Swaniti Global

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THE 21st CENTURY SCRAMBLE FOR AFRICA

and the Lessons and Opportunities for India

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Swaniti Global, is an international policy and governance organization that operates at the intersection of policy, governance, and community needs to drive meaningful, long-term change. Swaniti works across regions to identify opportunities, unlock critical resources, and accelerate the energy transition through context-specific, collaborative strategies. Its approach is rooted in building partnerships with governments, communities, industry clusters, and civil society organizations to co-create solutions that are both innovative and impactful. By engaging with government systems to understand existing capacities and aligning them with community aspirations, Swaniti facilitates the design and implementation of integrated programs that address structural and developmental challenges.

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List of Abbreviations and Acronyms

PGE	Platinum Group Elements
WITS	World Integrated Trade Solutions
IMF	International Monetary Fund
WEF	World Economic Forum
IEA	International Energy Agency
PGM	Platinum Group Metals
IR	International Relations
DRC	Democratic Republic of Congo
USA	United States of America
EU	European Union
REE	Rare Earth Elements
ESG	Environmental, Social and Governance
ToT	Terms of Trade
AfCFTA	African Continental Free Trade Area

1.0 Introduction

In the global imagination of a clean energy net zero future, there is a critical minerals conundrum - they occupy a paradoxical space. On one hand, they are celebrated as the foundational materials enabling decarbonisation—integral to the production of electric vehicles, wind turbines, solar panels, and battery storage systems. On the other, the conditions under which these minerals are extracted, traded, refined, and ultimately governed remain shadowed by prevailing narratives of green growth and climate urgency. This brief begins by asking: what lies beneath this mineral foundation of the energy transition? Who extracts, who controls, and who benefits by how much?

As the global energy order recalibrates, we are also consequently seeing a recalibration of the global mineral order. Africa has once again emerged as a pivotal geography—not merely for its vast mineral endowments, but for the strategic significance these now carry in a decarbonising, digitising world economy. From cobalt in the Democratic Republic of Congo to graphite in Mozambique and rare earths in Madagascar, the continent plays a major role in the upstream supply of critical minerals. Is Africa's centrality in upstream supply matched by its participation in higher-value nodes of the global mineral value chain such as refining, processing, and advanced manufacturing? This brief tries to uncover the patterns in the global value chains of various critical minerals - through independent data validation and analysis.

This brief investigates the political economy of critical minerals by anchoring itself in India's official list of 30 critical minerals[1], using it as both a methodological entry point into this study and a strategic frame of reference. Through this list, we trace mineral flows across borders and map the distribution of extraction, refining, and ownership—particularly in relation to African states. Our approach is grounded in both empirical analysis and theoretical inquiry: we bring together trade data, corporate ownership structures, refining capacities, and geopolitical alignments to build a mineral-wise, country-level account of global critical mineral supply chains.

We are aware that numerous narratives already exist around Africa's historical exploitation, resource curse dynamics, and structural marginalisation.[2] While these perspectives are important and have shaped much of the context in which this issue is situated, we have made a conscious effort to keep our analysis evidence-driven and empirically objective - thereby letting the verifiable data and structured theoretical analysis, rather than assumptions, guide our conclusions. In this brief, we test the hypothesis that Africa's role in the green mineral economy, while critical in physical terms, remains constrained in economic, political, and strategic terms. We ask key questions such as: Who sets the terms of trade? Who exports and imports what and who captures incremental value along the mineral value chain? Who controls the mining in the mineral-rich African nations? In doing so, we draw from a range of theories in international trade, political economy, international relations—to offer some conceptual clarity and trade policy relevance.

The sections that follow are designed to build logically and cumulatively: from data-driven tabling and mappings of trade flows and refining patterns, to identification of structural trends, and finally to interpretive reflections on what these patterns mean for the future of global mineral order. Our ambition is to go beyond surface-level descriptions and contribute to a more grounded, politically attuned understanding of how the net zero transition is being materially constructed—and contested—on the global stage.

2.0 Methodology

This investigation begins with India's official list of 30 critical minerals[3], as published by the Ministry of Mines, Government of India. Using this list as a foundation (we have expanded PGE which is included as a group of critical minerals in the Ministry of Mines' list to separate out the metals for our analysis - platinum, palladium, rhodium, ruthenium, osmium and iridium), we conducted a preliminary data extraction exercise to identify the leading global producers of each mineral. We then shortlisted those minerals for which one or more African countries appear among the top producers globally. The scope of the study was subsequently narrowed to focus exclusively on this subset of minerals.

To map the key actors across the supply chains of these shortlisted minerals, we sourced and analyzed international trade data at critical stages of the mineral value chain. Specifically, we identified the top exporting countries for raw or unprocessed mineral forms (e.g., ores, concentrates, unground or powdered materials) and the leading importers and refiners for each. This mineral-wise, country-level mapping across upstream and midstream segments of the value chain enabled us to trace patterns of global mineral flow and dependency.

Where data availability permitted, we also examined the ownership structures of refining facilities, particularly in major processing countries, and noted their geopolitical alignments. This additional layer of analysis aimed to highlight strategic control points and the influence of state or corporate actors with geopolitical significance. All quantitative data generated from these exercises is consolidated in the Appendix.

Subsequently, we analyzed the supply chain maps to discern cross-cutting patterns and emerging trends. These findings are synthesized and presented in the Results section. To interpret these patterns, we employed a combination of international trade and international relations (IR) theories, providing a conceptual framework for understanding the strategic dynamics at play.

Finally, to complement our quantitative analysis, we integrated qualitative insights from scholarly literature, policy commentaries, and international reporting. Particular emphasis was placed on recent efforts by mineral-rich African states to transition from raw mineral exports to value-added domestic beneficiation. This contextual lens enhances the depth and policy relevance of our analysis.

For our research, we have gathered global trade data from UN Comtrade and World Integrated Trade Solutions (WITS). We have also used the Austrian government's official World Mining Database. In addition, we have looked through multiple industry reports, blogs and articles by the International Monetary Fund (IMF), the World Bank and the World Economic Forum (WEF). We have also used reports of the US Geological Survey, the Indian Minerals Yearbook by the Indian Bureau of Mines, reports by the Ministry of Mines (Government of India), the International Energy Agency (IEA) etc. Additionally, we have gone through the global news reportage on the political economy of critical minerals and several other miscellaneous sources such as Energy Monitor, reports by Mordor Intelligence, **earth.org**. Finally, we have also referred to websites and annual reports of several critical minerals mining, processing, refining, exporting and importing companies.

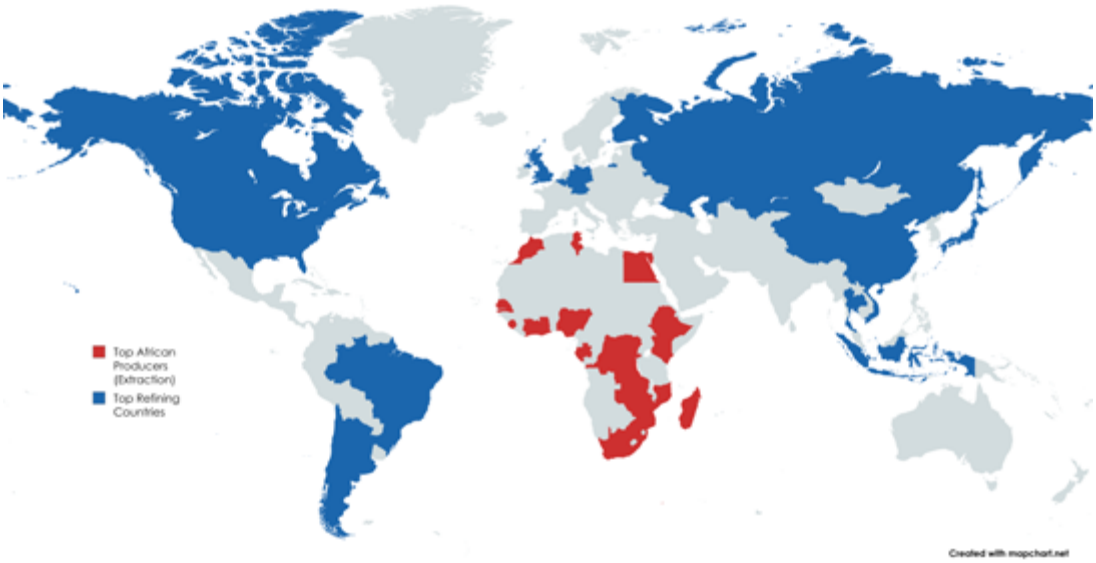

Figure 1: This figure locates top refining and producing (extraction) countries for critical minerals on the world map

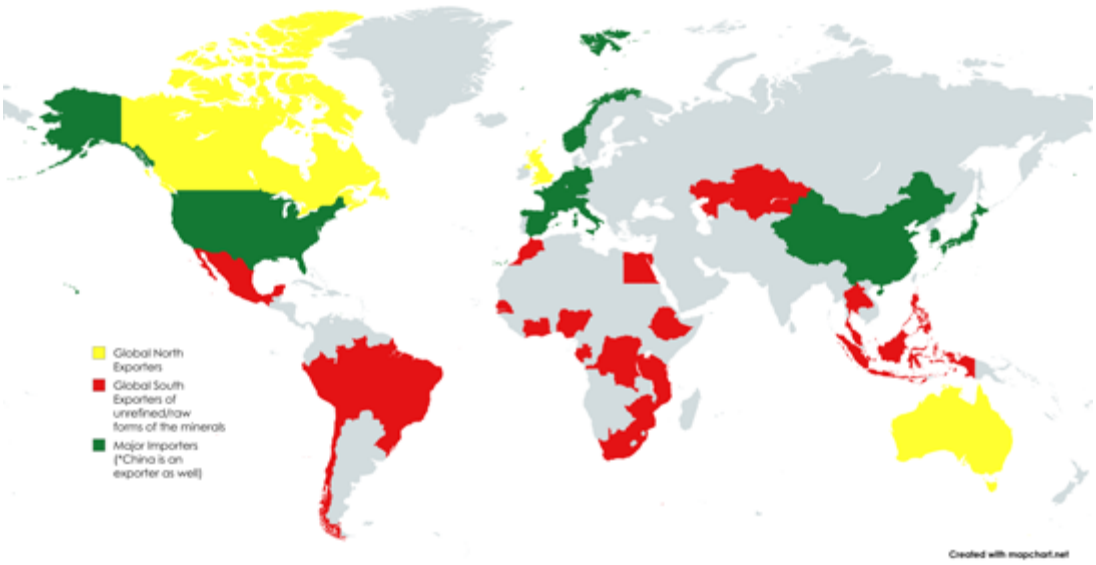

Figure 2: This figure locates top exporting and importing countries for critical minerals on the world map. The exporting countries are the ones that export the minerals in their raw/unrefined form(s).

3.0 Results and Pattern Analysis

This section presents the key empirical findings of our investigation, based on a mapping of mineral production, trade flows, refining locations and ownership patterns associated with Africa's critical minerals. The analysis focuses on a subset of minerals for which one or more African countries are among the top global producers, with particular attention to their positioning in global supply chains.

By examining the structure and direction of trade, the geographical distribution of refining and processing capabilities, and patterns of corporate control, the section identifies system trends that shape Africa's participation in the critical mineral

economy.

These patterns reveal a consistent asymmetry: African countries contribute significantly to global extraction but remain largely excluded from downstream value addition. The following analysis distills these insights into interrelated trends that highlight both structural vulnerabilities and potential opportunities for recalibrating Africa's role in the critical mineral economy.

3.1 Concentration Without Commensurate Control

Many African countries play an outsized role in the global extraction of critical minerals, yet remain largely excluded from downstream value creation. Their participation is overwhelmingly concentrated at the raw material stage, with limited involvement in refining, processing, or manufacturing. South Africa alone contributes more than 80% of global production in key Platinum Group Metals (PGMs), including rhodium (81.23%), ruthenium (91%)[4] (See Appendix). The Democratic Republic of Congo (DRC) supplies over 70% of the world's cobalt[5], while Rwanda and the DRC together account for close to 58.8% of global tantalum production[6] (See Appendix). Despite being huge producers of minerals, African countries do not control pricing[7], lack local refining capacity[8], and derive limited economic or technological benefit from these strategic assets[9]. The continent's critical mineral engagement thus remains structurally skewed toward the lowest rung of the value chain, reinforcing a cycle of dependency and missed opportunities for industrial transformation.

3.2 Extractive Control, External Refinement

While African countries possess and extract significant volumes of critical minerals, the crucial stages of refining and value addition overwhelmingly occur outside the continent. This structural imbalance limits the industrial benefits and strategic leverage that Africa can derive from its mineral wealth[10]. For instance, although the Democratic Republic of Congo (DRC) supplies approximately 70% of global cobalt, more than 80% of cobalt refining is conducted in China (See Appendix). Similarly, tantalum extracted from Rwanda, Nigeria, Ethiopia, and the DRC is processed in countries such as Malaysia, Germany, China, and the United States (See Appendix). Rarely does any African nation rank among the top three global refiners of any critical mineral. This exclusion from midstream and downstream segments of the value chain reinforces Africa's entrenched role as a supplier of unprocessed raw materials—perpetuating a "dig and ship"[11] and a "pit to port" model of extraction[12] with limited prospects for industrial deepening or economic sovereignty. We see that Africa possesses significant critical mineral reserves, yet it retains less than 8% of the value from their processing[13]. While its cobalt, lithium, and copper deposits have the potential to fuel entire nations, outdated extractive practices continue to export raw materials abroad. This "dig-and-ship" model results in an estimated $10 billion in annual losses[14] from missed refining opportunities and leaves local communities grappling with environmental degradation. Lessons from Australia's "dig-and-ship" model are also not very encouraging. Australia's strategy on the global stage as a 'dig-and-ship' nation has also not yet capitalised on sovereign value-added processing and refining[15].

3.3 Ownership Asymmetry: African Minerals, Foreign Profits

Despite being the primary source of many critical minerals, African countries

exercise limited control over the companies that extract them[16]. Mining operations across the continent are heavily dominated by foreign corporations, resulting in a significant asymmetry between resource ownership and economic benefit. In the Democratic Republic of Congo (DRC), cobalt extraction is controlled by Chinese firms such as Huayou Cobalt, British multinational Glencore, and Belgian company Umicore. Zimbabwe's lithium sector is similarly dominated by foreign players, including Albemarle (USA), Ganfeng and Tianqi (China), and various Australian companies. In South Africa, key platinum group metal (PGM) operations are held by British and Russian multinationals, while nickel, beryllium, and copper production involves major actors like Norilsk Nickel (Russia), Glencore (UK/Switzerland), and Materion (USA). This pattern of foreign dominance in ownership and operational control weakens African economic sovereignty, limits revenue and value capture[17], and hence restricts the continent's ability to shape its own industrial and development trajectories going into the future.

3.4 Refining Dependence on China — Even When Mined Elsewhere

China has established a near-monopoly over the global refining and processing of critical minerals, including those extracted from Africa, reinforcing structural dependencies in the global supply chain[18]. Notably, China refines over 90% of the world's rare earth elements. It also controls the majority of global refining capacity for cobalt, lithium, and tungsten—much of which originates from African countries such as the DRC, Zimbabwe, and Rwanda[19]. While countries like South Korea and Japan play secondary roles in refining, African nations are usually absent from the top tiers of global processing. This over-reliance on Chinese refining hubs not only sidelines African countries from capturing downstream value but also exposes them—and their mineral trade partners—to significant geopolitical risk in the event of supply chain disruptions or diplomatic tensions. The result is a further entrenchment of Africa's subordinate role in the global mineral economy, despite its upstream strengths.

3.5 Skewed Trade Routes and Export Destinations

The trade routes for Africa's critical minerals primarily favor industrialized economies (See Appendix), reinforcing extractive dependencies and sidelining opportunities for regional integration or South-South cooperation. Minerals mined across the continent are funneled into the manufacturing hubs of the Global North or China, bypassing African value chains. For instance, South Africa's platinum group metals (PGMs) are primarily exported to the United Kingdom, European Union, and the United States, with negligible volumes reaching other African nations or emerging partners like India. Similarly, phosphates from Morocco, Senegal, and Tunisia are directed toward markets in the US, EU, and Brazil, with little to no processing or agricultural application within the continent. Compounding this structural imbalance, minerals such as tantalum and tin from Central Africa often enter illicit or opaque trade routes[20]. The net effect of all this is a trade architecture that systematically bypasses local value retention, impedes the development of robust regional industrial and mineral policies, and locks Africa into a lower-rung role in global critical mineral markets.

3.6 Export Fragmentation and Strategic Short-sightedness

Despite shared interests and overlapping mineral endowments, African countries frequently approach critical mineral exports through fragmented, uncoordinat-

ed strategies—undermining their collective leverage in the global marketplace[21]. Instead of forging regional alignments, many states compete with one another to attract extractive investment, often offering concessions that dilute environmental safeguards or undercut long-term development goals. For example, the Democratic Republic of Congo (DRC) and Zambia—both major producers of cobalt and copper—pursue divergent extraction and export policies, despite operating within the same mineral corridors[22]. This absence of a pan-African approach to mineral diplomacy not only weakens the continent's bargaining position with powerful importers like China, the EU, and the US but also delays the emergence of a coherent mineral policy architecture that could promote value addition, transparency, and intra-African industrial cooperation[23].

3.7 Value Chains Controlled Elsewhere: China's Dominant Position

China exerts commanding influence over global critical mineral supply chains not necessarily by dominating extraction, but by controlling the critical infrastructure for refining, processing, and trade. It serves as the primary importer and processor for a wide range of minerals—including graphite, cobalt, rare earth elements (REEs), lithium, and phosphates—many of which are mined in Africa. African countries routinely export these raw materials to Chinese processing facilities, effectively bypassing any opportunity for domestic or regional beneficiation. This structural asymmetry enables China to capture the majority of economic value and strategic leverage from minerals sourced in Africa, while African states remain confined to the extractive periphery. The result is a supply chain architecture in which Africa provides the inputs, but China dictates the terms—a model that continues to stifle industrialisation across the continent and perpetuate dependence on external actors.

3.8 Emerging Producers at Risk of Repeating the Pattern

A new wave of mineral-rich African countries is entering the global critical mineral market, but many of these states risk replicating the same extractive dependency that has historically characterized the continent's engagement with natural resources. Countries such as Madagascar (rare earth elements, graphite)[24], Ghana (manganese)[25], and Nigeria (lithium)[26] are expanding their production footprints and attracting international attention. However, they too risk following a familiar trajectory in the absence of better precedents—dominated by foreign ownership, export of raw materials, and minimal domestic value addition. In the absence of targeted policy interventions, including investment in refining capacity, enforcement of robust environmental, social, and governance (ESG) standards, and the creation of local beneficiation ecosystems, these nations are likely to be integrated into global value chains on terms that replicate existing patterns of low-value extraction and high-dependence. The opportunity to chart a different course exists, but it requires deliberate action now. In an era of rising demand for transparent, ethical, and diversified sourcing, these emerging producers could represent Africa's most promising pathway to climb the value chain—transforming from raw material exporters into integrated participants in the green industrial future.

4.0 Discussion

As seen in the above analysis, African countries play a central role in the extraction of critical minerals essential for the global energy transition, yet they remain significantly underrepresented in downstream stages such as refining, processing, and manufacturing. This gap between extraction and value capture reflects structural characteristics of the global economy rather than isolated circumstances. To better understand these dynamics, in this section we apply some key International Relations (IR) theories and international trade theories to make sense of all of it through conceptual and theoretical frameworks. Specifically, we deploy the *World-Systems Theory* and *Dependency Theory* to make sense of and explain the geopolitical aspects of the trends and the *Comparative Advantage Theory*, *Terms of Trade Theory*, and *Strategic Trade Theory* to further understand and explain the economic underpinnings and consequences of these trends.

4.1 Africa in the Global Periphery

Immanuel Wallerstein's world-systems theory provides a useful conceptual framework for examining Africa's positioning in global mineral supply chains. According to this theory, the international economy is structured into core, semi-periphery, and periphery zones. Core countries are typically capital- and technology-intensive, dominating high-value segments of production and trade. Periphery countries tend to focus on low-value activities such as raw material extraction and commodity exports.

This model aligns with observed trends in the critical minerals sector. Countries such as the Democratic Republic of Congo (DRC), South Africa, Zimbabwe, Mozambique, and Madagascar are major producers of globally significant minerals, including cobalt, platinum group metals, graphite, lithium, and rare earth elements. However, these same countries are largely absent from global refining and manufacturing hubs—positions occupied predominantly by countries such as China, Germany, Japan, and the United States. This divergence between extraction and industrial value addition reflects a long-standing pattern of global production in which raw materials are sourced from resource-rich economies, but the greater economic value is realised through industrial processing in more developed countries.

4.2 Persistent Structural Challenges

Dependency theory provides further insight into the economic dimensions of this relationship. Originating in Latin American development literature, the theory posits that some countries, particularly those in the Global South, face structural limitations in advancing up the value chain due to their reliance on exporting raw materials and importing high-value finished goods.

In cases such as cobalt from the DRC, tantalum from Rwanda, graphite from Mozambique etc, the raw materials are often exported in unprocessed form to countries with advanced refining and manufacturing capabilities, where they are incorporated into high-tech applications such as electric vehicle batteries, semiconductors, and renewable energy technologies. The higher economic returns from these processed materials are typically realised outside the producing countries. While this pattern is influenced by historical factors, it is also shaped by present-day considerations including infrastructure limitations, access to finance, and industrial capacity. Addressing these structural challenges would require coordinated industrial policy

and long-term investment in processing and manufacturing ecosystems within the continent.

4.3 Comparative Advantage and Structural Limitations

Classical Comparative Advantage Theory, based on the work of David Ricardo, suggests that countries benefit from specialising in the production of goods for which they have the lowest opportunity cost. On the surface, this might justify Africa's focus on mineral extraction, given its abundant geological resources.

However, the application of this theory in the African context must be viewed alongside its limitations. Comparative advantage assumes a level playing field, but in practice, structural factors such as limited access to capital, skills shortages, infrastructure deficits, and historical patterns of foreign investment can constrain industrial diversification. These factors often reinforce specialisation in extractive sectors, making it difficult for countries to move into higher-value segments. The experience of countries like Indonesia, which implemented a nickel export ban to stimulate local smelting and value addition, illustrates that comparative advantage is not static and can be shaped by deliberate and progressive/forward-looking policy choices. In this context, Africa's mineral endowments could support more diversified industrial strategies if accompanied by the right enabling policies.

4.4 Terms of Trade and the Value-Capture Gap

The concept of Terms of Trade (ToT)—defined as the ratio between the prices a country receives for its exports and the prices it pays for its imports—offers another relevant framework to understand the structural disadvantages faced by many resource-rich African economies. Countries that primarily export low-value, unprocessed commodities (such as cobalt ore, lithium concentrate, or phosphate rock) and import high-value, refined or manufactured goods (such as electric vehicle batteries or fertilisers) often face a declining ToT over time. This means they must export more and more raw material to afford the same volume of industrial imports.

This pattern arises because the prices of manufactured goods mostly tend to rise steadily due to technological innovation, branding, and control over intellectual property—factors that give pricing power to firms in advanced economies. In contrast, raw commodity prices are highly volatile, often shaped by global supply gluts, and shocks such as civil conflicts, climate events etc. As a result, even during commodity booms, producing countries may not capture lasting gains if they are not integrated into the higher-value segments of the supply chain such as refining, processing and manufacturing of high-value products. For instance, the value of cobalt hydroxide exported per tonne is significantly lower than the value of cobalt sulphate or battery-grade cobalt products. Without domestic refining or processing, the DRC, which has significant cobalt reserves, will remain exposed to global price fluctuations, and be unable to translate global demand surges into proportional fiscal or industrial gains.

This underscores the importance of policies that African countries must proactively design - that enable local beneficiation, refining infrastructure and skill development and reduce exposure to price volatility in global markets - so that African countries can retain more value domestically, reduce vulnerability to global commodity cycles, and improve their terms of trade over the long term.

4.5 Strategic Trade Theory and Policy Opportunities

Unlike classical models, Strategic Trade Theory emphasises the role of government intervention in promoting competitive trade advantages. It is a theory in international economics that focuses on how governments can use trade policy to influence the outcomes of strategic interactions between firms, particularly in oligopolistic industries where a few large firms dominate. It posits that governments can improve domestic welfare by intervening in industries where firms' decisions are interdependent. The theory suggests that states can foster globally competitive industries by supporting innovation, protecting nascent sectors, and coordinating investment.

For African countries, this implies that developing domestic capabilities in mineral processing, battery manufacturing, or component production is both viable and strategically sound. Indeed, some countries are already taking initial steps. Namibia and Zimbabwe, for instance, have adopted policies that restrict the export of raw lithium in an effort to promote local beneficiation. Meanwhile, the African Continental Free Trade Area (AfCFTA) offers a platform for regional coordination that could enable shared processing hubs, common industrial standards, and harmonised investment frameworks. If strategically leveraged, these developments could help African countries retain more value within the continent, promote employment, and strengthen industrial ecosystems. However, this would require clear policy coordination, institutional capacity, and sustained investment.

5.0 Conclusion

The trends observed in Africa's participation in critical mineral supply chains—ranging from refining dependence and foreign ownership to fragmented export strategies—are shaped by structural factors rooted in both historical experience and contemporary market dynamics. Drawing on IR and international trade theories, this brief has outlined how global frameworks continue to position Africa as a key provider of raw materials, but not yet as a participant in high-value production.

This brief set out not only to map mineral flows, but to critically examine the global supply chain architecture, asking whether the rules of trade—who extracts, who refines, who profits—are changing in the age of energy transition. What we find is that the so-called "scramble" for critical minerals follows deeply entrenched patterns: minerals mined in Africa are refined elsewhere, predominantly in China, and sold in finished form to advanced economies, often with minimal value capture for producing countries. While the global language around sustainability and decarbonisation may have changed, the political economy of minerals remains shaped by asymmetries of power, capital, and technology.

In this context, African countries face an important opportunity. With global demand for critical minerals accelerating, and geopolitical interest in supply chain diversification rising, there is scope to rethink existing models. Investments in local processing, coordinated regional strategies, and fairer international partnerships can help shift Africa's role from that of a supplier of raw inputs to a more integrated and value-adding actor in the global energy transition.

For India, this analysis presents both a warning and an opportunity. The country's growing demand for critical minerals must be met not through extractive deals, but through genuine equal partnerships that support value addition, industrial development, and skills transfer in the Global South. If India seeks to reduce its own dependency on China, it must also work to ensure that its mineral diplomacy doesn't reinforce the very asymmetries it aims to escape. A future-focused strategy will require moving beyond raw resource access toward co-creating resilient, equitable, and regionally distributed critical mineral ecosystems.

APPENDIX

The following table lists the top African producing countries of the minerals short-listed for this study. The table then maps the top exporting (raw/unrefined) countries, the top importing countries, the top refining countries and the top mining companies for the minerals.

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Platinum	South Africa (69.84%), Zimbabwe (10.73%) (Source 1, Source 2, Source 3)	- Anglo Platinum (UK/ South Africa) - Norilsk Nickel (Russia) - Impala Platinum (South Africa) - Lonmin Platinum (Britain) (Source)	(Unwrought or powder form) South Africa UK EU	(Unwrought or powder form) China Hong Kong Belgium USA	USA UK Russia Germany (Source 1, Source 2, Source 3, Source 4)
Palladium	South Africa (36.45%), Zimbabwe (7.71%)		(Unwrought or powder form) US UK South Africa	(Unwrought or powder form) EU Belgium USA	
Rhodium	South Africa (81.23%), Zimbabwe (7.32%)		(Unwrought or powder form) EU South Africa US	(Unwrought or powder form) USA Japan Germany (Source)	
Ruthenium	South Africa (91%) (2021) (Source 1, Source 2)		(Unwrought or powder form) South Africa Belgium Germany	Japan USA China	
Osmium	South Africa (exact % share could not be found) (Source)		(Unwrought or powder form) South Africa Belgium Germany		
Iridium	South Africa (exact % share could not be found) (Source)		(Unwrought or powder form) South Africa Belgium Germany		

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Cobalt	DRC (70.81%) Madagascar (1.72%)	- Zhejiang Huayou Cobalt Company Ltd. and others (China) - Glencore (British/Switzerland) - Umicore (Belgium) (Source 1, Source 2, Source 3)	Canada European Union Belgium Japan US China	China EU South Korea	China Finland (Umicore HQ) Belgium (Source 1, Source 2)
Phosphate	Morocco (12.83%) Egypt (1.54%) Senegal (1.32%) Tunisia (1.18%)	- The OCP Group S.A. (Morocco) - The Mosaic Company (US) - PhosAgro Group of Companies (Russia) - Ma'aden (Saudi Arabia) - Nutrien Ltd. (Canada) (Source 1, Source 2)	(Unground Phosphate Rock) Jordan Morocco Peru (Ground Phosphate Rock) Egypt Kazakhstan Senegal	(Unground Phosphate Rock) India USA EU (Qty. not given) Brazil (Ground Phosphate Rock) India EU Indonesia	China Morocco United States Russia (Source)
Lithium	Zimbabwe (6.78%) Nigeria (0.19%)	- Albemarle Corporation (USA) - Sociedad Química y Minera de Chile - Ganfeng Lithium (China) - Tianqi Lithium (China) - Mineral Resources (Australia) (Source 1, Source 2)	(Lithium Oxide and Hydroxide) China Chile US EU Republic of Korea	China South Korea Japan USA	China Chile Argentina (Source 1, Source 2)
Copper	DRC (12.65%) Zambia (3.26%)	- Guixi (Jiangxi Copper Corporation) - Jinchuan (Jinchuan Non-Ferrous Co.) - Hindalco (Birla Group) - Codelco (Chile) (Source 1, Source 2)	(Ores and Concentrates) Chile Peru Indonesia Mexico Kazakhstan	China Japan EU (Qty. not given) South Korea	China Chile Japan (Source)
Manganese	South Africa (34.9%) Gabon (21.69%) Ghana (4.3%) Ivory Coast (2.32%)	--	(Ores and Concentrates) South Africa Gabon Côte d'Ivoire Malaysia Ghana Brazil	China India Norway	(not rank-wise) China Australia (Source 1, Source 2)

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Beryllium **bertrandite (Be4Si2O7 (OH)2) + beryl (Be3Al-2Si6O18)**	Mozambique (11.54%), Nigeria (2.47%)	- Materion Corporation (USA) - National Atomic Company Kazatomprom JSC (Kazakhstan) - Shuikoushan Nonferrous Metals Group Co., Ltd. (China) (Source)	(Unwrought, Waste & Scrap and Powders) Nigeria Switzerland USA Kazakhstan Mozambique	China France Germany	USA (produced 90% of the world's beryllium in 2015) (Source 1, Source 2)
Graphite	Mozambique (5.88%), Madagascar (3.67%)	- China Minmetals (Source)	(Natural Graphite - in powder & flakes) China Madagascar Mozambique (Other Natural Graphite - excluding in powder & flakes) China Tanzania Ethiopia EU Germany (Synthetic Graphite) China Brazil EU Japan Germany US Republic of Korea	China USA EU	China (refines 90% of the world's graphite) (Source)
Niobium	DRC (0.48%)	- CBMM Niobium (Netherlands)* - Changsha South Tantalum Niobium Co.,Ltd Source (China) - CMOC Group Limited (China) (Source) *Parent organisation: Companhia Brasileira de Metalurgia e Mineração (CBMM) owned by a brazilian bank called Grupo Moreira Salles	(Niobium, Tantalum and Vanadium - Ores and Concentrates) Brazil (niobium largest producer) Malaysia Rwanda Mozambique Russia Nigeria Democratic Republic of Congo Republic of Korea Ethiopia US Burundi	(Niobium + Tantalum + Vanadium) Thailand Malaysia Japan (China is the largest consumer of Niobium)	Brazil Canada China (Source)

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Nickel	Côte d'Ivoire (1.01%), Madagascar (0.98%)	- Vale (Brazil) - Norilsk Nickel (Russia) - Jinchuan group (China) - Glencore (Switzerland) - BHP (Australia) (Source 1, Source 2, Source 3)	(Ores and Concentrates) Philippines Zimbabwe Côte d'Ivoire Brazil Guatemala	China South Korea Japan	China Indonesia Japan (Source)
REE	Madagascar (1.04%)	- China Northern Rare Earth Group High-Tech Co. Ltd. - Iluka Resources (Australia) - Energy Fuels (USA) - MP Materials Corp (USA) (Source 1, Source 2, Source 3)	(Rare Earth Metals, Scandium and Yttrium) China Thailand Lao PDR		China (90% of REE processing as of 2024) Malaysia* *Australian mining company has refining facilities in Malaysia (Source 1, Source 2)
Tantalum	DRC (29.86%) Rwanda (22.51%) Nigeria (9%) Ethiopia (5.69%) Mozambique (3.89%) Sierra Leone (1.04%)	- Global Advanced Metals Pty Ltd Source (Australia) - Pilbara Minerals Limited (Australia) - AMG Advanced Metallurgical Group (Dutch) - Minsur (Peru) (Source 1, Source 2, Source 3)	(Niobium, Tantalum and Vanadium - Ores and Concentrates) Malaysia Rwanda Brazil Mozambique Russia Nigeria Democratic Republic of Congo Republic of Korea Ethiopia US Burundi	US China Taiwan (Source)	China Germany Kazakhstan Thailand (Source)
Tin	DRC (6.39%) Nigeria (2.66%) Rwanda (1.11%)	- Yunnan Tin Company (China) - Malaysia Smelting corp - PT Timah (indonesia) - Yunnan Chengfeng Non-ferrous Metals (China) Minsur (Peru) (Source 1, Source 2)	(Ores and Concentrates) Nigeria Brazil Australia Democratic Republic of Congo (DRC)	China Malaysia Thailand	China Indonesia (Source)

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Titanium	Mozambique (20.1%) South Africa (11.1%) Madagascar (3.41%) Senegal (2.65%) Kenya (1.88%) Sierra Leone (1.58%) (Source)	-	(ores and concentrates) South Africa Mozambique Madagascar Senegal Kenya India Ukraine	China EU USA	
Tungsten	Rwanda (1.64%)	- A.L.M.T. Corp. (Japan) - ATI - Allegheny Technologies Incorporated (USA) - Buffalo Tungsten Inc. (USA) - Umicore N.V. (Source)	(Ores and Concentrates) Spain Bolivia EU US Singapore Australia	China USA Vietnam	China, Vietnam, and Russia (Source)
Vanadium	South Africa (7.42%)	(Vanadium Redox Battery) - VRB Energy .(Canada) - VanadiumCorp Resource Inc. (Canada) - Invinity Energy Solutions (USA) - UniEnergy Technologies (USA) (Other refineries) - Bushveld Minerals (SA) - Glencore (Anglo Swiss) - Largo Inc. (Canada) - AMG Vanadium (USA) - U.S. Vanadium - Panzhihua Iron and Steel (Pangang) (Source 1, Source 2, Source 3)	(Niobium, Tantalum and Vanadium - Ores and Concentrates) Malaysia Rwanda Brazil Mozambique Russia Nigeria Democratic Republic of Congo Republic of Korea Ethiopia US Burundi	EU USA Germany	China South Africa Brazil (Source)

Critical Minerals for India	Major African Producers (sourced from World Mining Data, if not specified otherwise)	Top Mining Companies (with Countries)	Top exporting countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Importing Countries (sourced from World Integrated Trade Solution - WITS, unless specified otherwise)	Top Refining Countries
Zirconium	Zircon: South Africa (21.86%) Mozambique (10.84%) Senegal (5.54%) Madagascar (2.6%) Sierra Leone (2.10%) Kenya (1.6%)	- Iluka Resources Limited (Australia) - Kenmare Resources plc. (British/ Irish) - Australian Strategic Materials Ltd (ASM) - Rio Tinto (British/ Australian) - Tronox Holdings Plc (USA) - Tosoh (Japan) (Source 1, Source 2, Source 3)	(Ores and Concentrates) South Africa Indonesia Mozambique Senegal Kazakhstan Australia Madagascar Sri Lanka	China EU Spain	South Africa United States China Indonesia (Source)

*All data is from 2023, unless otherwise specified. Additionally, independent data for Antimony, Bismuth, Gallium, Germanium, Hafnium, Indium, Molybdenum, Potash, Rhenium, Silicon, Tellurium, Selenium, Cadmium were not looked into because no African country is a major producer of these minerals and the scope of this brief is the African continent.

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