

International Journal of **Supply Chain and Logistics**

(IJSCL)

**Oil and Gas Supply Chains in Africa: Structure, Actors, and Flow of
Materials**



**CARI
Journals**

Oil and Gas Supply Chains in Africa: Structure, Actors, and Flow of Materials



¹Dr. Florence Masai, PhD, ²Dr. Kadugala J.M Aniceto, PhD, ³Albert Kafilondi, MSc.

^{1,2}Faculty of Unicaf University in Zambia

³Geographical Sciences Depart., Makerere University Kampala (MUK)-Uganda

<https://orcid.org/0000-0003-2776-1013>



Accepted: 4th Aug, 2026, Received in Revised Form: 14th Aug, 2026, Published: 24th Aug, 2026

ABSTRACT

Purpose: This paper evaluates the oil and gas sector in Africa through a supply chain approach, arguing that developmental performance is shaped not by resource endowment alone but by the interaction between chain structure, actor power, and material flows.

Methodology: The article deploys the qualitative study of secondary data based on the synthesis approaches to trace the transnational material flows using the upstream, midstream and downstream segments and firmly imprints a comparative case study of Nigeria, Mozambique and Algeria. These illustrations depict how different formations of the actors and infrastructure constructions produce different flow effects such as extensive leakage and reliance on imports and more centralized but stringent control.

Findings: The findings show that the partial governance and underperforming midstream integration bring about a massive loss of value in form of flaring, theft, bottlenecks, and circular trade structures. Formation of enclaves and export-oriented economical organization diminishes national inter-relatedness, and lack of undercapacity in the downstream will guarantee dependence on imported refined products. More unified systems achieve a tradeoff between sovereignty and efficiency. Overall, there is no correspondence between the formal possession of the resources and their efficient management in terms of development

Unique Contribution to Theory, Practice, and Policy: The article also contributes to the scholarship on extractive industry by creating an interdisciplinary flow of flow, which relates the aspects of governance and political economy to the embodied realities of logistics and infrastructure. The policy implications are based on the fact that the country should not just leave on fiscal policies but should go to the extent of integrating supply chain, governing infrastructure and having institutional capability. To the companies, the research indicates hazards of failing to analyze risks in ecosystem-based analysis which extends beyond a project to a whole supply chain.

Keywords: *Oil and Gas supply, Value chains, Political economy, Energy security; Material flows, Infrastructure governance*

JEL Codes: *Q31, L71, L14, P16, Q17*

INTRODUCTION, THE AFRICAN HYDROCARBON CONUNDRUM

1.1 The Situation of Strategic and Paradoxical Positioning

Africa is a major source of crude oil and natural gas in terms of energy security to Europe, Asia and emerging markets especially in instances of geopolitical upset (OPEC, 2025; UNCTAD, 2025). Other countries such as Nigeria, Algeria, and Angola are the ones that are more discussed as they are at the core of stabilizing the hydrocarbon markets and the alteration of the supply of gases has a new field of frontier with Mozambique (EIA, 2025; IGU, 2024). But the strategic irrelevance is completely contradictory to the stable developmental failures, including energy poverty, inadequate industrialization, and financial frailty on producer states (AfDB, 2024; IMF, 2024). The reliance on the importation of fuel and unstable rents on commodities are continuing to affect many African economies despite decades of exhaustion, which indicates a structural paradox of plenty in the absence of any developmental change despite the abundance of the resource (UNCTAD, 2024; World Bank, 2023).

1.2 The Supply Chain as the Analytical Lens of Criticism

In this paper, it is believed that neither resource endowment but the supply chains of oil and gas that is the determinant arena of value capture, conflict and economic outcomes in Africa (WTO, 2025; UNCTAD, 2024). It is the supply chain structure which has an impact on the person in charge of extraction, transportation, processing, and distribution and the governance structure defines the bargaining power of states, firms, and communities (APRM, 2025; EITI, 2024). The susceptibility is further integrated in material characteristics of the hydrocarbons as the pipeline and ports, as well as refineries, are chokepoints that can be easily destabilized and politically challenged (World Bank, 2024; IRENA, 2024). The supply chains, as a result, are socio-technical systems, where inefficiencies are either a gas flaring, theft, dependency on imports and conflict, where the structural vulnerabilities are directly translated into the loss of development (NEITI, 2024; AfDB, 2024).

1.3 Knowledge Gap

The knowledge gap of the research is to establish that; there is no literature review of the topic and that some studies have been established which can promote the practicality of the topic to the nursing practice.

Existing literature on the topic of African hydrocarbons is categorized into technical logistic literature, governance literature, and differentiated literature on political economy and largely interprets these factors in isolation (WTO, 2025; World Bank, 2023). Logistics research focuses on the infrastructure shortages, the transparency of governance studies on the institutions and the rents and the state behavior of the political economy, and material flows are rarely captured in a single analysis (APRM, 2025; EITI, 2024). The paper closes this gap by offering an integrated system-level framework, which considers the structure of the supply chain, the power of its actors,

and material flows as a triad that mutually depends on each other (UNCTAD, 2025; IRENA, 2024). The article also takes a step forward in combining Global Value Chain governance, rent-based political economy, and critical logistics analyses to explain the developmental success of similar resource endowments in the four Africa oil and gas producers (AfDB, 2024; IMF, 2025).

1.4 Objectives and Guiding questions

The key purpose of this paper is to explain how the value retention, vulnerability, and the developmental sovereignty would be dependent on the structure of the oil and gas supply chain in Africa. It specifically tries to examine how different chain structures and efficiencies of flows are produced by the different constellations of actors that the international oil companies, the national oil companies and the states are constituted. Another way through which the flow of materials also reveals disjuncture's between formal ownership of resources and the actual economical control particularly in the form of export dependence and imported refined products is also analyzed in the paper. In accordance with these objectives, the research questions is as follows, how do the supply chain governance intervene power, risk and value distribution within the hydrocarbon systems in Africa?

1.5 Methodology and Article roadmap

The analysis in the article is based on the qualitative line of research that is built on the critical synthesis of the secondary data and uses policy reports, statistics in the industry, and peer-reviewed literature on African oil and gas supply chains (UNCTAD, 2024; World Bank, 2023). The content of comparative cases in Nigeria, Mozambique, and Algeria is used to explain the outcomes of structural variation and flow in the context of the coherent approach of analysis (EIA, 2025; NEITI, 2024). The article has a conceptual framework in Chapter Two, structural mapping in Chapter Three, empirical flow analysis in Chapter Four, and theoretical, policy, and strategic implications in Chapter five (APRM, 2025; IMF, 2025).

LITERATURE REVIEW

2.1 Beyond Linear Chains: The Complex System View

The oil and gas supply chains are increasingly being viewed as innovative socio-technical-political infrastructures rather than the linear chains of extraction, transportation, and sale (WTO, 2025; UNCTAD, 2024). According to this point of view, physical infrastructure, institutional regulations, and political authority interact in a continuous way to function upon results of the length of the chain (World Bank, 2023; IRENA, 2024). African supply chains include social relations, security and state interest politics, engineering, and logistics (AfDB, 2024; APRM, 2025). Gas flaring, theft or clogged ports are not technical incidents on their own, and symbols of administrative weaknesses and power struggles NEITI, 2024; IMF, 2024. The view of oil and gas supply chains as complex systems, therefore, makes it possible to examine feedback loops of actors,

infrastructure, and material flows that lead to the development of long-term inefficiencies and vulnerabilities (UNCTAD, 2025; World Bank, 2024).

2.2 Theory Pillar I: Global Value Chain Governance

2.2.1 GVC Fundamentals

Global Value Chain theory provides the way of analyzing the organization and control of activities spread over production chains with a special interest to relationships of power between lead firms and their suppliers (WTO, 2025; OECD, 2025). The typologies of governance consist of the forms of markets and modular, relational, captive, and hierarchical, each suggesting the degrees of the coordination and control that are varied (UNCTAD, 2024; WTO, 2025). Governance is also characterized by captive or hierarchical in capital-intensive industries such as oil and gas that are characterized by high barriers to entry, technological complexity, and risk concentration (World Bank, 2023; OPEC, 2025). These arrangements mark out among others who is favored with value, who would take a risk and how upgrading opportunities are distributed on the chain (AfDB, 2024; IMF, 2024). GVC analysis is the key to the explanation of lasting asymmetries between global firms and the African host economies (UNCTAD, 2025; APRM, 2025).

2.2.2 Africa Niche in GVC Governance

It has a hybrid form of GVC governance both in upstream (international oil companies with captives) and downstream (state-based hierarchical interventions) in the African oil and gas industries (EIA, 2025; APRM, 2025). IOCs monopolize both exploration and production through their capital and technological controlling positions and limited access to global markets and emphasize the independence of local actors (World Bank, 2023; UNCTAD, 2024). Meanwhile, licensing, national oil companies and fiscal regimes, states are using their power to the detriment of productive coordination and, in most cases, are interested in revenue capture (AfDB, 2024; IMF, 2024). This hybrid governance creates dismembered accountability and ineffective alignment of Outside Vestration not-indu of production at home steadies. This hybrid governance sets up disintegrated accountability and effective funerary alignment of Outside Vestration not-indu of production at home steadies (EITI, 2024; NEITI, 2024). This has in turn transformed supply chains to become the enclaves of exports that are not tightly integrated with the national economies (UNCTAD, 2025; OPEC, 2025).

2.2.3 Upgrading and Value Capture

Although GVC literature focuses on upgrading as a pathway through which the local actors could be able to move to the higher value activities by deepening their functions, processes or products (WTO, 2025; OECD, 2025). The opportunities of upgrading are constrained by technological dependence, lack of good skills base, and governing instability in oil and gas sectors in Africa (AfDB, 2024; World Bank, 2023). The local contents policies are now aimed at stimulating the participation in the services and manufacturing as well as downstream processing, yet the

outcomes are not even and rather symbolic (EITI, 2024; APRM, 2025). The capture government diminishes the learning spillovers as opposed to the state interventions that are commonly consistent and enforcement feeble (UNCTAD, 2025; IMF, 2024). As a result, capture of value is also concentrated at upstream rents as against sustained industrial upgrading strengthening structural dependence (OPEC, 2025; UNCTAD, 2024).

2.3 Theory Pillar II: Resource Political Economy and the Rentier State

2.3.1 The Political Logic of Rents

The political economy approaches are concentrated on how the hydrocarbons rents may affect the actions of the states, their incentives, and institutional development (IMF, 2024; APRM, 2025). Governments in rent dependent economies are motivated by revenue collection and distribution rather than productive investment so as to support short-term fiscal logics (World Bank, 2023; AfDB, 2024). These dynamic influences the supply chain governance; the main focus is made on exports and fiscal flows to the upstream instead of the integration and efficiency of the infrastructures (UNCTAD, 2025; OPEC, 2025). Rent dependency also alters the bargaining power with the IOCs because the states are trading regulatory stability with immediate income (EITI, 2024; IMF, 2024). The outcomes of supply chains are directly influenced by political logic of rents that result in predisposing the latter to weakness and instability (APRM, 2025; UNCTAD, 2024).

2.3.2 Patronage and institutional Fragility

The presence of institutional weaknesses and patronage networks is another precondition of oil and gas supply chains in Africa (APRM, 2025; World Bank, 2023). The laxity of regulation permits opacities in the licensing, contracting and revenue management, which undermines transparency throughout the chain (EITI, 2024; NEITI, 2024). Local content efforts are distorted by patronage politics, and political relationships in terms of favoritism to politically connected firms as opposed to establishing a competitive capability (AfDB, 2024; IMF, 2024). Such dynamics result in reduced efficiencies and inflated prices and demotivation of long-term infrastructure investments (UNCTAD, 2025; World Bank, 2024). This results in supply chains recreating rather than correcting institutional inefficiencies, which run economies in low-value, high-risk modes (OPEC, 2025; APRM, 2025).

2.3.3.4 Conflict and Weaponized Interdependence

It is a common occurrence that hydrocarbon infrastructure is turned into a political and militant resource and the supply chains become the warring regions (World Bank, 2024; NEITI, 2024). Pipelines, terminals and export corridors serve as points of leverage in order to disrupt and attain leverage within states and firms (IMF, 2024; IRENA, 2024). The fact that sabotage and theft of natural resources such as the Niger Delta or gas areas that fall under insurgency is a sign that there is a struggle of rent distribution and power (AfDB, 2024; UNCTAD, 2025). It is a weaponized interdependence that integrates the material flows to the security processes, increasing its costs

and uncertainty (APRM, 2025; World Bank, 2023). The political economy analysis has revealed that conflict is present at the supply chain structures rather than in the outside (EITI, 2024; OPEC, 2025).

3.4 Pillar III: Infrastructures and Important Logistics Theoretical Research

3.4.1 Materiality and Power

Critical logistics scholarship puts infrastructure under the category of highly political, as it defines the developmental tracks and power relations (UNCTAD, 2024; World Bank, 2023). Control of the flows and value capture are seen in African Oil and Gas Industries, by way of Pipeline, Ports and Refinery (IRENA, 2024; AfDB, 2024). The Export Oriented infrastructure, usual investment is about the external markets rather the internal integration giving the dependency pattern which is highly stretching (OPEC, 2025; IMF, 2024). Geopolitical interests and corporate strategies are introduced to material form in the routing, ownership and financing decisions (UNCTAD, 2025; APRM, 2025). Infrastructure is, therefore, an instrument of economic and political policy and not a passive and technical resource (World Bank, 2024; IRENA, 2024).

3.4.2 The Logistics Space

The ideas of logistics space where there is emphasis on the distribution of friction and delay and vulnerability along the corridors and nodes (World Bank, 2023; UNCTAD, 2024). These characteristics of African oil and gas logistics include network fragmentation, low connectivity of the region, and high expenses of transactions (AfDB, 2024; IMF, 2024). Congested ports, vandalism of pipeline, and improper storage enhance the congestion of ports and expose them to shocks (NEITI, 2024; World Bank, 2024). All these frictions are directly translated into the value loss, financial expenditure, and energy insecurity (UNCTAD, 2025; OPEC, 2025). The analysis of logistics has thereby been introduced to political economy and GVC approaches as it brings the power relations to the realities of flow and movement (IRENA, 2024; APRM, 2025).

To achieve the desired analysis, there is the need to synthesize Analytical Triad.

Global Value Chain governance, resource political economy and critical logistics are considered by the research paper as one synoptic analytic triad (UNCTAD, 2025; WTO, 2025). Chain architecture identifies the co-ordination and control, actor power identifies incentives and institutional behavior and material flows efficiency discloses the arguments of sovereignty gaps and vulnerability (APRM, 2025; World Bank, 2024). Assuming the dependence of these dimensions, one can comprehend the causes of the failure of African oil and gas supply chains at a system level despite the important strategic role that these chains play (AfDB, 2024; IMF, 2025). The proposed model suggests a regularity of approach to the study of discrepancy among nations and the feasibility of directly connecting theory with empirical flow outcomes (UNCTAD, 2024; OPEC, 2025).

STRUCTURAL ANATOMY

3.1 The Tripartite Chain: A Continental Snapshot

3.1.1 The upstream: Capital-Intensive, Export-Oriented Enclave

The upstream oil and gas sector of Africa is characterized by capital-intensive projects, which are organized into export enclaves, and have minimal domestic integration (OPEC, 2025; UNCTAD, 2025). The exploration and production are regulated by the international oil companies with excellent technology, financing, and risk management that supports the captive governance arrangements (EIA, 2025; World Bank, 2023). These enclaves are institutionally and geographically off-balanced to national economies, focusing on crude and gas exports instead of connecting with the local industry (AfDB, 2024; IMF, 2024). Consequently, the upstream success does not often translate into the broad-based development, which fixes the dependency on the outside markets and unstable revenues (UNCTAD, 2024; APRM, 2025).

3.1.2 Midstream: The Important Missing Link

The weakest and most disperse part of supply chains of hydrocarbons in Africa is the middle ground (World Bank, 2024; UNCTAD, 2025). There are restricted pipeline networks, infrastructure that is becoming old and bottlenecks at export-terminals, limiting the movement of crude and gas across national and regional boundaries in a reliable manner (AfDB, 2024; EIA, 2025). The midstream sector is extremely political, and ownership, tariffs, and security disagreements are damaging efficiency (IMF, 2024; APRM, 2025). Damage to pipeline and port congestion are also additional ways of disrupting flows, which spike up costs and uncertainty (NEITI, 2024; World Bank, 2023). This conditional structure impulses the upstream enclaving and negate the downstream industrialization (UNCTAD, 2024; OPEC, 2025).

3.1.3 Downstream: Under-Capacity and Import Dependency

Although most African nations are large hydrocarbon producers, they do not have adequate refining and processing facilities, which is paradoxical as they are dependent on exports and have imports of fuels (AfDB, 2024; IMF, 2025). Inconsistency in the policy, old refineries, low maintenance, and aging reduces the downstream performance (World Bank, 2023; UNCTAD, 2024). Thus, crude oil is being exported and refined products re-imported at a higher price, eliminating fiscal and energy security benefits (NEITI, 2024; OPEC, 2025). Downstream weakness indicates the defects of the midstream connectivity and governance coordination, but not the shortage of resources (APRM, 2025; EIA, 2025). This paradox highlights the systemic nature or the dysfunctional nature of supply chains (UNCTAD, 2025; AfDB, 2024).

3.2 The Actor Ecosystem: The Power Typology

3.2.1 Core Systemic Actors

International oil companies act as strategic integrators performing capital, technological and access to the global market throughout African supply chains (WTO, 2025; UNCTAD, 2024). The national oil companies differ in size, with some of them being powerful and having integrated mandates, and others being proxies whose main purpose is to capture rent (APRM, 2025; IMF, 2024). Host states play dual roles effectively as regulators and rent seekers and define the licensing, fiscal and infrastructures priorities (AfDB, 2024; World Bank, 2023). These overlapping roles create tension between developmental objectives and the need for short-term revenue (EITI, 2024; UNCTAD, 2025). The power imbalances between these actors are largely responsible for chain architecture and distribution of values (OPEC, 2025; EIA, 2025).

3.2.2 Empowerment and Limiting Actors

Global service conglomerates offer technical services and project management and this supports the dominance of the IOC's and reduces local learning spillovers (World Bank, 2023; WTO, 2025). Financial and insurances relations determine whether projects are feasible or not by inserting political and security risk into cost of capital (IMF, 2024; AfDB, 2024). The local content partners take an undefined role, and they are usually limited by the gaps in skills and patronage politics (EITI, 2024; APRM, 2025). Militant groups and civil society are seen as accountability mechanisms, as well as disruptive forces especially when it comes to revenue allocation and environmental degradation (NEITI, 2024; UNCTAD, 2025). A combination of these players predisposes efficacy and unsteadiness in the supply chain apparatus (World Bank, 2024; OPEC, 2025).

Synthesis of Chapters 3.3: Chapter 3.3.1 Chapter Static Map 3.3.2 Chapter Dynamic System

This chapter has presented the oil and gas supply chains of Africa as a three-part formation through unequal infrastructure and power asymmetries (UNCTAD, 2025; AfDB, 2024). The interaction between segments and actors generates systemic vulnerabilities as opposed to isolated failures (APRM, 2025; World Bank, 2023). These structural conditions determine the way that material flows are disrupted, diverted or captured, shaping the stage for the empirical analysis based on flows as they follow below (NEITI, 2024; IMF, 2025).

EMPIRICAL ANALYSIS - FLOWS OF MATERIALS AND COMPARATIVE REALITIES

4.1. Diagnostic activities of the hydrocarbon journey flow

4.1.1 Upstream Leakage: Flow Failures at Extraction

Upstream material flows are characterized by African oil and gas systems, where up to persistent leakage through flaring, theft and operational inefficiencies (World Bank, 2024; OPEC, 2025). Gas flaring as a phenomenon is a structural failure in capturing associated gas due to weak enforcement

in regulatory policy and low capacity of absorption by the midstream segment. Gas flaring as a phenomenon is a structural failure in capturing associated gas because of poor enforcement in regulatory policy and small capacity of absorption of midstream segment (UNCTAD, 2025; IRENA, 2024). Oil theft and illegal bunkering contribute to the further diversion of flows beyond the formal channel corrosive of the revenues of states and corporate returns (NEITI, 2024; IMF, 2024). These leakages do not just happen randomly, but are built into governance arrangements that accept loss in return for the distribution of rent and political stability (APRM, 2025; World Bank, 2023). Consequently, the upstream levels of production distort a true amount of value realized in national economies (AfDB, 2024; UNCTAD, 2024).

4.1.2 Midstream Chokepoints: Briefly Interrupted Circulation and Fragmentation

Midstream flows reveal the most evident bottlenecks in African hydrocarbon supply chains, especially by way of the pipeline vandalism, congestion of terminals, and the lack of connectivity in the region (World Bank, 2024; UNCTAD, 2025). Pipelines are a type of high-risk chokepoint, in which sabotage and theft disrupts circulation and increases security expenses (IMF, 2024; NEITI, 2024). The port infrastructure can be inefficient and not always have capacity, leading to time wastage in exports, as well as high demurrage fees (AfDB, 2024; UNCTAD, 2024). This lack of inter-region network also hinders the intra-African energy trade, which strengthens the dependence on exports (OPEC, 2025; EIA, 2025). These intermediate interferons turn the material flow restrictions into the systemic losses in the economy (World Bank, 2023; APRM, 2025).

4.1.3 Downstream Paradox: Circular Costly Flows

The material flows in Africa in the downstream are paradoxically circular with crude oil exported and refined goods imported back in (AfDB, 2024; IMF, 2025). Limited refining capacity and an unreliable feedstock supply compromise domestic processing (World Bank, 2023; UNCTAD, 2024). By doing so and making it a circular flow, it exposes them to international price volatility and foreign exchange pressure (OPEC, 2025; NEITI, 2024). It also indicates the inability to coordinate upstream production with downstream investment planning (APRM, 2025; EIA, 2025). The downstream paradox therefore captures the transition from resource plenty to fiscal and energy insecurity (UNCTAD, 2025; AfDB, 2024).

4.2 Comparative Case Analysis of the Embedded Product

Case A: Nigeria - The Dysfunctional Giant

The flows of hydrocarbon in Nigeria represent the case of extreme value leakage caused by configurations of complex actors and weak coordination (NEITI, 2024; World Bank, 2024). Huge production potential is coupled with theft and flaring affecting the upstream flows, indicating the non-existence of regulations and militant power (IMF, 2024; APRM, 2025). State control is eroded due to the inability of the national oil company to communicate with the mighty IOCs (EIA, 2025; UNCTAD, 2025). Midstream pipelines are common targets of vandalisms as this stop supply of

energy to refineries and to export terminals (World Bank, 2023; AfDB, 2024). It, therefore, exports crude fuel and imports refined fuel, which shows how the fragmentation of actors sacrifices the efficiency of the flows and the retention of values (OPEC, 2025; IMF, 2025).

Case B: The Frontier LNG Archipelago of Mozambique

An example of such an opposite and project-oriented LNG supply chain is Mozambique, which is organized around externally funded mega-projects (IGU, 2024; IISD, 2023). Floating LNG and shore infrastructure minimises exposure to onshore disruption but exposes the supply to global capital and geopolitics (UNCTAD, 2025; IMF, 2024). The flows of materials include technical efficiency but are socially detached, and not much integrated into the domestic energy systems (AfDB, 2024; IRENA, 2024). Participation in the local content is still at its infancy due to the absence of skills and the design of the enclave project (APRM, 2025; World Bank, 2023). The level of leakage is lower than in Nigeria, but flow risks are present as costs exceed expectations, there is a security threat, and it is geopolitically sensitive (UNCTAD, 2024; IGU, 2024).

Case C: The Algerian - The State-Integrated Model

In Algeria, the supply chain is state-integrated with a powerful political presence of a national oil company and massive pipeline networks (EIA, 2025; OPEC, 2025). Material flows are rather stable, sustained by established export corridors as well as domestic refining capacity (World Bank, 2024; UNCTAD, 2025). However, bureaucracy unofficially and inefficient due to the old oriented infrastructure (IMF, 2024; AfDB, 2024). Powerful state control makes for greater sovereignty of flows, but less flexibility and innovation (APRM, 2025; IRENA, 2024). The example of Algeria shows that centralized power of actors might minimize leakage and still produce inefficiencies and exemplifies another tradeoff between control and performance (UNCTAD, 2024; IMF, 2025).

The next method is the use of cross-case synthesis: What Flows Reveal

The comparison flow analysis indicates that the divergent results in the case of Nigeria, Mozambique, and Algeria are consistent with chain architecture, power of actors, and control of infrastructure (UNCTAD, 2025; WTO, 2025). Nigeria has a fragmented governance that results in leakage and circular dependency, Mozambique is enclave LNG model reduces leakage but restricts sovereignty and Algeria is an integrated system that improves control at the cost of efficiency (AfDB, 2024; IMF, 2025). These patterns do reinforce the analysis triad discussed in Chapter Two where material flows are the operationalizers of power relations and choice of governance (APRM, 2025; World Bank, 2024). The results of flows thus offer hard data on mediation of development, vulnerability and value retention by supply chain structure in the hydrocarbon economies of Africa (UNCTAD, 2024; OPEC, 2025).

CONCLUSION - THEORY, POLICY AND CORPORATE STRATEGY IMPLICATIONS

5.1 Summarization of the Main Arguing

This paper has presented a position that oil and gas performance in Africa can be described by a triadic interdependence of supply chain structure, actor power and material flows in addition to resource endowment (UNCTAD, 2025; AfDB, 2024). Fragmented chain architecture, asymmetric governance and limited infrastructure are a combination of factors that determine leakage, inefficiency and low value retention in the chain (World Bank, 2024; APRM, 2025). The flow evidence of the three countries, Nigeria, Mozambique, and Algeria shows that differences in actor set-up and infrastructure regulation generate different flow patterns and development results (IMF, 2025; OPEC, 2025). Material flows hence entail a diagnostic prism of showing how vulnerability and gaps in sovereignty are created in the daily circulation of hydrocarbons (UNCTAD, 2024; WTO, 2025). African hydrocarbon dilemma is therefore endemic and not accidental.

5.2 Implications: Scholarly Implications: Moving Interdisciplinary Research

It is important to highlight that the results reveal that interdisciplinary studies are necessary to combine Global Value Chain analysis, political economy, and logistics research in the study of the extractive industry (WTO, 2025; UNCTAD, 2024). Coordination and control are described by the GVC theory, incentives and rents by the political economy, and material infrastructure and flow as an origin of ground power by logistics (APRM, 2025; World Bank, 2023). A difference in the treatment of these perspectives is an obscuration of the fact that governance failures become operational losses (AfDB, 2024; IMF, 2024). This work fills in the gaps of the system-level perspective, which has stimulated new interdisciplinary research to take place in the future but leave the siloed analysis of development outcomes behind, and implement empirically observed explanations based on flows of resources to encourage development in resource-rich economies (UNCTAD, 2025; OPEC, 2025).

5.3 Pragmatic Implications

To the policymakers, the analysis implies focusing on the infrastructure governance, midstream integration, and national oil company competence as the key supply chain priorities rather than focusing on the fiscal terms only (AfDB, 2024; APRM, 2025). Leakage can be minimized by strengthening pipelines and refineries, as well as coordinating the regulatory efforts (World Bank, 2024; IMF, 2025). To corporate strategists, the results indicate the extent of lease-block risks assessment and ecosystem development that encompasses security, local capacity building, and infrastructure alliances (UNCTAD, 2025; IRENA, 2024). Companies considering the political and logistical interdependencies are in a better position to deal with disruption and continue to operate (WTO, 2025; OPEC, 2025).

Table 5.1: Summary of Key Implications

Dimension	Polymakers	Corporate Strategists
Primary Focus	Infrastructure capacity	governance, NOC Ecosystem stability, flow reliability
Key Risk	Leakage and import dependence	Disruption at chokepoints
Strategic Shift	From rent capture to chain integration	From asset control to system coordination

5.4 Limitations and Avenues for Future Research

The research has limitations as it uses secondary literature and the ambiguity of oil and gas business in most African situations (EITI, 2024; World Bank, 2023). Fields-based research, such as contractor network analysis and port-logistics ethnography, should be used in the future to find out more about the micro-level dynamics of flows and power relations (UNCTAD, 2025; AfDB, 2024).

REFERENCES

- African Development Bank (2024). *African economic outlook 2024*. https://www.afdb.org/sites/default/files/2024/06/06/aeo_2024_-_chapter_1.pdf
- African Energy Commission (2025). *Opportunity for a regional domestic market for oil and gas: Eastern Africa*. <https://au-afrec.org/sites/default/files/2025-04/Eastern%20Africa%20Oil%20and%20Gas%20Market%20Report.pdf>
- African Peer Review Mechanism (2025). *Africa governance report 2025: Natural resource governance in Africa*. <https://aprm.au.int/sites/default/files/files/2025-09/consolidatedagr25-digital-22-sept-25.pdf>
- African Union Commission, & Organisation for Economic Co-operation and Development (2025). *Africa's development dynamics 2025: Infrastructure, growth and transformation*. https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/10/africa-s-development-dynamics-2025_d153f2a8/c2b40285-en.pdf
- Anyagou, I (2025). Nigeria's Dangote refinery ramps up output on back of new fuel import duty. *Reuters*. <https://www.reuters.com/business/energy/nigerias-dangote-refinery-ramps-up-output-back-new-fuel-import-duty-2025-11-01/>
- Extractive Industries Transparency Initiative. (2024). *EITI progress report 2024*. <https://eiti.org/sites/default/files/EITI%20Progress%20Report%202024.pdf>

- European Commission. (2025, December 2). *EU agrees to permanently stop Russian gas imports and phase out remaining flows*. https://ec.europa.eu/commission/presscorner/detail/en/ip_25_2860
- Halsey, R., Bridle, R., Vazi, B., & Geddes, A. (2023). *Navigating decisions: The risks to Mozambique from liquefied natural gas export projects*. International Institute for Sustainable Development. <https://www.iisd.org/system/files/2023-12/navigating-decisions-lng-exports-risks-mozambique.pdf>
- International Gas Union (2024). *2024 world LNG report*. <https://www.igu.org/igu-reports/2024-world-lng-report>
- International Monetary Fund (2024). *Regional economic outlook: Sub-Saharan Africa—Reforms amid great expectations*. <https://www.imf.org/-/media/files/publications/reo/afr/2024/october/english/text.pdf>
- International Monetary Fund (2025). *Regional economic outlook: Sub-Saharan Africa*. <https://www.imf.org/-/media/files/publications/reo/afr/2025/october/english/text.pdf>
- International Renewable Energy Agency (2024). *Geopolitics of the energy transition: Energy security*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Apr/IRENA_Geopolitics_transition_energy_security_2024.pdf
- International Renewable Energy Agency (2024). *The energy transition in Africa: Opportunities for international collaboration with a focus on the G7*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Apr/IRENA_G7_Energy_transition_Africa_2024.pdf
- Laryš, M (2024). Russia's potential for weaponization of gas supplies after the re-invasion of Ukraine. *Energy Policy*, 191, 114195. <https://doi.org/10.1016/j.enpol.2024.114195>
- Le Poidevin, O (2025). Tariffs and conflict causing major volatility in shipping industry, says UN trade agency. *Reuters*. <https://www.reuters.com/world/middle-east/tariffs-conflict-causing-major-volatility-shipping-industry-says-un-trade-agency-2025-09-24/>
- Nigeria Extractive Industries Transparency Initiative (2024). *Oil and gas industry report 2023*. <https://neiti.gov.ng/wp-content/uploads/2024/09/NEITI-OGA-Report-2023-FINAL.pdf>
- Organization of the Petroleum Exporting Countries (2025). *Annual statistical bulletin 2025*. <https://www.opec.org/assets/assetdb/asb-2025.pdf>
- Sonatrach (2024). *Annual report 2024*. https://sonatrach.com/wp-content/uploads/2025/12/RA_2024_EN_-08-dec.pdf

- U.S. Energy Information Administration (2025). *Algeria country analysis*. <https://www.eia.gov/international/analysis/country/DZA>
- United Nations Conference on Trade and Development (2024). *Review of maritime transport 2024*. https://unctad.org/system/files/official-document/rmt2024_en.pdf
- United Nations Conference on Trade and Development (2025). *World investment report 2025: International investment in the digital economy*. https://unctad.org/system/files/official-document/wir2025_en.pdf
- United Nations Conference on Trade and Development (2025). *World investment report 2025: Chapter II – Investment policy trends*. https://unctad.org/system/files/official-document/wir2025_ch02_en.pdf
- World Bank (2023). *Logistics Performance Index (LPI) 2023*. <https://lpi.worldbank.org/>
- World Bank (2024). *Global gas flaring tracker report*. <https://thedocs.worldbank.org/en/doc/d01b4aebd8a10513c0e341de5e1f652e-0400072024/original/Global-Gas-Flaring-Tracker-Report-June-20-2024.pdf>
- World Bank (2025). *Global gas flaring tracker report*. <https://thedocs.worldbank.org/en/doc/bd2432bbb0e514986f382f61b14b2608-0400072025/original/Global-Gas-Flaring-Tracker-Report-July-2025.pdf>
- World Trade Organization (2025). *Recent developments in global value chains*. https://www.wto.org/english/res_e/booksp_e/gvcreport2025-01_e.pdf



2026 by the Authors. This Article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>)