bureaucratic inefficiencies and enable more strategic, long-term planning for Zambia's industrialisation goals.

Frequent changes in mining tax regimes have discouraged long-term investment in copper processing and beneficiation. Investors remain cautious about committing capital to Zambia's value-added industries due to uncertainties surrounding fiscal policies (Kragelund, 2020). To attract sustained investment, the government must commit to a stable tax framework that provides clear incentives for mining firms engaged in beneficiation. The introduction of a tiered taxation system—offering preferential rates for mining companies that invest in local processing facilities, supplier development, and workforce training—could incentivise more value addition within Zambia.

Additionally, PPPs should be leveraged to support industrial infrastructure, finance local suppliers, and facilitate technology and skills transfer. Given Zambia's fiscal constraints, attracting private sector investment into mining-related manufacturing, renewable energy infrastructure, and transport logistics is essential. By structuring PPPs in a way that mandates technology transfer and skills upgrading, Zambia can enhance local technological capacity while fostering knowledge-sharing between multinational firms and local businesses. A PPP model that ties investment incentives to local workforce training, joint ventures, and technology sharing would help bridge the existing skills gap in high-value copper processing and renewable energy production.

For example, Indonesia's resource nationalist policies in the nickel sector have successfully compelled foreign firms to establish local smelters and invest in skills transfer programs, ensuring that domestic workers acquire expertise in high-tech processing and engineering (Warburton, 2024). Zambia can adopt a similar approach by integrating mandatory training programs and knowledge-transfer agreements into PPPs focused on copper refining, battery precursor production, and advanced manufacturing. This would not only create employment opportunities but also build a domestic knowledge base necessary for sustaining long-term industrialisation.

Zambia's industrial strategy should also prioritise partnerships with universities, technical institutes, and global research organisations to ensure that its workforce is equipped with the skills required for advanced mineral processing and high-tech copper applications. Linking PPP projects to Zambia's TVET programs could help align academic curricula with the evolving needs of the copper industry. Establishing industry-academic partnerships—where multinational mining firms co-fund research and training programs—would further enhance the country's competitiveness in value-added copper industries.

Finally, if Zambia can align its industrial strategy with regional positioning and governance reforms, the country can transition from a raw copper exporter to a critical player in global green energy value chains. Through decisive and well-crafted policy initiatives, the country can overcome its historical dependence on mineral exports and secure a sustainable, high-value industrial future.

6.4 Final Reflections and Future Research Directions

Zambia's industrialisation will require a clear strategic vision that moves beyond extractive exports toward a more diversified, value-added economy. The findings of this study underscore the necessity of shifting from a raw material export model to a more integrated industrial strategy that prioritises both upstream and downstream linkages within the copper sector. While global demand for copper in the green energy transition presents new economic opportunities, Zambia must proactively shape its industrial policies to ensure that these benefits translate into domestic value retention rather than reinforcing historical patterns of resource extraction.

This study has demonstrated that pragmatic, evidence-based policies are crucial for Zambia's economic transformation. The repeated cycles of policy reversals, weak enforcement of local content regulations, and the absence of long-term industrial planning have constrained Zambia's ability to benefit from past commodity booms. As shown in Chapter 4, strengthening productive linkages—particularly in copper beneficiation and local supplier integration—will be critical to Zambia's industrial trajectory. Lessons from Chile, Indonesia, and South Africa illustrate that consistent policy enforcement, state-led strategic investments, and industrial financing mechanisms can significantly enhance value addition and backward linkages. Without these structural reforms, Zambia risks remaining trapped in an extractive economy, with little long-term economic diversification.

Furthermore, as highlighted in Chapter 5, Zambia must play a stronger role in regional and global negotiations over mineral governance. The increasing geopolitical competition for Zambia's copper, particularly between China, the US, and Middle Eastern investors, presents both risks and opportunities. Zambia's "positive neutrality" approach in international engagements must be reinforced with clear industrial policy objectives that prioritise domestic beneficiation, skills transfer, and infrastructure development. The Zambia-DRC EV Battery Chain Alliance represents a significant opportunity for regional industrialisation, but its success will depend on strong governance structures, policy alignment, and Zambia's ability to negotiate beneficial terms that prevent economic asymmetries in regional value chains. Similarly, the development of the Lobito Corridor could serve as a transformative infrastructure project, but only if it is strategically leveraged to support local manufacturing rather than facilitating another export-driven model.

While this research has provided a comprehensive analysis of Zambia's position within global and regional copper value chains, there are key areas that future research should explore. One critical area is the role of emerging technologies in Zambia's copper value chains. The global mining and energy industries are rapidly evolving with advancements in automation, artificial intelligence (AI), and renewable energy technologies. Understanding how these developments could shape Zambia's industrialisation trajectory—particularly in high-tech copper applications like electric vehicle batteries and smart grid systems—is crucial for long-term policy planning.

Additionally, the impact of political leadership changes on mineral governance remains an essential area for future inquiry. Zambia has experienced frequent shifts in mining policies due to changes in administration, often resulting in policy unpredictability and investor uncertainty. A comparative analysis of how different political administrations have influenced Zambia's mining policies—relative to other resource-rich economies—would offer valuable insights into the structural constraints that hinder long-term industrial policy implementation.

In conclusion, Zambia stands at a crossroads in determining whether it will leverage the critical minerals boom for sustained economic development or remain a passive participant in global value chains. Achieving meaningful industrialisation will require institutional reforms, stronger policy enforcement, strategic global partnerships, and targeted investments in productive linkages. While the challenges are significant, Zambia has the opportunity to position itself as a leader in copper-based green technologies—if it adopts a coherent, forward-

looking industrial strategy that prioritises domestic value addition and regional economic integration.

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APPENDICES

Appendix A: Stakeholder Questionnaire

SECTION A: Background Information

Role:	
Organisation:	

SECTION B: General Questions

S/N	Question	Response
1.	Zambia hosts significant reserves of critical minerals, offering remarkable potential for fostering economic development within the nation. In recent years, international mining companies have displayed immense confidence in the Zambian market, pledging substantial new investments. Renowned entities such as FQM, IRH (Mopani Copper Mines), and the potential resurgence of Anglo American have expressed keen interest in Zambia's mining sector. Are you optimistic that these investments will be sustained and will contribute to deepening participation in the mining sector supply chain and the potential to support domestic production of new renewable energy technologies?	{Please enter response below}
2.	Are there any new advocacy initiatives that you are currently engaged in given the opportunities presented by critical mineral mining and the green energy transition?	{Please enter response below}
3.	What are some of your short to medium-term goals regarding the transition to renewable energy?	{Please enter response below}

S/N	Question	Response
4.	a. What is your general sense regarding prevailing government policy on critical mineral mining and the green energy transition?	{Please enter response below}
	b. What direction do you think the policy could take?	{Please enter response below}
5.	Based on your interactions, does the government demonstrate willingness to listen to and consider your submissions regarding critical mineral mining and the green energy transition? (*Not applicable to Government stakeholder)*	a) Yes b) No c) Don't know If yes, please elaborate _____

SECTION C: Technical Questions: Downstream Industries

S/N	Question	Response
1.	Can Zambia develop the internal capacity for domestic production of renewable energy technologies like solar, and EV battery precursors?	d) Yes e) No f) Don't know If yes, please elaborate _____

S/N	Question	Response
2.	Are there concrete plans in place to achieve this?	a) Yes b) No c) Don't know If yes, please elaborate _____
3.	How does the DRC-Zambia alliance enhance the chances of developing a local EV battery precursor industry and regionally?	{Please enter response below}
4.	What specific challenges are currently being encountered in the efforts to enhance domestic production capacity for renewable energy technologies? *e.g., development of local solar industry – local manufacturing base*	{Please enter response below}
5.	What are the potential avenues or opportunities that can be utilised to bolster the internal capacity for domestic production of renewable energy technologies?	{Please enter response below}

SECTION D: Technical Questions: Upstream Industries

S/N	Question	Response
1.	To what extent do the existing conditionalities facilitate the promotion of local content, specifically in relation to local suppliers?	a) Highly favourable b) Favourable c) Neutral d) Unfavourable

S/N	Question	Response
		e) Highly unfavourable Please elaborate on your answer_____
2.	Can local content be enhanced by imposing conditionalities on new copper investments in Zambia, considering the critical minerals boom and its associated geopolitics?	a) Yes b) No c) Don't know If yes, please elaborate _____
3.	a. Are there ongoing plans to ensure the enhancement of local content?	a. Yes b. No c. Don't know If yes, please elaborate _____
	b. Are these plans to promote local content feasible?	a. Yes b. No c. Don't know If yes, please elaborate _____

S/N	Question	Response
4.	What are the primary challenges currently being faced in the efforts to enhance local content?	{Please enter response below}
5.	What specific opportunities exist for the enhancement of local content (in light of the green energy transition)?	{Please enter response below}
6.	In the context of Zambia's green energy transition, which area should receive greater emphasis in terms of development: upstream industries, downstream industries, or both?	a) Upstream industries b) Downstream industries c) Both upstream and downstream industries Please elaborate on your answer_____

SECTION E: Technical Questions: Regional Dimension

S/N	Question	Response
1.	Are regional solutions a viable option for Zambia to maximise the benefits derived from the green energy transition?	a. Yes b. No c. Don't know If yes, please elaborate _____

S/N	Question	Response
2.	Is Zambia currently expressing interest in pursuing such regional solutions?	a. Yes b. No c. Don't know If yes, please elaborate how are these solutions being pursued _____
3.	Should manufacturing of renewable energy technologies be left to countries with infrastructure capabilities for mass production like South Africa for example?	a. Yes b. No c. Don't know If yes, please elaborate how are these solutions being pursued _____