Implementing Circular Economy for Sustainability

Kariuki Muigua

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Abstract

Achieving sustainability has become pertinent concern in the wake of problems facing the planet from the environmental, social and economic spheres. Environmental problems including climate change and depletion of natural resources; social concerns such as poverty and inequalities; and economic challenges including recessions and underdevelopment in some countries and regions are a major hindrance to sustainability. Various initiatives are being embraced at local, national, regional and global levels towards achieving sustainability as envisioned under the United Nation's 2030 Agenda for Sustainable Development. The circular economy has been advocated as one of the key approaches towards sustainability with benefits for people and the planet, including reducing greenhouse gas emissions and other forms of pollution, biodiversity loss, and environmental degradation. The paper critically examines the role of circular economy in the Sustainable Development agenda. It defines circular economy and identifies its key elements. It further discusses the progress made towards embracing circular economy at the global, regional and national levels. The paper also explores the challenges facing realization of circular economy and suggests reforms towards implementing it for sustainability.

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1.0 Introduction

Sustainability has been defined as creating and maintaining the conditions under which humans and nature can exist in productive harmony to support present and future generations[1]. Sustainability is often thought of as composed of three overlapping, mutually dependent goals: to live in a way that is environmentally sustainable, or viable over the very long-term; to live in a way that is economically sustainable, maintaining living standards over the long-term; and to live in a way that is socially sustainable, now and in the future[2]. The need for sustainability has become a global concern in recent decades in light of the growing environmental challenges and climate change, together with issues of poverty, increasing disparity between societies and the tensions brought by social inequalities[3]. The need to strike a balance between the environmental, social and economic facets of development towards sustainability gave rise to the concept of Sustainable Development.

Sustainable Development requires an integrated approach that takes into consideration environmental protection along with economic development and social progress[4]. The concept of Sustainable Development was defined by the World Commission on Environment and Development ('*Brundtland Commission*') as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs[5].' Sustainable Development seeks to foster sustainability by ensuring environmental protection, economic development and addressing social concerns[6]. It has

[1] United States Environmental Protection Agency., 'What is Sustainability.' Available at https://www.epa.gov/sustainability/learn-about-sustainability (Accessed on 30/11/2023)
[2] Heinberg. R., 'What Is Sustainability?.' Available at https://cdn.auckland.ac.nz/assets/arts/documents/What%20is%20Sustainability.pdf (Accessed on 30/11/2023)
[3] Giovannoni. E., & Fabietti. G., 'What Is Sustainability? A Review of the Concept and Its Applications.' In: Busco, C., Frigo, M., Riccaboni, A., Quattrone, P. (eds) Integrated Reporting. Springer, Cham. Available at https://doi.org/10.1007/978-3-319-02168-3_2 (Accessed on 30/11/2023)
[4] United Nations., 'Sustainability.' Available at https://www.un.org/en/academic-impact/sustainability (Accessed on 30/11/2023)
[5] World Commission on Environment and Development., 'Our Common Future.' Oxford, (Oxford University Press, 1987)
[6] Fitzmaurice. M., 'The Principle of Sustainable Development in International Development Law.' *International Sustainable Development Law*., Vol 1

been asserted that Sustainable Development seeks to improve the quality of life on earth in a comprehensive manner by fostering economic prosperity, social equity and environmental protection[7].

The need for sustainability has led to the adoption of the concept of Sustainable Development as the global blueprint for development as set out in the United Nation's 2030 Agenda for Sustainable Development[8]. The Agenda represents a shared blue print for peace and prosperity for people and the planet in the quest towards the ideal of Sustainable Development[9]. The Agenda envisions attainment of the ideal of Sustainable Development through 17 Sustainable Development Goals (SDGs) which seek to strike a balance between social economic and environmental aspects of sustainability[10].

Various initiatives have been undertaken at local, national, regional and global levels towards achieving sustainability as envisioned under the 2030 Agenda for Sustainable Development. The circular economy has been advocated as one of the key approaches towards sustainability with benefits for people and the planet, including reducing greenhouse gas emissions and other forms of pollution, biodiversity loss, and environmental degradation[11].

The paper critically examines the role of circular economy in the Sustainable Development agenda. It defines circular economy and identifies its key elements. It further discusses the progress made towards embracing circular economy at the global,

[7] Muigua. K., 'Nurturing Our Environment for Sustainable Development.' Glenwood Publishers Limited, 2016
[8] United Nations., 'Transforming Our World: The 2030 Agenda for Sustainable Development.' Available at https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (Accessed on 30/11/2023)
[9] Ibid
[10] Ibid
[11] United Nations Development Programme., 'Circular Economy.' Available at https://climatepromise.undp.org/what-we-do/areas-of-work/circular-economy (Accessed on 30/11/2023)

regional and national levels. The paper also explores the challenges facing realization of circular economy and suggests reforms towards implementing it for sustainability.

2.0 Interpreting Circular Economy

The circular economy has been defined as a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible[12]. It has also been defined as a system where materials never become waste and nature is regenerated[13]. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting[14]. In addition circular economy can also be understood 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[15]. Circular economy accomplishes these goals through measures such as durability-enhancing construction, servicing, repair, reuse, re-manufacturing, refurbishment, and recycling[16]. According to the United Nations Development Programme (UNDP), circular economy aims to minimize waste and promote a sustainable use of natural resources, through smarter product design, longer use, recycling and more, as well as regenerate nature[17].

[12] European Parliament., 'Circular Economy: Definition, Importance and Benefits.' Available at https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits#:~:text=The%20circular%20economy%20is%20a,cycle%20of%20products%20is%20extended (Accessed on 30/11/2023)

[13] Ellen MacArthur Foundation.,' What is a Circular Economy?.' Available at https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview#:~:text=The%20circular%20economy%20is%20a,remanufacture%2C%20recycling%2C%20and%20composting (Accessed on 30/11/2023)

[14] Ibid

[15] Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Available at https://www.frontiersin.org/articles/10.3389/frsus.2023.1190470/full#:~:text=Kenya%20has%20been%20working%20toward,new%20avenues%20for%20financial%20growth (Accessed on 30/11/2023)

[16] Ibid

[17] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Available at https://climatepromise.undp.org/news-and-stories/what-is-circular-economy-and-how-it-helps-fight-climate-change (Accessed on 30/11/2023)

Circular economy is therefore essentially about fostering sustainable production and consumption of goods as well as services[18]. This is in line with SDG 12 which seeks to ensure sustainable consumption and production patterns[19]. Among the targets under SDG 12 is to substantially reduce waste generation through prevention, reduction, recycling and reuse[20]. According to UNDP, encouraging industries, businesses and consumers to recycle and reduce waste is important in achieving the targets of SDG 12[21]. Circular economy is therefore an integral part of the Sustainable Development agenda.

The idea of circular economy is premised on certain fundamental principles such as *refuse*, which seeks to foster solutions that maximize the usage of fewer goods in order to avoid unnecessary and unsustainable products; *rethink*, a principle that asserts that every product and every system needs to be rethought with a focus on how to reduce its environmental impact; *reduce*, a principle whose central idea is dematerialisation or 'doing more with less'; *reuse*, that entails using products more than once in order to minimize waste; *repair*, which aims to extend product life cycles and to preserve rather than discard them; *refurbish*, a concept that aims at restoring old or discarded products and bringing them up to date to serve their initial function; *remanufacture*, which entails refurbishing and re-using parts of a discarded product in a new product with the same function; *repurpose*, a principle that seeks to foster the remodeling of discarded products into a new ones with different functions; *recycle* which entails using old products in new ways; and *recover*, a process that aims at sustainably sourcing bio-waste into uses such as energy generation[22]. The principles of circular economy aims to achieve certain objectives which include preservation and optimization of natural resources, reducing the

[18] Gendre. I., 'Circular Economy: Definition and Principles.' Available at https://greenly.earth/en-us/blog/company-guide/circular-economy-definition-and-principles (Accessed on 30/11/2023)
[19] United Nations., 'Transforming Our World: The 2030 Agenda for Sustainable Development.' SDG 12
[20] Ibid, SDG 12.5
[21] United Nations Development Programme., 'Goal 12: Responsible Consumption and Production.' Available at https://www.undp.org/sustainable-development-goals/responsible-consumption-and-production (Accessed on 30/11/2023)
[22] The 10 Principles of a Circular Economy., Available at https://www.lombardodier.com/contents/corporate-news/responsible-capital/2020/september/the-10-steps-to-a-circular-econo.html (Accessed on 30/11/2023)

consumption of non-renewable resources, achieving eco-design, reducing the impact of human activities on the environment and on health by minimizing carbon emissions and implementing the use of renewable energy, limiting consumption, and fostering efficient management of waste through reducing, reusing, recycling among other measures[23].

Circular economy is integral in achieving sustainability. It has been argued that the adoption of circular economy principles enhances increased attention to environmental sustainability concerns, therefore, creating more benefits such as improved productivity and resource utilization[24]. Circular economy ensures that resources, energy and waste volumes are minimized at every stage of a product lifecycle, as well as greenhouse gas emissions, pollution and public health risks[25]. It has also been pointed out that circular economy has numerous benefits including protecting the environment since reusing and recycling products would slow down the use of natural resources, reduce landscape and habitat disruption and help to limit biodiversity loss, reducing the dependence on raw materials and creating jobs since redesigning materials and products for circular use would boost innovation across different sectors of the economy[26]. In addition, it has been argued that apart from helping tackle the problem of pollution, circular economy can play an important role in solving other complex challenges such as climate change and biodiversity loss[27]. Circular economy can address climate change by reducing greenhouse gas emissions[28]. It has been argued that through efficient and more circular use of materials in key industrial materials such as cement, steel, plastics, and aluminum,

[23] Gendre. I., 'Circular Economy: Definition and Principles.' Op Cit
[24] Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Op Cit
[25] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Available at https://www.undp.org/blog/why-green-circular-economy-key-beating-triple-planetary-crisis (Accessed on 30/11/2023)
[26] European Parliament., 'Circular Economy: Definition, Importance and Benefits.' Op Cit
[27] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit
[28] Ibid

circular economy strategies can help reduce global greenhouse gas emissions by up to 40 percent by 2050[29].

It is therefore important for countries to embrace and transition towards circular economy. It has been argued that a transition to a green and circular economy is an opportunity to promote social inclusion, poverty eradication and sustained economic and employment growth, while simultaneously maintaining a healthy ecosystem[30]. It has further been asserted that transitioning to circular economy is key for climate change adaptation and mitigation, and has vast potential to create jobs, improve productivity and strengthen the economic competitiveness of countries[31]. Transitioning to a green, circular economy involves several elements which include promoting sustainable production through material and energy efficiency, eco-friendly materials and clean, renewable energy, such as solar and wind energy; fostering ecosystems and biodiversity conservation through sustainable management of natural resources; transitioning to sustainable and green transport based on e-mobility and energy efficiency; encouraging sustainable consumption by avoiding single-use items and keeping products in use for as long as possible; and encouraging waste reduction, reuse, repair and recycling to in order to recover valuable materials and minimize waste[32]. It is therefore necessary for all countries to implement a green, circular economy for sustainability.

[29] Ellen McArthur Foundation., 'Completing the Picture: How the Circular Economy Tackles Climate Change.' Available at https://www.ellenmacarthurfoundation.org/completing-the-picture (Accessed on 30/11/2023)
[30] Fwangkwal. B., Luotonen. E., & Jarvinen. L., 'Africa's Circular Economy Needs Support from Policymakers.' Available at https://www.sitra.fi/en/articles/africas-circular-economy-needs-support-from-policymakers/ (Accessed on 30/11/2023)
[31] Lewis. I., 'AfDB's Donor-Funded Facility Supports Africa's Circular Economy.' Available at https://impact-investor.com/afdbs-donor-funded-facility-supports-africas-circular-economy/ (Accessed on 30/11/2023)
[32] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit

3.0 Implementing Circular Economy: Opportunities and Challenges

It has been observed that many countries especially those that are mainly industrialized, newly industrialized and emerging economies partially apply the 3R principles of circular economy(reduce, reuse and recycling of material)[33]. It has been observed that the reduce component is mostly practiced in production as a result of competition and the necessity of achieving high input use efficiency[34]. Further, it has been pointed out that in developed nations' households, recycling of certain materials including glass, plastic, paper, metal and burnable solid waste is becoming more common[35]. On the other hand, municipalities take the responsibility of treating and reusing waste water from households as well as solid waste and recycling auto and household appliances[36].

It has been pointed out that there are many opportunities to implement circular economy in different sectors including textiles, buildings and construction, and at various stages of a product's lifecycle, including design, manufacturing, distribution, and disposal[37]. For example, it has been pointed out that in the textiles and fashion sector, there are initiatives that employ regenerative agriculture to produce organic cotton and other natural fibres, through the use of natural colorings and dye, thus ensuring higher quality and safer garments for the health of consumers and the environment[38]. Such an approach ensures that clothing can last longer, be repaired, thrifted, and recycled[39]. In the building and construction sector, initiatives being undertaken to implement circular economy include reducing raw material use, re-using existing materials in circulation, substituting carbon-intensive materials for regenerative alternatives such as timber, promoting energy efficiency in buildings, recycling, waste management and the use of alternative construction materials, and embracing green buildings and green supply chains within

[33] Heshmati. A., 'A Review of the Circular Economy and its Implementation.' Available at https://docs.iza.org/dp9611.pdf (Accessed on 01/12/2023)
[34] Ibid
[35] Ibid
[36] Ibid
[37] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit
[38] Ibid
[39] Ibid

the construction industry[40]. Implementation of circular economy principles in the construction industry promotes the use of sustainable materials, maximizing material recovery, and avoiding unnecessary waste generation and waste disposed to landfill[41].

In addition, there are numerous opportunities for the private sector to implement circular economy. It has been observed that ensuring the success of circular economy requires the active engagement of the private sector, which brings with it innovation and investment, to identify new green circular business models[42]. For example, circular economy offers the hospitality sector an opportunity to move away from single-use plastic items and the transport sector to unlock opportunities for e-mobility[43]. By implementing circular economy, the hospitality sector can address the problem of plastic through elimination of problematic or unnecessary plastic packaging through redesign, innovation, and new delivery models; applying reuse models where relevant therefore reducing the need for single-use packaging; ensuring that plastic packaging is 100% reusable, recyclable, or compostable; ensuring that the use of plastic is fully decoupled from the consumption of finite resources; and making sure that plastic packaging is free of hazardous chemicals, and the health, safety, and rights of all people involved are respected and protected[44].

The transport sector can also implement circular economy through approaches such as promoting public transport in order to reduce carbon emissions, encouraging active transport such as walking and cycling, embracing hybrid vehicles, adopting a shared economy approach, and encouraging the use of sustainable fuels including biofuels and

[40] Norouzi. M., 'Circular Economy in the Building and Construction Sector: A Scientific Evolution Analysis.' *Journal of Building Engineering*, Volume 44, 2021
[41] Ibid
[42] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit
[43] Ibid
[44] Ellen McArthur Foundation., 'Plastics and the Circular Economy -Deep Dive.' Available at https://www.ellenmacarthurfoundation.org/plastics-and-the-circular-economy-deep-dive#:~:text=The%20vision%20for%20a%20circular%20economy%20for%20plastic%20has%20six,need%20for%20single%2Duse%20packaging (Accessed on 01/11/2023)

hydrogen among others[45]. It has also been argued that there is need for circular economy approaches in the transport sector such as designing vehicles to be more lightweight so that fewer materials are needed to make them, and less energy is needed to power them and recycling end-of-life tyres[46]. It has been pointed out that by transitioning toward a circular economy and making efforts to reduce waste, emissions from the materials used in manufacturing vehicles could be reduced by up to 70 per cent by the year 2050 or an equivalent of 250 million tons of carbon dioxide[47].

It is therefore evident that there are numerous opportunities to implement circular economy. The private sector therefore has a vital role to play in implementing circular economy. It has also been pointed out that the public can implement circular economy by demanding environmentally friendly products and services and actively minimizing waste by embracing practices such as reducing, reusing and recycling of materials[48].

Circular economy is being implemented in Europe through the *European Union Circular Economy Action Plan*[49]. The action plans seeks to ensure that products within the European Union are fit for a climate-neutral, resource-efficient and circular economy, reduce waste and ensure that the performance of front-runners in sustainability progressively becomes the norm[50]. The Action plan embraces the sustainability principles of circular economy and seeks to achieve various targets which include improving product durability, reusability, upgradability and reparability, addressing the presence of hazardous chemicals in products, and increasing their energy and resource efficiency; increasing

[45] Africa Circular Business Alliance., 'Circular Economy Implementation Strategies for Sustainable Transportation.' Available at https://www.linkedin.com/pulse/circular-economy-implementation-strategies/ (Accessed on 01/12/2023)
[46] Vandycke. N et al., 'Defining the Role of Transport in the Circular Economy.' Available at https://blogs.worldbank.org/transport/defining-role-transport-circular-economy (Accessed on 01/12/2023)
[47] Ibid
[48] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit
[49] European Commission., 'A new Circular Economy Action Plan For a Cleaner and More Competitive Europe.' Available at https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF (Accessed on 01/12/2023)
[50]Ibid

recycled content in products, while ensuring their performance and safety; enabling remanufacturing and high-quality recycling; restricting single-use and countering premature obsolescence; introducing a ban on the destruction of unsold durable goods; incentivising product-as-a-service or other models where producers keep the ownership of the product or the responsibility for its performance throughout its lifecycle; mobilising the potential of digitalisation of product information, including solutions such as digital passports, tagging and watermarks; and rewarding products based on their different sustainability performance, including by linking high performance levels to incentives[51]. The Action Plan acknowledges that circular economy is an essential part of a wider transformation of industry towards climate neutrality and long-term competitiveness[52]. It further points out that circular economy can deliver substantial material savings throughout value chains and production processes, generate extra value and unlock economic opportunities[53]. The Action Plan envisages implementation of circular economy across key products and value chains including electronics and Information and Communications Technology (ICT), batteries and vehicles, packaging, plastics, textiles, construction and buildings, and food, water and nutrients[54]. Actualizing the European Union Circular Economy Action Plan can accelerate the transition to circular economy in the European Union and beyond.

Circular economy is also being implemented in Africa. It has been asserted that circular economy is particularly relevant for African countries, whose economies remain largely resource dependent and under sustained pressure from rapid population growth[55]. It has been observed that circular practices are embedded in many of the Continent's cultures and activities, particularly within Micro, Small and Medium-Sized enterprises (MSMEs)[56]. There is increased emergence of economic activities centred around

[51] Ibid
[52] Ibid
[53] Ibid
[54] Ibid
[55] Fwangkwal. B., Luotonen. E., & Jarvinen. L., 'Africa's Circular Economy Needs Support from Policymakers.' Op Cit
[56] Ibid

repairing, refurbishing and recycling end-of-life products as well as growing access to renewable energy contributing to expanding circular systems in Africa[57]. There has been growth of circular economy initiatives in Africa such as the *Africa Circular Economy Network*[58] which seeks to build a restorative African economy that generates well-being and prosperity, inclusive of all its people, through new forms of economic production and consumption which maintain and regenerate its environmental resources; The *Africa Circular Economy Alliance*[59] which seeks to spur Africa's transition to a Circular Economy at the country, regional and continental levels by operating as a collaborative platform to coordinate and link the various initiatives on the continent and harness immediate opportunities in Africa for increased circularity in sectors that will support the economy, jobs, and the environment on the continent in the long-term; *Greenovations-Africa*[60] which seeks to enhance circular economy in Africa by promoting green practices in areas such as smart agriculture, renewable energy, waste management, water management and climate action; and the *Afri-Plastics Challenges Initiative*[61] which aims to reduce amount of plastic waste both on land and in the ocean in and around the African continent by providing funding for African recycling businesses, new bioplastics, waste conversion processes among others. There has also been growth of businesses and start-ups in Africa geared towards implementing circular economy through approaches such as technology-driven waste collection and management and recycling of waste[62]. The African Development Bank Group is also supporting the implementation of circular economy in

[57] Ibid
[58] Africa Circular Economy Network., Available at https://www.acen.africa/ (Accessed on 01/12/2023)
[59] Africa Development Bank Group., 'The African Circular Economy Alliance (ACEA).' Available at https://www.afdb.org/en/topics-and-sectors/topics/circular-economy/african-circular-economy-alliance-acea (Accessed on 01/12/2023)
[60] Greenovations-Africa., Available at https://vc4a.com/greenovations-africa/greenovations-africa-2023/ (Accessed on 01/12/2023)
[61] Packaging Europe., 'Afri-Plastics Challenge Provides Funding for African Recycling Businesses, New Bioplastics, Waste Conversion Processes, and more.' Available at https://packagingeurope.com/news/afri-plastics-challenge-provides-funding-for-african-recycling-businesses-new-bioplastics-waste-conversion-processes-and-more/9548.article#:~:text=Afri%2DPlastics%20Challenge%20provides%20funding,and%20more%20%7C%20Article%20%7C%20Packaging%20Europe (Accessed on 01/12/2023)
[62] Nairobi Garage., 'Mr Green Africa // Kenyan Recycling Startup Secures Round of Funding.' Available at https://nairobigarage.com/mr-green-africa-secures-round-of-funding/ (Accessed on 01/12/2023)

Africa by channeling finance to businesses and supporting the country-led African Circular Economy Alliance in integrating the circular economy into African green growth strategies such as renewable energy, climate-smart agriculture and green manufacturing sectors[63]. It acknowledges that this will create new value-chains that generate new green jobs for the African youth[64].

Africa therefore has immense opportunities to implement circular economy. The East African Community recently launched its *Regional Bioeconomy Strategy*[65] which seeks to make use of the region's abundant natural resources, including underutilized agricultural waste materials, to produce value-added products with applications in many sectors including food, health, energy and industrial goods. The strategy seeks to implement circular economy within the East African Community through approaches such as the creation of new forms of sustainable bioenergy, and the conversion of waste materials to useful products[66].The strategy further seeks to ensure the transformation of economies and place innovation in bio-based products and processes at the centre, with a bio-based circular economy as the organising framework[67]. The strategy has the potential to spur Sustainable Development within the East African region through effective, efficient and sustainable production and use of bio-based materials, products, processes and business models[68]. It has been asserted that moving towards circular economy within the East African region and Africa at large can help the Continent address the problem of waste management by adopting sustainable waste management

[63] African Development Bank Group., 'African Development Bank Group Launches Dedicated Trust Fund for Circular Economy.' Available at https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-group-launches-dedicated-trust-fund-circular-economy-51948 (Accessed on 01/12/2023)
[64] Ibid
[65] East African Community., 'Regional Bioeconomy Strategy 2021/22-2031/32.' Available at https://www.eac.int/press-releases/2515-eac-unveils-regional-bioeconomy-strategy-2021-22-2031-32 (Accessed on 01/12/2023)
[66] Ibid
[67] Ibid
[68] Ibid

models and further contribute towards creating green jobs and fostering entrepreneurship[69].

From the foregoing, it is evident that there are immense opportunities to implement circular economy in Africa and other regions. However, it has been pointed out that implementing circular economy is threatened by challenges such as limited knowledge in some countries and regions about the potential of circular economy, lack of effective strategies for implementing circular economy, inadequate financing for businesses especially MSMEs to transition to circular economy, and lack of transparency in supply chains[70]. Other key challenges include shortage of advanced technology to implement circular economy in some countries, inadequate capacity, poor enforcement of legislations, weak economic incentives, lack of clear, standardized quantitative measurements and goals, poor leadership and management and lack of public awareness on circular economy and its benefits[71]. It is imperative to address these challenges in order to effectively implement circular economy and enhance its role in addressing key environmental challenges including pollution, resource security, climate change and biodiversity loss.

[69] Mwita. M., 'East Africa Mulls Shifting from Linear to Circular Economy.' Available at https://theexchange.africa/investing/africas-development/east-africa-mulls-shifting-from-linear-to-circular-economy/ (Accessed on 01/12/2023)
[70] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit
[71] Heshmati. A., 'A Review of the Circular Economy and its Implementation.' Op Cit

4.0 Way Forward

In order to implement a circular economy, there is need for governments to develop and implement policies on circular economy while also aligning circular economy principles with national climate goals[72]. Such policies should focus on key areas of circular economy such as minimizing single-use plastics and the promotion of environmentally friendly products and on mainstreaming energy efficiency, clean energy and e-mobility in multiple sectors[73]. Governments also have role in implementing circular economy through designing new financing instruments, such as green bonds and blended financing, to raise funds to achieve widespread transformational change towards green economies[74]. In addition, it has been pointed out that by ensuring circular economy approaches are embedded into national climate goals such as Nationally Determined Contributions (NDCs), countries can accelerate the transition to a low-carbon economies, protect the natural environment, and create green, decent, and dignified jobs as well[75]. Circular economy can aid countries in meeting their climate targets by cutting greenhouse gas emissions associated with industry, agriculture, and land use that the energy transition cannot address due to its potential to eliminate waste and pollution therefore reducing greenhouse gas emissions across value chains, circulate products and materials therefore retaining their embodied energy, and regenerate nature thus sequestering carbon in soil and products[76]. It is therefore pertinent for governments to implement policies on circular economy and align circular economy approaches with national climate goals.

[72] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit

[73] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit

[74] Ibid

[75] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit

[76] Ellen McArthur Foundation., 'Fixing the Economy to Fix Climate Change.' Available at https://www.ellenmacarthurfoundation.org/topics/climate/overview#:~:text=How%20a%20circular%20economy%20cuts,value)%2C%20and%20regenerate%20nature. (Accessed on 01/12/2023)

There is also need to enhance financing for businesses, startups, organizations and individuals undertaking initiatives to implement circular economy. One of the key challenges facing the implementation of circular economy especially in developing countries has been identified to be inadequate financing for businesses especially MSMEs to transition to circular economy[77]. Access to finance in developing countries remains a barrier, especially for small businesses in the circular economy and for businesses in general, in part due to unfavourable factors such as high interest rates[78]. It is therefore important for developing countries including those in Africa to enable access to finance in order to unlock circular economy through initiatives such as grant financing, lowering risks, removing policy barriers in order to foster investments, and investing in circular infrastructure[79]. Enhancing access to finance and investments in circular businesses can enable an inclusive development approach that creates opportunities for marginalised people including the youth and women[80].

It is also imperative for countries to strengthen their laws and policies on waste management in support of waste prevention and circular economy. It has been argued that countries need to modernize their laws and policies on waste management on an ongoing basis to make them fit for the circular economy and the digital age[81]. Countries should therefore improve their legislation on waste management in aspects such as batteries, packaging, end-of-life vehicles, and hazardous substances in electronic equipment in order to align them with circular economy principles through approaches such as preventing waste, increasing recycled content, promoting safer and cleaner waste streams, and ensuring high-quality recycling[82].

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[77] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit

[78] Milenge. D., Luotonen. E., & Korja. M., 'Enabling Access to Finance will Unlock Africa's Circular Economy.' Available at https://www.sitra.fi/en/articles/enabling-access-to-finance-will-unlock-africas-circular-economy/ (Accessed on 01/12/2023)

[79] Ellen McArthur Foundation., 'Fixing the Economy to Fix Climate Change.' Op Cit

[80] Ibid

[81] European Commission., 'A New Circular Economy Action Plan for a Cleaner and More Competitive Europe.' Op Cit

[82] Ibid

Organizations and businesses should also be encouraged to embrace and implement principles of circular economy. It has been rightly pointed out that businesses sit at the heart of the transition to a circular economy by inspiring innovations and implementing circular economy solutions at scale[83]. Throughout the world, businesses have been at the forefront of transitioning to circular economy through measures which include refurbishing electronic goods, fostering green transport based on e-mobility and energy efficiency, promoting water-soluble, recyclable and biodegradable packaging, embracing sound waste management practices and processing animal waste into fertilizers and biogas for cooking, heating and lighting[84]. According to the United Nations Environment Programme(UNEP), moving to a more circular approach represents a huge opportunity for businesses, opening doors to new markets and the opportunity of increasing market share; reducing costs and risks for business; driving innovation, attracting talent and aligning business performance with public expectations[85]. To do this, businesses can use a value-chain approach to prioritize where they should take action to have the biggest impact on greenhouse gas emissions, biodiversity loss and pollution while making 'transformational sprints' towards circularity[86]. It is also imperative for organizations and businesses to integrate sustainability criteria into business strategies by improving their corporate governance framework and enhance disclosure of environmental data in order to effectively implement circular economy[87].

There is also need for developed countries to support developing countries in areas such technology development and transfer in order to accelerate the adoption of clean and

[83] Ellen McArthur Foundation., 'Business and the Circular Economy.' Available at https://www.ellenmacarthurfoundation.org/resources/business/overview#:~:text=Business%20sits%20at%20the%20heart,create%20resilience%20and%20grow%20prosperity. (Accessed on 01/12/2023)
[84] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit
[85] United Nations Environment Programme., 'The Role of Business in Moving from Linear to Circular Economies.' Available at https://www.unep.org/resources/publication/role-business-moving-linear-circular-economies (Accessed o 01/12/2023)
[86] Ibid
[87] European Commission., 'A New Circular Economy Action Plan for a Cleaner and More Competitive Europe.' Op Cit

green technologies necessary to implement circular economy[88]. Developing countries often face barriers in embracing technology and innovation necessary to implement circular economy in areas such as renewable energy, sustainable agriculture, waste management, and recycling[89]. It has correctly been argued that technology in its advanced stages along with technological capabilities are key factors in the successful implementation of circular economy principles at different levels and in different areas[90]. Technology development and transfer is envisioned under the *Paris Agreement*[91] which urges countries to promote and facilitate enhanced action on technology development and transfer in order to support the implementation of the Agreement[92]. It is therefore important for countries to cooperate in technology development and transfer in order to implement circular economy while also achieving climate targets envisioned under the Paris Agreement.

Finally, it is necessary to enhance public awareness on circular economy. It has been pointed out that the public can play an important role in implementing circular economy by demanding environmentally friendly products and services and actively minimizing waste by embracing practices such as reducing, reusing and recycling of materials[93]. Countries should therefore enhance public awareness by facilitating investments in education, providing information and active public participation to increase environmental awareness and the benefits of circular economy[94]. It has been suggested that improving community awareness about environmental protection and resource conservation, and environmental certification of products can accelerate the transition to circular economy[95]. Public awareness can encourage the public to embrace the principles

[88] Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Op Cit
[89] Ibid
[90] Heshmati. A., 'A Review of the Circular Economy and its Implementation.' Op Cit
[91] United Nations Framework Convention on Climate Change., 'Paris Agreement.' Available at https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed on 01/12/2023)
[92] Ibid, Article 10
[93] United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit
[94] Heshmati. A., 'A Review of the Circular Economy and its Implementation.' Op Cit
[95] Ibid

of circular economy including reducing, reusing and recycling of materials. In addition to public awareness, countries should also embrace public participation in implementing circular economy[96]. It has been argued that many reviews of the various circular economy-related policies show that the huge public support for policies such those relating to the ban on the use, manufacture, and importation of single-use plastic bags in Kenya demonstrates the importance of public participation in the enforcement of public policies that support circular economy principles[97]. Public participation is a key principle of environmental governance that has been recognized in various countries including Kenya[98]. The Constitution of Kenya enshrines public participation as one of the national values and principles of governance[99]. The Constitution also obligates the state to encourage public participation in the management, protection and conservation of the environment[100]. Countries should therefore embrace public participation in order to effectively implement circular economy for sustainability.

5.0 Conclusion

Circular economy is pivotal in achieving sustainability since it aims to minimize waste and promote a sustainable use of natural resources, through smarter product design, longer use, recycling and more, as well as regenerate nature[101].Adoption of circular economy principles enhances increased attention to environmental sustainability concerns, therefore, creating more benefits such as improved productivity and resource utilization[102]. It also plays an important role in tackling global environmental challenges

[96] Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Op Cit
[97] Ibid
[98] Muigua. K., 'Towards Meaningful Public Participation in Natural Resource Management in Kenya.' Available at https://kmco.co.ke/wp-content/uploads/2018/08/TOWARDS-MEANINGFUL-PUBLIC-PARTICIPATION-IN-NATURAL-RESOURCE-MANAGEMENT-IN-KENYA.pdf (Accessed on 01/12/2023)
[99] Constitution of Kenya., 2010., Article 10 (2) (a)
[100] Ibid, Article 69 (1) (d)
[101] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit
[102] Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Op Cit

such as pollution, climate change and biodiversity loss[103]. Despite efforts towards embracing circular economy, its effective implementation is hindered by challenges such as lack of effective strategies for implementing circular economy, inadequate financing for businesses especially MSMEs to transition to circular economy, lack of transparency in supply chains, shortage of advanced technology to implement circular economy in some countries, inadequate capacity, poor enforcement of legislations, weak economic incentives, lack of clear, standardized quantitative measurements and goals, poor leadership and management and lack of public awareness on circular economy and its benefits[104]. Addressing these challenges is necessary in order to effectively implement circular economy. Circular economy can be effectively implemented through approaches such as developing and implementing policies on circular economy while also aligning circular economy principles with national climate goals, enhancing financing for businesses, startups, organizations and individuals undertaking initiatives to implement circular economy, strengthening laws and policies on waste management in support of waste prevention and circular economy, embracing and implementing principles of circular economy by organizations and businesses, technology development and transfer, and enhancing public awareness on circular economy and embracing public participation in implementing circular economy[105]. Implementing circular economy for sustainability is an ideal that needs to be fast-tracked.

[103] United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit

[104] Heshmati. A., 'A Review of the Circular Economy and its Implementation.' Op Cit

[105] Ibid; United Nations Development Programme., 'Why the Green, Circular Economy is Key to Beating the Triple Planetary Crisis.' Op Cit; United Nations Development Programme., 'What is Circular Economy and Why Does it Matter?.' Op Cit; and Muriithi. J., & Ngare. I., 'Transitioning Circular Economy from Policy to Practice in Kenya.' Op Cit

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