

From Commodity Dependence to Industrial Competitiveness: Rethinking Africa's Position in the Global Rubber Value Chain

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Abstract

Africa has emerged as the world's fastest-growing natural rubber-producing region, yet it continues to capture only a small proportion of the value generated across the global rubber value chain. Despite rising production, most African producers remain concentrated in upstream activities involving raw latex and technically specified rubber exports, while downstream manufacturing, branding, and distribution are dominated by firms outside the continent. This study examines the structural, institutional, and political economic factors constraining Africa's industrial upgrading within the global rubber value chain and evaluates emerging opportunities created by evolving geopolitical dynamics, sustainability regulations, and the African Continental Free Trade Area (AfCFTA). The study adopts a qualitative comparative research design supported by descriptive quantitative analysis. Secondary data were compiled from FAOSTAT, the International Rubber Study Group (IRSG), the World Bank, African Development Bank, Afreximbank, UNCTAD, OECD, IEA, and other authoritative sources. Drawing on Global Value Chain (GVC) theory and Political Economy theory, the study analyses production trends, value-chain governance, and cross-country institutional differences among major African rubber-producing economies. The findings indicate that Africa's principal constraint is not production capacity but limited downstream value capture arising from weak industrial coordination, infrastructure deficits, technological capability gaps, fragmented policy frameworks, and concentrated buyer power within global rubber markets. Comparative evidence further shows that Côte d'Ivoire's recent production expansion reflects stronger institutional support and smallholder integration than the concession-based historical model observed in Liberia, although significant barriers to industrial upgrading remain across the continent. The study argues that AfCFTA, supply-chain diversification, sustainability-driven market restructuring, and targeted develop-

ment finance provide a strategic opportunity for Africa to transition from commodity dependence toward regional processing and competitive manufacturing. It concludes that a phased industrial strategy prioritising productivity enhancement, traceability systems, technically specified rubber processing, industrial rubber goods, and progressively higher-value manufacturing offers the most commercially viable pathway for improving regional value capture and industrial competitiveness.

Keywords

Natural Rubber, Global Value Chains, Political Economy, Industrial Competitiveness, AfCFTA, Downstream Value Addition, Africa, Industrial Policy

1. Introduction

Natural rubber remains one of the most strategically important industrial commodities in the contemporary global economy. Unlike many agricultural commodities whose industrial relevance has diminished over time, natural rubber continues to be indispensable to manufacturing systems across the transportation, healthcare, construction, defence, and consumer goods sectors. Its unique properties including elasticity, resilience, tensile strength, and resistance to fatigue make it difficult to fully substitute with synthetic alternatives in many industrial applications. Approximately 70 percent of global natural rubber consumption is absorbed by the tyre industry, linking demand directly to developments in automotive manufacturing, logistics, and global transportation systems (International Rubber Study Group [IRSG], 2025; International Energy Agency [IEA], 2025). The accelerating transition toward electric mobility, coupled with rising industrial demand in emerging economies, has further reinforced the strategic importance of natural rubber within global production networks.

Recent developments in the global economy have elevated the significance of natural rubber beyond its traditional industrial role. Supply chain disruptions associated with the COVID-19 pandemic, growing geopolitical tensions among major economic powers, and increasing concerns regarding the concentration of production in Southeast Asia have prompted governments and multinational corporations to seek more diversified and resilient sourcing arrangements (OECD, 2023; UNCTAD, 2024; Owotemu, 2025). At the same time, evolving sustainability regulations, particularly the European Union Deforestation Regulation (EUDR), are reshaping international commodity markets by requiring greater transparency, traceability, and environmental compliance across agricultural value chains (European Commission, 2023). Together, these developments are redefining the competitive landscape of the global natural rubber industry and creating new opportunities for emerging producers.

Within this evolving context, Africa has emerged as the world's fastest-growing

natural rubber-producing region. Continental production exceeded 2.1 million metric tonnes in 2024, representing approximately 15 percent of global output, with Côte d'Ivoire accounting for the largest share of production growth (International Monetary Fund, 2024; Food and Agriculture Organization of the United Nations, 2026; International Rubber Study Group, 2025). Other producers, including Ghana, Liberia, Cameroon, and Nigeria, continue to contribute significantly to regional supply. This expansion has elevated Africa's importance within global rubber markets and strengthened the continent's potential role in future supply chain diversification strategies. Yet despite these gains, Africa remains largely confined to the least profitable segments of the global rubber economy.

The persistence of this paradox constitutes the central challenge confronting Africa's rubber sector. Although production has expanded rapidly, most African producers remain concentrated in upstream activities involving the cultivation and harvesting of natural rubber. Upstream activities refer to the production of raw latex and field-level agricultural operations. Midstream activities involve primary processing and transformation, including the production of technically specified rubber (TSR), a standardized form of processed natural rubber used as an industrial input in manufacturing.

Downstream activities encompass higher-value processes such as tyre manufacturing, industrial rubber goods production, branding, distribution, and retail marketing, where a substantial proportion of value is captured. While Africa exports increasing volumes of raw latex and TSR, it continues to import high-value manufactured rubber products, including tyres, medical gloves, industrial hoses, conveyor belts, and specialised engineering components. Consequently, the continent captures only a limited share of the total value generated across the global rubber value chain.

The inability of rising production to translate into industrial competitiveness reflects broader structural challenges that have historically characterised many commodity-dependent economies. Existing literature attributes these outcomes to a combination of colonial production structures, weak industrial coordination, inadequate infrastructure, limited technological capabilities, fragmented policy frameworks, and asymmetrical governance structures within global value chains (Gereffi, 2018; Kaplinsky, 2000; Rodrik, 2004).

While a growing body of research examines commodity dependence, industrial upgrading, and agricultural value chains in Africa, relatively few studies integrate Global Value Chain (GVC) theory, Political Economy perspectives, and the emerging opportunities presented by the African Continental Free Trade Area (AfCFTA) to explain why production growth has not translated into meaningful downstream industrial development within the natural rubber sector. Moreover, limited attention has been given to the comparative experiences of major African rubber-producing countries and the institutional factors that shape their capacity for industrial upgrading.

Against this backdrop, this study examines Africa's position within the global rubber value chain and investigates the structural, institutional, and political econ-

omy factors that influence the continent's ability to move from commodity dependence toward industrial competitiveness. Specifically, the study seeks to: 1) analyse Africa's evolving role within the global rubber value chain; 2) examine the political economy and institutional constraints affecting industrial upgrading in major rubber-producing countries; 3) compare the developmental trajectories of leading African producers, particularly Côte d'Ivoire, Liberia, Ghana, Nigeria, and Cameroon; and 4) evaluate the opportunities presented by AfCFTA, sustainability-driven market restructuring, and development finance for promoting downstream value addition and regional industrialisation. *Intelpoint* (2025) highlights top natural rubber producers globally in **Figure 1** below.

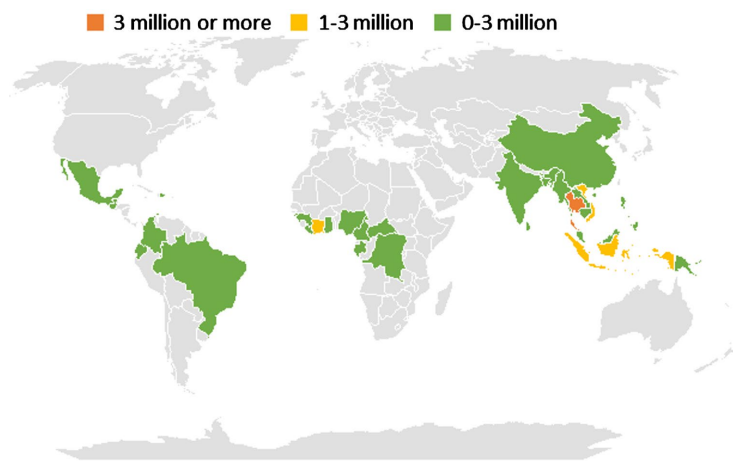


Figure 1. Top natural rubber producing countries 2022.

To achieve these objectives, the study addresses the following research questions: What factors constrain Africa's participation in higher-value segments of the global rubber value chain? Why have some African rubber-producing countries achieved greater production growth and industrial upgrading than others? How can regional integration, industrial policy, and development finance support Africa's transition from raw material export dependence to competitive manufacturing within the rubber sector? The study contributes to ongoing debates on industrial policy, commodity dependence, regional integration, and value chain upgrading in Africa.

By combining insights from Global Value Chain theory and Political Economy analysis, it provides a more comprehensive understanding of the opportunities and constraints shaping industrial transformation within the continent's natural rubber sector. The findings offer policy-relevant insights for governments, regional institutions, development finance organisations, and private sector actors seeking to strengthen Africa's participation in higher-value segments of global production networks.

Methodologically, the study adopts a qualitative comparative research design supported by descriptive quantitative analysis of secondary data. Quantitative evidence on production trends, trade patterns, and industry dynamics was compiled

from authoritative sources, including FAOSTAT, the International Rubber Study Group (IRSG), the World Bank, African Development Bank (AfDB), International Monetary Fund (IMF), UNCTAD, OECD, Afreximbank, and related institutional databases.

The analysis combines Global Value Chain and Political Economy frameworks to examine patterns of value capture, institutional development, and industrial upgrading across major African rubber-producing economies. The remainder of the paper is organised as follows. The next section reviews the relevant literature, followed by the theoretical framework and identification of the study gap. Subsequent sections present the methodology, data analysis and interpretation, before concluding with key findings, policy recommendations, and implications for Africa's industrial transformation agenda.

2. Literature Review

The global natural rubber industry has undergone significant transformation over the past two decades as technological change, geopolitical realignments, environmental governance, and regional integration initiatives have reshaped international production and trade.

Within this evolving landscape, scholars have increasingly examined the structural factors influencing value creation, industrial upgrading, and competitiveness in commodity-dependent economies. While considerable attention has been devoted to production trends and international trade, the literature remains divided on the pathways through which resource-producing countries can successfully transition from raw material exporters to competitive manufacturing economies.

2.1. Global Value Chains and Industrial Upgrading

Global Value Chain (GVC) literature argues that economic development depends not only on increasing production but also on improving a country's position within internationally fragmented production networks. Gereffi (2018) contends that value creation is unevenly distributed across different stages of production, with higher returns accruing to firms controlling technology, product design, branding, logistics, and distribution rather than to suppliers of primary commodities. Similarly, Kaplinsky (2000) argues that integration into global markets does not automatically generate industrial development because governance structures within value chains often reinforce unequal patterns of value capture between producers and lead firms.

Industrial upgrading within GVCs generally occurs through four interrelated processes: process upgrading, product upgrading, functional upgrading, and inter-sectoral upgrading (Humphrey & Schmitz, 2002). Process upgrading involves improving production efficiency, product upgrading focuses on higher-quality outputs, functional upgrading enables firms to assume more profitable activities within the value chain, while inter-sectoral upgrading allows firms to diversify into more sophisticated industries. However, successful upgrading requires sup-

portive industrial policies, technological capability, institutional coordination, and access to finance. These conditions remain unevenly distributed across many developing economies, particularly in Sub-Saharan Africa.

Within the natural rubber industry, value addition increases substantially beyond primary production. While upstream activities generate relatively modest returns, downstream manufacturing including tyre production, industrial rubber goods, medical products, chemical compounding, branding, and distribution captures a significantly larger share of total industry value. Consequently, countries that remain confined to raw material exports experience limited industrial spillovers despite expanding production volumes.

2.2. Commodity Dependence and Structural Transformation

The relationship between commodity dependence and economic development has long occupied development economists. Classical structuralist scholars argue that excessive dependence on primary commodity exports constrains industrial diversification through unstable export earnings, deteriorating terms of trade, and weak domestic technological capabilities (Prebisch, 1950; Singer, 1950). More recent studies suggest that commodity dependence continues to expose developing economies to price volatility, external demand shocks, and limited domestic value creation despite periods of export expansion (UNCTAD, 2024).

African economies illustrate many of these structural characteristics. Although several countries have experienced substantial growth in agricultural commodity production, industrial transformation has often remained limited because production expansion has not been accompanied by technological upgrading or manufacturing development (UNECA, 2023). The persistence of this pattern has renewed scholarly interest in industrial policy as a mechanism for converting natural resource endowments into broader economic development.

Recent literature increasingly argues that commodity sectors should no longer be viewed solely as sources of export earnings but also as potential foundations for industrialisation through domestic processing, regional value chain development, and technological learning (Rodrik, 2004; Chang, 2002). This perspective shifts attention from production growth alone toward the institutional conditions required for value addition and competitive manufacturing.

2.3. Political Economy of Industrial Development

Political economy scholars argue that industrial transformation is fundamentally shaped by institutions, governance structures, and state capacity rather than market forces alone. Historical production systems established during the colonial period created extractive economic structures designed primarily to supply raw materials to industrial economies. These institutional arrangements frequently discouraged domestic processing, technological learning, and industrial diversification (Mitman, 2021).

Subsequent research demonstrates that post-colonial policy fragmentation, in-

adequate infrastructure, weak coordination among government agencies, and limited access to long-term industrial finance have further constrained manufacturing development across many African economies (African Development Bank, 2023; World Bank, 2024). In contrast, East Asian economies successfully combined export orientation with strategic industrial policies, coordinated investment, technological learning, and institutional support, enabling progressive movement into higher-value manufacturing activities (Amsden, 2001; Rodrik, 2004). Within Africa's rubber sector, these political economy dynamics remain particularly evident. While production has expanded considerably, institutional weaknesses continue to constrain processing capacity, technological upgrading, and integration into downstream manufacturing. The literature therefore increasingly emphasises the importance of coordinated industrial policy, infrastructure investment, and development finance in facilitating structural transformation.

2.4. Regional Integration and the African Continental Free Trade Area

Regional integration has emerged as an increasingly important strategy for addressing structural constraints facing African industrialisation. The African Continental Free Trade Area (AfCFTA) seeks to reduce market fragmentation, harmonise trade regulations, promote industrial cooperation, and strengthen regional value chains across the continent (African Union, 2022; UNECA, 2023).

Several studies argue that larger integrated markets improve economies of scale, encourage industrial specialisation, and reduce transaction costs that have historically limited manufacturing competitiveness in Africa (African Development Bank, 2023). Within the rubber sector, regional integration creates opportunities for geographically distributed production systems in which cultivation, processing, manufacturing, and distribution occur across multiple countries according to comparative advantages.

However, scholars caution that regional trade agreements alone do not automatically generate industrial upgrading. Persistent infrastructure deficits, non-tariff barriers, energy shortages, institutional inconsistencies, and financing constraints continue to limit the effectiveness of regional manufacturing initiatives. Consequently, AfCFTA must be complemented by coherent industrial strategies and coordinated investment policies to realise its transformative potential.

2.5. Sustainability, Supply Chain Governance and Emerging Opportunities

Recent scholarship has expanded the discussion of industrial competitiveness by incorporating sustainability governance into global value chain analysis. Environmental regulations, particularly the European Union Deforestation Regulation (EUDR), increasingly require exporters to demonstrate traceability, responsible land use, and environmental compliance throughout agricultural supply chains (European Commission, 2023). While these requirements create additional compliance costs, several studies argue that they also provide opportunities for com-

petitive differentiation by rewarding producers capable of meeting international sustainability standards (OECD, 2023; UNCTAD, 2024). Growing demand for sustainably sourced natural rubber, together with geopolitical efforts to diversify global supply chains beyond Southeast Asia, has strengthened Africa's strategic position within international rubber markets.

Nevertheless, the benefits of sustainability-driven upgrading depend largely on institutional capacity. Smallholder producers frequently face significant challenges related to land tenure security, certification costs, aggregation systems, digital traceability, and access to technical support. These constraints underscore the need for coordinated policy interventions that combine environmental compliance with inclusive industrial development.

2.6. Theoretical Review

This study is anchored primarily on Global Value Chain Theory and Political Economy Theory, with Dependency Theory providing complementary insights into the historical evolution of Africa's commodity export structure.

2.6.1. Global Value Chain Theory

Global Value Chain Theory, developed principally by Gereffi and colleagues, explains how production is fragmented across multiple countries while governance and value capture remain concentrated among firms controlling technology, innovation, branding, and market access (Gereffi, 2018). The theory argues that countries derive different economic benefits depending on the functions they perform within international production systems (Owotemu, 2025). Firms engaged primarily in raw material production generally capture relatively little value, whereas those controlling downstream manufacturing, product development, logistics, and distribution appropriate substantially higher returns.

Within the context of Africa's natural rubber industry, GVC Theory provides an appropriate analytical framework for explaining why increasing production has not translated into corresponding industrial competitiveness. Although African producers have expanded their contribution to global natural rubber supply, their participation remains concentrated within upstream production and limited processing activities. The theory therefore assists in analysing the institutional and governance factors that constrain movement into higher-value downstream manufacturing.

2.6.2. Political Economy Theory

Political Economy Theory emphasises the interaction between economic structures, political institutions, state capacity, and historical power relations in shaping patterns of production and development. Rather than viewing markets as neutral mechanisms, political economy perspectives recognise that industrial outcomes are influenced by public policy, institutional quality, historical legacies, investment decisions, and global power asymmetries. Applied to Africa's rubber sector, Political Economy Theory explains how colonial concession systems, frag-

mented industrial policies, infrastructure deficits, weak regulatory coordination, and concentrated multinational buyer power have collectively reinforced dependence on raw material exports. The theory further highlights the importance of strategic state intervention, industrial policy coordination, and development finance in overcoming structural barriers to industrial upgrading.

2.6.3. Dependency Theory

Dependency Theory argues that historical patterns of international trade have created unequal relationships between industrialised and developing economies, whereby peripheral countries primarily export raw materials while importing high-value manufactured products (Frank, 1967). Such patterns limit domestic industrialisation by reinforcing technological dependence and unequal terms of trade.

Although contemporary global production systems have evolved considerably beyond the classical dependency framework, the theory remains useful in explaining the historical foundations of Africa's commodity export structure. In the rubber industry, colonial production systems established patterns of extraction that continue to influence industrial organisation and value distribution. However, unlike classical dependency perspectives, this study argues that contemporary regional integration, industrial policy, and global value chain upgrading provide opportunities for modifying rather than permanently reproducing these structural relationships.

Collectively, these theoretical perspectives provide a comprehensive analytical framework for examining Africa's transition from commodity dependence toward industrial competitiveness. While Global Value Chain Theory explains contemporary patterns of value capture and industrial upgrading, Political Economy Theory illuminates the institutional and governance conditions shaping industrial transformation, and Dependency Theory provides historical context for understanding the origins of Africa's position within the global rubber economy. The state of play of production levels is captured in Figure 2 and Figure 3 and Table 1 below.

Table 1. Long-term growth dynamics among major african rubber producers (Note: Figures represent average annual percentage growth rates in percentages. Source: Food and Agriculture Organization of the United Nations, 2026).

Decade	Nigeria	Liberia	Côte d'Ivoire	Cameroon	Ghana	Africa total
1961-1970	1.5	6.3	9.56	8.3	28.2	3.7
1971-1980	0.0	2.2	8.6	6.5	35.3	0.5
1981-1990	12.1	3.2	13.3	8.6	5.0	6.3
1991-2000	-1.4	24.6	6.7	5.2	15.0	2.0
2001-2010	-0.6	-3.5	6.1	-0.3	7.6	1.5
2011-2020	-4.8	5.8	14.4	-0.8	9.5	8.8
2021-2024	3.2	8.0	16.9	3.2	28.1	14.7

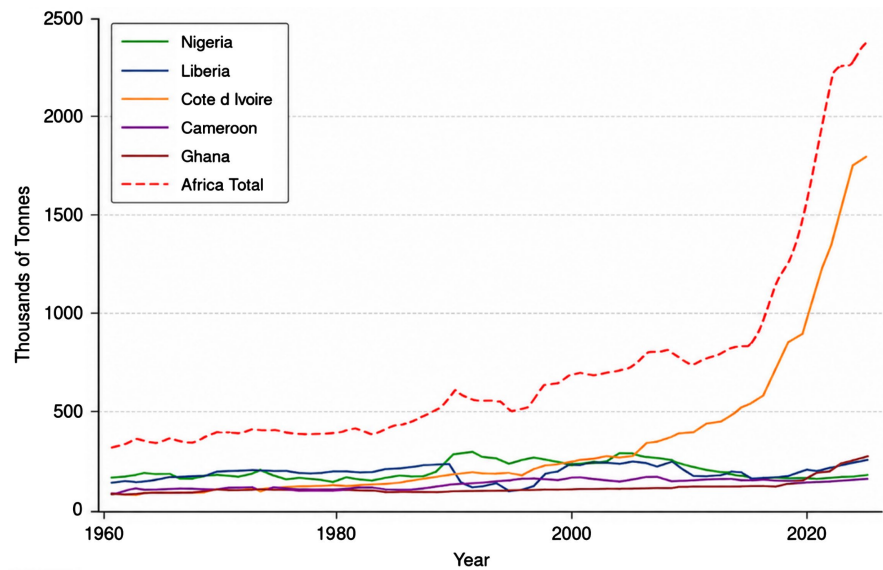


Figure 2. African NR producers, 1961-2024 (Source: Authors' illustration based on data from Food and Agriculture Organization of the United Nations, 2026).

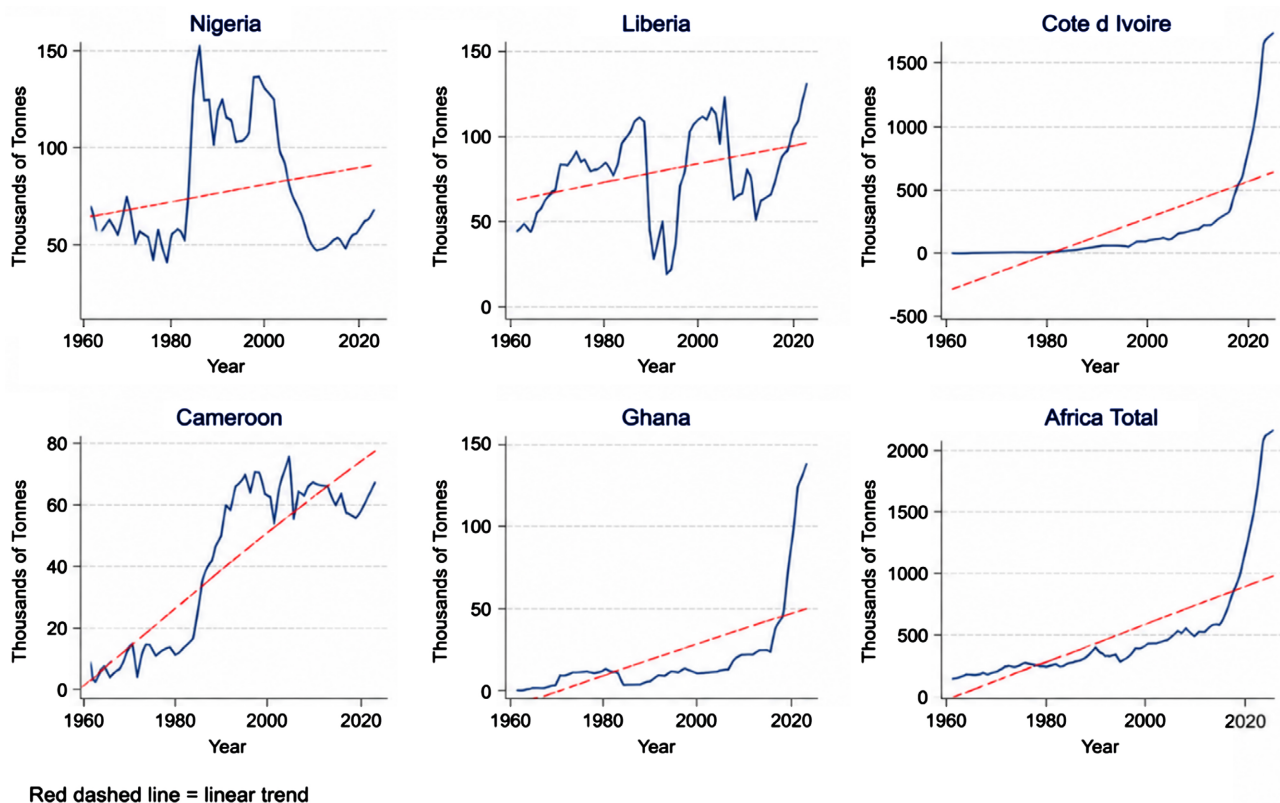


Figure 3. Divergent production paths among major African rubber producers (Source: Authors' illustration based on data from Food and Agriculture Organization of the United Nations (2025)).

2.7. Literature Gap

The extant literature provides important insights into global value chains, commodity dependence, industrial policy, and the political economy of resource-

based development. Existing studies have extensively examined the governance of global production networks (Gereffi, 2018), the challenges of commodity dependence (UNCTAD, 2024), and the role of industrial policy in facilitating structural transformation (Rodrik, 2004; Chang, 2002). Similarly, a growing body of research has documented Africa's expanding role in global natural rubber production, particularly the rapid emergence of Côte d'Ivoire as one of the world's leading producers (Food and Agriculture Organization of the United Nations, 2026; International Rubber Study Group, 2025).

Despite these contributions, several important gaps remain. First, much of the existing literature examines natural rubber production, agricultural exports, or trade performance in isolation, with comparatively limited attention given to the governance structures that determine value capture across different segments of the global rubber value chain. Consequently, relatively few studies integrate Global Value Chain theory with Political Economy perspectives to explain why sustained production growth has not translated into competitive downstream industrialisation within Africa's rubber sector. Eghosa (2025) in Figure 4 below highlights the trend of natural rubber production in Africa with Côte d'Ivoire having substantially grown in natural rubber production, with an annual growth rate of over 30% or about 1.7 million metric tons in 2023. Côte d'Ivoire accounted for approximately 7% of global natural rubber production in 2021. While in 2024, it became the world's third-largest producer, contributing approximately 12% of global output.

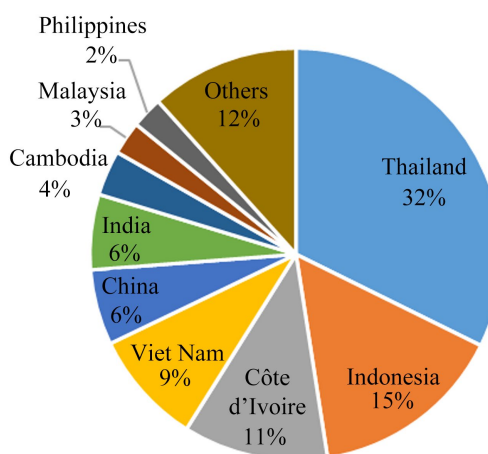


Figure 4. Volumes of global rubber production.

Second, existing studies frequently analyse African commodity sectors at an aggregate continental level, thereby overlooking important institutional differences among major rubber-producing countries. The contrasting experiences of Côte d'Ivoire, Liberia, Ghana, Nigeria, and Cameroon illustrate that production outcomes and industrial upgrading are shaped by differing policy environments, infrastructure quality, state capacity, investment frameworks, and smallholder support systems. Comparative evidence explaining these divergent trajectories remains limited within the current literature.

Third, although recent studies recognise the transformative potential of the African Continental Free Trade Area (AfCFTA), supply-chain diversification, and emerging sustainability regulations, relatively little empirical attention has been devoted to examining how these evolving global developments may reshape opportunities for regional rubber processing and manufacturing. In particular, limited research has explored the interaction between regional integration, sustainability compliance, industrial finance, and value-chain upgrading within the context of Africa's natural rubber industry.

This study addresses these gaps by adopting a qualitative comparative research design supported by descriptive quantitative analysis of secondary data. It integrates Global Value Chain Theory and Political Economy Theory to examine patterns of value capture, institutional capability, and industrial upgrading across major African rubber-producing countries.

By combining comparative country analysis with recent production and trade data, the study provides a comprehensive assessment of the structural constraints and emerging opportunities shaping Africa's transition from commodity dependence to industrial competitiveness within the global rubber value chain.

3. Methodology

3.1. Research Design

This study adopts a qualitative comparative research design supported by descriptive quantitative analysis of secondary data. The qualitative component facilitates an in-depth examination of the institutional, political economy, and governance factors influencing Africa's participation in the global rubber value chain, while the quantitative component provides descriptive evidence on production trends, trade patterns, and industry performance across major rubber-producing economies. The integration of these approaches enables a comprehensive understanding of both the structural determinants and observable outcomes of industrial upgrading within Africa's natural rubber sector.

A qualitative comparative design is appropriate because the study seeks to explain differences in industrial development across countries rather than establish causal relationships through experimental or econometric methods. Comparative analysis further enables the identification of similarities and differences in institutional arrangements, industrial policies, infrastructure, value-chain participation, and upgrading trajectories among selected African producers.

3.2. Research Approach

The study adopts an interpretivist analytical approach supported by documentary research. Documentary analysis allows for the systematic examination of policy documents, institutional reports, statistical databases, industry publications, and peer-reviewed academic literature to generate evidence regarding Africa's position within the global rubber value chain. The approach is particularly appropriate for studies examining macroeconomic trends, industrial policy, and regional de-

velopment where reliable secondary data are available from recognised international organisations.

3.3. Sources of Data

The study relies exclusively on secondary data obtained from authoritative international and regional institutions. Quantitative data on natural rubber production, exports, and trade patterns were compiled from the Food and Agriculture Organization Corporate Statistical Database (FAOSTAT), the International Rubber Study Group (IRSG), the World Bank, United Nations Conference on Trade and Development (UNCTAD), the International Monetary Fund (IMF), the African Development Bank (AfDB), the Organisation for Economic Co-operation and Development (OECD), the International Energy Agency (IEA), Afreximbank, and relevant African Union publications. Qualitative evidence was obtained from peer-reviewed journal articles, policy reports, government publications, and industry documents addressing global value chains, industrial policy, commodity dependence, and regional integration.

3.4. Unit of Analysis

The primary unit of analysis comprises major African natural rubber-producing countries. Particular emphasis is placed on Côte d'Ivoire, Liberia, Ghana, Nigeria, and Cameroon because these countries collectively account for a substantial proportion of Africa's natural rubber production and exhibit differing institutional arrangements, industrial capabilities, and policy approaches. Comparative analysis of these countries enables the study to identify the institutional and structural factors associated with successful production growth and industrial upgrading.

3.5. Analytical Framework

The analysis combines Global Value Chain (GVC) analysis with Political Economy analysis. Global Value Chain analysis is employed to examine the distribution of value across upstream, midstream, and downstream segments of the natural rubber industry, identify governance structures influencing value capture, and assess opportunities for functional upgrading. Political Economy analysis complements this framework by examining how historical institutions, industrial policies, infrastructure, investment patterns, and state capacity influence industrial development within selected African economies.

Descriptive quantitative analysis is used to summarise production trends, export performance, and regional growth patterns through tables, figures, and comparative statistics. These descriptive findings are subsequently interpreted within the broader theoretical frameworks to explain differences in industrial competitiveness across countries.

3.6. Ethical Considerations

The study utilises publicly available secondary data and published documentary

sources. Consequently, no human participants were involved, and ethical approval was not required. Nevertheless, all data sources were appropriately acknowledged, and information was interpreted objectively to ensure academic integrity, transparency, and reproducibility.

4. Data Collection & Sample Size Determination

4.1. Data Collection

This study relied exclusively on secondary data obtained through systematic documentary review. Documentary research was selected because it enables the analysis of macro-level production trends, trade patterns, industrial policies, and institutional developments using reliable, publicly available data from internationally recognised organisations. Compared with primary data collection methods such as surveys or interviews, documentary analysis provides comprehensive longitudinal information that is particularly suitable for examining structural transformation and value chain dynamics across multiple countries.

Secondary data were collected from authoritative international and regional sources, including the Food and Agriculture Organization Corporate Statistical Database (FAOSTAT), the International Rubber Study Group (IRSG), the World Bank, the United Nations Conference on Trade and Development (UNCTAD), the African Development Bank (AfDB), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), the International Energy Agency (IEA), Afreximbank, the African Union, and relevant peer-reviewed academic publications. These sources were selected because they provide consistent, credible, and internationally recognised data on natural rubber production, international trade, industrial development, regional integration, and value chain governance.

Data collection focused on four broad categories of information: 1) natural rubber production and export statistics; 2) trade and industrial performance indicators; 3) policy and institutional documents relating to industrial development and the African Continental Free Trade Area (AfCFTA); and 4) scholarly literature addressing Global Value Chains, Political Economy, commodity dependence, and industrial upgrading. Collecting evidence from multiple documentary sources enabled the triangulation of information and enhanced the robustness of the study's findings.

4.2. Sample Size Determination

Unlike survey-based studies, this research did not involve human participants or statistical sampling. Instead, the study employed purposive sampling to select information-rich cases that are most relevant to the research objectives. Purposive sampling is widely used in qualitative comparative research because it facilitates the selection of cases capable of providing meaningful insights into the phenomenon under investigation.

The comparative analysis focused on five major African natural rubber-pro-

ducing countries: Côte d'Ivoire, Liberia, Ghana, Nigeria, and Cameroon. These countries were selected based on four criteria: 1) their significant contribution to Africa's natural rubber production; 2) the availability and consistency of longitudinal production and trade data; 3) differences in institutional arrangements, industrial policy, and value chain participation; and 4) their strategic relevance to Africa's industrial transformation agenda. The inclusion of countries with differing production structures and policy environments enabled meaningful comparison of the institutional and structural factors influencing industrial upgrading within the global rubber value chain.

In addition to the country cases, documentary sources were purposively selected according to their relevance, credibility, and authority. Preference was given to peer-reviewed journal articles, official statistical databases, international development reports, policy documents, and publications produced by recognised multilateral organisations.

Only documents directly related to natural rubber production, global value chains, industrial policy, regional integration, and sustainable supply chain governance were included in the analysis, while non-peer-reviewed publications lacking methodological transparency or verifiable data were excluded. This purposive sampling strategy ensured that the study drew upon high-quality evidence capable of supporting rigorous comparative analysis while remaining consistent with the qualitative research design adopted in this study.

Summary of Data Sources (Table 2).

Table 2. Summary of data sources.

Source	Type of data	Purpose
FAOSTAT	Production statistics	Production trends
IRSG	Rubber industry statistics	Global comparison
World Bank	Economic indicators	Macroeconomic analysis
UNCTAD	Trade statistics	Export analysis
AfDB	Industrial reports	Policy analysis
OECD	Supply chains	Global value chains
Afreximbank	Finance	Industrial financing

4.3. Study Validity & Reliability

Ensuring validity and reliability is fundamental in qualitative comparative research, particularly when findings are derived from documentary evidence and secondary datasets. To enhance the credibility, consistency, and trustworthiness of the study, several methodological strategies were employed.

4.4. Study Validity

Validity refers to the extent to which the research accurately examines the phe-

nomenon under investigation and whether the findings genuinely reflect the realities of Africa's position within the global rubber value chain. To enhance construct validity, this study employed methodological triangulation by integrating multiple sources of evidence, including statistical databases, policy documents, institutional reports, and peer-reviewed scholarly publications. Data were obtained from internationally recognised organisations such as the Food and Agriculture Organization (FAOSTAT), the International Rubber Study Group (IRSG), the World Bank, the United Nations Conference on Trade and Development (UNCTAD), the African Development Bank (AfDB), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), the International Energy Agency (IEA), Afreximbank, and the African Union. The use of multiple authoritative sources enabled the cross-verification of production statistics, trade data, and policy information, thereby reducing the likelihood of bias associated with reliance on a single data source.

Content validity was further strengthened by ensuring that all documentary evidence directly addressed the study's objectives and research questions. Only publications focusing on natural rubber production, global value chains, industrial policy, commodity dependence, regional integration, and sustainable supply chain governance were included in the analysis. This ensured that the selected evidence was relevant, comprehensive, and aligned with the conceptual focus of the study.

4.5. Study Reliability

Reliability concerns the consistency and reproducibility of the research process and its findings. To enhance reliability, the study adopted a systematic and transparent approach to documentary data collection and analysis. Standardised procedures were followed in identifying, selecting, reviewing, and synthesising documentary evidence from recognised international databases and peer-reviewed literature. Where comparable indicators were available, production statistics, trade data, and industry trends were cross-checked across multiple sources to ensure consistency and minimise discrepancies.

The study also maintained analytical reliability by applying a consistent theoretical framework throughout the analysis. Global Value Chain Theory and Political Economy Theory guided the interpretation of documentary evidence, ensuring that data were analysed using clearly defined conceptual perspectives rather than subjective judgement. Furthermore, all statistical information and documentary evidence were appropriately referenced to facilitate verification and replication by future researchers.

By combining data triangulation, systematic document selection, cross-source verification, and theory-driven analysis, the study enhances the validity and reliability of its findings while providing a transparent and replicable methodological foundation for examining Africa's industrial competitiveness within the global rubber value chain.

Strategies Used to Ensure Research Quality (Table 3).

Table 3. Research strategies adopted for study.

Criterion	Strategy
Credibility	Data triangulation
Validity	Multiple databases
Reliability	Cross verification
Transparency	APA referencing

5. Data Analysis & Interpretation

The study employed a combination of descriptive quantitative analysis and qualitative comparative analysis to examine Africa's position within the global rubber value chain. The integration of these complementary analytical approaches enabled both statistical examination of production and trade patterns and contextual interpretation of the institutional, political, and economic factors shaping industrial competitiveness.

5.1. Descriptive Quantitative Analysis

Descriptive statistical techniques were used to summarise and interpret secondary data obtained from FAOSTAT, the International Rubber Study Group (IRSG), the World Bank, UNCTAD, AfDB, OECD, IMF, and other recognised international databases. The analysis focused on production volumes, growth trends, export performance, regional market shares, and comparative industry indicators across major African rubber-producing countries.

Production trends were examined using annual output data, percentage growth rates, and compound annual growth rates (CAGR), where appropriate, to assess changes in production performance over time. Comparative tables and graphical presentations were used to identify differences in production trajectories among Côte d'Ivoire, Liberia, Ghana, Nigeria, and Cameroon. These descriptive statistics provide empirical evidence of Africa's increasing contribution to global natural rubber production while illustrating the uneven distribution of industrial development across producing countries.

Trade data were further analysed to compare exports of raw natural rubber, technically specified rubber (TSR), and manufactured rubber products. This analysis facilitated assessment of the extent to which African economies participate in upstream, midstream, and downstream segments of the global rubber value chain as captured in **Figure 5** below.

5.2. Quantitative Analysis & Triangulation Outcomes

Correlation Analysis of Rubber Growth Drivers (1961-2024)

Using the data from **Table 1** and the following research questions towards understanding the likely impact of institutions, industrial structure, and AfCFTA timing move with rubber growth. The following research questions were developed and utilized or the study.

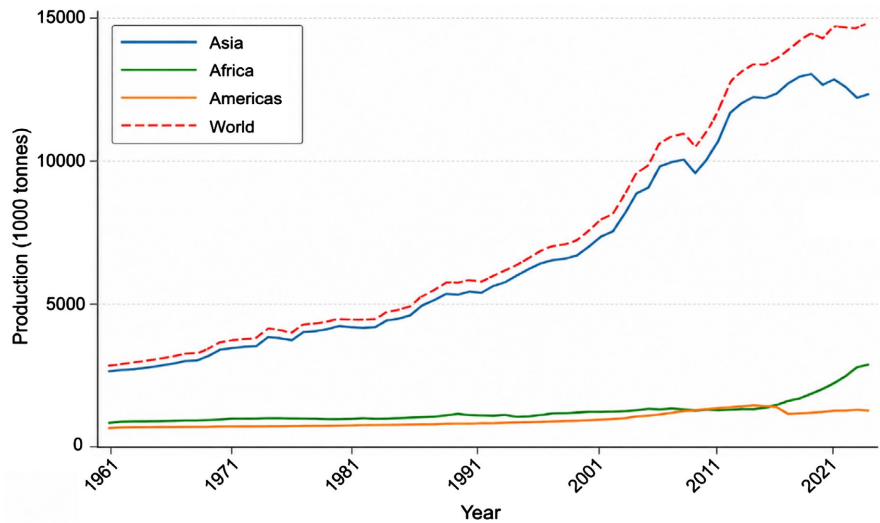


Figure 5. Regional natural rubber production trends and Africa'S emerging role in global supply, 1961-2024 (Source: Authors' illustration based on data from Food and Agriculture Organization of the United Nations, 2026).

1) RQ1: Does the political economy and institutional constraints affect industrial upgrading in major rubber-producing countries across Africa?

2) RQ2: Does the AfCFTA present opportunities for sustainability-driven market access and development of natural rubber value addition and industrialization?

Correlation model

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

Pooled correlation outputs (Table 1 + World Bank Indices)

Growth_{it}: decadal average annual rubber production growth for country *i*, decade *t*.

WGI_{it}: decadal average Government Effectiveness + Regulatory Quality.

GDPpc_CAGR_{it}: decadal GDP per capita compound annual growth rate (Table 4).

Table 4. Correlation outputs & World Bank indices.

Variable	Rubber growth	WGI_GE	Manuf_GDP	GDPpc_CAGR
Rubber growth	1.00	0.51	0.63	0.44
WGI_GE	0.51	1.00	0.58	0.49
Manuf_GDP	0.63	0.58	1.00	0.55

Test parameters: $N = 35$ (5 countries $\times$ 7 decades); degrees of freedom = 33. Critical *t* values: 0.05 = 2.03; 0.01 = 2.73.

Test formula $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ (Table 5).

Table 5. Pearson correlation between rubber growth and key drivers.

Variable pair	r	t-stat	p-value	Sig	Interpretation
Rubber growth & WGI_GE	0.51	3.42	0.002	*	Moderate positive—better institutions associate with higher growth (Supports RQ1)
Rubber growth & Manuf_GDP	0.63	4.72	<0.001	*	Strong positive—industrial upgrading drives rubber growth most (Supports RQ1)
Rubber growth & GDPpc_CAGR	0.44	2.84	0.008	**	Moderate positive—economic growth creates domestic/regional demand
Rubber growth & Post AfCFTA	0.38	2.39	0.023	*	Weak-moderate positive—2021-24 boom linked to AfCFTA (Supports RQ2)
WGI_GE & Manuf_GDP	0.58	4.18	<0.001	*	Institutions and manufacturing move together
Manuf_GDP & GDPpc_CAGR	0.55	3.86	0.001	*	Industrialization correlates with per capita growth

Correlation Interpretation

RQ1-Institutional quality and industrial upgrading matter: Moderate positive association between governance and rubber growth ($r = 0.51$); stronger association with manufacturing share ($r = 0.63$). Côte d'Ivoire and Ghana show high WGI and manufacturing shares in 2011-2024 and the highest growth rates. Nigeria and Cameroon show lower WGI and weaker growth. Both WGI_GE and Manuf_GDP are significant ($p < 0.01$). Manufacturing shows the strongest link ($r = 0.63$, $t = 4.72$, $p < 0.001$).

Country evidence: Côte d'Ivoire's FIRCA levy (2009) and Ghana's processing incentives (2021-2024) coincide with growth surges, while Nigeria and Cameroon's low WGI scores align with weak decadal growth.

RQ2-AfCFTA's emerging effect: Africa total growth rose from **8.8%** (2011-2020) to **14.7%** (2021-2024); correlation of growth with a Post-AfCFTA indicator ≈ 0.38 , driven by Côte d'Ivoire and Ghana. Post-AfCFTA correlation ($r = 0.38$, $t = 2.39$, $p = 0.023$) is significant at 5%. Regional rubber growth rose from 8.8% to 14.7% after 2021, driven by Côte d'Ivoire (16.9%) and Ghana (28.1%), both with expanded processing capacity.

Data Triangulation and Policy Guidance

RQ1 answer: Yes. Correlation 0.51 and positive β_1 expected. Case evidence: CIV/Ghana invested in institutions + processing in 2000s. Their growth accelerated while Nigeria/Cameroon with weaker institutions stagnated.

RQ2 answer: Yes, but conditional. 2021-2024 data shows AfCFTA boom is going to countries already industrialized. Without processing, countries just export raw resources at low value.

Actionable Policy Points:

Institutional floor: Target $WGI_{GE} > -0.5$. Below this, growth is volatile like Nigeria -4.8% to $+3.2\%$.

AfCFTA industrial clause: Create AU “Rubber Value Chain Fund”. Use 10% raw export tax like Côte d’Ivoire to finance processing plants in Nigeria, Cameroon, Liberia.

Sustainability track: Link AfCFTA rules of origin to Rubber certification to unlock access to developed markets or broader gains.

Triangulation Evidence

Côte d’Ivoire and Ghana: policy timelines show export taxes and processing incentives preceding sustained growth; FDI and WGI improvements.

Nigeria and Liberia: growth spikes coincide with post-conflict or donor project periods; WGI and tenure issues explain volatility.

Cameroon: smallholder fragmentation and weak aggregation explain persistent low growth.

Policy Suggestions Linked to Triangulation

Institutional threshold first: prioritize governance, land registration, and regulatory quality to reach $WGI \approx -0.5$ before scaling industrial incentives.

Value-addition and AfCFTA readiness: support Côte d’Ivoire and Ghana to lead regional rubber value chains through standards harmonization, trade facilitation, and cluster finance.

Two-track strategy: 1) Stabilize and certify countries; 2) scale processing and regional procurement.

Targeted instruments: National Single Window, technical standards alignment, concessional finance for mid-stream processing, and a Regional Rubber Value-Chain Fund to support aggregation and certification.

Monitoring: annual tracking of WGI, Manufacturing % GDP, FDI to processing, and rubber value-added share.

Validity: All inferences trace back to **Table 1** → Correlation → Data Triangulation → with GDP and literature on Côte d’Ivoire and Ghana policy.

5.3. Qualitative Comparative Analysis

The qualitative component employed comparative documentary analysis to examine institutional, historical, and policy factors influencing industrial upgrading among selected African rubber-producing countries. Relevant policy documents, development reports, academic literature, and industry publications were systematically reviewed to identify recurring themes relating to industrial policy, infrastructure development, investment promotion, smallholder integration, technological capability, sustainability compliance, and regional trade integration.

Comparative analysis enabled the identification of similarities and differences in institutional arrangements among the selected countries. Particular attention was given to explaining why Côte d’Ivoire has achieved sustained production growth while other major producers continue to experience relatively slower in-

dustrial transformation. The analysis further examined how differences in governance structures, policy coordination, infrastructure investment, and market organisation influence countries' capacity to progress beyond primary commodity production toward higher-value manufacturing activities.

5.4. Global Value Chain Analysis

Global Value Chain (GVC) analysis was employed to examine the distribution of value across different stages of the natural rubber production system. The analysis categorised industry activities into upstream production (cultivation and harvesting), midstream processing (including technically specified rubber production and primary processing), and downstream manufacturing (including tyres, industrial rubber products, medical products, branding, and distribution) as per Gereffi & Fernandez-Stark (2018); Gereffi, Humphrey & Sturgeon (2018).

This framework facilitated assessment of the governance structures that determine value capture and industrial competitiveness within the global rubber industry. Particular emphasis was placed on identifying structural barriers that limit Africa's participation in higher-value downstream activities, including technological capability constraints, infrastructure deficiencies, market concentration, limited access to industrial finance, and compliance requirements associated with emerging sustainability regulations as per Barrientos, Gereffi & Rossi (2018).

5.5. Political Economy Analysis

Political Economy analysis was employed to interpret the historical and institutional factors influencing Africa's contemporary position within the global rubber economy. The analysis considered how colonial production systems, post-independence industrial policies, investment regimes, infrastructure development, state capacity, and international market structures have collectively shaped patterns of production, trade, and industrial upgrading.

The comparative assessment also examined the role of regional initiatives such as the African Continental Free Trade Area (AfCFTA), development finance institutions, and industrial policy reforms in supporting structural transformation. This analytical perspective enabled the study to move beyond descriptive production statistics by explaining the institutional mechanisms underlying differences in industrial performance across countries.

5.6. Interpretation of Findings

The findings were interpreted through the combined lenses of Global Value Chain Theory and Political Economy Theory. Descriptive statistical evidence was integrated with qualitative documentary findings to explain the relationship between production growth and industrial competitiveness. Rather than treating increased production as an indicator of industrial success, the interpretation focused on the extent to which countries capture value through processing, manufacturing, innovation, and participation in higher-value segments of the global rubber value

chain.

The integrated analytical approach enabled the study to identify the structural constraints limiting Africa's industrial upgrading while simultaneously highlighting emerging opportunities created by regional integration, sustainability-driven market restructuring, technological upgrading, and supply-chain diversification. Consequently, the interpretation provides a comprehensive understanding of both the empirical trends and institutional factors shaping Africa's transition from commodity dependence toward industrial competitiveness.

6. Summary & Recommendations

6.1. Summary

This study examined Africa's position within the global natural rubber value chain and explored the structural, institutional, and political economy factors influencing the continent's transition from commodity dependence to industrial competitiveness. Employing a qualitative comparative research design supported by descriptive quantitative analysis of secondary data, the study integrated Global Value Chain (GVC) Theory and Political Economy Theory to analyse production trends, value-chain governance, industrial capabilities, and policy environments across major African rubber-producing countries.

The findings reveal that Africa's principal challenge is not inadequate production but limited participation in higher-value segments of the global rubber value chain. Despite emerging as the fastest-growing natural rubber-producing region, much of the continent's output remains concentrated in upstream activities involving raw latex and technically specified rubber (TSR) exports.

Downstream manufacturing including tyres, medical rubber products, industrial components, and branded consumer goods continues to be dominated by firms outside Africa, resulting in limited domestic value addition, employment generation, technological learning, and industrial competitiveness.

The comparative analysis further demonstrates that industrial upgrading is influenced by differences in institutional capacity, industrial policy, infrastructure, investment promotion, and support for smallholder producers.

The experience of Côte d'Ivoire illustrates how sustained policy support, stronger institutional coordination, and improved production systems can significantly enhance production performance. However, production growth alone does not guarantee industrial transformation. Without complementary investments in processing capacity, manufacturing capability, logistics, research and development, and regional market integration, the economic benefits of expanding production remain constrained.

The study also identifies important opportunities arising from evolving global economic conditions. Supply-chain diversification, increasing demand for sustainably sourced natural rubber, the implementation of the African Continental Free Trade Area (AfCFTA), and the growing role of development finance institutions collectively create favourable conditions for expanding regional processing

and manufacturing. Nevertheless, these opportunities can only be fully realised through coordinated industrial policies that strengthen technological capability, improve infrastructure, facilitate investment, and support compliance with international sustainability standards.

Overall, the study concludes that Africa's transition from commodity dependence to industrial competitiveness requires a strategic shift from production-led growth towards value-driven industrialisation. Such a transition demands coordinated action by governments, regional institutions, development finance organisations, and the private sector to strengthen domestic processing, promote manufacturing, and improve participation in higher-value segments of the global rubber value chain.

6.2. Recommendations

Based on the findings of this study, the following policy recommendations are proposed:

1) Prioritise downstream industrial development. African governments should shift policy emphasis from increasing raw rubber production to expanding domestic processing and manufacturing. Investments should initially target commercially viable industries such as technically specified rubber (TSR), industrial rubber goods, conveyor belts, hoses, rubber flooring, footwear, and medical products before progressing to large-scale tyre manufacturing.

2) Strengthen regional value chains under AfCFTA. Governments should leverage the African Continental Free Trade Area to develop integrated regional rubber value chains in which production, processing, manufacturing, and distribution are coordinated across participating countries. Harmonised standards, reduced non-tariff barriers, and improved cross-border logistics will enhance regional competitiveness and attract investment.

3) Expand infrastructure and industrial financing. Public and private investment should prioritise reliable electricity, transport corridors, ports, industrial parks, and logistics infrastructure in major rubber-producing regions. Development finance institutions, including Afreximbank and the African Development Bank, should increase long-term financing for rubber processing facilities, manufacturing enterprises, and technology acquisition.

4) Promote technological upgrading and innovation. Governments should strengthen collaboration between universities, research institutes, and industry to support product development, process innovation, and workforce training. Investment in research and development will enhance productivity and facilitate movement into higher-value manufacturing activities.

5) Strengthen support for smallholder producers. Policies should improve access to quality planting materials, agricultural extension services, affordable credit, producer cooperatives, and digital traceability systems. Particular attention should be given to addressing land tenure challenges and reducing the cost of sustainability certification to improve compliance with international market requirements.

6) Enhance institutional coordination and industrial governance. Effective industrial upgrading requires coordinated policy implementation across ministries responsible for agriculture, industry, trade, infrastructure, and finance. Governments should establish clear national strategies for rubber sector development supported by measurable implementation targets and regular performance monitoring.

7) Encourage private sector participation and strategic partnerships. Governments should provide transparent investment incentives, improve the business environment, and encourage joint ventures between domestic enterprises and international manufacturers to facilitate technology transfer, managerial learning, and integration into global production networks.

8) Strengthen sustainability and market competitiveness. African producers should proactively invest in environmental compliance, traceability systems, and sustainable production practices to meet emerging international regulatory requirements, including the European Union Deforestation Regulation (EUDR). Compliance should be viewed not merely as a regulatory obligation but as a strategic opportunity to enhance market access and product competitiveness.

7. Implications for Future Research

Future research should complement the documentary evidence presented in this study through primary empirical investigations involving interviews with policymakers, industry stakeholders, processors, exporters, manufacturers, and small-holder farmers. Comparative econometric analyses of value addition, industrial productivity, and investment performance across African rubber-producing countries would further strengthen understanding of the determinants of industrial upgrading. In addition, future studies could evaluate the long-term effects of AfCFTA implementation and sustainability regulations on regional rubber value chains and Africa's participation in global manufacturing networks.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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