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Transitioning circular economy from policy to practice in Kenya

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Policies are imperative in assessing how certain proposed actions or practices can be implemented. In the context of the circular economy, public policies have been influential in determining the way practices are adopted and implemented. In specific contexts, policies can be used to assess a country's preparedness to transition to the circular economy by examining how those that are formulated support the transition. This study examines Kenya's circular economy policy landscape by looking at the strides made by the country to embrace the concept and principles of the circular economy and focusing on the policies formulated so far. Using the thematic analysis approach, the study examines relevant circular economy laws, policies, and regulations to capture the initiatives the country has taken to embrace circular economy principles. The study's overall finding points to environmental sustainability, resource efficiency, sustainable economic development, and stakeholder engagement as the four primary policy areas shaping Kenya's transition to a circular economy. However, there persist certain obstacles to the effective implementation of circular economy principles. These challenges encompass the prevailing dominance of the government in the circular economy sector, which ought to be a collaborative endeavor involving both the private and public sectors. Furthermore, there is a scarcity of financing mechanisms to support circular economy initiatives, inadequate infrastructure to effectively implement circular economy practices, and a lack of capacity to propel progress in both the public and private sectors. Given that many of these challenges revolve around the financial aspect, the study recommends that the Kenyan government considers providing financial incentives to foster dynamism in harnessing the environmental and economic potential offered by the emerging circular economy.

KEYWORDS

circular economy, circularity, policies, practices, transition, Kenya

1. Introduction

The concept of circular economy has taken root globally as an important transition model for promoting environmental protection and sustainable development (Berg et al., 2018). It has attracted the interests of different actors, including the private sector, scholars, and policymakers (Geissdoerferet al., 2019; Suárez-Eiroa et al., 2019). The circular economy offers potential solutions to address environmental challenges facing the world, including resource depletion, biodiversity loss, pollution, and excessive use of land. Embracing a circular economy is envisaged as a fundamental shift in the way products and materials are produced, consumed, and disposed of. Consequently, countries such as China, the Netherlands, and Finland have embraced circular economy models by adapting and developing policies that promote sustainable circularity practices and transition

(Zhu et al., 2019; Hartley et al., 2020). Taghipour et al. (2022) and Bleischwitz et al. (2022) posit that policies are important in guiding circularity practices. Moreover, Govindan and Hasanagic (2018) suggest that there are different types of policies designed to support different aspects of the circular economy's supply chain. For instance, China and the European Union have formulated policies that govern the circular economy value chain from design, manufacturing, consumption, and treatment of waste (McDowall et al., 2017). This approach provides a comprehensive view that shows the contribution of the circular economy to driving the sustainability agenda in these countries.

In Africa, the concept of a circular economy is still vaguely understood in the development of practice, research, and the formulation of policies (Desmond and Asamba, 2019). The application of the concept is barely in its formative stage. Consequently, most economic and environmental activities across Africa are based on a linear economy. In terms of scholarship, there is also limited literature that captures research activities on the circular economy in Africa, apart from a few studies from South Africa (Tahulela and Ballard, 2020; Halog and Anieke, 2021) and Kenya (Ghosh, 2020; Koech and Munene, 2020; Turing, 2021).

Kenya is, therefore, among the few African countries that have started embracing the circular economy concept and has formulated some policies and laws to guide the implementation of circular economy principles. However, there is inadequate information to clarify the key focus of the policies that have been formulated to support the implementation of a circular economy in the country. The purpose of this study was, therefore, to examine Kenya's relevant circular economy policies and laws that capture the strides and key areas of focus made to embrace the concept, philosophy, and principles of circular economy. This study largely focuses on environmental and economic policies and laws that are relevant to the circular economy transition situation in Kenya. Therefore, the research question that guided the study was as follows: What are the key areas of focus of the policies currently shaping the transition to a circular economy in Kenya?

2. Literature review

2.1. Definition, evolution, and key aspects of circular economy

The "circular economy" concept has gained traction in academia, industry, and policy with a built-in impetus on sustainability and environmental consciousness (Masi et al., 2017; Goyal et al., 2021; Halog et al., 2021). Similarly, the novel understanding of the circular economy is highly contested by definition, by broader industrial circular economy practices, and as a narrative umbrella against the linear economy (Brydges, 2021; Manniche et al., 2021; Wuyts, 2022). The Ellen MacArthur Foundation (2015) defines circular economy as "an industrial economy that is restorative or regenerative by intention and design." Consequently, Geissdoerfer et al. (2017) define the circular economy concept as "an established closed-loop material flow in an entire economic system." From these varied scholarly definitions, we derive the definition of the "circular economy" as a "tri-generation system in which input resources are conserved and waste, emissions, and energy leakage are reduced through the gradual closing and contraction of material and energy loops." This can be accomplished by measures such as durability-enhancing construction, servicing, repair, reuse, re-manufacturing, refurbishment, and recycling (Koech and Munene, 2020).

Circular economy transition precedes the linear economy model and its accrued challenges that have pervaded global sectoral economies for decades (Cullen, 2017; Garcés-Ayerbe et al., 2019). The linear economy's "take-make-dispose" attitude to resources and waste necessitated the shift to a circular economy (Cheng and Chou, 2018; Neves and Marques, 2022). The linear economy depletes natural resources, pollutes the environment, and causes climate change by extracting, processing, consuming, and discarding things. Circular economy transitions aim to build a closed-loop system that reuses resources and reduces waste (Upadhayay and Alqassimi, 2018; Esposito et al., 2020). Through recycling, reuse, re-manufacturing, and sharing, we restore and regenerate materials and resources. Similarly, Ghosh (2020), Hamam et al. (2021), and Khaw-ngern et al. (2021) posit that circular economy transitions address linear economy difficulties in numerous ways: resource depletion, which extends material use and lowers resource exploitation; environmental degradation, which reduces waste and pollution and promotes resource sustainability; climate change, which reduces greenhouse gas emissions through renewable energy, energy efficiency, and waste reduction; and economic sustainability, which creates new businesses and jobs and lowers waste disposal costs (Naustdalslid, 2014).

The implementation of circular economy principles is also associated with other related concepts, including environmental sustainability, economic growth, and resource use. Therefore, the circular economy is often associated with many benefits and solutions to some of the emerging development and environmental challenges in many countries. The circular economy is also regarded as a key driver of sustainable development capable of enabling sustainable economic growth (Suárez-Eiroa et al., 2019; Chen and Pao, 2022). The Ellen MacArthur Foundation (2015) and Jabbour et al. (2019) have pointed out that the application of circular economy principles, adopting new business models, and promoting innovations can contribute to economic growth, create new business opportunities, and generate jobs. Similarly, Schröder et al. (2020) have indicated that circular economy practices can improve human development, which ultimately leads to improved wellbeing and a reduction in poverty, especially in developing countries. However, Suchek et al. (2021) have suggested that for sustainable growth to be realized through the implementation of circular economy principles, it is important to ensure there are innovations, especially in the manufacturing and production of competitive products.

Adoption of circular economy principles enhances increased attention to environmental sustainability concerns, therefore, creating more benefits such as improved productivity and resource utilization (Dwivedi and Paul, 2022). With the rising population in the world, and the increasing threats of a reduction in the capacity of the planet to cater to the needs of the population, the importance of circular economy in promoting environmental sustainability has become increasingly important (Bjørnbet et al., 2021). Overall,

Harris et al. (2021) have shown that the implementation of circular economy principles has the potential to improve overall environmental performance, especially through waste management and resource practices that are implemented. The notion of efficient use of resources has also emerged strongly as an important aspect in the adoption of circular economy principles, such as reuse, recovery, recycling, refurbishing, and reuse (Moraga et al., 2022). Moreover, Domenech and Bahn-Walkowiak (2019) have highlighted the importance of emphasizing resource efficiency in the transition to the circular economy, especially if the transition is guided by the right circularity policies. Additionally, Camilleri (2018) has shown the importance of the adoption of circular economy principles because of their regenerative systems that focus on minimizing industrial waste, emissions, and energy leakages through the creation of long-lasting designs that improve resource efficiencies. Resource efficiency in circular economy processes, therefore, helps to reduce demand for natural resources, ultimately minimizing waste and pollution.

Stakeholder engagement has also emerged from the literature as another important and critical aspect for the successful implementation of circular economy principles. For example, Marjamaa et al. (2021) have highlighted the relevance of stakeholder interests and collaboration in promoting circular economy. They emphasize consideration of stakeholders' economic, ecological, and local social perspectives in advancing the circular economy agenda because of the diverse stakes that the concept of the circular economy comes with. These diverse stakes and perspectives have caused circular economy to attract the interests of governments, the private sector, and civil society actors. According to Salvioni and Almici (2020), the adoption of a stakeholder engagement strategy based on values such as participation, effective fulfillment of stakeholders' expectations, and dialogue is a more meaningful way to ensure a successful shift toward the circular economy.

Globally, well-established economies such as the Netherlands, China, Finland, and Japan have adopted circular economy practices and principles that foster their economies' innovation and sustainable development. The Netherlands is regarded as a global leader in the circular economy with its emphasis on building a sustainable circular economy roadmap. To foster circular practices and innovation, the Dutch government has adopted policies and initiatives such as a Circular Economy Implementation Programme 2019–2023 (Government of The Netherlands, 2019), the National Waste Management Plan implemented in terms; 2017–2023–2029 (Government of The Netherlands, 2017a), and the circular economy action plan (Government of The Netherlands, 2017b). China has recognized the importance of the circular economy to reduce waste and address environmental issues. The Chinese government has implemented policies such as the Circular Economy Promotion Law 2008, which encourages the use of renewable resources and the development of eco-industrial parks to promote circular practices (People's Republic of China, 2008). Finland has established a firm commitment to CE, with the government striving to be a leader in the sector by 2025. To facilitate the transition to a circular economy, the Finnish government has instituted policies and initiatives that include the National Roadmap for a Circular Economy (Sitra, 2016), the Finnish Bioeconomy Strategy 2022 (Government of Finland, 2022), and the Finnish Innovation Fund Sitra (Sitra, 2017). Japan has been implementing circular economy ideas for decades, with a heavy emphasis on resource optimisation and waste reduction. To support circular actions, the Japanese government has enacted measures, for example, the 3R (reduce, reuse, recycle) policy (Hezri, 2010). Moreover, the Japanese government, through its previously approved Fifth Basic Environmental Plan, proposed a vision aimed at building self-reliant or prudent societies and leveraging regional natural resource assets with a collaborative and coordinated nexus and a unique developmental pathway (Government of Japan, 2019).

2.2. Circularity in Africa

Circular economy is a fairly new concept in Africa, and there is growing interest in its potential as a tool for achieving sustainable development on the continent (Mhlanga et al., 2022). While Africa's circular economy is still in its early phases, there are numerous encouraging signals of improvement. For starters, several African countries have implemented policies and practices that support the circular economy, for example, South Africa's National Waste Management Strategy (2020) (Republic of South Africa, 2020), actions toward waste reduction, recycling, and recovery. Correspondingly, Kenya's Green Economy Strategy and Implementation Plan 2016–2030 (Government of Kenya, 2016) and The Sustainable Waste Management Act (2022) encourage the transition to a green economy and circular economy techniques throughout several sectors of the economy, including agriculture, manufacturing, and construction. Moreover, various circular economy initiatives and projects are now ongoing throughout Africa.

The "Trash to Wealth" programme in Nigeria, for instance, has been effective in creating jobs and generating income by converting waste into valuable items (Olukanni et al., 2018). Similarly, Rwanda's "Waste to Energy" project has reduced waste and greenhouse gas emissions while also delivering affordable energy to local populations (Global Green Growth Institute, 2021). Furthermore, there is increased knowledge and interest in the circular economy among African enterprises, entrepreneurs, and investors. In recent years, there has been substantial growth in the number of circular economy ventures and social enterprises all across the continent, with many of these initiatives focusing on renewable energy, waste management, and sustainable agriculture (Ellen Macarthur Foundation, 2020; Cau and Ciambotti, 2023). Despite these encouraging signals, fostering the circular economy in Africa faces enormous hurdles including, limited access to funding, a lack of policies, poor regulatory frameworks, and a lack of awareness and understanding of circular economy concepts among policymakers. While the circular economy is still in its infancy in Africa, there is increasing momentum and interest in its potential as a vehicle for achieving sustainable development on the continent.

2.3. Circularity in Kenya

Kenya is among the fastest growing economies in Africa, with a population of over 50 million people (Merem et al., 2019). The agricultural and industrial sectors have contributed significantly

to the country's economic prosperity, resulting in vast volumes of waste and pollution. In recent years, there has been a growing awareness of the negative impacts of the linear economy on the environment and human health, which has led to the adoption of circular economy principles. The take-make-dispose paradigm that characterizes Kenya's linear economy sees the country's natural resources being scavenged for their raw materials, which then employed to manufacture finished products that are ultimately disposed of as garbage. Massive amounts of trash, pollution, and ecological detriment have been produced due to this model. The United Nations Environment Programme (UNEP) and Kenya's National Environment Management Authority (NEMA) estimate that Kenya produces 22,000 tons of waste daily, which amounts to 8 million tons annually (Kemp, 2023). The UNEP points out that out of this waste, just 25% is being collected and disposed of appropriately. Approximately 40% of total waste comes from urban areas, and with yearly urbanization growth of 10%, the country's urban population is projected to generate an estimated 5.5 million tons of waste annually by 2030. Kenya has adopted a model of the circular economy that emphasizes conservation and the use of resources to their fullest extent, including recycling. This model's goals are to extend the useful life of materials and goods, cut down on waste, and lessen the negative effects of both production and consumption on the environment. In addition, Kenya has taken a number of positive measures toward adopting a circular economy model, such as enacting regulations and launching initiatives that encourage waste reduction, recycling, and the growth of a sustainable economy.

Kenya has been working toward a sustainable, circular economy since 2021 (Sustainable Inclusive Organisation, 2021) points out that Kenya's overarching goal is to transition to a circular economy model to boost efficiency in resource use, cut down on waste, and open up new avenues for financial growth. Strategies such as investing in circular business models and encouraging the use of renewable energy sources are part of the overall approach. Kenya has also launched a number of programmes and initiatives to encourage recycling and trash minimization. The National Environment Management Authority (NEMA) has issued legislation and standards for waste management to encourage ethical garbage disposal and recycling, for instance. As a further measure, the country has banned single-use plastic bags, which have significantly cut down on litter. The Ellen MacArthur Foundation estimates that by 2030, Kenya may reap $3.4 billion in yearly economic benefits from establishing a circular economy. However, there are still a number of obstacles that must be overcome, such as a lack of resources, poor waste management infrastructure, and limited knowledge about the circular economy.

While Kenya's economy remains mostly linear (Netherlands Enterprise Agency, 2021), the country has made tremendous progress toward a circular economy. Kenya has the potential to become a pioneer in circular economy development in Africa with the implementation of policies and programmes to encourage waste reduction, recycling, and sustainable economic growth. The importance of policies in directing the transition to the circular economy approach has grown significantly in Kenya (Karcher et al., 2020), as has been the case in leading countries, such as China, Europe, and Japan, where the circular economy concept is well-rooted (Bleischwitz et al., 2022). However, very few studies have been done on the circular economy, let alone on policies that promote it. Some of the work done includes that of Odongo and Thomsen (2021), who explore barriers and enablers experienced by small and medium enterprises (SMEs) practicing the circular economy in Kenya. They point out a host of barriers, including resource, infrastructure, regulatory, policy, and internal and external environmental barriers. Turing (2021) analyses the concept of circular economy to answer the question of what form of circular economy is taking place in Kenya. The author asserts that there are three forms of circular economy: the ideal type that is not identified in practice, the real one mainly practiced by small- and micro-sized firms, and the instrumental one done by multinational corporations. The author further claims that the ideal one forms the dominant conception of a circular economy, influenced largely by the thinking of the global north and used as a form of greenwashing in Kenya.

Nazir and Maina (2022), on the contrary, investigated the role of designers in the circular design economy process and demonstrated the critical role of designers in decreasing waste and pollution-generating products and materials engaged in circularity. Additionally, they found out that having a design contributes to a more resilient economy that addresses many societal challenges. However, Mugambi et al. (2020) examined water recovery opportunities and their contribution to a circular economy in urban areas. Their study observed that local knowledge and experience are crucial in supporting resource recovery initiatives. Even with these limited studies on the circular economy in Kenya, there is no specific study that focuses on how public policies are shaping the country's transition into circular economy practice. In this article, we fill this gap in the literature by examining the existing policies and the way the policies are defining the transition to a circular economy in the country. This way, this article will be an additional contribution to the emerging circular economy field and therefore enhance a better understanding of how to pursue the transition to a circular economy not only in Kenya but also in many other developing countries that are embracing the circular economy concept.

3. Methodology

This study explores the policy landscape of Kenya's circular economy by examining the progress made in transitioning to a circular economy through the formulation of guiding policies. A qualitative study design was employed, utilizing the thematic analysis approach to evaluate key policies that promote the circular economy agenda in Kenya. In addition to reviewing specific policy documents, various commentaries, gray literature, and independent reports were examined to incorporate public and expert perspectives during the discussion phase of the study. The thematic analysis was based on 11 policy documents, as depicted in Table 1.

The thematic analysis procedures proposed by Braun and Clarke (2006) were adopted as the main methodological approach for analyzing the policies iteratively, as follows:

TABLE 1 Policies and laws subjected to thematic analysis.

Policy document	Year
The Environmental Management and Coordination Act	1999
The Vision 2030	2007
The Constitution of Kenya	2010
The Climate Change Act	2016
The Green Economy Strategy and Implementation Plan (GESIP) 2016–2030	2016
Single-use Plastic ban regulations	2017
Kenya National Electrification Strategy	2018
The National Solid Waste Management Strategy (2018-2024)	2018
The Energy Act	2019
The Extended Producer Responsibility Regulations	2021
The Sustainable Waste Management Act	2022

Phase 1: After identifying all the relevant policies to the research question, the first author became familiar with the policy documents by reading and re-reading them while taking notes iteratively to enable the creation of a coding scheme.

Phase 2: This involved generating initial codes by going through all the data and identifying ideas relating to the research question. Using a manual process of creating a Microsoft Word matrix, it was possible to generate initial descriptive codes such as waste reduction and public participation.

Phase 3: Here, emergent themes were identified, with overarching themes arising from the codes determined. Efforts were made to ensure that themes present in the policy documents were included.

Phase 4: The themes were reviewed to ensure that they reflected what was in the policy documents.

Phase 5: Finally, the themes were defined and named to confirm they captured what the policies reflect. At the end of this stage, the four themes are shown in Figure 1.

4. Results

At the conclusion of phase 5, the analysis exercise yielded four distinct thematic areas. The first theme, environmental sustainability, encompassed three sub-themes: waste and pollution reduction, principles of environmental conservation, and climate change mitigation and adaptation. The second theme, sustainable3 economic growth, consisted of two codes: technology and innovations, as well as new businesses and industries. The third theme, resource efficiency, included three sub-themes: waste reduction, sustainable production, and energy conservation. Finally, the fourth theme, stakeholder engagement, comprised two sub-themes: public participation and devolved governance. Figure 1 provides a summary of these themes and their corresponding sub-themes.

4.1. Environmental sustainability

This theme was developed from the sub-themes of waste and pollution reduction, climate change adaptation and mitigation, and environmental conservation principles. The theme addresses the question of how a circular economy in Kenya can enhance environmental sustainability by adopting practices that support the reduction of waste, adhere to known environmental conservation principles, and contribute to the adoption of strategies to adapt to climate change and mitigate its impacts as outlined in the various policies and laws reviewed.

4.1.1. Waste and pollution reduction

The sub-theme of waste and pollution reduction captures the intersection between waste and pollution reduction and circular economy principles. The majority of the policies, laws, and regulations that address this sub-theme have clear statements that refer to the challenge of waste and pollution. Some even outline possible policy solutions to reduce waste and pollution. To begin with, the Constitution of Kenya of 2010 enshrines a right to a clean and healthy environment for the benefit of present and future generations. Additionally, the Environmental Management and Coordination Act provides a comprehensive framework for the management and coordination of environmental activities in the country through specific regulatory, policy, and legal provisions. In 2017, the amendment of the Environmental Management and Coordination Act to ban single-use plastic bags in the country showed how effective enforcement of environmental laws and regulations can be in mitigating the negative effects of poor waste management practices. The ban outlawed the use, production, and importation of single-use bags in Kenya, therefore demonstrating how a policy, if well-enforced, can contribute to environmental sustainability by reducing pollution while promoting circular economy practices through proposals for the use of bags that can be sustainably reused or are biodegradable. Ultimately, there was a significant reduction in plastic bag pollution that previously caused serious environmental challenges in the country. The ban promoted the adoption of circular principles by manufacturers and importers, resulting in the production of environmentally friendly, reusable, and easily biodegradable alternative bags made from plant materials, such as sisal and palm leaves.

An extension of the plastic bag ban in 2020 to cover Kenyan protected areas such as national parks and reserves shows the country's commitment to escalate environmental sustainability measures to more sectors of society and the economy, such as tourism and conservation. Furthermore, the enactment of the Sustainable Waste Management Act in 2022 has outlined measures that directly relate to the promotion of circular economy-related practices such as reuse and recycling waste at the lowest level of governance, which is the county. Additionally, it provides for how to control and regulate all types of pollution, including air, water, and soil quality. Together with the Environmental Management and Coordination Act, the Climate Change Act, and the Energy Act, they promote the adoption of clean technologies, the reduction of waste and emissions, and the adoption of sustainable products aimed at ensuring environmental sustainability in the country.

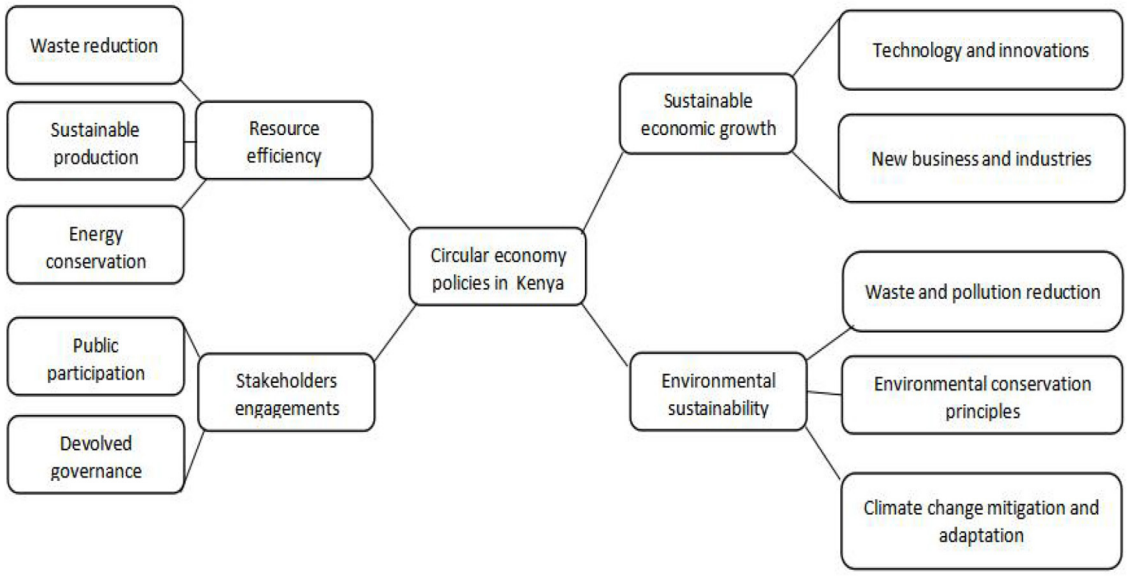

FIGURE 1
Themes and sub-themes of circular economy policies in Kenya.

4.1.2. Environmental conservation principles

This sub-theme focuses on aspects of the sustainable conservation of environmental resources. It addresses the main guiding principles in the formulation of the reviewed policies relating to the transition to a circular economy. All the laws and policies highlighted important environmental sustainability principles that promote the circular economy philosophy. For example, the constitution of Kenya requires the protection and conservation of natural resources to ensure equitable sharing of environmental and economic benefits. Together with the right to a clean environment, the constitution further provides how to enforce and compensate those deprived of these rights and guarantees. These constitutional guarantees arose from past experiences of mismanagement of environmental resources and pollution, especially caused by the absence of sustainable waste management systems. Poor waste management has been a menace in the country for many years.

Recently, policies and laws have been formulated to actualise these environmental principles enshrined in the constitution into circular economy practices. For example, the Sustainable Waste Management Act has as one of its objectives to promote circular economy practices for green growth in the country. It seeks to help achieve the constitutional right of citizens to a clean and healthy environment. Similarly, the Extended Producer Responsibility Regulations seek to hold producers of various products responsible for the environmental impacts of their products until they reach their end of life by proposing reuse or recycling. Coupled with the introduction of take-back schemes proposed in the Sustainable Waste Management Act, extended producer responsibility regulations support the achievement of the right to a clean and healthy environment for citizens not only by the government but also by the private sector, especially manufacturers, by holding them responsible for their sustainability actions. Policies such as the Climate Change Act, the Energy Act, and the Sustainable Waste Management Act have cited important environmental conservation principles as guiding their formulation and implementation. They provide linkages to the promotion of circular economy principles and include the precautionary principle, polluter pays principle, payment of ecosystem services principle, and zero-waste principle, all of which go toward capturing important circular economy life-cycle aspects touching on the need to conserve and protect the environment and ensure environmental sustainability.

4.1.3. Climate change mitigation and adaptation

A recurrent issue in most of the policies and laws reviewed is climate change. This sub-theme thus captures the potential impacts that climate change may have on Kenya's transition to a circular economy. Although the sub-theme is prominent in almost all recent policy documents, it is also uniquely and comprehensively addressed in the Climate Change Act. The Climate Change Act was enacted to address climate change-related issues from the broadest perspective, specifically how to respond to the effects of climate change on sustainable development. The legislation provides a regulatory framework for enhanced responses to climate change and promotes climate resilience through measures to achieve low-carbon development. Additionally, from a circular economy perspective, the law promotes important principles, including recycling, reuse, and recovery of waste, to reduce greenhouse emissions as a climate mitigation strategy. In 2018, the government suspended logging in various forests to curb deforestation and allow the regeneration of forests following many years of unsustainable logging, which was a threat to biodiversity in key ecosystems across the country. Furthermore, the legislation also promotes climate adaptation through measures such as the

conservation of biodiversity and ecosystems and engaging in sustainable land use practices. These practices promote circular economy principles by helping the country meet its climate adaptation goals.

4.2. Resource efficiency

This theme emphasizes the importance of using resources in a sustainable manner to minimize impacts on the environment. The theme is elaborated into three sub-themes: waste reduction, sustainable consumption, and renewable energy. The sub-themes address broad issues related to the promotion of sustainable use of resources in the best possible way.

4.2.1. Waste reduction

The sub-theme of waste reduction emerged following a review of policies that included the National Solid Waste Management Strategy, the National Plastic Action Plan, the Construction Regulations, the Agricultural Sector Transformation and Growth Strategy (2019–2029), the Extended Producer Responsibility Regulations, and the single-use plastic bag ban. The National Waste Management Strategy is more explicit in its promotion of circular economy-related principles by suggesting the adoption of the reduce, reuse, and recycle strategy as a way to minimize waste and promote resource efficiency. Similarly, the Sustainable Waste Management Act seeks to promote resource efficiency by outlining measures to implement and enforce waste reduction, product reuse, and waste recycling across all the devolved units (counties) in the country. From a practical perspective, however, the enforcement of the single-use plastic bag regulations set the pace for control of plastic waste and pollution and produced the greatest impacts yet in terms of reducing waste by outlawing the use, manufacture, or even importation of plastic carrier bags. Additionally, the ban proposed the use of alternative bags that could be reused and are easily biodegradable.

Most other policies have not been fully implemented or enforced to register any significant impact, especially in terms of behavior change among citizens, as has been the case with the single-use plastic ban. With the agriculture sector being the largest sector in terms of contribution to the economy in the country, it is also responsible for the generation of the largest amount of waste. Consequently, it offers the greatest opportunities and potential for circular economy activities in the country. There are measures already in place in support of waste reduction strategies in the sector in specific counties. For example, much of the food gets lost after leaving farms and when it is distributed to consumers across the country. Additionally, much of the food is dumped in the market outlets, becoming a source of large volumes of waste that pollutes the environment due to poor waste collection systems. With waste management being a devolved function, many counties are required to put in place waste management measures relating to collection, reuse, and recycling as outlined in the Sustainable Waste Management Act. However, the enforcement of these policies remains a challenge, with many counties failing to have the required funding and infrastructure to implement the policies. There are, however, efforts, especially through stakeholder collaboration, to support waste management. For example, in Nairobi County, which is the largest recipient of food outside its boundaries, trade associations, waste pickers, and private companies are combining forces to reduce waste in the market centers. Circularity initiatives employed to reduce food waste include using food waste for the generation of biogas for domestic use and making compost manure for urban farming. Furthermore, the construction sector offers another great opportunity to engage in circular economy activities given the sheer size of the waste it generates. However, like in other sectors, these opportunities identified by the policies have not been fully exploited. The main policy action undertaken is the development of new building regulations that target developers and constructors in adhering to the regulations when building structures as this sector has huge potential in other circular economy practices such as reduction, reuse, and recycling.

4.2.2. Sustainable production

This sub-theme emerged strongly from a review of four policies: Vision 2030, the National Climate Change Action Plan, the Energy Act, and the Environmental Management and Coordination Act. These policies promote sustainable production as a way of enhancing resource efficiency. For example, Vision 2030, Kenya's long-term blueprint for industrialization promotes sustainable production by encouraging the adoption of clean technologies. In addition, it has a special focus on making better use of waste by promoting innovations and creating new business opportunities. The policy proposes the removal of most dump sites and landfills by better managing waste using recycling facilities in key cities and towns. Vision 2030 was the first policy blueprint that proposed the introduction of a ban on single-use plastic bags as a way of managing pollution through the production of reusable bags. The ban outlawed the use, manufacture, and importation of reusable bags as a first step in enhancing resource efficiency by enforcing single-use plastic regulations. In addition, the National Climate Change Action Plan, the Energy Act, and the Climate Change Act promote sustainable production by encouraging industry players to adopt sustainable production practices. For example, the Energy Act promotes the use of renewable energy sources in support of the reduction of greenhouse gas emissions. Finally, the National Environmental Management and Coordination Act encourages industry players to engage in environmentally friendly production by putting into place requirements for environmental impact audits and undertaking environmental impact assessments in many industrial production processes and development projects with environmental impacts.

4.2.3. Energy conservation

The energy conservation sub-theme has emerged from the review of the Energy Act, the Climate Change Act, the Kenya Climate Change Action Plan, the Kenya National Electrification Strategy, and the Kenya Feed-in Tariff Policy, all of which are policies that promote circular economy principles relating to the development of renewable energy sources, such as solar energy, biomass power, wind energy, and geothermal power. The National Electrification Strategy and the Energy Act are policies that

promote energy conservation initiatives such as waste-to-energy initiatives, which support the conversion of organic waste into usable energy, thereby contributing to energy conservation by reducing the need for conventional energy sources. Additionally, the Feed-in Tariff policy and the Energy Act promotes the development of small-scale renewable energy projects that target energy sources, such as solar, wind, biomass, and geothermal. Such projects enable the production of energy closer to points of consumption, thus reducing transmission and distribution losses associated with the centralized national grid transmission method. These policies increase overall system efficiency by promoting the adoption of inclusive energy access strategies that ensure people in far-flung areas have access to electricity developed locally. Notably, these policies also promote the adoption of energy-efficient technologies and equipment, such as energy-efficient stoves, and curb the use of non-renewable energy resources, such as wood fuel for domestic cooking, which are the predominant sources of energy in the country. This is eventually expected to contribute to the carbon emission reduction goals in the country, especially with the threats posed by forest destruction through the use of firewood and charcoal as the main sources of energy. Through the promotion of the use of renewable energy, which is more sustainable and contributes to resource conservation, these policies support circular economy principles, which ultimately help reduce environmental impacts.

4.3. Sustainable economic growth

This theme focuses on policies that promote circular economy principles to enable sustainable economic growth in the country. The theme emerged from the sub-themes of technology and innovations and the development of new businesses and industries that emerged from the reviewed policies, especially Vision 2030 and the Green Economy Strategy and Implementation Plan to leverage entrepreneurship, technologies, and innovations. Consequently, the key focus is on using circular economy principles to transform and realize its industrialization goals.

4.3.1. Technology and innovations

The technology and innovation sub-themes emerged in the review of the Vision 2030 policy, the Energy Act, the Green Economy Strategy and Implementation Plan, the Building Regulations, the National Solid Waste Management Strategy, the National Industrialization Policy Framework for Kenya, and the Agriculture Sector Transformation and Growth Strategy. The key points of emphasis in these policies relate to the importance of technology and innovation in promoting sustainable economic growth and the need to adopt sustainable industrial processes and green technologies. The Energy Act, the Sustainable Waste Management Act, and the National Solid Waste Management Strategy are more specific in their promotion of waste-to-energy technologies as circularity measures. The policies also suggest that the agriculture and construction sectors offer many opportunities for technological innovations for the creation of new products through better use of waste generated in the sector. The two sectors are the biggest in Kenya, with the agricultural sector being the largest contributor to the country's GDP. Additionally, the construction sector has huge potential for innovations and the adoption of new technologies, particularly because of the rising housing demand that is occasioned by the rising population and migration into urban centers. The Green Economy Strategy and Implementation Plan and the new construction regulations promote innovations and technologies that exploit opportunities in green buildings that are energy-efficient and environmentally friendly. The rising demand for low-cost housing in Kenya to ensure urban dwellers currently living in informal settlements demonstrate the great need for innovation in developing the right technology for this demand. Furthermore, the potential to leverage innovations and technology to promote sustainable economic growth is also apparent in other regulations with huge potential for technology and innovation found in renewable energy, sustainable agriculture, waste management, and recycling. This potential is well-articulated in the various policy documents reviewed.

4.3.2. New businesses and industries

This sub-theme focused on policies that promote entrepreneurship and the creation of new businesses by embracing circular economy principles. Consequently, policies that promote these ideas cut across various sectors, including the waste management sector, agro-forestry sectors, and construction sectors, where there is huge potential. For example, the Vision 2030 policy identifies green economy and sustainable industries in sustainable agriculture, green construction, renewable energy, ecotourism, and waste management. However, besides these untapped potentials identified in Vision 2030, the Green Economy Strategy and Implementation Plan identifies opportunities in the water management and recycling sectors for the adoption of smart irrigation systems to boost agricultural productivity. However, with agriculture being the largest economic sector, contributing about a third to the country's GDP, the various policies show that it also offers the biggest circular economy opportunities in the country. In organic waste management alone, the agriculture sector potentially has new opportunities in food waste, crop residues, and animal manure that can be used to produce valuable resources. Already, in many parts of the country, the production of biogas for cooking and lighting homes has picked up well. Vision 2030 further identifies value-added processing and product diversification as a high-potential source of new industries and job creation in the agriculture sector through the export of processed agricultural products, thus boosting sustainable economic growth.

4.4. Stakeholder engagement

The focus of this theme revolves around how stakeholders are engaged in matters relating to how stakeholders' interests are addressed during the implementation of policies. The theme was developed from two sub-themes: public participation and devolved governance. The theme, therefore, shows the importance of engaging, reaching out, and collaborating with a diverse range of societal stakeholders, including private sector actors,

consumers, and governmental agencies, in advancing circular economy principles.

4.4.1. Public participation

Under this sub-theme, all the policies reviewed suggest promoting public involvement in matters related to the implementation of circular economy principles. Importantly, the constitution recognizes the value of public participation by requiring it in all subjects of public interest. As a result, most policies, including those dealing with the circular economy, require stakeholders to be involved in their development. Furthermore, public hearings and consultations are required before most projects are initiated to seek stakeholders' opinions on how the projects may affect them. Hence, some policies, such as the Environmental Management and Coordination Act and the Building Regulations, provide for public participation in the approval of development plans. Many reviews of the various circular economy-related policies show that the huge public support for the policy to ban the use, manufacture, and importation of single-use plastic bags shows the importance of public participation in the enforcement of public policies that support circular economy principles. During the enforcement of the plastic paper ban, resistance to compliance by some manufacturers was defeated by the huge public support the regulations got from the public. Moreover, the Environmental Management Act underscores the importance of engaging the public when environmental impact assessments of projects are being undertaken. Stakeholder engagement can also happen at the level of collaboration and partnership with relevant agencies, especially in areas of developing regulations such as extended producer responsibility. While the Extended Producer Responsibility regulations in Kenya were initiated and their formulation facilitated by the government, the private sector, through the Kenya Private Sector Alliance and the Kenya Association of Manufacturers, was directly impacted by their formulation and was at the center of these types of engagements.

4.4.2. Devolved governance

Because of the nature of the governance structure in Kenya, where devolution is enshrined in the constitution, vertical stakeholder engagement is an important consideration because the majority of the implementation of circular economy initiatives and activities takes place in the devolved units or counties. Therefore, the reviewed policy emphasizes public participation and engagement across the two levels of government that exist in Kenya. The sub-theme of devolved governance was captured in several laws and policies, including the constitution of Kenya, the Environmental Management and Coordinator Act, the Climate Change Act, the Green Economy Strategy and Implementation Plan, and the Sustainable Waste Management Act. First, the principle of devolved governance is recognized by the constitution, with two levels of government in Kenya—the national and county governments—being established. Consequently, most policies in agriculture, waste management, and climate change take a devolved approach because they address issues implemented by the county government as part of their devolved functions. Moreover, most circular economy activities, including resource extraction and waste management functions and activities, are implemented at the devolved levels. Additionally, most circular economy-relevant sectors in the country, including construction, agriculture, waste management, etc., are devolved functions under the jurisdiction of county governments. Furthermore, the devolved approach allows the creation of intergovernmental partnerships between the national government and the county governments, but with a specific administrative structure to allow inter-government relations at the national and devolved levels. This is best illustrated in the manner in which the Sustainable Waste Management Act is formulated for implementation because it recognizes the role of each level of government and ensures that institutions and actors at the two levels have to engage with each other for effective implementation of the policy.

5. Discussion

This study examined Kenya's relevant circular economy policies and laws that capture how circular economy principles are captured in the policies. The thematic analysis identified four main themes: environmental sustainability, resource efficiency, sustainable economic growth, and stakeholder engagement. The conclusion drawn from these themes shows that circular economy-related policies have focused on key aspects that define the transition circular economy in Kenya.

The findings support the conclusion that Kenya's transition to a circular economy is still in its early stages, but it is supported by important policy foundations. Most of the policies reviewed suggest that there are adequate circular economy policies to guide the implementation of circular economy principles, especially in the waste management sector. However, the same cannot be said concerning other sectors, such as the agricultural and construction sectors, which have enormous potential for implementing circularity practices. This supports the observation by Desmond and Asamba (2019) that the circular economy in many countries in Africa is still in its formative stages and that much of economic production activities are being driven by the unsustainable linear economic model.

This study considered specific circularity aspects such as environmental sustainability, resource efficiency, economic growth, and stakeholder engagement to find out how they were reflected in the policies. Concerning environmental sustainability, it was found that environmental sustainability is a key point of interest in Kenya's circular economy policies. Almost all the policies capture aspects of environmental sustainability. Sustainability concerns are enshrined in the constitution, which guarantees every citizen the right to a clean and healthy environment. The emphasis on these issues also reflects the trends in other parts of the world where the implementation of circular economy principles has taken deeper roots than in Kenya. Environmental sustainability is shown to provide benefits to society through improved productivity (Dwivedi and Paul, 2022) and enhanced environmental performance (Harris et al., 2021). In the Kenyan context, the largely successful implementation of the single-use plastic paper ban and the extension of the ban in all national parks and reserves have helped in reducing waste and pollution, therefore enhancing environmental sustainability and supporting

environmental conservation goals in the country. However, apart from the successes of the single-use plastic bag ban, other policies and laws have not been able to generate similar kinds of impacts. This has been attributed to the challenges of inadequate funding, a lack of infrastructure, and technical capacity at the devolved levels of government (counties), where many circular economy activities are supposed to be implemented.

Regarding the question of resource efficiency, it shows that a good number of policies promote this circular economy principle. For example, the enactment of a single piece of legislation on sustainable waste management in 2022 has offered a comprehensive national framework for addressing an important phase of the circular economy life cycle of waste management. The law promotes the full adoption and implementation of circular economy principles, including reducing, reusing, repairing, refurbishing, and recycling waste at the lowest levels of the county, thus promoting resource efficiency. The Sustainable Waste Management Act requires county governments to set up collection centers for recyclable materials and establish waste management infrastructure to promote sourcing, segregation, collection, reuse, and material recovery centers, all of which will go a long way in further promoting resource efficiency principles. The inclusion of resource efficiency values in the legislation supports the circular economy goal of reducing demand for natural resources, which in Kenya have seen their fair share of degradation. Notably, these findings are in agreement with studies by Camilleri (2018) and Moraga et al. (2022) that emphasize the application of resource efficiency measures in the transition to a circular economy era.

Another important finding is that several policies promote sustainable economic development as an important goal of the circular economy. Prominent in this regard is the long-term economic blueprint known as Vision 2030, which emphasizes the importance of fostering the development of new circular economy businesses and industries driven by innovations and technological advancement. Underlying this industrialization focus of Vision 2030 is the importance of entrepreneurship, which has huge potential in the circular economy sector in Kenya. It is, however, important to note that all the policies and laws that support this sustainable economic development goal of circular economy strive to project Kenya as a regional leader in sustainable industrialization. The Green Economy Strategy and Implementation Plan has, therefore, been formulated as a mid-term policy framework to drive and align the green agenda with the industrialization goals of the country. It is also clear that through innovative thinking and development, and the use of technology, circular economy principles have the potential to be applied to improve wellbeing in the country. This finding is consistent with studies that show circular economy contributes to sustainable economic growth (Suárez-Eiroa et al., 2019; Chen and Pao, 2022). It also offers many opportunities for innovations and new business models, besides having the potential to generate job opportunities (Ellen MacArthur Foundation, 2015; Jabbour et al., 2019).

Finally, the results also show that stakeholder engagement is a key ingredient in driving the transition to a circular economy in Kenya. Salvioni and Almici (2020) and Marjamaa et al. (2021) contend that the participation of stakeholders, including businesses, policymakers, and consumers, is central to the promotion of circular economy principles. In Kenya, stakeholder engagement is valued for its ability to involve citizens and other key stakeholders in matters crucial to the transition to a circular economy in Kenya. For instance, the development of Kenya Extended Producer Responsibility regulations has shown the value of engaging stakeholders to effectively fulfill their expectations and the eventual ownership of the outcome. Consequently, the collaboration and partnership in developing the regulations have enabled key stakeholder groups like the Kenya Association of Manufacturers to embrace the self-regulatory measures to ensure they reduce plastic waste and adopt circularity practices through institutionalizing the practice by establishing the Kenya Extended Producer Organization (KEPRO). Therefore, this finding suggests that circular economy policies in Kenya have enabled embracing the values of inclusion and collaboration as an important ingredient in hastening the transition to the circular economy. However, the findings, too, show that the role of government has been more prominent in driving the circular economy agenda. This has been especially true in the implementation of circular economy policies, as indicated by the early resistance shown by private sector actors when the government implemented the single-use plastic bag ban.

6. Conclusion

The primary objective of this study was to investigate the circular economy policies and laws in Kenya that encompass the significant progress and key focal points in adopting and implementing the principles and concepts of a circular economy. In the current global economic landscape, characterized by dwindling resources and an urgent need for efficient resource utilization, the concept of a circular economy has emerged as a crucial element for the long-term sustainability of both environmental preservation and economic systems. The findings of this study indicate that Kenya has established a robust framework of laws, policies, regulations, institutions, and programmes that are facilitating a successful transition toward a circular economy. Furthermore, the study reveals a diverse range of circular economy principles reflected in the laws and policies, suggesting that Kenya has established an important policy environment capable of fostering circular economic practices and propelling the country toward the circular economy transition. However, it is important to note that while Kenya has made significant strides, the development of an enabling policy environment signifies that the country is still in the early stages of embracing the circular economy.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

JM conceived the study and wrote the abstract and the introduction. IN and JM collectively wrote the literature review.

JM wrote the other sections with review input from IN. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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