KPMG

Supply Chain Transformation in the Energy Sector

May 2025

home.kpmg/ng

Outline

1.0 Introduction

Global economic indicators have taken a major hit in recent times, with fiscal instability creating a ripple effect on energy and supply chain delays globally. Furthermore, current market volatilities have generated a level of uncertainty that supply chain organisations have had to contend with. Market volatility is no longer driven by a predictable set of factors. Over the past decade, the landscape has shifted dramatically, with new drivers emerging such as cybersecurity threats, pandemics, trade tariff wars, Environment, Social and Governance (ESG) issues, and geopolitical conflicts like the Russia-Ukraine war. This constant state of crisis is wreaking havoc on supply chains, causing unprecedented variability across the board.

In Nigeria, soaring inflation has eroded the purchasing power of both businesses and the public. The uncertain FX rate has multiplier effects on the cost of operations in the Manufacturing and Energy industries, with major manufacturers exiting the country due to their inability to break even.

Amidst all these, one of the national refineries has undergone a structural revamp and is currently operating at 40% production capacity, while a private indigenous refinery has been commissioned and commenced operations. However, these developments are faced with challenges. Refiners have stated that the lack of crude oil allocation from regulators to local refineries prevents them from reaching their full production capacity.

In October 2024, the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) launched the "Project 1 Million Barrels of Oil Per Day Initiative", targeting a daily oil production of at least 2.1 million barrels. This expansion presents significant economic opportunities, but its success depends on efficient and resilient supply chain management.

Addressing the crude oil allocation challenges will unlock the potential for refineries to optimise their supply chains, driving both operational efficiency and profitability in a dynamic market.

The supply chain function is critical to the operations of these organisation, thus, achieving efficiency in this function will contribute to profitability and cost management in an otherwise volatile period.

To fully harness the benefits of increased refining capacity, businesses must implement robust supply chain strategies. Effective Supply Chain Management (SCM) ensures stable business operations, optimised distribution, agility in market demand, regulatory compliance, risk mitigation, and cost efficiency and revenue maximisation. The article will give insights into how the SCM function can be optimised to reduce costs and maximise revenue.

2.0 Current Trends in Global Economy and its Effect on Supply Chain Management

Upstream exploration, and production (E&P), midstream, and downstream companies are driving efficiencies with several transformations throughout their supply chain, including in digital technologies.

Upstream

KPMG's Delivering long-term value in E&P[1] publication suggests that there are five potential transformations to generate longer-term value for the E&P process in upstream operations. These five levers were derived from engagements with global senior E&P executives -- across the spectrum of players, including supermajors, independents, small players and National Oil Companies (NOCs)—to identify latest E&P efforts:

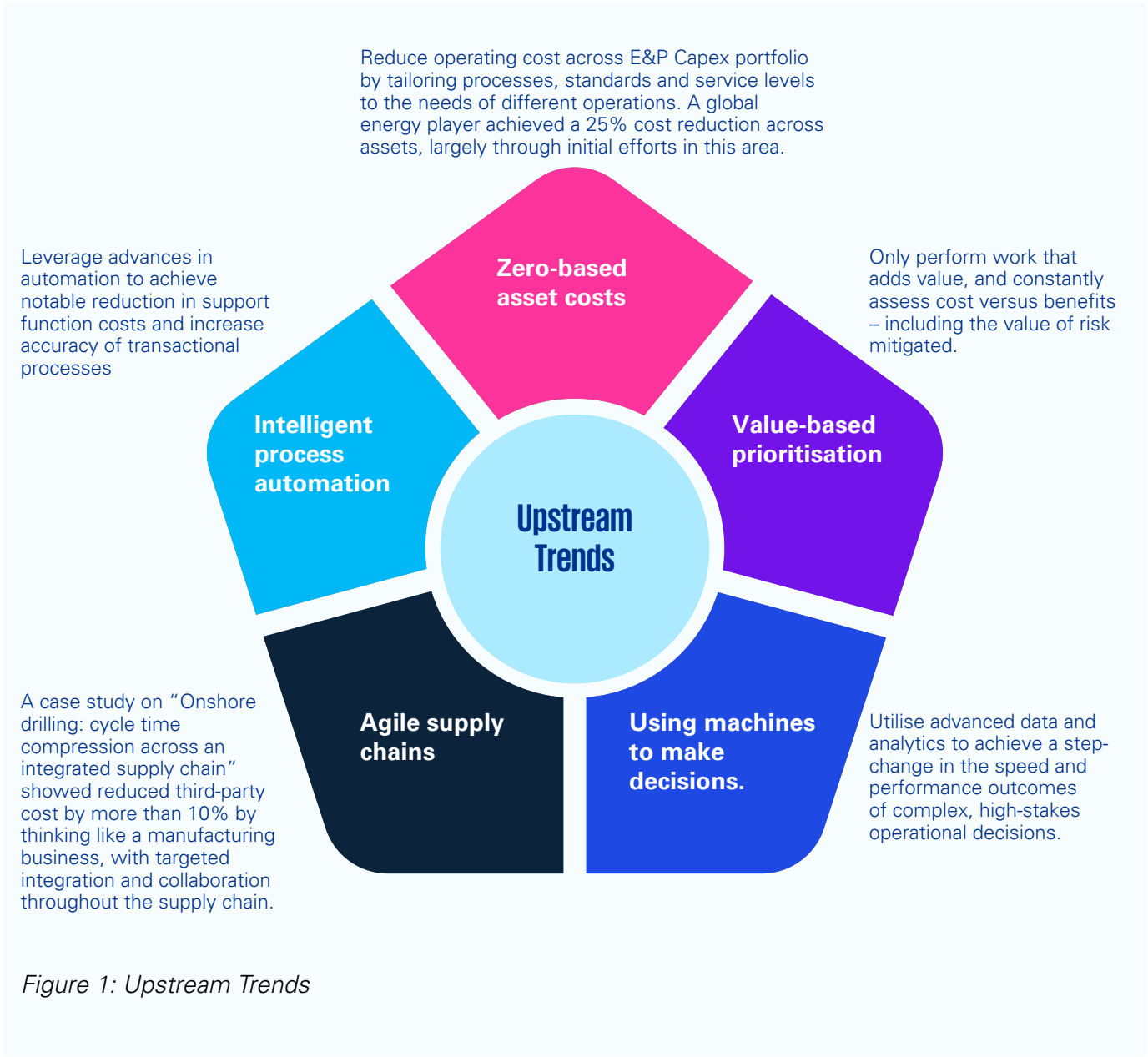


Figure 1: Upstream Trends

[1] Source: KPMG Publication – Delivering long-term value in E&P

Mid-Stream

Energy companies can also improve transportation and storage processes in midstream with these digital technologies as seen in established and more mature markets.

Robotics

Robots are employed for tasks such as pipeline inspection and maintenance, reducing human exposure to hazardous environments and improving operational efficiency.

Smart Labels, QR Codes, and Blockchain Technologies

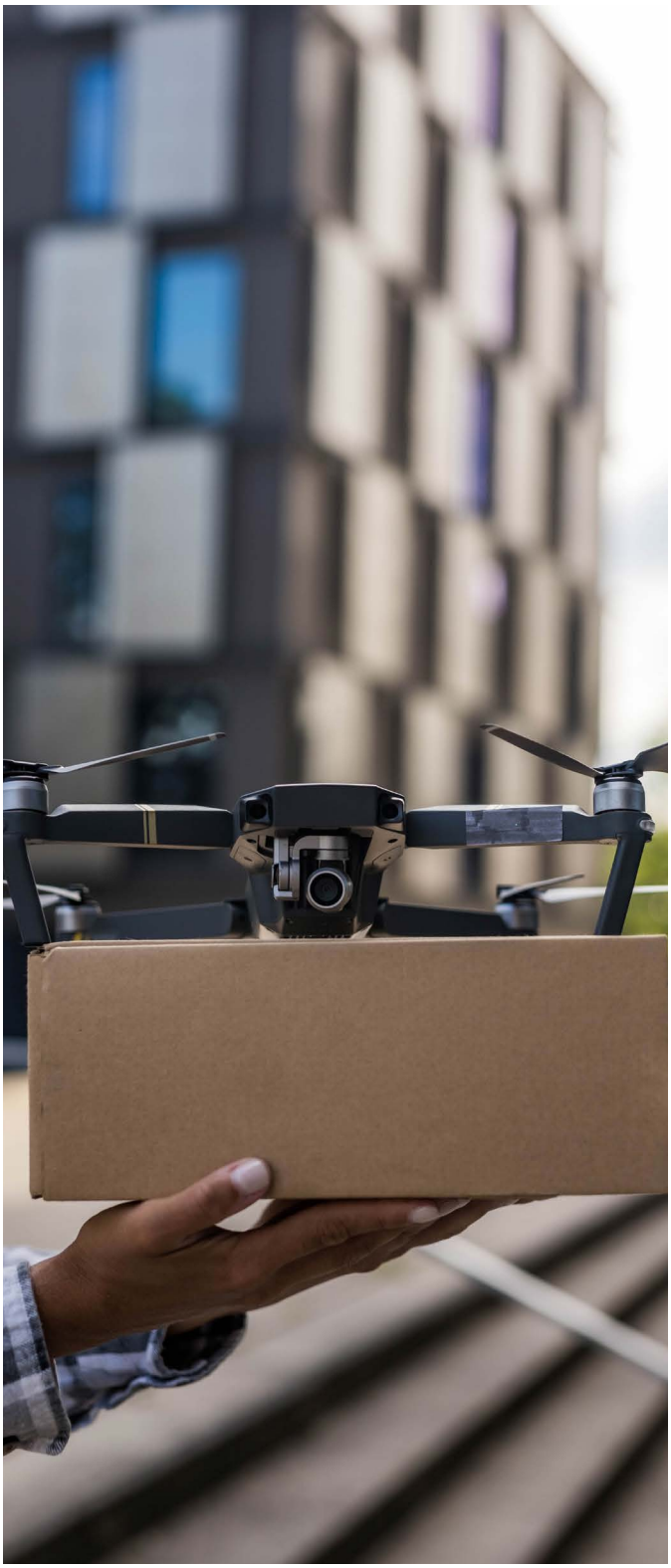
Integrating smart labels and QR codes with blockchain enhances supply chain transparency and traceability. Blockchain provides a secure, immutable ledger for tracking product movement, ensuring data integrity and reducing fraud.

Driverless vehicles, drones and on-board technologies

Autonomous vehicles and drones are utilised for monitoring infrastructure, detecting leaks, and assessing hard-to-reach areas, thereby increasing safety and reducing inspection times. On-board technologies in transportation vehicles improve route optimization and real-time monitoring of cargo conditions.

Cloud-based centralized platforms

These platforms facilitate real-time data sharing and collaboration across the supply chain, leading to improved decision-making and operational efficiency. They enable seamless integration of various processes, from inventory management to transportation logistics.



Downstream

Energy companies can prepare their retail and lubricants businesses for change by positioning themselves for new value pools while at the same time repositioning existing assets ahead of disruption as can be seen in established more mature markets.

	Retail	Lubricants
Short term (protect the core)	• Leverage Data &Analytics (D & A) to optimise margin capture (deeper customer understanding to offer loyalty programs)	• Leverage Data &Analytics (D & A) to optimise margin capture (deeper customer understanding to offer loyalty programs) • Diversify the added value beyond products to services
Medium term (investigate optionality)	• Review forecourt fuel mix and pilot new offers (e.g. highway offerings) • Investigate new partnerships and ownership models	• Expand plug-and-play solutions • Create more dynamic lubricant formulation/process engineering via data feedback loops
Long term (shift the core)	• Pursue digital strategies (e.g. fully automated self-service fuel pumps) • Offer B2B/fleet services (e.g. Integrated energy offerings)	• Drive stickiness through vehicle-based technology • Offer B2B/fleet services

Table 1: Downstream Trends

Supply Chain of the Future: IoT and Blockchain in Nigeria's Energy Supply Chain

While Nigeria's energy sector lags behind more mature markets in deploying IoT and blockchain technologies, there is significant potential for these capabilities to transform pipeline monitoring, asset tracking, and supply chain integrity.

In more advanced markets, IoT and blockchain are already revolutionizing operations by:

IoT in Pipeline Monitoring

Leading global energy companies deploy sensors along oil and gas pipelines to detect leaks, theft, and structural weaknesses, preventing financial and environmental losses. Many industry players leverage real-time IoT-based asset monitoring to reduce maintenance costs and improve efficiency.

Blockchain in Supply Chain Transparency

Major oil and gas operators utilize blockchain to track fuel origin, enhance contract management, and prevent fraud. The technology ensures end-to-end traceability, which is critical for ESG reporting and regulatory compliance.

For Nigeria to adopt and optimize these technologies, the following levers must be in place:

Infrastructure Development

Expansion of fiber-optic networks and 5G to support real-time IoT data transmission.

Regulatory Clarity

Policy frameworks to govern data security, blockchain transactions, and IoT deployment in energy operations

Investment in Local Capacity

Building technical expertise in IoT and blockchain applications through partnerships with global technology firms and academic institutions.

Stakeholder Collaboration

Major industry players, regulatory bodies, and key government agencies must work together to foster an ecosystem for digital transformation in the energy sector.

Source:
IoT in Oil and Gas: Revolutionizing Businesses
Blockchain Technology in Oil and Gas Industry
NNPC LTD | Sustainability

Increasing necessity of ESG Integration in Supply Chain Strategy Alignment

Amidst growing stakeholder pressure, ESG integration within organisations has transitioned from an exercise limited to fulfilling regulatory requirements to becoming a fundamental business imperative. This shift has largely been driven by the rising need for businesses- including those in the energy sector - to demonstrate responsible and sustainable practices to regulators, investors, customers and other stakeholders.

A recent consumer pulse report revealed that approximately 40% and 30% of consumers surveyed indicated that both environmental and social sustainability was important to their purchasing decisions. Hence, as consumer preferences continue to evolve, especially with younger generations such as the Gen Zs, the demand for more sustainably sourced products will continue to rise.

Businesses in jurisdictions outside of the EU are also required to comply with these regulations if they have affiliations with the EU- as business partners or part of a larger EU group, or form part of the supply chain of an EU company. Some organisations in the energy sector are more impacted by one of these regulations than the other.

Hence, to align their businesses with sustainability goals, organisations have begun to integrate ESG priorities into their supply chain strategy, recognising this area as a major blind spot in measuring their sustainability impact. According to the CDP's article titled "strengthening the chain", Corporate supply chain emissions are on average 26x greater than their operational emissions, highlighting the critical importance of integrating ESG in managing supply chains.

Beyond environmental concerns, other ESG topics such as human rights violations, forced or child labour, diversity, equity and inclusion, anti-bribery and corruption are some of the critical issues which organisations need to bear in mind while conducting ESG due diligence assessment for suppliers and eventual purchasing decisions.

According to a recent KPMG publication, it is expected that supply chain leaders will turn ESG and Scope 3 emission challenges into opportunities as a competitive differentiator for stronger business performance in 2025.

The strategic alignment between supply chain and corporate ESG priorities will increasingly define procurement approaches as companies seek to establish more environmentally and socially responsible supply chain practices across the various tiers of suppliers. Considering how much impact suppliers have on an organisation's exposure to ESG risks and consequently, its corporate reputation, it is important that companies, including those in manufacturing and energy sectors, consider the following:

Defining clear ESG objectives

Organisations should identify which ESG principles align with the organisation's core values and are most significant to stakeholders. This strategic clarity will enable organisations to effectively prioritise sustainability issues when evaluating and engaging with supply chain partners.

Keeping abreast with evolving regulations

The evolution of ESG is largely driven by regulations aimed at addressing environmental and social risks across supplier tiers. A significant piece of legislation affecting Nigerian businesses is the EU Battery regulation which seeks to promote sustainable sourcing of battery components, battery production, consumption and end-of-life handling. Another is EU Deforestation Regulation (EUDR), which prohibits the sale of certain commodities in agriculture & agro-processing, forestry & timber, bioenergy & biofuels sectors etc. in the EU unless they are proven not to come from recently deforested land and comply with local laws. Though most organisations affected in Nigeria are in agricultural and manufacturing sectors, energy players including bioenergy producers and utilities using biomass or biofuels with EU affiliations or part of the supply chain of an EU affiliated organisation, must also stay informed about these regulations to ensure compliance and avoid potential revenue loss and market access issues.

Capacity building programs

Players in the energy sector should seek to engage stakeholders across their supply chain in relevant ESG-focused capacity building programs to improve their ESG capabilities and ensure their compliance with the company's ESG priorities. They should also understand their own business' ESG requirements.

Lifecycle Impact Assessments

Businesses should conduct comprehensive evaluations of business products' environmental footprints from raw material extraction through end-of-life disposal, enabling data-driven decisions that minimise ecological impact across the entire value chain. This may include the need to develop and implement initiatives on waste reduction and recycling.

Supply chain ESG due diligence

Organisations need to focus on where the highest risks may occur across the supply chain, as such organisation in Nigeria would need to establish clear criteria to assess ESG risks across all supplier tiers, ensuring alignment with ethical and sustainable practices. It would be necessary to conduct thorough supplier assessments, evaluating suppliers' environmental impact, sustainability practices and compliance with environmental regulations as their actions or inactions would ultimately affect the organisation. The assessment would also need to evaluate the suppliers; compliance with human rights standards, including labour rights, working conditions and child labour practices.

Implementation of Sustainable Sourcing Practices

Manufacturing companies would need to ensure they source raw materials from suppliers who adhere to sustainable practices including utilisation of renewable energy, sustainable agriculture and responsible forestry.

Reduce Carbon Footprints Practices

Suppliers would need to be encouraged to reduce their carbon footprints by optimising their logistics, transportation and their supply chain operations to minimise their greenhouse gas emissions.

By embracing ESG-driven supply chain reforms, organisations can enhance the traceability and transparency of their impacts, improve the identification and management of supply chain ESG risks and drive the achievement of an organisation's ESG goals.

3.0 Supply Chain Issues Identified in the Nigerian Energy Industry

Despite advancements in supply chain management across Nigeria's energy subsectors, several challenges persist. Insights from interactions with industry players nationwide highlight critical areas of concern:

01 Sub-optimal Technology Utilisation

Many businesses continue to rely on manual processes, leading to inefficiencies and errors. The adoption of advanced technologies remains limited, and where implemented, there is often a skills gap hindering effective utilisation.

Opportunities for Improvement

- **Develop Scalable, Flexible, and Secure Data Systems**

  Implementing robust data infrastructures can facilitate the adoption of technologies such as automation, advanced analytics, artificial intelligence (AI), machine learning (ML), supply chain control towers, and Internet of Things (IoT) devices.

- **Enhance Data Fluency**

  Cultivate a culture of continuous skill assessment and data training to improve team proficiency in utilising technological tools.

- **Leverage Low-Code Platforms**

  Utilize low-code platforms to enable rapid and cost-effective application development, allowing organisations to respond swiftly to market demands and customer needs, thereby gaining a competitive advantage.

02 Absence of Codified Policies and Procedures

Many organisations lack documented processes and policies guiding key supply chain activities. This gap leads to control lapses, particularly in procurement processes such as vendor selection, purchasing, and contract management, and increases the risk of knowledge loss when key personnel depart.

Opportunities for Improvement

- **Conduct Comprehensive Process Assessments**

  Evaluate current processes to identify areas for improvement, redesign workflows based on diagnostic insights, and codify the updated procedures.

- **Implement System Controls**

  Strengthen key processes by embedding system controls to enhance oversight and compliance.

- **Utilize Advanced Analytics in Procurement**

  Employ advanced analytics to conduct side-by-side comparisons of vendor proposals based on predefined criteria, aiding in identifying the best value offerings.

03 Sub-optimal Collaboration Between Vital Partners Within the Chain

Operating in silos is common among industry players, leading to limited real-time information sharing with stakeholders (partners, regulators and customers). This isolation increases the risk of the Bullwhip Effect, causing supply chain inefficiencies.

Opportunities for Improvement

- **Invest in Integrated Systems**

  Develop integrated systems among supply chain partners and establish policies to facilitate timely information sharing. Implement Customer Relationship Management (CRM) and Supplier Relationship Management (SRM) systems to enhance collaboration.

- **Establish Structured Communication Platforms**

  Create systematic platforms to engage with customers, facilitating better demand planning through collaborative approaches such as feedback forums and surveys to align sales projections with real-time customer needs.

04 Lapses in Warehouse Operations and Controls

Issues such as lack of transparency in material usage, absence of tags on critical equipment, and reliance on manual operations are prevalent. The use of simple, non-analytical tools for recording warehouse data further exacerbates inefficiencies.

Opportunities for Improvement

- **Enhance Product Flow Visibility**

  Implement continuous monitoring systems to improve resilience and manage goods-in-transit effectively.

- **Refine Internal Planning Capabilities**

  Utilise automation and advanced analytics to anticipate events that might disrupt supply and demand.

- **Embed Technologically Enabled Monitoring**

  Adopt product tagging and predictive capabilities to meet customer demand efficiently.

- **Shift from Just-in-Time to Just-in-Case Inventory Management**

  Adopt a more flexible approach to protect against material access issues and inflationary pressures.

05 Sustainability and ESG Considerations

The rise of Environmental, Social, and Governance (ESG) policies necessitates that businesses adapt their supply chain operations. Compliance with these guidelines introduces various cost implications, requiring investments in sustainable practices and monitoring systems.

Opportunities for Improvement

- **Enact a Decarbonisation Strategy**

  Promote comprehensive product traceability to ensure ESG concerns, such as high-energy-use sites, waste, carbon emissions, plastic usage, and human rights issues, are addressed throughout the value chain.

- **Capture Real-Time Operational Data**

  Collect data along the supply chain to support measurement and reporting requirements for ESG improvement objectives.

06 Tactical Approach to Supply Chain Management

Many energy organisations treat supply chain management as a purely operational function, overlooking its strategic potential. This approach limits their ability to leverage supply chain agility, resilience, and competitive advantage, ultimately impacting their bottom line.

Opportunities for Improvement

- **Opportunities for Improvement**

  Develop a Supply Chain Strategy Aligned with Corporate Goals: Create a supply chain strategy that aligns with the organisation's corporate strategy and regularly update it to reflect environmental changes and realities.

07 Impact of Pricing on Downstream Operations

Filling stations, integral to the downstream sector, face significant challenges due to fluctuating fuel prices. These fluctuations affect supply chain dynamics, influencing procurement costs, inventory management, and pricing strategies at the retail level.

Opportunities for Improvement

- **Implement Dynamic Pricing Models**

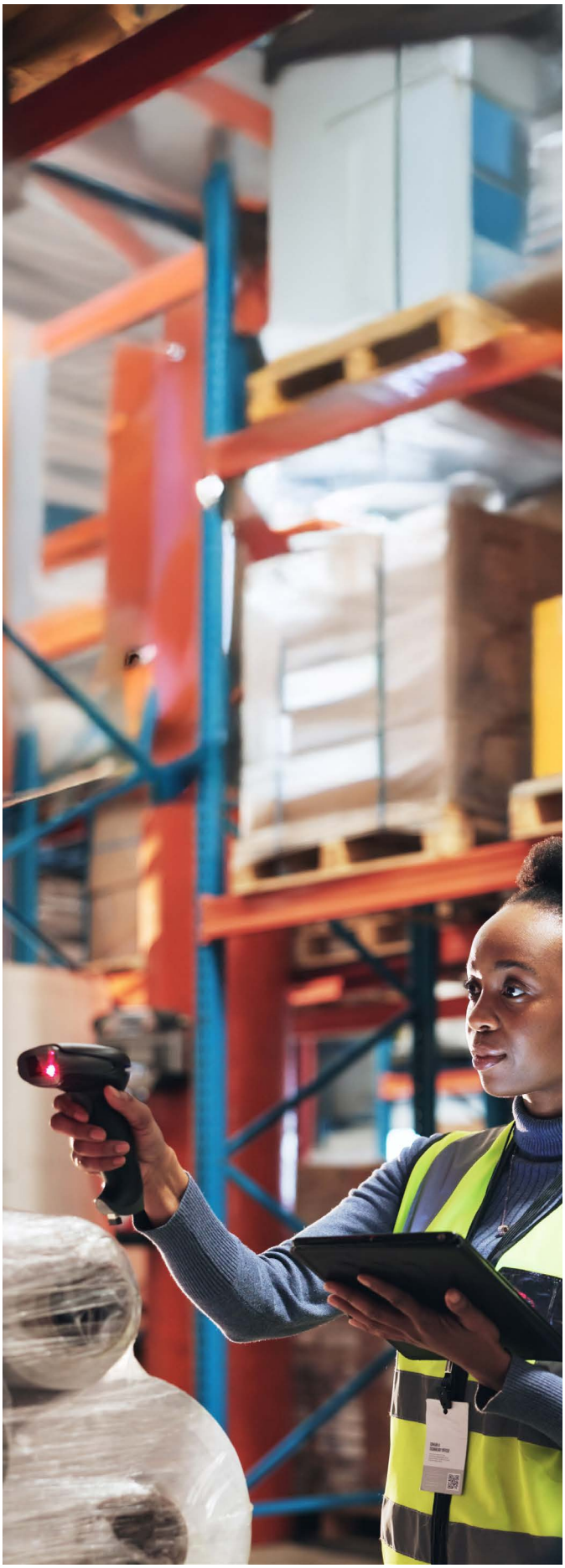
  Adopt pricing strategies that reflect real-time market conditions to maintain competitiveness and manage consumer expectations.

- **Enhance Inventory Management**

  Utilise advanced analytics to optimise stock levels, reducing the risk of shortages or overstocking amid price volatility.

- **Strengthen Supplier Relationships**

  Foster strong relationships with suppliers to negotiate favorable terms and ensure a steady supply of products, even during price fluctuations.



Organisations must develop an agenda to deal with disruption and drive future growth. The supply chain challenges in Nigeria's energy industry, such as inefficiencies, lack of transparency, and outdated processes, reflect the need for a major transformation.

To stay competitive and sustainable, businesses must move toward more streamlined, collaborative, and forward-thinking supply chain practices. By embracing innovation, improving supplier relationships, and adopting smarter ways of working, the industry can enhance efficiency, reduce costs, and build a more resilient and future-ready supply chain.

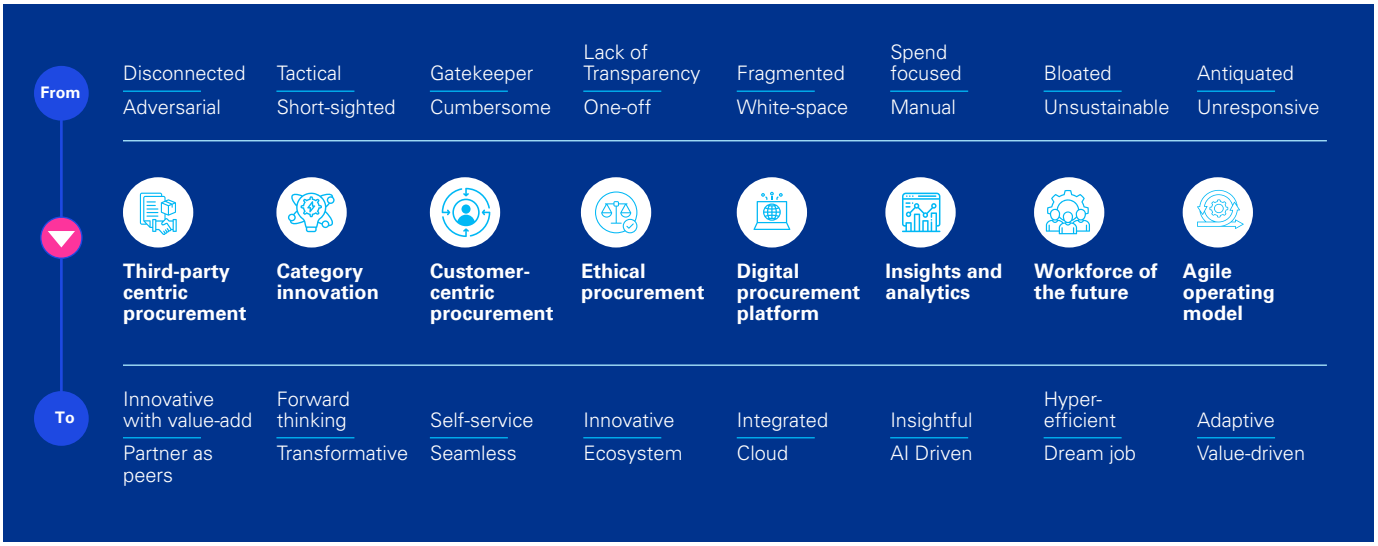
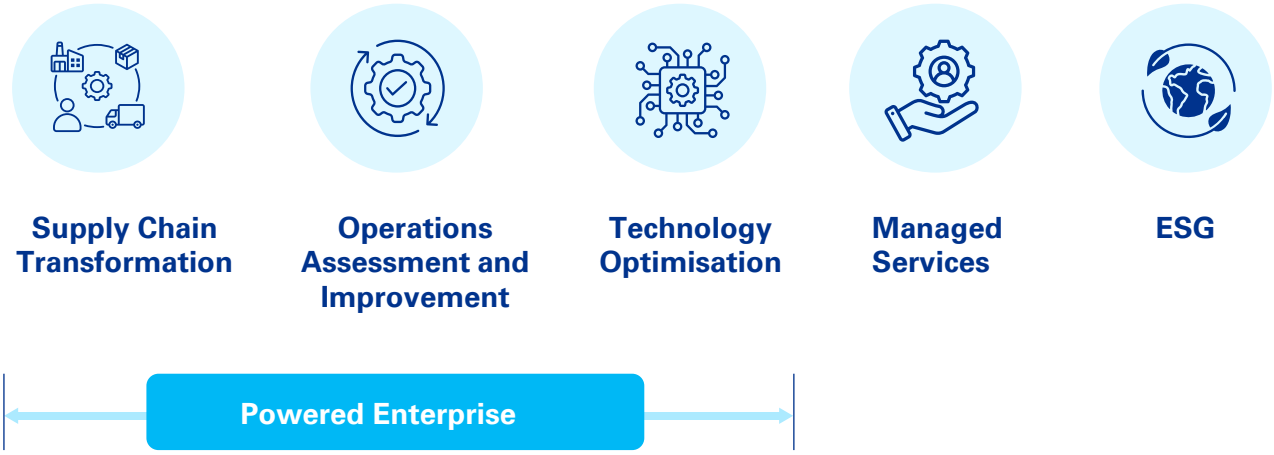


Figure 2: Supply Chain shifts

4.0 KPMG Capabilities and Support SCM Optimisation

The KPMG supply chain team consists of skilled professionals who grasp the essential role of supply chains in business management. We provide end-to-end services covering the below, underpinned by our proprietary Powered Enterprise methodology:



KPMG doesn't just offer solutions; we architect transformation. By harnessing the proven power of our Powered Enterprise library – a preconfigured Supply Chain platform of best practices – we deliver bespoke strategies that redefine client success across our solution areas.

Supply Chain Transformation

This is end-to-end transformation of the Supply chain function, which involves aligning an organisation's Supply chain to its Corporate Strategy. The transformation covers all facets – processes, governance, service delivery, service measures and people.

Operations Assessment and Improvement

We deliver comprehensive process improvement services designed to elevate your Supply Chain's operational efficiency. Starting with a detailed maturity assessment, we benchmark your current state against leading industry practices. Leveraging our deep expertise and a wealth of proven methodologies, we then craft bespoke solutions to drive measurable improvements and sustainable growth.

Technology Optimisation

Define technology solutions required to enable to-be desired processes.

Managed Services

Our managed services, encompassing strategic procurement and beyond, provide seamless execution and unparalleled visibility. We drive efficiency, reduce costs, and mitigate risk, empowering you to focus on core business growth with a resilient, agile supply chain.

ESG

KPMG has made significant investments in ESG capabilities in response to mounting stakeholder expectations and regulatory requirements. Our firm is uniquely positioned to support our clients through simple - complex sustainable supply chain solutions, including: Sustainable Supply Chain Strategy, Supply Chain Assessments Due Diligence, Supply Chain Sustainability operationalisation including technological enablesments, supply chain monitoring and evaluation as well as sustainable supply chain reporting.

KPMG's Powered Enterprise for Supply Chain offers a structured approach that combines preconfigured cloud solutions, AI-driven insights, and industry best practices to modernize supply chain operations. Built on six core pillars, ranging from process optimization to predictive analytics and governance, it enables organizations to enhance agility, sustainability, and performance.

In a rapidly changing landscape, a Powered Enterprise framework is not just an advantage but a necessity.

KPMG Powered Enterprise | Supply Chain brings together industry-leading practices and processes; preconfigured, cloud-based technology applications and a next generation delivery framework to help clients jump start their supply chain transformation journey.

Leverage customer centric business models, prebuilt KPI libraries, data models, and reports to align your supply chain to your customer experience. This is all underpinned by the KPMG Taget Operating Model, fine-tuned to derive value from your chosen technology platform and based upon six layers of change.

"As well as establishing the future architecture and the processes that seat underneath it, the furure supply chain target operating model establishes robust governance practices and identifies the spans of control," says Liddell.

"First, however, existing processes need to be fixed, and we need to ensure the right level of data is flowing in to support key decisions."

Ultimately, every facet of a business's operation needs to be focused on the customer. By undergoing a functional transformation supported by leading technology solutions, companies can build a coordinated flexible supply chain that is integrated across the entire business.

One that can survive and thrive, regardless of the challenges that lie ahead.

01

Functional Process

Hundreds of predefined, leading practice processes sit within this layer.

02

People

Managing the supply chain workforce, including upskilling for the digital age.

03

Technology

From advanced analytics and tracing predictive analytics to cognitive decision centers and intelligent automation, technology can streamline processes and change how the supply chain operates.

04

Performance insights and data

KPIs, process performance indicators, and enhanced reporting are all critical components of this layer.

05

Governance

Focuses on the risks in the supply chain process as well as duties and policies.

06

Service delivery model

The overall architecture of the delivery model.

1.0 Forecast to plan		2.0 Schedule to produce (S2P)		3.0 Maintain to optimize		4.0 Store to fulfil		5.0 Idea to commercialization	
1.1 Define strategy	1.6 Collaborate with suppliers	2.1 Define production policy	2.7 Quality management	3.1 Define strategy	3.5 Manage subcontractors & spares	4.1 Define strategy	4.8 Intercompany transfer	5.1 Strategy	5.6 Launch product/ service management
1.2 Collaborate with customer	1.7 Enable executive decisions	2.2 Manage flow design (discrete)	2.8 Production controlling	3.2 Manage asset	3.6 Reporting & analytics	4.2 Define logistics strategy	4.9 Customer service & logistics management	5.2 Product innovation & portfolio management	5.7 Retire product/ service
1.3 Generate forecast	1.8 Reporting and analytics	2.3 Manage production master data	2.9 Reporting & analytics	3.3 Develop maintenance plan	3.7 Manage process	4.3 Logistics - strategy sourcing	4.10 Reverse logistics	5.3 Design/Develop preliminary product and affiliated services	5.8 Reporting and analytics
1.4 Manage demand	1.9 Manage process	2.4 Schedule production	2.10 Manage process	3.4 Manage work order management system (WOMS)	3.8 System governance	4.4 Warehouse, fulfillment operations management	4.11 Manage cost accounting	5.4 Detailed product Design/Develop & scale for production	5.9 Manage process
1.5 Create and manage supply	1.10 System governance	2.5 Develop production methods	2.11 System governance			4.5 Inventory execution	4.12 Reporting & analytics	5.5 Commercialize product	5.10 System governance
		2.6 Execute production schedule				4.6 Manage material flow	4.13 Manage process		
						4.7 Transportation planning & operations	4.14 System governance		

Figure 3: Supply Chain Process Taxonomy

Contact Us

KPMG combines our multi-disciplinary approach with deep, practical industry knowledge to help clients meet challenges and respond to opportunities. Connect with our team to start the conversation.

Segun Sowande
Partner
Management Consulting
KPMG Africa
E: segun.sowande@ng.kpmg.com

Ayo Salami
Partner
TRPS - ENR
KPMG Africa
E: ayo.salami@ng.kpmg.com

Oluyomi Akinyemi
Partner
Analytics & Operations
KPMG Africa
E: oluyomi.akinyemi@ng.kpmg.com

Tomi Adepoju
Partner & Head
Enterprise Risk and ESG Services
KPMG Africa
E: tomi.adepoju@ng.kpmg.com

Aghogho Sam-Umurhurhu
Senior Manager
Analytics & Operations
KPMG Africa
E: aghogho.sam-umurhurhu@ng.kpmg.com

Yewande Adeyi
Senior Manager
ESG Advisory Services
KPMG Africa
E: yewande.adeyi@ng.kpmg.com

Contributors

Tawakalitu Ninalowo
Kate Karieren
Chukwuemeka Ogbonna
Ibukunoluwa Odejayi
Silas Eyube

Global Thought Leaadership Available

ESG and Supply Chain - ESG and Supply Chain
The future of supply chain - The future of supply chain
Actionable Insights for your supply chain challenges - Actionable insights for your supply chain challenges.

home.kpmg.ng
home.kpmg/socialmedia