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Research Paper

Promoting circular economy model through SMEs' growth: a focus on African nations

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ABSTRACT

Purpose- The purpose of this study is to investigate the pivotal role of Small and Medium-sized Enterprises (SMEs) in promoting circular economy principles within African countries. By examining the challenges, opportunities, and policy implications, this research aims to provide valuable insights into how SME development can be harnessed as a catalyst for sustainable and circular economic growth in the African context. Design/methodology/approach: Our methodology encompasses a comprehensive literature review and theoretical analysis to explore the relationship between Small and Medium-sized Enterprises (SMEs) and circular economy principles in African countries, providing a robust foundation for our study. Findings: The study's findings emphasize the significant potential of African SMEs in promoting circular economy practices. However, they also reveal the various challenges these SMEs encounter, including financial constraints and regulatory complexities. Successful initiatives and supportive policies demonstrate that with targeted interventions, SMEs can play a vital role in advancing sustainability in Africa. Research limitations/implications: The study primarily relies on theoretical analysis due to the absence of empirical data, potentially limiting the practical application of findings. Additionally, the diverse African context may require further country-specific research for precise policy recommendations. Social implications: The research carries significant social implications, as the adoption of circular economy practices by SMEs in African nations can lead to the creation of more sustainable and inclusive economic systems, positively impacting local communities and fostering social cohesion. Originality/value: The research contributes original insights by specifically focusing on the underexplored intersection of SMEs and the circular economy in the African context, providing a valuable foundation for future studies and policy initiatives aimed at fostering sustainability and economic development.

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1. INTRODUCTION

The concept of a circular economy has emerged as a compelling solution to address the pressing global challenges of resource depletion, environmental degradation, and economic sustainability. It represents a departure from the traditional linear "take-make-dispose" model, advocating for a regenerative approach where resources are conserved, reused, and recycled to minimize waste and environmental impact. In the quest to transition towards circularity, Small and Medium-sized Enterprises (SMEs) play a pivotal role. These enterprises, often the backbone of many economies, possess the agility and potential to foster sustainable practices and drive innovation. The concept of a circular economy offers a perspective for enhancing resource efficiency. Extending the lifespan of materials through reuse is gaining importance and represents an appealing aspect of the solution. Embracing this approach may yield substantial advantages for businesses [1] in a comprehensive sense, a Circular Economy can be defined as an economic system with the primary goal of achieving zero waste and pollution throughout the lifecycles of materials. This entails minimizing waste to the extent that products are kept in use until the end of their life, and their components are reused in new products, creating a regenerative economic system. Achieving this transformation involves the design of innovative processes, resource optimization solutions, and business models that reduce reliance on finite resources (Figure 1).

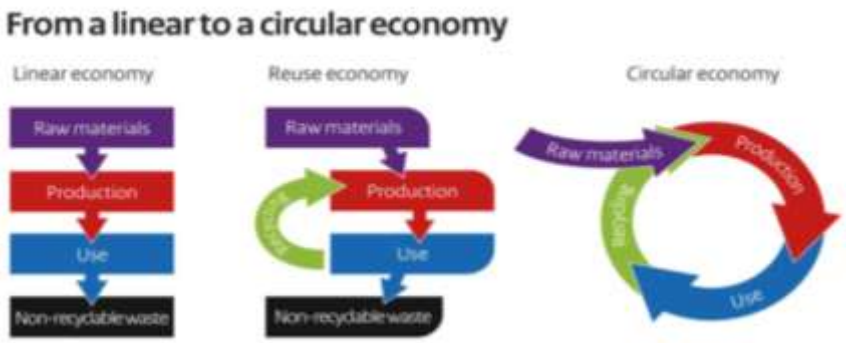

Figure 1. Linear vs Circular Economy

The global interest in the Circular Economy has surged in response to the growing world population and the consequent rise in demand for finite raw materials. This trend presents new opportunities for businesses, job creation, cost reduction through efficient material usage, and enhancements in the security and stability of supply chains [2]. The World Business Council for Sustainable Development has identified the circular economy as a substantial commercial opportunity, estimating its potential value to be as high as $4.5 trillion [3]. This recognition underscores the transformative potential of the circular economy, which could lead to the emergence of new industries, job creation, reduction in greenhouse gas emissions, and enhanced efficiency in the utilization of natural resources. Tangible examples of these improvements are already visible in sectors such as clothing, durable goods, and textiles. These industries are increasingly adopting circular practices, which include recycling, reusing, and refurbishing products and materials, leading to reduced waste, resource conservation, and economic benefits. This not only aligns with sustainability goals but also demonstrates the tangible economic advantages of transitioning toward a circular economy [4], [5], [6].

1.1 Problem of the study

The present study focuses on the significance of the circular economy within small and medium-sized enterprises (SMEs) in African nations, with three primary objectives. Firstly, it aims to evaluate how SME development can contribute to the advancement of circular economy principles [7]. Secondly, the study seeks to uncover the extent to which SMEs in African countries are integrating circular economy practices into their daily operations. Lastly, it explores the barriers and challenges that SMEs encounter when attempting to adopt circular economy principles, including financial constraints and regulatory obstacles. To facilitate successful adoption of circular economy principles, the study employs the 4R framework, encompassing reduction, reuse, recycling, and repurposing. This research endeavors to provide valuable insights into the role of SMEs in promoting sustainability and resilience in African economies. The circular economy (CE) marks a significant shift in the prevailing paradigm, transitioning from linear supply chains to circular ones across various industries. This research specifically investigates the adoption of circular economy practices within small and medium-sized enterprises (SMEs) in Africa, shedding light on the associated challenges, strategies, necessary resources, and competencies required for successful implementation. While the development and application of circular economy principles are more prominently observed in developed economies, notably in Europe, there is emerging evidence of circular economy initiatives taking shape in Africa, signifying efforts to introduce and implement this concept on the continent [4].

1.2 Objective of the study

- The central objective of this study is to evaluate how the Circular Economy system can be improved through the growth and development of small and medium-sized enterprises (SMEs) in African nations.
- The study aims to uncover the ways in which SMEs in Africa incorporate Circular Economy principles into their day-to-day operations.
- The research seeks to investigate and address the obstacles and hindrances that SMEs encounter when trying to embrace Circular Economy practices in Africa, with a focus on finding effective solutions to these challenges.

1.3 Research Question

- How can the Circular Economy system be improved within SMEs in Africa?
- In what ways do SMEs operating in Africa incorporate Circular Economy principles into their daily business operations?
- What are the key challenges and obstacles that SMEs in Africa encounter when attempting to embrace Circular Economy practices, and what effective solutions can be identified to address these challenges?

2. RELATED WORK

The Circular Economy (CE) is an economic system centered around the reduction, reuse, recycling, and recovery of materials throughout the entire lifecycle of production, distribution, and consumption. Its overarching goal is to achieve sustainable development, fostering environmental well-being, economic prosperity, and social equity, with benefits that extend to both present and future generations. Achieving this sustainability relies on innovative business models and conscientious consumers. At its core, the primary objective of the Circular Economy is to facilitate sustainable growth for enterprises across micro, meso, and macrosystem levels while mitigating the unsustainable depletion of natural resources, energy, and materials. [8] A research study investigated the adoption of Circular Economy (CE) practices within small and medium-sized enterprises (SMEs) in France, Greece, Spain, and the UK and assessed its influence on sustainability outcomes. The results indicate that the incorporation of CE principles can lead to improved environmental performance, primarily driven by enhanced energy and resource efficiency, as well as reduced waste generation. Building on these findings, the study put forth a comprehensive implementation framework aimed at guiding SMEs in the development of organization-wide strategic

initiatives for embracing Circular Economy practices within their business operations [9]. An examination of Circular Economy (CE) policies and practices in the context of Africa is the focus of this study, which draws on case studies from Kenya and South Africa. The research delves into the potential of the shift toward a Circular Economy in Africa to play a pivotal role in advancing the United Nations Sustainable Development Goals. This involves the development of national and regional roadmaps aimed at charting the course for CE adoption. The study identifies opportunities for applying sustainable principles and strategies across diverse contexts, ultimately benefiting economies, livelihoods, and the environment in the African region [10]. Embracing circular economy approaches presents multifaceted opportunities and advantages across environmental, social, and economic dimensions. From an environmental perspective, these practices hold the potential to decrease the demand for virgin materials, curtail waste generation, and lower energy consumption, thereby contributing to resource conservation and reduced ecological impact. On the economic front, the benefits encompass the creation of new market opportunities and the augmentation of product value, fostering innovation and economic growth. At the societal level, embracing circular economy principles can enhance overall welfare and nurture a sense of community, particularly through shared economy practices that align with the collaborative and sustainable ethos inherent to a circular economy [11]. Circular Economy (CE) practices hold significant promise in elevating the sustainability performance of organizations. This research seeks to investigate the adoption of CE principles within small and medium-sized enterprises (SMEs) in Europe and assess their influence on sustainability performance. The study employs a mixed-methods approach to analyze the state of CE practices and their impact on sustainability performance, with a specific focus on critical CE areas including design, procurement, production, distribution, consumption, and recovery, within SMEs operating in France, Greece, Spain, and the UK. The findings underscore that the adoption of CE can yield superior environmental performance by fostering energy and resource efficiency and reducing waste generation. [9].

3. METHODOLOGY

This study employs a research methodology rooted in theoretical analysis and literature review. Given the absence of empirical data or practical case studies, our research methodology centers on an extensive exploration of existing theoretical frameworks, concepts, and models related to the circular economy and Small and Medium-sized Enterprises (SMEs). The research process involves a thorough understanding of the available literature to gather relevant insights of the circular economy-SME relationship. The methodology acknowledges the limitations of a purely theoretical approach and suggests potential directions for future empirical research to validate and expand upon the theoretical foundations explored in this study.

3.1 The Role of SMEs in Advancing Circular Economy

SMEs play a crucial role in the promotion of eco-design and product lifecycle management. They are increasingly adopting principles that emphasize designing products for durability, repairability, and recyclability. In doing so, SMEs foster product longevity and reduce the overall environmental impact. Furthermore, the circular practices of SMEs extend to building circular supply chains and strengthening local economies. These enterprises actively source materials locally, thereby minimizing resource waste and transportation emissions. SMEs' engagement in circular supply chains creates symbiotic relationships with other businesses, contributing to a more sustainable and resilient economic ecosystem. In essence, SMEs are not merely passive actors in the circular economy paradigm; they are dynamic catalysts, driving innovation, reducing waste, and creating economic value while championing the cause of sustainability within the diverse landscapes of African countries.

3.2 Successful Initiatives Taken by African SMEs in Circular Economy Practices

The Africa Circular Economy Facility (ACEF) is a significant initiative that serves as a multi-donor grants trust fund. Its primary objective is to promote and integrate the circular economy as a key strategy

for inclusive green growth in African nations, aligning with their development priorities. ACEF plays a crucial role in advancing the circular economy by:

- **Supporting Institutional Frameworks:** ACEF assists in the establishment of institutional frameworks that facilitate the transition to a circular economy. This involves creating policies, regulations, and guidelines that encourage sustainable practices and resource optimization.
- **Private Sector Support:** The facility provides support to the private sector in its efforts to transition toward circular business models. This can involve financial assistance, capacity building, and technical expertise to help businesses adopt circular practices and technologies. In the African context, there is a strong emphasis on several key aspects:
- **Job Creation:** The circular economy approach aligns with Africa's focus on job creation. Circular activities often require new skills and labor, contributing to employment opportunities in sectors like recycling, repair, remanufacturing, and sustainable agriculture.
- **Income Generation:** By promoting resource efficiency and sustainable practices, the circular economy can lead to increased income generation, particularly among small and medium-sized enterprises (SMEs) engaged in circular activities.
- **Environmental Impact:** The circular economy places a significant emphasis on minimizing environmental impacts. African nations recognize the importance of sustainable resource management and waste reduction to mitigate environmental challenges.
- **Maximizing Resource Use:** Given the continent's abundant natural resources, there is a growing awareness of the need to maximize resource utilization. Circular economy principles help extract maximum value from resources while reducing waste.

A concrete example of the positive impact of circular activities in Africa is the vehicle repair and remanufacturing cluster in Kumasi, Ghana. This cluster not only contributes to job creation but also extends the life of vehicles, reduces waste, and fosters a more sustainable automotive industry.

Overall, the ACEF and similar initiatives are instrumental in driving the adoption of circular economy practices across Africa, aligning economic growth with environmental sustainability, job creation, and the efficient use of resources [10].

3.3 Adoption of Circular Economy Practices in African SMEs' Operation

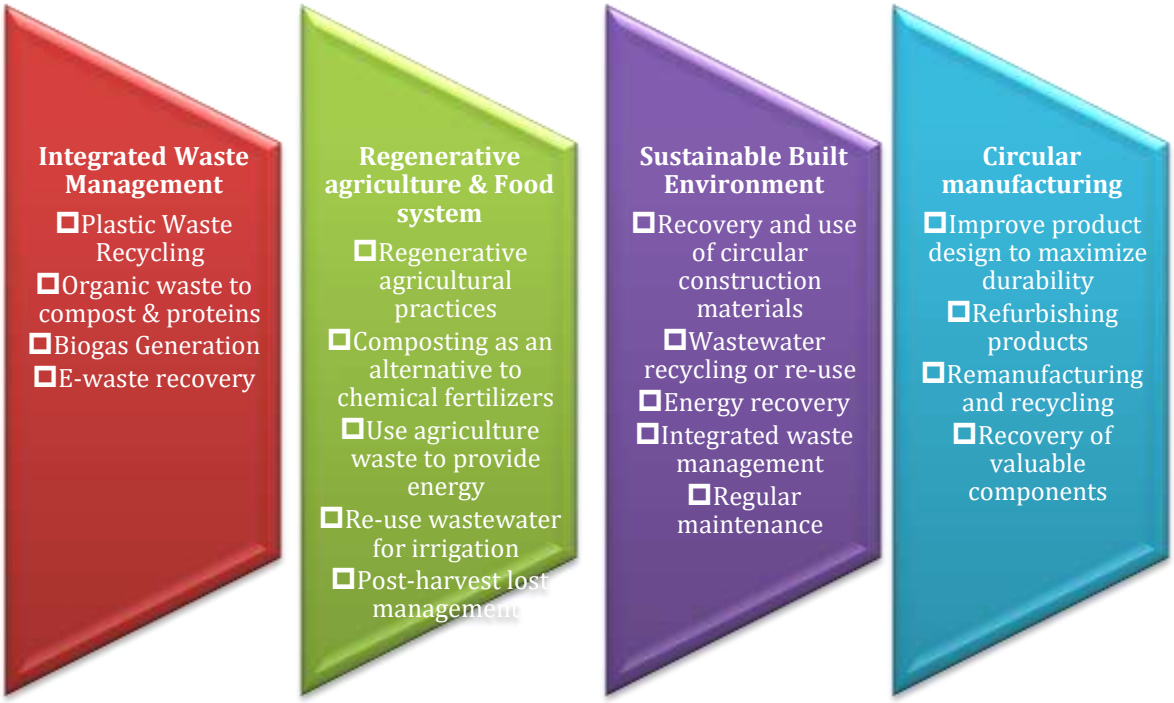

Figure 2. Circular Economy Practices

SMEs are increasingly embracing circular business models, optimizing resource utilization, and prioritizing sustainable sourcing and procurement. They are redefining waste management practices, incorporating recycling into their supply chains, and even redesigning products for longevity and recyclability. Beyond operational changes, African SMEs are engaging with consumers, raising awareness about circular products and services, and nurturing a culture of sustainability. Digitalization and technology play pivotal roles, enabling resource sharing, efficient supply chain management, and data-driven decision-making. While challenges such as limited resources and technology access persist, innovative solutions and support mechanisms are emerging to overcome these barriers.

- **Construction Industry:** The approach involves an endeavor to eliminate waste and pollution within the construction sector by adopting a series of sustainable practices. This includes the sourcing of building materials from local and reclaimed sources, incorporating bioclimatic and passive design principles, and capturing and efficiently utilizing resources. Additionally, the strategy involves the design of buildings with modularity and flexibility in mind, allowing for adaptability and reduced resource consumption over the long term. By integrating these practices, the construction industry can significantly reduce its environmental footprint and promote sustainability.
- **Electronics and E-Waste:** The escalating sales of electronic devices across African nations have led to a corresponding rise in electronic waste (e-waste) generation, encompassing items like refrigerators, televisions, and mobile phones. This annual increase in e-waste poses significant challenges to both public health and the environment in African countries. Consequently, e-waste management has assumed a critical position on the policy agenda, prompting countries like Ghana, Rwanda, Nigeria, and South Africa to develop comprehensive policy frameworks aimed at enhancing e-waste management practices. These frameworks often include the introduction of policies such as Extended Producer Responsibility (EPR) to address the growing concerns associated with e-waste.
- **Fashion and Textiles:** A Circular Economy (CE) offers the potential for a fashion industry that is not only economically prosperous but also inclusive and resilient, all while circumventing the shortcomings of the prevailing linear system that detrimentally affects both the environment and people's overall well-being. Remarkably, African designers, tailors, and entrepreneurs are at the forefront of driving circular fashion practices and business models. Their innovative approaches provide a compelling example of CE in action, showcasing how sustainable and regenerative practices can thrive within the African fashion industry, paving the way for a more sustainable and equitable future. Food and agriculture: Every year, African cities demand an increasing quantity of food, resulting in a higher output of organic waste. Effectively managing the flow of urban organic waste in a manner that conserves resources and promotes sustainability is poised to be one of the primary challenges in the coming decades. Plastics: Addressing the issue of plastic pollution has become increasingly crucial as global plastic production and consumption have surged in recent decades. Projections indicate that Egypt, Nigeria, South Africa, Algeria, Morocco, and Tunisia will witness a doubling of plastic imports by 2030, posing substantial environmental challenges. The influx of plastic waste into the oceans poses a significant threat to food security and economic development, while mismanaged waste on land may contribute to the spread of diseases and viruses, such as malaria or Ebola (Bank, 2021). In Africa, three primary strategies are pivotal in designing out packaging waste:
- **Elimination:** This approach involves identifying methods to eliminate unnecessary packaging or innovating packaging designs to render them obsolete.
- **Reuse:** Implementing business models that extend the lifespan of packaging beyond a single use, achieved either through packaging return systems or customer-refilled containers.
- **Material Circulation:** This strategy focuses on redesigning packaging materials to enable recycling or composting, thus promoting circularity and sustainability.

These strategies play a vital role in mitigating the detrimental effects of plastic pollution and promoting responsible packaging practices in Africa.

3.4 Challenges and Barriers to SME Adoption of Circular Economy in Africa

Lack of Awareness	Many SMEs in Africa may not be fully aware of the principles and benefits of a circular economy, making it challenging for them to embrace circular practices.
Financial Constraints	Limited access to financing and resources can hinder SMEs from investing in circular initiatives, which may require upfront capital.
Inadequate Infrastructure	Insufficient infrastructure for recycling and waste management in some regions of Africa can impede the recycling and repurposing of materials.
Regulatory Hurdles	Complex or unclear regulations related to waste management and recycling may pose obstacles to SMEs seeking to adopt circular practices.
Limited Technological Resources	Many SMEs may lack the technological capabilities required for efficient resource optimization and recycling.
Access to Markets	SMEs may face challenges in accessing markets for recycled or repurposed products, limiting their ability to close the loop in the circular economy.
Capacity and Skills	A shortage of skilled personnel and capacity constraints may hinder SMEs in implementing circular strategies effectively.
Supply Chain Complexities	Managing circular supply chains can be complex, especially for SMEs with limited resources and expertise.
Cultural Shift	Encouraging a cultural shift towards sustainable consumption and circular practices among consumers may be challenging.
Scale and Collaboration	Collaborative efforts and economies of scale are often required for successful circular initiatives, which can be challenging for individual SMEs.

Figure 3. Challenges and Barriers to SME Adoption of Circular Economy in Africa

3.5 Government Policies and Support Mechanisms

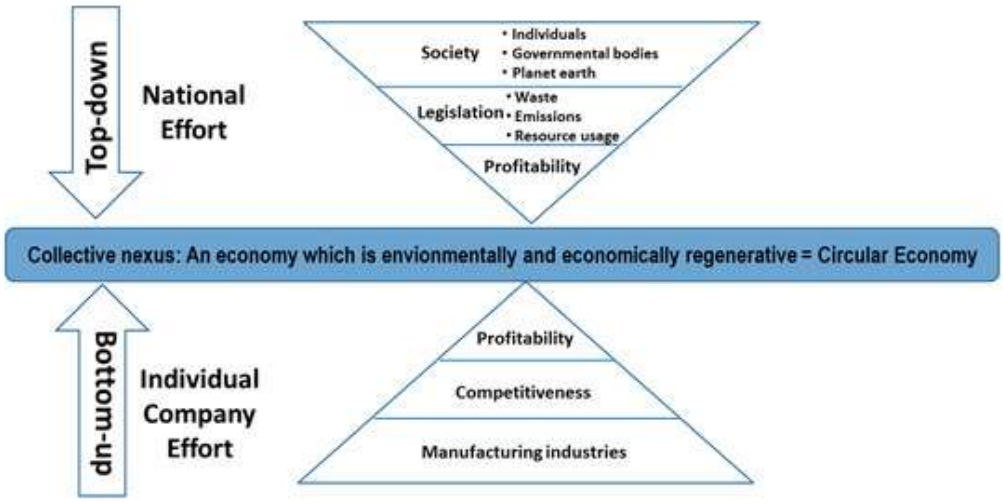

Figure 4. Government Policies and Mechanisms

Source: Top-down and bottom-up integration in the implementation of CE strategies, adapted from [12].

Government policies and mechanisms play a pivotal role in driving the adoption of Circular Economy (CE) practices, particularly among Small and Medium-sized Enterprises (SMEs). Their importance cannot be overstated in the journey towards sustainability and resource efficiency. These policies provide a structured framework that guides SMEs in transitioning from linear, resource-intensive models to circular, regenerative ones. By offering financial incentives, tax benefits, and grants, governments alleviate some of the initial financial burdens associated with implementing CE practices, making them more accessible to SMEs. Capacity-building programs and training initiatives foster the necessary knowledge and skills to navigate this transformative shift effectively. Furthermore, regulations and

standards ensure that SMEs align their operations with circular principles, encouraging waste reduction, resource optimization, and sustainable sourcing. Government-backed circular procurement policies create demand for circular products and services, thus stimulating market growth. In essence, these policies and mechanisms form a supportive ecosystem that empowers SMEs to become active contributors to the circular economy, driving economic development while mitigating environmental impacts. Their role is integral, fostering a sustainable future for both businesses and the planet. Here are some examples of policies and initiatives related to the circular economy that have been implemented or proposed in various African countries:

South Africa's National Waste Management Strategy: South Africa has developed a comprehensive strategy that includes policies and initiatives to promote waste reduction, recycling, and resource recovery. This strategy aims to create a more circular economy by minimizing waste generation and optimizing resource use. Case Study of African Countries.

1. Kenya's Plastic Bag Ban: Kenya implemented a ban on single-use plastic bags, encouraging the use of reusable bags and reducing plastic waste. While not exclusive to SMEs, this policy indirectly influences circular economy practices by reducing waste generation.
2. Tunisia's Eco-labeling Program: Tunisia introduced an eco-labeling program that allows businesses, including SMEs, to label their products as environmentally friendly. This encourages sustainable and circular product design and production.
3. Nigeria's National Environmental Standards and Regulations Enforcement Agency (NESREA): NESREA has established regulations to govern environmental standards, including waste management and recycling practices. These regulations impact SMEs and encourage more sustainable operations.
4. Rwanda's Green Growth and Climate Resilience Strategy: Rwanda's strategy promotes circular economy principles by focusing on sustainable resource management, efficient resource use, and waste reduction. This indirectly affects SMEs operating in Rwanda.
5. Mauritius' Circular Economy Policy Framework: Mauritius has developed a policy framework specifically dedicated to the circular economy. The framework outlines strategies for various sectors, including SMEs, to adopt circular practices.
6. Morocco's Renewable Energy and Energy Efficiency Program: While not exclusive to the circular economy, Morocco's program promotes resource efficiency and sustainable energy practices, which indirectly benefit SMEs aiming to reduce their environmental footprint.
7. Rabat (Morocco) low carbon emission initiative: The Moroccan government has pledged to shift towards a low-carbon emissions society, demonstrating its commitment to sustainable environmental practices. Geo-cycle, as an organization, serves as an exemplary embodiment of this vision and aligns well with the national government's objectives and aspirations.
8. Accra’s (Ghana) initiatives of using leaves to wrap take-away meals: Its citizens are already engaged in circular practices as part of their daily routines, such as using leaves to wrap take-away meals. Accra's circular economy potential lies in the preservation and continuation of traditional and indigenous practices that naturally reduce material consumption and prolong the lifespan of products.
9. Cape Town’s (South Africa) initiative of Green-Cape: Cape Town has initiated multiple projects to advance Circular Economy practices within the city. It is currently engaged in two significant projects in partnership with Green-Cape. Firstly, they are actively developing and executing a Circular Economy roadmap, an endeavor focused on exploring the economic potential and opportunities for enterprise development and investment. Additionally, the city has initiated a solid waste management project, geared towards expediting waste avoidance. Through this project, Cape Town aims to explore various strategies for waste reduction, minimization, and prevention, thereby advancing its commitment to a Circular Economy approach.
10. Nairobi’s (Kenya) initiative of Sanergy: Sanergy's initiatives encompass waste collection, treatment, and upcycling, with a grand vision of establishing the largest organic recycling plant on the African continent. Through these circularity-driven endeavors, Nairobi has embarked on a journey aimed at

reducing, reusing, regenerating, and recycling solid waste, charting a more sustainable path for the city's future.

4. CONCLUSION

The pursuit of a circular economy in African countries stands at a critical juncture, where economic development and environmental sustainability converge. This study has undertaken a comprehensive exploration of the intricate relationship between Small and Medium-sized Enterprises (SMEs) and the advancement of circular economy principles within the African context. The findings and insights drawn from this research contribute to a deeper understanding of the challenges, opportunities, and potential pathways towards sustainable, circular economies in Africa. In conclusion, this study underscores the imperative of forging a symbiotic relationship between SME development and the circular economy agenda in African countries. While acknowledging the formidable challenges, it remains clear that SMEs can be champions of sustainable and inclusive economic growth. Through concerted efforts by governments, stakeholders, and SMEs themselves, Africa has the potential to redefine its economic landscape, fostering resilience and prosperity while preserving the planet's precious resources. The findings of this research provide actionable recommendations for policymakers, SMEs, and stakeholders. These recommendations are aimed at harnessing the potential of SMEs to not only adapt to but also lead the way in creating circular economies that benefit the African continent as a whole.

4.1 Limitations

The study may encounter limitations such as constrained access to comprehensive and current data on circular economy practices among Small and Medium-Sized Enterprises (SMEs) in African countries, the heterogeneity of SMEs across different sectors and regions, resource constraints impacting circular adoption, and a need for deeper exploration of the regulatory environment and cultural factors influencing SMEs' circular behavior. Additionally, expanding the scope to encompass a diverse range of case studies, evaluating the long-term sustainability of circular initiatives, conducting comparative analyses of policies, and formulating specific policy recommendations for enhanced SME support are all avenues for further exploration. Furthermore, assessing the social inclusivity and environmental metrics of SME-driven circular practices can provide valuable insights into the topic's comprehensive understanding.

4.2 Recommendation for Future Research

Future recommendations should focus on strengthening collaboration among stakeholders, enhancing capacity-building programs for SMEs, aligning circular initiatives with sustainable development goals, ongoing research and data collection, and the development of tailored policies and incentives to support SMEs in their circular economy endeavors. The diverse initiatives and policies related to the Circular Economy (CE) across various countries in Africa underscore a growing commitment to sustainability and resource efficiency. While the specifics of these initiatives may vary, their common thread is the recognition of the critical role that CE practices play in fostering economic growth while minimizing environmental impact. These proactive measures, from plastic bag bans to comprehensive CE policy frameworks, offer inspiration and valuable lessons for SMEs and other stakeholders seeking to embrace circularity. As African nations increasingly integrate CE principles into their policy agendas, a collective momentum builds, propelling the continent toward a more sustainable, resilient, and prosperous future.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
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Sara Mohamed Kheir Ali Mihaisi	✓	✓	✓		✓	✓	✓	✓			✓			✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not Applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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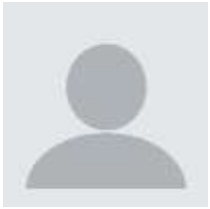
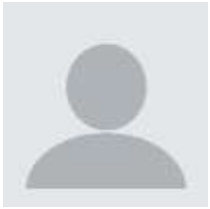
BIOGRAPHIES OF AUTHORS

	**Ruby Khan**, is affiliated with the Department of Finance and Banking, College of Business Administration, Jazan University, Jazan, Saudi Arabia. Her research focuses on finance, banking, corporate governance, financial performance, and sustainable business practices. She has contributed to academic research through publications in peer-reviewed journals and is committed to advancing knowledge in finance and business management through innovative and impactful research. Email: ruby_khan123@yahoo.co.in
	**Sara Mohamed Kheir Ali Mihaisi,** is affiliated with the Department of Finance and Banking, College of Business Administration, Jazan University, Jazan, Saudi Arabia. Her academic interests include finance, banking, financial markets, and corporate sustainability. She actively engages in research addressing contemporary financial challenges and aims to contribute to the development of evidence-based practices in business and financial management. Email: smali@jazanu.edu.sa