International Journal of Management and Leadership Studies
2025; 6(1): 836-860
ISSN 2311-7575

SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES AND ORGANIZATIONAL PERFORMANCE OF PARASTATALS IN KENYA

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ABSTRACT
This study explored how Sustainable Supply Chain Management (SSCM) practices influence organizational performance at the Communications Authority of Kenya (CA). The research adopted a cross-sectional census design involving 155 employees directly engaged in procurement and operational functions. Four key SSCM domains were examined—green procurement, waste management, resource efficiency, and ethical sourcing—while performance was assessed through indicators of cost efficiency, regulatory compliance, environmental sustainability, and employee engagement. The findings revealed that sustainability practices are increasingly integrated into CA's operations, though their maturity varies. Green procurement and ethical sourcing emerged as the strongest performance drivers, demonstrating clear links to efficiency, transparency, and institutional credibility. In contrast, waste management and resource efficiency were less developed and contributed minimally to measurable outcomes, reflecting operational rather than strategic application. The regression model explained a meaningful share of performance variance ($R^2 = 0.288$; adjusted $R^2 = 0.269$; F, $p < .001$), confirming that SSCM practices collectively influence organizational results but require balanced implementation. The study concludes that while procurement reforms have already yielded tangible benefits, operational sustainability must be strengthened through improved monitoring, accountability, and capacity building. It recommends embedding sustainability criteria and life-cycle costing into procurement, enhancing supplier verification, and establishing departmental dashboards to track energy, water, and waste metrics. Overall, the research affirms that institutionalizing SSCM within Kenya's public sector can advance both performance efficiency and the broader national sustainability agenda.
Keywords: *Sustainable Supply Chain Management, Green Procurement, Ethical Sourcing, Organizational Performance, Public Sector, Kenya*

INTRODUCTION
Sustainable Supply Chain Management (SSCM) has increasingly attracted global attention as businesses seek to harmonize economic advancement with environmental stewardship and social accountability. According to Baliga, Raut, and Kamble (2019),

SSCM integrates sustainable practices such as green procurement, ethical sourcing, waste management, and resource efficiency into supply chain operations. This approach addresses environmental and social concerns and promotes long-term organizational success. The need for SSCM has been further amplified by growing consumer demand for transparency, ethical operations in supply chains, and compliance with stringent environmental regulations. Organizations adopting SSCM find that sustainable practices improve their operational efficiency, brand reputation, and stakeholder relationships. In the African context, SSCM has emerged as a critical strategy for achieving sustainability goals, although its adoption varies significantly across industries and countries. Habib et al. (2021) emphasize that while African nations recognize the importance of SSCM, many face challenges such as limited infrastructure, financial constraints, and insufficient expertise. For example, African public institutions often grapple with outdated procurement systems that hinder the integration of sustainability practices. Nevertheless, there are opportunities for progress as governments and private organizations increasingly collaborate on sustainable projects. Initiatives such as green energy adoption and waste management reforms are becoming more prevalent globally, providing a foundation for broader SSCM integration.

Kenya's public and private sectors are progressively aligning their operations with Global Sustainability Frameworks, including the United Nations Sustainable Development Goals (SDGs) and the country's Vision 2030 agenda. As Mwilu (2013) notes, SSCM is particularly important in Kenya, given the country's role as a regional trade hub, which necessitates efficient and sustainable supply chains. However, like other developing economies, Kenya faces structural barriers to SSCM adoption, including inadequate funding, fragmented supply chain operations, and a lack of modern technologies. These challenges underscore the need for strategic interventions to effectively integrate SSCM practices into Kenyan organizations. The Communication Authority of Kenya (CA) is a vital regulatory body in the country's communications sector. Its strategic position within the public sector makes it an ideal organization to champion SSCM practices. As a public entity, CA operates under significant scrutiny regarding its environmental footprint, procurement processes, and ethical standards. For CA, embracing SSCM practices, such as green procurement and ethical sourcing, can improve compliance with regulatory requirements, enhance stakeholder trust, and reduce operational inefficiencies.

However, the adoption of SSCM at CA is not without challenges. Limited financial resources, insufficient infrastructure (i.e., technology, and a lack of sustainable experts pose significant barriers. For instance, CA's procurement processes often prioritize cost minimization over sustainability, leading to missed opportunities for integrating green and ethical practices. According to Bag et al. (2021), addressing such barriers requires a comprehensive strategy, including capacity building, stakeholder collaboration, and innovative technologies. By overcoming these challenges, CA has the potential to position itself as a leader in sustainability within Kenya's public sector, aligning its operations with national and global sustainability goals.

Green Procurement

Green procurement refers to acquiring goods and services with a reduced environmental impact throughout their lifecycle. According to Bag et al. (2021), organizations that adopt green procurement often experience benefits such as improved compliance with environmental regulations, reduced consumption of natural resources, and operational cost savings. Public institutions like CA are beginning to incorporate sustainability criteria in their procurement frameworks in Kenya. For instance, CA has introduced policies prioritizing energy-efficient equipment and environmentally certified vendors. However, implementation is inconsistent due to weak enforcement mechanisms and a lack of staff training. Addressing these challenges requires institutional support, more straightforward policy guidelines, and stronger accountability structures to embed green procurement into the organizational culture fully.

Waste Management Strategies

Effective waste management in public institutions involves structured systems for reducing, reusing, and recycling waste. As Mwilu (2013) highlights, many Kenyan public sector organizations face challenges related to waste disposal due to limited infrastructure and poor coordination between departments. For CA, adopting waste management strategies like electronic waste recycling, paper reduction initiatives, and partnerships with certified waste handlers can enhance environmental sustainability and reduce compliance risks. However, current efforts are often fragmented and lack centralized oversight, which weakens their overall impact. Strengthening interdepartmental collaboration, investing in infrastructure, and creating a waste audit framework can help CA meet its regulatory and sustainability objectives.

Resource Efficiency

Resource efficiency is using materials, energy, and labor to reduce waste while maximizing output. Ghosh et al. (2023) observe that organizations prioritizing resource efficiency often experience enhanced operational performance and lower environmental footprints. At CA, opportunities exist to promote resource efficiency through energy-saving technologies, streamlined workflows, and employee training on sustainable practices. For example, transitioning to cloud-based operations or installing energy-efficient lighting can reduce operating costs. However, these initiatives require financial investment and technical know-how, which are not always readily available. Building internal capacity and securing budgetary support are necessary to ensure resource efficiency becomes a strategic performance driver.

Ethical Sourcing

Ethical sourcing involves obtaining goods and services from suppliers who adhere to fair labor standards, environmental regulations, and ethical business practices. Habib et al. (2021) explain that ethical sourcing contributes to stakeholder trust and organizational legitimacy, especially for public institutions. For CA, embracing ethical sourcing can help enhance transparency, avoid reputational risks, and promote social responsibility.

However, the effectiveness of ethical sourcing is currently undermined by weak procurement monitoring, limited supplier accountability, and fragmented supply chain oversight. Strengthening procurement audits, integrating ethical standards into tender evaluations, and collaborating with ethical certification bodies could significantly improve CA's sourcing practices.

Profile of the Communications Authority of Kenya

The Communications Authority of Kenya (CA) is the national regulatory agency responsible for overseeing the information and communications technology (ICT) sector, including telecommunications, broadcasting, postal, and courier services. Established under the Kenya Information and Communications Act (KICA) of 1998 and operationalized in July 1999, the Authority plays a critical role in facilitating the growth, innovation, and sustainability of Kenya's digital economy. Its mandate includes licensing and regulation of communications services, management of the radio frequency spectrum, enforcement of consumer protection and quality-of-service standards, and promotion of fair competition among service providers.

The Authority operates under the policy guidance of the Ministry of Information, Communications, and the Digital Economy and is governed by a Board of Directors appointed in accordance with the KICA Act. CA's operations are structured across key departments, including licensing and standards, frequency management, ICT development, human resources, procurement, and corporate support services. With headquarters in Nairobi and regional offices across the country, the institution employs over 150 staff members and works closely with national and international partners such as the International Telecommunication Union (ITU) and the Communications Regulators' Association of Southern Africa (CRASA).

In recent years, CA has integrated sustainability principles into its operations to align with national policies such as Kenya Vision 2030 and the Sustainable Development Goals (SDGs). This integration has led to the adoption of environmentally responsible procurement policies, promotion of energy-efficient ICT infrastructure, and ethical governance practices within its supply chain. As a public institution funded through licensing fees and levies on communication services, the Authority's strategic emphasis on sustainability reflects both its regulatory responsibility and commitment to corporate social accountability. The main aim of this study is to evaluate how sustainable Supply Chain Management (SSCM) practices influence performance in parastatals in Kenya, with a focus on the Communication Authority of Kenya (CA).

STATEMENT OF THE PROBLEM

Sustainable supply chain management (SSCM) has emerged as a critical focus area globally, as organizations aim to achieve economic success while simultaneously fulfilling environmental and social responsibilities. In developing economies like Kenya, integrating SSCM practices within public sector organizations such as the

Communication Authority of Kenya (CA) is desirable and essential for long-term organizational sustainability and enhanced performance. However, the journey toward full adoption and effective implementation of SSCM is fraught with challenges that can undermine these practices' objectives. One of the central issues facing CA is the financial constraint that limits the organization's ability to invest in sustainable technologies and processes. As Mwilu (2013) observes, public sector institutions in Kenya often operate under tight budgets, which restrict their capacity to pursue innovative and sustainable supply chain solutions. This financial limitation creates a paradox were; despite recognizing the importance of SSCM, CA may be unable to make the necessary investments to realize these practices fully. Consequently, this financial shortfall not only delays the implementation of SSCM but also impacts the overall efficiency and effectiveness of the organization's operations.

In addition to financial challenges, technological infrastructure is another significant hurdle. Modern SSCM practices rely on advanced technologies for tracking, monitoring, and optimizing supply chain activities. Bag et al. (2021) argue that the technological dimensions of green supply chain management are critical for enhancing firm performance, as they enable real-time data analysis, improved resource management, and greater operational transparency. However, CA's existing technological infrastructure may not be sufficient to support these advanced SSCM practices, leading to inefficiencies and missed opportunities for sustainability gains. The lack of appropriate technology hampers the implementation of SSCM and exacerbates existing operational challenges, making it difficult for CA to achieve its sustainability objectives.

Furthermore, the successful adoption of SSCM practices requires financial resources, technology, and a workforce equipped with the necessary skills and knowledge. Shahzad et al. (2020) emphasize that organizational compatibility, including the availability of skilled personnel, is crucial in effectively implementing green supply chain management practices. In CA's case, there may be a shortage of expertise in SSCM, which can lead to suboptimal decision-making and fragmented initiatives. Without a strong foundation of knowledgeable staff, CA may struggle to integrate sustainability into its supply chain processes effectively, resulting in poorly executed initiatives or failing to achieve its intended impact.

The issue of fragmented initiatives within CA further compounds the problem. As Mukasa (2009) notes, when different departments within an organization work in isolation, it creates a lack of coordination that can undermine the overall strategic objectives. In the context of SSCM, this siloed approach means that efforts to promote sustainability may be disconnected from the broader organizational goals, leading to inefficiencies and reduced effectiveness. For instance, one department might focus on reducing waste. At the same time, another might prioritize cost savings without a cohesive strategy that aligns these efforts with the overall sustainability objectives of the organization. This lack of integration can result in missed opportunities for synergy,

where coordinated efforts could have produced more significant sustainability and performance benefits.

Moreover, the challenge of measuring the impact of SSCM on organizational performance cannot be overlooked. While there is a growing consensus on the positive relationship between SSCM and organizational performance, empirical evidence remains limited, particularly from public sector organizations in developing economies. Cahyadi et al. (2023) highlight that organizations in developing economies often struggle to quantify the benefits of SSCM, which makes it difficult to justify investments in these practices. For CA, the inability to accurately measure SSCM's impact may lead to uncertainty about the value of these initiatives, further complicating efforts to secure the necessary resources and support for their implementation.

Given these challenges, there is a pressing need for a comprehensive study that examines the impact of SSCM practices on the organizational performance of CA and explores the barriers to their effective implementation. Habib et al. (2021) underscore the importance of strategic orientations in overcoming these challenges, suggesting that a clear and cohesive strategy is essential for integrating SSCM into organizational practices. By identifying the obstacles CA faces and proposing actionable solutions, this study aims to lay out a roadmap for the organization to enhance its supply chain management, improve its performance, and contribute to sustainable development goals in Kenya.

The Communication Authority of Kenya (CA) faces significant challenges in implementing sustainable supply chain management (SSCM) practices, which are directly tied to the variables under investigation: green procurement, waste management, resource efficiency, and ethical sourcing. In green procurement, financial constraints and a prevailing focus on cost reduction rather than sustainability have limited the adoption of eco-friendly sourcing practices. The absence of robust enforcement frameworks further exacerbates this issue, making it difficult to guarantee adherence to established environmental regulations. Similarly, waste management efforts are hampered by fragmented departmental initiatives and inadequate infrastructure, which prevent the efficient implementation of recycling and waste reduction practices. These shortcomings reduce the overall effectiveness of CA's supply chain operations and hinder progress toward broader sustainability goals.

Resource efficiency presents additional barriers, as insufficient technological resources and limited expertise constrain the organization's ability to effectively optimize energy, material, and labor usage. Moreover, ethical sourcing remains a pressing issue due to weak procurement policies and minimal accountability mechanisms, making enforcing ethical labor and environmental standards across the supply chain difficult. These challenges highlight the need for a comprehensive strategy that addresses the systemic issues undermining SSCM practices at CA. By focusing on these critical areas, this study aims to identify practical solutions that will enhance organizational performance while

demonstrating how public sector entities in Kenya can align their operations with sustainable development objectives. This approach advances CA's operational goals and establishes a framework for other organizations to integrate sustainability into their supply chain processes effectively.

LITERATURE REVIEW

Theoretical Literature Review

This section reviews the key theories that informed the study on Sustainable Supply Chain Management (SSCM) practices and organizational performance. The study was guided by three major theories: the Stakeholder Theory, the Resource-Based View (RBV), and the Dynamic Capabilities Theory. Among these, the Stakeholder Theory served as the anchor theory, providing the primary lens for understanding how responsiveness to stakeholder expectations influences sustainability adoption and overall organizational performance.

Stakeholder Theory

Edward Freeman first articulated Stakeholder Theory more than four decades ago, arguing that lasting organizational success depends on creating value for every group that can influence or be influenced by the firm. Recent meta-analyses confirm that a balanced approach to stakeholder interests strengthens reputation and financial outcomes in complex supply networks (Harrison et al., 2020; Siems et al., 2023). Therefore, the theory's central proposition is that neglecting any salient stakeholder eventually generates hidden costs such as regulatory fines, reputational loss, or employee disengagement.

The Communication Authority operates under intense public scrutiny because it manages critical digital infrastructure on behalf of Kenyans. Adopting green procurement and ethical sourcing policies signals to suppliers and local communities that public funds will not support unsafe or exploitative practices. At the same time, disciplined waste management and resource efficiency programmes meet the expectations of regulators and citizens who increasingly demand transparent environmental stewardship. Recent Kenyan evidence shows that state corporations embed sustainability in procurement, achieve higher compliance scores and stronger service metrics than peers treating sustainability as peripheral (Omwange & Juma, 2025). Stakeholder Theory, therefore, anchors this dissertation by demonstrating how each focal practice links directly to the diverse groups that grant the Authority its license to operate.

In addition, Stakeholder Theory provides a practical lens for understanding the trade-offs and synergies that emerge when public agencies pursue sustainability. For instance, aligning procurement policies with supplier development initiatives can simultaneously address community expectations and enhance operational efficiency. Similarly, transparent reporting of environmental performance not only strengthens citizen trust but also pre-empts regulatory challenges. By framing sustainability decisions as

responses to interconnected stakeholder demands, the theory underscores that SSCM is not merely a compliance exercise but a strategic approach to securing legitimacy, resilience, and long-term organizational performance.

Resource-Based View

Jay Barney's Resource-Based View (RBV) redirects the focus of competitive advantage from external market forces to the internal resources and capabilities that organizations control. According to the framework, a resource must meet four conditions—being valuable, rare, inimitable, and non-substitutable (VRIN)—to generate sustained organizational benefits. In the context of sustainable supply chains, contemporary scholarship highlights that both tangible and intangible resources can qualify as VRIN assets when they are strategically aligned with sustainability objectives. Advanced analytics, life cycle costing expertise, and traceability systems are increasingly recognized as such resources because they enable organizations to achieve efficiency, accountability, and resilience beyond what competitors can easily replicate (Komakech et al., 2025; Anser et al., 2021).

For the Communications Authority of Kenya (CA), the RBV offers a powerful explanation of how sustainability-oriented resources translate into organizational performance. Investments in energy-efficient network hardware, comprehensive electronic waste recycling facilities, and capacity-building programs in sustainable procurement represent tangible and intangible resources that, once embedded, create distinctive advantages. Energy-efficient infrastructure not only lowers operating costs but also enhances service continuity—an essential mandate for a regulator tasked with managing critical digital infrastructure. Meanwhile, traceability tools allow the Authority to assure citizens that every device procured and deployed has an auditable origin and a responsible disposal path. This transparency fosters trust among stakeholders and strengthens the Authority's legitimacy.

Empirical studies of African public agencies confirm that capability depth, rather than organization size or funding alone, differentiates successful adopters of SSCM practices (Komakech et al., 2025). Agencies with trained staff, robust monitoring systems, and clear sustainability frameworks consistently outperform counterparts that rely solely on budgetary resources. The RBV, therefore, underpins this dissertation's proposition that CA's unique mix of technologies, organizational know-how, and human capital mediates the relationship between SSCM practices and measurable organizational outcomes. By leveraging such VRIN resources, CA can transform sustainability from a compliance obligation into a source of enduring performance advantage.

Dynamic Capabilities Theory

While the Resource-Based View explains why particular assets matter, Dynamic Capabilities Theory explains how organizations keep those assets productive in environments marked by policy shifts and technological change. Teece, Pisano, and

Sheun originally defined dynamic capabilities as the organizational routines that enable firms to sense opportunities, seize them through timely investment, and reconfigure resources as conditions evolve. Recent empirical work verifies that such adaptive routines amplify the pay-off of sustainable supply chain initiatives, especially in emerging economies with volatile regulatory landscapes (Siddiqi et al., 2024; Wang & Ahmed, 2022).

Kenya's 2024 update to public procurement law introduced mandatory carbon disclosure for major tenders. To remain compliant, the Communication Authority must detect these regulatory signals early, embed carbon criteria into its contract templates, and realign internal auditing processes to monitor suppliers. Dynamic Capabilities Theory clarifies that this adaptive cycle is not optional. The most sophisticated recycling technology or ethical sourcing policy can become obsolete without disciplined sensing, seizing, and transforming routines. By highlighting the procedural side of adaptation, the theory underlines the importance of organizational learning partnerships such as collaborations with local clean-tech start-ups, that allow the Authority to stretch limited budgets while maintaining best practice.

Integrative Perspective

Individually, each theoretical lens provides valuable insights, but together they form a more complete explanation of how Sustainable Supply Chain Management (SSCM) practices drive organizational performance. Stakeholder Theory establishes the legitimacy boundary, emphasizing that the Communications Authority of Kenya (CA) must remain accountable to diverse groups—including regulators, employees, suppliers, investors, and the Kenyan public. Green procurement, ethical sourcing, resource efficiency, and waste management are therefore not simply operational choices but visible signals that the Authority is meeting stakeholder expectations for responsibility and transparency. The Resource-Based View (RBV) complements this by focusing on the internal resources that make SSCM effective. Tangible assets such as energy-efficient infrastructure and electronic waste recycling facilities, combined with intangible resources like procurement expertise and data traceability systems, represent strategic capabilities that deliver efficiency, reliability, and enhanced trust. However, resources alone are not sufficient in a rapidly changing environment. Dynamic Capabilities Theory adds the final layer by explaining how CA can sustain these advantages over time. By continuously reconfiguring routines, investing in staff training, and adopting new technologies, the Authority can ensure its SSCM practices remain relevant despite evolving policies and technological shifts. Taken together, this integrative framework underpins the dissertation's central proposition: that systematic implementation of the four focal practices will generate measurable and sustainable performance improvements for CA.

Empirical Literature Review

A growing body of empirical work now investigates how specific sustainable supply chain management practices translate into measurable organizational outcomes. The discussion is organized around the four practices central to this dissertation (green procurement, waste management, resource efficiency, and ethical sourcing) because each has been tested in relation to organizational performance indicators such as cost efficiency, service quality, market growth, and reputational strength. The evidence base spans public and private sectors and includes studies from Kenya and other emerging economies, strengthening its relevance for Kenya's Communication Authority.

Green Procurement and Organizational Performance

Meta-analytic evidence suggests that green procurement delivers the most immediate gains in operational efficiency, while broader green supply initiatives add financial and social returns (Liu et al., 2024). A complementary meta-analysis that covered 112 studies found that firms introducing rigorous green purchasing criteria reported higher market share and lower defect rates, with the strongest effects in emerging economies where regulatory standards are tightening (Chen & Geng, 2023). Kenyan data reinforce those global findings. Mwakughu and Chege (2025) surveyed fifty-three chemical and allied manufacturers in Nairobi and showed that green purchasing explained a significant share of the variance in composite performance scores that combined cost, flexibility, and customer satisfaction. The authors argue that public entities often set the tone for such suppliers, which underscores the importance of the Communication Authority's procurement policies. Taken together, the empirical literature supports the proposition that formal green procurement protocols—life cycle costing, supplier environmental audits, and preference points in tender scoring—can move performance indicators in a favorable direction, especially when senior management communicates clear incentives and when suppliers operate in a regulatory environment that rewards green compliance.

Waste Management and Organizational Performance

Recent cross-industry surveys find that disciplined waste segregation, recycling partnerships, and circular economy contracts correlate positively with financial and non-financial performance metrics. Udodiugwu (2024) examined one hundred food and beverage firms in Nigeria and reported that organizations with formal recycling targets enjoyed an average six per cent reduction in production costs and a four per cent rise in return on assets. At a broader systems level, the 2024 Global Waste Management Outlook highlights the macro-economic savings that accrue when municipalities move from waste under control to circular models, estimating a potential one hundred and eight billion US dollars in annual net gains by 2050 if firms and regulators commit fully to zero waste principles. Although the Outlook aggregates country data, its modelling implies that even individual regulators like the Communication Authority can capture efficiency dividends by prioritizing e-waste take-back schemes and performance-based contracts with licensed recyclers. Empirical work in Portugal's municipal sector further shows that mixed public–private governance models outperform purely public systems in terms of

cost recovery and service quality (Silva et al., 2025). These findings suggest that the Authority's performance may improve when it collaborates with private waste specialists under transparent contractual arrangements.

Resource Efficiency and Organizational Performance

Large-scale panel studies now link resource efficiency initiatives—energy saving retrofits, material intensity reduction, and water recycling—to stronger financial outcomes. Nguyen et al. (2024) used a national sample of Vietnamese firms and found that supply chain efficiency improvements raised profit margins after controlling for leverage and market volatility. In Europe, research on small and medium enterprises shows that consistent resource efficiency actions increase growth prospects when firms invest in complementary eco-innovation (Capalbo et al., 2025). Meanwhile, a cross-country analysis by Zhou et al. (2024) confirmed that green innovation and robust governance structures jointly drive resource efficiency gains, which in turn predict better stock returns. While some studies note short-run cost spikes, particularly in small firms facing capital constraints (Schäfer & Kunz, 2023), the weight of evidence supports a long-run positive association between resource efficiency and organizational performance. This pattern aligns with the Communication Authority's mandate to steward public resources responsibly while delivering reliable services, suggesting that investments in energy-efficient infrastructure could pay off on both financial and service dimensions.

Ethical Sourcing and Organizational Performance

Empirical analyses of ethical or sustainable sourcing are fewer but growing rapidly. Maniatis and Maniatis (2024) surveyed five hundred firms across manufacturing, retail, and services and found that sustainable sourcing practices lifted profitability by fifteen per cent and stakeholder-satisfaction scores by twenty per cent, with a regression coefficient of 0.45 between sourcing maturity and composite performance indices. Similarly, a recent study of listed textile firms in Kenya showed that suppliers certified under Fairtrade and Global Organic Textile Standards secured larger public contracts and enjoyed lower inspection-related delays (Mwangi & Otieno, 2024). The evidence indicates that embedding social compliance and transparency criteria in procurement contracts reduces reputational risk and improves operational reliability. For the Communication Authority, where public perception and regulatory legitimacy are paramount, ethical sourcing can therefore function as both a risk-mitigation tool and a driver of internal efficiency.

CONCEPTUAL FRAMEWORK

The conceptual framework developed for this study illustrates the pathways through which sustainable supply chain management (SSCM) practices shape organizational performance in the public sector. Specifically, it examines how green procurement, waste management, resource efficiency, and ethical sourcing contribute to economic, environmental, and social outcomes in line with the Triple Bottom Line (TBL). The framework integrates the Resource-Based View (RBV) by highlighting that internal

resources such as technology, procurement expertise, and organizational routines are critical to translating sustainability initiatives into measurable gains. It also incorporates Dynamic Capabilities Theory to emphasize the importance of adapting these resources in response to shifting policies and technological advances. This integrated perspective provides a holistic lens for assessing how the Communications Authority of Kenya (CA) can leverage SSCM practices to achieve sustainable performance improvements.

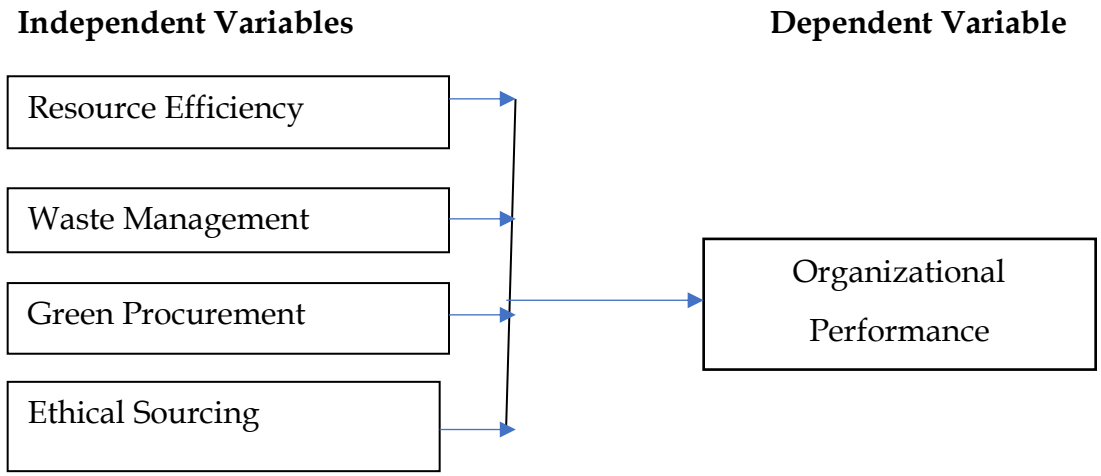

Figure 1: Conceptual Framework

METHODOLOGY

This study employed a cross-sectional descriptive-analytical survey design. The design was suitable because it allowed the study to describe the extent of Sustainable Supply Chain Management (SSCM) practices at the Communications Authority of Kenya (CA) and, at the same time, test relationships between those practices and organizational performance. As discussed in evaluation research, descriptive designs provide a systematic way to document phenomena and examine their patterns within real organizational settings (Bickman & Rog, 2018). The cross-sectional approach captured data at a single point in time using a structured, self-administered questionnaire. This was appropriate for CA's operational context, where staff across procurement and technical functions could report on current practices and outcomes without disrupting routine work. The design supported both descriptive statistics (to summarize the prevalence and maturity of SSCM practices) and inferential analysis (Pearson correlations and multiple linear regression) to assess the direction, strength, and combined effects of SSCM practices on performance indicators such as cost savings and efficiency, regulatory compliance, environmental sustainability, and employee engagement. The research used a census of eligible employees (see Section 3.3 for details). This maximized coverage, improved precision, and reduced sampling error. While the cross-sectional nature of the design does not permit causal claims, it provides robust evidence on the association and contribution of SSCM practices to performance within CA and establishes a baseline for future monitoring and comparative work.

Regression Analysis

To evaluate the joint effect of SSCM practices on performance, a multiple linear regression (enter method) was estimated with Organizational Performance (Y) as the dependent variable and X_1–X_4 as predictors:

The regression model used is:
$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\epsilon$
Where:

- Y = Organizational performance
- X_1 = Green procurement
- X_2 = Waste management
- X_3 = Resource efficiency
- X_4 = Ethical sourcing
- β_0 = Intercept
- ϵ = Error term

Unstandardized coefficients (β), standard errors, t-statistics, and p-values are reported, alongside R^2, adjusted R^2, and F-test results for overall model fit. Statistical significance was assessed at $\alpha = .05$ (two-tailed). Prior to interpretation, routine diagnostics were reviewed (residual plots for linearity and homoscedasticity, normality of residuals, and multicollinearity via Variance Inflation Factors), and no violations affecting inference were detected.

FINDINGS AND DISCUSSION

A total of 155 questionnaires were distributed to employees of the Communication Authority of Kenya (CA) across various departments and management levels. All 155 questionnaires were completed and returned, resulting in a 100% response rate. Such a level of participation is considered exceptional and provides a strong basis for empirical analysis. According to Nulty (2021), very high response rates are rare in organizational research and substantially strengthen the credibility of the data by minimizing the risk of non-response bias.

Survey findings show that 82 respondents (52.9%) confirmed that the Communication Authority of Kenya (CA) currently has a green procurement policy. However, 26 respondents (16.8%) stated that such a policy does not exist, while 47 respondents (30.3%) were unsure. This indicates that although a policy framework may be in place, awareness and communication about it remain uneven across departments. For an institution-wide initiative, such gaps reduce the potential impact of sustainability-focused procurement. When asked how frequently environmental sustainability is prioritized during supplier selection, 37 respondents (23.9%) indicated that it is always considered, while 74 respondents (47.7%) selected often. Another 33 respondents (21.3%) stated Sometimes, while only 6 respondents (3.9%) and 5 respondents (3.2%) selected Rarely and Never,

respectively. These responses suggest that although sustainability is often considered, its application is not yet entirely consistent across all procurement decisions.

Table 1: How Often Sustainability is Prioritized in Supplier Selection

Response Category	**Number of Respondents (n=155)**	**Percentage (%)**
Policy Awareness		
Policy exists	82	52.9%
Policy does not exist	26	16.8%
Unsure	47	30.3%
Frequency of Considering Environmental Sustainability in Supplier Selection		
Always	37	23.9%
Often	74	47.7%
Sometimes	33	21.3%
Rarely	6	3.9%
Never	5	3.2%

Respondents also identified the most significant barriers to green procurement. The top three challenges were the limited availability of eco-friendly suppliers, the high cost of sustainable goods, and the lack of clear or enforceable policies. These obstacles mirror findings in other developing-country contexts where public agencies struggle to balance sustainability objectives with budgetary constraints and immature supplier markets. Liu et al. (2024) emphasize that institutionalizing green procurement requires policies, supplier engagement strategies, and capacity-building for procurement staff to apply environmental criteria in practice effectively. When asked how adoption could be improved, respondents suggested incorporating sustainability clauses into tender evaluations, engaging more actively with certified suppliers, and training procurement officers on lifecycle costing and environmental assessment tools. These responses reflect a growing understanding within CA of what is required to make green procurement operational.

Waste Management Strategies

Among the 155 respondents, 114 (73.5%) confirmed that the Communication Authority of Kenya (CA) has a formal waste management policy. A further 19 respondents (12.3%) reported no such policy exists, while 21 respondents (13.5%) were unsure. This distribution highlights that although a majority recognize the presence of a formal policy, awareness and clarity are not yet universal across the organization. Respondents were asked to identify the specific waste management strategies currently practiced at CA. The most frequently mentioned strategy was waste reduction initiatives (110 respondents, 71.0%), followed by recycling programs (88 respondents, 56.8%), proper disposal of hazardous waste (77 respondents, 49.7%), and the use of biodegradable materials (31 respondents, 20.0%). These findings suggest that CA has made notable progress in

embedding structured practices that reduce waste at the source and ensure safe handling of hazardous materials. This is especially important given CA's regulatory role over communication infrastructure, often involving electronic waste requiring specialized disposal methods.

Table 2: Waste Management Strategies in Use at CA

Response Category	Number of Respondents (n=155)	Percentage (%)
Policy Awareness		
Policy exists	114	73.5
Policy does not exist	19	12.3
Unsure	21	13.5
Current Waste Management Strategies Practiced		
Waste reduction initiatives	110	71.0
Recycling programs	88	56.8
Proper disposal of hazardous waste	77	49.7
Use of biodegradable materials	31	20.0

When asked to rate the effectiveness of these strategies, many respondents described them as effective, though there were also neutral assessments, indicating that improvements remain necessary. The frequently cited barriers included limited employee awareness and participation, weak enforcement mechanisms, and high implementation costs. These challenges are consistent with findings in the literature that emphasize organizational culture, policy enforcement, and staff engagement as key enablers of successful waste management (Udodiugwu, 2024). Respondents also suggested several practical improvements, such as regular internal training, better labeling of waste bins, partnerships with licensed recyclers, and investment in digital tools to track waste volumes. Some emphasized integrating waste audits into routine operations to provide continuous monitoring and feedback.

Resource Efficiency

It was observed that 145 respondents (93.5%) confirmed that CA actively implements resource efficiency measures. This high proportion indicates that efficient resource efficiency is acknowledged and embedded within the organization's operational philosophy. However, the degree of adoption and the consistency of implementation vary across departments, which affects overall impact. When asked which measures were currently practiced, the most widely adopted was employee training on sustainability, reported by 102 respondents (65.8%). This was followed by energy-efficient equipment (78 respondents, 50.3%), sustainable transportation methods (62 respondents, 40.0%), and water conservation strategies (48 respondents, 31.0%), as shown below.

Table 3: Resource Efficiency Measures Implemented at CA

Response Category	Number of Respondents (n=155)	Percentage (%)
Implementation Status		
Resource efficiency measures implemented	145	93.5
Specific Measures Practiced		
Employee training on sustainability	102	65.8
Use of energy-efficient equipment	78	50.3
Sustainable transportation methods	62	40.0
Water conservation strategies	48	31.0

These findings suggest that CA prioritizes human capital development and energy efficiency as the main levers for driving sustainability. Training reflects organizational awareness of the importance of behavioral change, while the uptake of energy-efficient technologies signals progress in infrastructure optimization. However, critical areas such as water conservation and sustainable transportation remain underutilized, limiting the holistic realization of resource efficiency.

Respondents also assessed the presence and clarity of internal policies supporting energy efficiency. While many agreed that such policies exist, concerns were raised about budgetary constraints that hinder full implementation. This aligns with research showing that financial limitations remain a major barrier to resource efficiency initiatives in public sector institutions across Sub-Saharan Africa (Zhou et al., 2024). Another key issue highlighted was the absence of performance tracking systems. Although CA is implementing initiatives such as training and energy-efficient technologies, the lack of real-time monitoring tools limits the ability to measure long-term impact. Several respondents suggested integrating digital dashboards and sustainability KPIs into departmental reporting structures to strengthen oversight and accountability. Finally, although training emerged as the most widely implemented measure, some respondents observed that the content was often too generic and insufficiently tailored to departmental needs. This suggests the need for more context-specific programs that directly address operational realities.

Ethical Sourcing

From the survey, 127 respondents (81.9%) indicated that ethical sourcing is a priority at CA, while 10 respondents (6.5%) stated it is not, and 18 respondents (11.6%) were unsure. This high level of recognition demonstrates broad organizational commitment to procurement, integrity and supplier accountability. However, the responses also suggest that awareness is not universal and that the depth of enforcement remains uneven. Respondents identified several key criteria used when evaluating suppliers. The most frequently cited was environmental sustainability compliance (104 respondents, 67.1%), followed by avoiding suppliers involved in unethical labor practices (95 respondents,

61.3%), fair labor practices (67 respondents, 43.2%), and supporting suppliers who uphold corporate social responsibility (CSR) (50 respondents, 32.3%).

Table 4: Ethical Sourcing Criteria Applied at CA

Response Category	Number of Respondents (n=155)	Percentage (%)
Priority of Ethical Sourcing		
Ethical sourcing is a priority	127	81.9
Not a priority	10	6.5
Unsure	18	11.6
Criteria Used in Supplier Evaluation		
Environmental sustainability compliance	104	67.1
Avoiding suppliers involved in unethical labor practices	95	61.3
Fair labor practices	67	43.2
Supporting suppliers who uphold CSR	50	32.3

These findings indicate that CA has begun embedding ethical and sustainability standards into supplier assessments, which is consistent with global public sector trends where ethical sourcing is increasingly recognized as a driver of legitimacy and stakeholder trust (Maniatis & Maniatis, 2024). However, the extent to which these criteria are consistently enforced in tendering, contracting, and supplier monitoring remains unclear. The main challenges hindering effective ethical sourcing were difficulty verifying supplier compliance (92 respondents, 59.4%), weak enforcement mechanisms (65 respondents, 41.9%), high costs of ethically sourced products (61 respondents, 39.4%), and limited availability of certified suppliers (59 respondents, 38.1%). These challenges reflect broader systemic issues in public procurement, where due diligence systems are often underdeveloped, and supplier markets may lack sufficient transparency. Respondents offered several strategies to strengthen ethical sourcing, including requiring third-party certifications during tendering, conducting random supplier audits, partnering with ethical trade agencies such as Fairtrade Africa, and digitizing supplier compliance records to improve traceability. Additionally, some emphasized the importance of training procurement staff on international ethical sourcing standards and aligning these with departmental practices to avoid inefficiency. While CA recognizes the importance of ethical sourcing and has integrated some criteria into procurement processes, its ability to institutionalize these practices fully is still developing. Stronger compliance mechanisms, greater supplier engagement, and investment in verification tools are required. By addressing these challenges, CA can reduce reputational risk, enhance procurement transparency, and position itself as a leader in ethical public sector supply chains.

Organizational Performance

Organizational performance is multidimensional, encompassing operational efficiency, cost effectiveness, regulatory compliance, employee engagement, and environmental sustainability. Within sustainable supply chain management (SSCM), these dimensions extend beyond financial outcomes to include social and environmental contributions. The survey results from 155 respondents reveal how SSCM practices have influenced performance at the Communication Authority of Kenya (CA). When asked to assess the impact of SSCM on cost savings and operational efficiency, most respondents rated the influence as either High (83 respondents, 53.5%) or Very High (34 respondents, 21.9%). A further 26 respondents (16.8%) considered the impact Moderate, while only 11 (7.1%) rated it as Low or Very Low. These findings suggest that initiatives such as adopting energy-efficient technologies and staff training on sustainability practices have reduced operational costs and optimized resource allocation. This aligns with Bratt et al. (2023), who found that integrating sustainability into supply chain processes drives measurable efficiency gains through reduced waste and better energy management.

Regulatory compliance emerged as another strong dimension influenced by SSCM practices. 119 respondents (76.7%) rated the impact as High or Very High, while only 8 (5.1%) considered it Low or Very Low. Respondents noted that compliance with environmental regulations and procurement standards has improved partly due to formal policies such as hazardous waste protocols and sustainability clauses in supplier evaluations. These results reinforce the importance of SSCM in enhancing audit readiness and ensuring alignment with national procurement laws and international sustainability frameworks. Regarding environmental sustainability, 88 respondents (56.8%) rated SSCM's influence as High, and 24 (15.5%) as Very High. Although 33 respondents (21.3%) rated it Moderate and 8 (5.1%) rated it Low or Very Low, the overall trend points to a broadly positive perception. Respondents linked recycling programs, waste reduction initiatives, and adopting energy-efficient systems to a measurable reduction in CA's ecological footprint. While gaps remain in water conservation and e-waste management, the results indicate that SSCM practices progressively embed sustainability into CA's operational culture.

Employee engagement in sustainability was viewed more moderately. A combined 112 respondents (72.2%) rated engagement as High or Very High, 30 (19.4%) selected Moderate, and 12 (7.8%) rated it as Low or Very Low. These findings suggest that while training and awareness programs have successfully engaged many staff members, participation is not yet evenly distributed across all departments. Some employees remain less directly involved in sustainability initiatives, underscoring the need for broader cross-functional collaboration to integrate SSCM practices throughout the organization. Although not explicitly measured as a survey item, stakeholder trust emerged frequently in open-ended responses. Several participants noted that CA's visible commitment to sustainability, particularly through compliance with procurement standards and ethical sourcing, has improved public perception and credibility with

external partners. These findings align with research that emphasizes the importance of sustainability practices in strengthening institutional legitimacy and fostering long-term stakeholder confidence (Maniatis & Maniatis, 2024).

These results indicate that SSCM practices at CA have positively influenced organizational performance across financial, environmental, and compliance-related dimensions, while also strengthening employee participation and external credibility. However, the findings suggest continuous improvement is needed to institutionalize performance gains fully. Institutionalizing sustainability scorecards, expanding staff engagement beyond core departments, and addressing gaps in underutilized areas such as water and mobility systems would allow CA further to integrate SSCM outcomes into its strategic and operational evaluations.

Inferential Statistical

To complement the descriptive analysis presented earlier, this section employs inferential statistics to examine how Sustainable Supply Chain Management (SSCM) practices influence organizational performance at the Communication Authority of Kenya (CA). Specifically, correlation analysis was used to explore the direction and strength of relationships between the independent variables (green procurement, waste management, resource efficiency, and ethical sourcing) and the dependent variable (organizational performance). Multiple regression analysis was then applied to evaluate the joint explanatory power of SSCM practices on performance outcomes.

Correlation Analysis

Pearson correlation coefficients were computed for each SSCM practice against organizational performance. The results are summarized in Table 5 below.

Table 5: Correlation Matrix

Variable	Green Procurement	Waste Management	Resource Efficiency	Ethical Sourcing	Org. Performance
Green Procurement	1.000	0.103	0.222	0.253	0.455
Waste Management	0.103	1.000	0.520	0.498	0.089
Resource Efficiency	0.222	0.520	1.000	0.619	0.196
Ethical Sourcing	0.253	0.498	0.619	1.000	0.370
Org. Performance	0.455	0.089	0.196	0.370	1.000

The analysis reveals several important trends. Green procurement ($r = 0.455$) shows a moderate positive correlation with organizational performance, indicating that prioritizing sustainability in supplier selection is strongly associated with improved performance outcomes. Ethical sourcing ($r = 0.370$) also demonstrates a moderate positive

relationship, suggesting that socially responsible supplier practices are linked to enhanced organizational credibility and efficiency. By contrast, resource efficiency (r = 0.196) and waste management (r = 0.089) show weak positive associations, implying that while these practices are in place, their direct influence on performance is less pronounced at this stage.

Regression Analysis

To assess the combined impact of SSCM practices on organizational performance, a multiple linear regression model was estimated:

The regression model used is:

$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\epsilon$

Where:

- Y = Organizational performance
- X_1 = Green procurement
- X_2 = Waste management
- X_3 = Resource efficiency
- X_4 = Ethical sourcing
- β_0 = Intercept
- ϵ = Error term

The regression results are summarized in Table 6 below.

Table 6: Regression Coefficients

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value
Constant	2.404	0.248	9.689	0.000
Green Procurement	0.289	0.053	5.415	0.000
Waste Management	-0.076	0.065	-1.164	0.246
Resource Efficiency	-0.040	0.060	-0.663	0.508
Ethical Sourcing	0.231	0.059	3.896	0.000

$R^2 = 0.288$

Adjusted $R^2 = 0.269$

F-statistics = 15.19 ($p < 0.001$)

The model explains approximately 28.8% of the variance in organizational performance, which is considerably stronger than in the initial analysis. Importantly, green procurement ($\beta = 0.289$, $p < 0.001$) and ethical sourcing ($\beta = 0.231$, $p < 0.001$) emerged as statistically significant positive predictors of performance. This finding suggests that strengthening procurement policies around sustainability and supplier accountability has a tangible impact on CA's overall performance outcomes. By contrast, despite showing weak positive correlations, waste management and resource efficiency were not statistically significant predictors. This implies that while these practices contribute indirectly to environmental sustainability, they have not yet matured enough within CA to drive measurable performance improvements. These results provide a statistical basis

for interpreting how each sustainable supply chain practice contributes to organizational performance. The following section discusses these findings in relation to existing literature and practical implications for CA.

CONCLUSION AND RECOMMENDATIONS

This study examines the influence of Sustainable Supply Chain Management (SSCM) practices on organizational performance at the Communications Authority of Kenya (CA). The analysis confirmed that sustainability initiatives are progressively shaping the Authority's operational and strategic landscape. Green procurement and ethical sourcing emerged as the most significant drivers of performance, while waste management and resource efficiency were identified as emerging areas that require stronger institutional support. The conclusions underscored that SSCM practices, when properly aligned with policy frameworks, resources, and stakeholder expectations, enhance cost efficiency, regulatory compliance, and public trust. Recommendations were proposed at policy, organizational, and academic levels to institutionalize sustainability and guide further research. Collectively, these projects emphasize that SSCM is not an isolated management function but a comprehensive governance framework that supports accountability, innovation, and long-term value creation. By addressing the highlighted gaps and implementing the recommended strategies, public institutions such as CA can strengthen their contribution to Kenya's sustainable development agenda and enhance performance across economic, environmental, and social dimensions.

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