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CIRCULAR ECONOMY: PROSPECTS AND OPPORTUNITIES FOR GREEN GROWTH IN ZIMBABWE

BY

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Abstract

The world is in abysmal crisis of macro-economic instabilities and ecological degradation due to rapid increases in waste and pollution generation. A clarion call has been made on the need to balance the economy and ecology by shifting towards an economic system that result in enhanced human welfare, social justice and equity while reducing environmental risks and ecological imbalances; that is towards green growth. Despite the several benefits that plastics offer, the pervasiveness of plastic waste and its negative effects on the ecosystem and human health has spurred the need to rethink and revisit its production, consumption and disposal patterns. Arguably, urban spaces overwhelmingly exhibit linear flows of plastic products and represent significant hotspots of unsustainable plastic consumption and waste discharge. Using a mixed research method approach and a descriptive research design, this study carried out a survey in Glen View suburb of Harare, one of Zimbabwe's most populous urban areas in exploration of the prospects and opportunities for a circular economy to achieve green growth. The study employed a cluster-random sampling method and purposively selected Glen View Ward 30, then used convenience sampling for a sample frame population of 48 Households to obtain data from residents therein. The study used questionnaires, key informant interviews as well as observations as data collection tools, and employed both qualitative and quantitative data analysis techniques to draw inferences from the data regarding the variables in the study area. The findings of the study were that a circular economy is a viable and sustainable alternative to the current linear economy of the 'produce-consume-dispose' approach given its potential to address both environmental and socio-economic concerns. The research also established that the transition to a circular economy requires a multi-stakeholder approach followed by policy instruments to make sure that on a systems level, achieving green growth becomes a public and private sector priority. Breaking out of old models and letting go of time tested approaches is challenging but the findings of the study showed that the benefits from making the transition to a circular economy outweigh the effort and the risk. The study's recommendations included the provision of regulatory and fiscal incentives that stimulate a circular thinking; the standardisation and implementation of compostable and biodegradable materials as well as the establishment of clear communication and guidance for citizens and businesses to facilitate the attainment of green growth using a circular economy.

Key words: circular, economy, green growth.

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another University for the award of a degree.

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. . . But thanks be to God, who gives us victory through our Lord Jesus Christ. - (*1 Corinthians 15:57-58*)

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Dedication

This work is gratefully dedicated to everyone participating to be a positive force towards making our human lifestyles more sustainable and to all those who over the years have maintained the dignity of planetary boundaries.

List of Acronyms and Abbreviations

3Rs	Reduce, Reuse, Recycle
CBO	Community Based Organisation
CDRF	Container Deposit Refund Scheme
CE	Circular Economy
C2C	Cradle-to-Cradle
EMA	Environmental Management Agency
EMAF	Ellen MacArthur Foundation
EPS	Expanded Polystyrene
EPR	Extended Producer Responsibility
GGDP	Green Gross Domestic Product
GoZ	Government of Zimbabwe
HCC	Harare City Council
HDPE	High Density Poly Ethylene
ISEW	Index of Sustainable Economic Welfare
ISWM	Integrated Solid Waste Management
LDPE	Low Density Poly Ethylene
MoHCC	Ministry of Health and Child Care

METHI	Ministry of Environment, Tourism and Hospitality Industry
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
PPP	Polluter Pay Principle
PAYT	Pay As You Throw
PET	Polyethylene Terephthalate
PWTA	Public Willingness to Accept
PWTP	Political Willingness to Push
RVI	Reverse Vending Initiative
SADC	Southern Africa Development Community
SDGs	Sustainable Development Goals
UN	United Nations
UNEP	United Nations Environment Programme
W.H.O	World Health Organisation
WEF	World Economic Forum
ZDHS	Zimbabwe Demographic and Health Survey
ZIMSTAT	Zimbabwe National Statics Agency

Definition of Key Terms

Circular Economy - an economic system aimed at minimizing waste and makes the most out of resources.

Consumption - the use of resources and products; for the purposes of this study, plastic products.

Green Growth - an economic system that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

Plastic - a synthetic material having the capacity to be shaped or moulded by heat.

Plastic waste/*Plastic pollution* - the accumulation of unwanted plastic in the environment that affects the ecosystem.

Sustainable Development- an approach to development that meets the needs of the present generation without compromising the ability of future generations to meet theirs.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

As countries around the globe endeavour to ensure economic growth and development, the 21st century has presented them with a new set of challenges ranging from natural resource depletion, intensive global warming, increasing greenhouse gas emissions, ecological degradation and pollution generation due to rapid increases in population and incessant consumption of finite resources (World Economic Forum, 2016). Accordingly, "The Limits to Growth" by the Club of Rome in 1972 had hinted that such trends based on finite resources, perpetual growth and inequality would not be sustainable (Berndtsson, 2015).

In the same context, the Brundtland Commission Report, "Our Common Future" (Brundtland Commission, 1987) noted that environmental problems can be relatively local but accumulatively global and made a clarion call on the global need to create a balance between the economy and ecology (Morrow, 2014). It can be argued that the Brundtland Commission Report laid the foundation for the convening of global conventions such as the 1992 Earth Summit which produced action plan documents such as the Agenda 21, the Rio Declaration and the Commission on Sustainable Development, intending to guide countries into a sustainable development path (Organisation for Economic Cooperation and Development , 2014).

Moreover, it can be stated that the focus of these conferences was to discuss the state of the global environment and its relationship to economic growth and development as well as to find approaches and resolutions of ensuring an inclusive economic well-being while not overreaching ecological limits at the same time (OECD, 2014).

Emerging from these global decision making spaces was an approach to shift towards an economic system or model that results in enhanced human welfare and social justice, whilst reducing environmental hazards and ecological imbalances; that is towards green growth or green economies (Campbell-Johnston, 2018).

While the United Nations Conference on Environment and Development (UNCED) summit themes evolved over time, limited progress has been made in revisiting the production and consumption patterns of plastics in order to foster green growth (WEF, 2018). The prolific and incessant consumption of plastic products coupled with poor plastic waste management in Ellen MacArthur Foundation (EMAF, 2017) view is causing unprecedented damage to humanity and the ecosystem. This menace is also attributed to the existing linear economy that is predicated on the frequent use and ultimate release of plastic waste and pollution into the environment (Campbell-Johnston, 2018).

According to the World Waste Survey about 2.8 billion tonnes (MT) of plastic waste is created annually, while about eight million tonnes of plastics end up in the ocean polluting fresh water, with about two million tonnes of this waste being extremely toxic (World Waste Survey, 2015). Therefore, as stated in the World Bank Report, considering the rates of consumption and urbanization, the volume of plastic waste is projected to double by 2025 (World Bank Group, 2017).

The need for finding viable solutions to the plastic waste predicament is becoming more urgent and there is a need for remedies and alternatives to humanity's plastic dependence if the world is to achieve green growth and sustainable development (Lewandowski, 2016). More so, well managed plastic waste should be explored as a resource in order to reduce pollution and dependence on virgin materials; hence

solutions such as material reduction, increased recycling capacity and development of bio-based plastics can be viable strategies to foster green growth (Bowen & Sam , 2015).

Against that backdrop, the transition to a circular economy that presents a shift from the linear economic model of the 'produce-consume-dispose' or 'take-use-discard' approach is flaunted as a convenient alternative because it has the potential to address both the ecological and economic concerns (MacArthur, 2015). The circular economy is about decoupling growth from resource constraints and is embodied in the United Nations' Sustainable Development Goals (SDGs) including SDG 8- Inclusive and Sustainable Growth; SDG 11- Sustainable Cities and Communities; and SDG 12- Sustainable Consumption and Production (EMAF, 2017). A circular economy is also fashioned to transform the linear model focussing on products and services that would inevitably reduce waste and pollution generation in the environment (Circular Academy, 2017).

1.2 Background to the Study

Over the past decade there has been rapid urbanization in Zimbabwe especially in the capital city, Harare, as people migrated from rural areas and from small towns across the country to look for opportunities (Tsiko, 2014). This exodus has led to high population densities and sprouting of illegal settlements as well as changing consumption patterns leading to an increase in urban waste generation (Chikobvu & Makarati , 2014). However, according to a Demographic and Health Survey carried out by the Zimbabwe National Statistics Agency (ZIMSTAT), these increases have not been matched by a similar increase of necessary infrastructures and services for

waste management, and that has been a major challenge to most of Zimbabwe's urban local authorities (ZDHS, 2015).

More so, as the population increases, the per capita waste generation also increases and consequently an increasing population leads to a growing demand in plastic goods and generation of plastic waste (Makwara & Magudu, 2014). This assertion entails that as Zimbabwe's population grows consistently, there is a comparable increase in plastic consumption and an increase in plastic pollution generation. In a research done by the University of Zimbabwe - Institute of Environmental Studies (IES), Zimbabwe is one of the main producers of plastic waste in the Southern African Development Community (SADC) mainly through the importation of plastic packaged commodities (IES, 2015). The IES report revealed that Zimbabwe generates about 1.65 million tonnes per year of total solid waste and 12percent (198 000 tonnes) of this is plastic waste (IES, 2015). The most used types of plastics in Zimbabwe include Expanded Polystyrene (EPS) popularly known as 'kaylite' generally used for fast foods packaging, and Polyethylene Terephthalate (PET) commonly used for soft drinks and purified bottled water.

1.3 Statement of the Problem

Notwithstanding the development of the Integrated Solid Waste Management Framework (ISWM, 2014), various pieces of legislation and Statutory Instruments in line with the National Conservation Strategy to integrate socio-economic and environmental/natural resources concerns in the national development trajectory; plastics have remained a menace in Zimbabwe. Poor plastic waste management, emissions of micro plastics and often insufficient disposal measures have led to far-

reaching environmental, health, social and economic impacts in the country (W.H.O, 2018).

Despite the ban of Expanded Polystyrene (EPS) popularly known as 'kaylite' through Statutory Instrument 98 of 2010 (*Plastic Packaging and Plastic Bottles*) and Statutory Instrument 84 of 2012 (*Amendment*); the cheap, flexible and multipurpose plastic has become the ubiquitous material of Zimbabwe's fast-moving economy. However, owing to an increased population and changes in consumption patterns, plastic waste has been mooted the significant contributor to the recurring cholera and typhoid epidemics mainly in the high density suburbs; for instance in the Glen View suburb of Harare which has been the epicentre of the 2008, 2009 and 2018-19 cholera and typhoid outbreaks (MoHCC, W.H.O, 2018).

Low rates of refuse collection by the Harare City Council (HCC) have prompted residents to burn plastic waste in open air and the proliferation of illegal waste dumps appearing on open spaces, in pits, on vacant plots, on road sides, in alleys as well as in storm water drains (EMA, 2018). Further, large amounts of toxins are released when plastic is burned in open air exposing people to toxic chemicals, including carcinogens, and the Environmental Management Agency (EMA) notes that the largest source of greenhouse gas emissions in the country emanate from open burning and incineration of plastic waste causing lasting damage to the flora and fauna (EMA, 2018).

Furthermore, the absence of properly engineered landfills have also triggered the disposal of plastic waste on unlined and poorly managed dumpsites creating an environment where disease causing vectors can thrive contributing to air and water pollution (W.H.O, 2018) and because of plastic's light weight nature, floatability and

prevalence to be blown from these disposal sites they travel easily through the gutters and storm water drains obstructing sewer reticulation pipes and eventually reaching the water bodies thereby contaminating residential water supply systems (MoHCC, 2019).

The current waste management system in Zimbabwe is traditional and primarily focuses on the disposal without controlling its generation and promoting waste reduction, re-use and recycling (Mafume et al, 2016). Against that background, the circular economy comes in at the leverage point by closing the loop in production and consumption patterns at all times through value preservation (EMAF, 2017), thus materials continuously flow around a "closed loop" system rather than being consumed once and then disposed; as a result the value of materials, plastics included, is not lost by being thrown away. In systems thinking a leverage point is a place in a system's structure where a solution element can be applied.

The key principle to green growth is stewardship, which means producing and consuming goods and services responsibly for own benefit and for the next generation to derive the same benefits (intergenerational equity) (WEF, 2018); thus a society with efficiency in production, sufficiency in consumption, conservancy of resources and deficiency in waste, captures well the ideal Zimbabwe to be achieved using a circular economy.

1.4 Research Objectives

The study objectives were to:

i. Investigate the drivers of plastic waste proliferation in Zimbabwe;

ii. Explore the challenges and opportunities for adopting a circular economy;

iii. Assess the prospects and opportunities for green growth using a circular economy.

1.5 Research Questions

The study aimed at answering the following questions:

i. What are the contributing factors to plastic waste in Zimbabwe?

ii. Is it feasible to adopt a circular economy in Zimbabwe?

iii. To what extent can a circular economy promote green growth in Zimbabwe?

1.6 Assumptions

The study was based on the assumptions that there was no circular economy in Zimbabwe and that the adoption of a circular economy would contribute to green growth. The study also assumed that the Glen View population in its entirety exhibited the patterns of plastic consumption and plastic waste management practises of the general Zimbabwean communities.

1.7 Significance of the Study

In addressing Zimbabwe's sustainable development trajectory, environmental issues have been at the periphery of the discussions; the government and policymakers have been pre-occupied with budget deficits, fiscal issues and political cycles which are undeniably important but it is imperative to note that ecological issues are also social issues (eco-social democracy), thus they are very critical to sustainable development

and require urgent attention. Therefore, the significance of this study is making a clarion call on the fundamental need to address the eco-social and economic structural issues for the country to achieve equitable sustainable development. The study will also contribute to the existing body of knowledge about the circular economy and green growth as well as opening avenues for further researches.

1.8 Delimitations of the Study

The study was conceptually delimited to a circular economy's potential to foster green growth in Zimbabwe. A circular economy is a wholly new ecotype concept that aims at keeping materials and products at their highest usefulness and promotes production that reduces waste and pollution (EMAF, 2015). The circular economy model is also underpinned on the three principles of reduce, reuse and recycle known as the 3R's (EMAF, 2017).

Geographically, the study was delimited to Glen View suburb in Harare, the capital city of Zimbabwe. Glen View falls under ward 30, 31, and 32 of the Harare Urban cluster (ZIMSTAT, 2012). It is a high density suburb and one of the most populous agglomerations in the country located in the South-Western parts of the Zimbabwe's capital city at a distance of 14 kilometres from Harare's Central Business District.

1.9 Limitations of the Study

One of the main limiting elements of this study was in relation to accessibility and literature content. The concept of a circular economy is still in its developmental stage, hence reducing the pond and diversity of sources for discussion on several aspects of the concept. However, this created space for more in-depth inquiries in future researches. Given the complexity and breadth of the plastic landscape, the

study did not cover all the aspects of the plastic system but a synopsis of plastics in relation to circular economy and green growth was incorporated. Moreover, restrictive organisational policies on access to information as well as bureaucratic procedures hindered the researcher from interviewing individuals whom the researcher deemed crucial to the study area. However, the researcher comprehensively used the provided information to come up with an objective study.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

In the past decades, the world has been grappling with a multi-faceted crisis that has negatively impacted human societies in terms of environmental and socio-economic damages. In the wake of these challenges, concepts such as the circular economy and green growth have gained traction and now firmly sit at the top of environmental and economic policy making agendas (Alfredsson & Wijkman, 2014).

This chapter presents a brief description of the green growth model before contextualising and examining the existing literature on the main tenets of the CE concept such as its origins and development; the goals and the benefits, as well as its limitations. The chapter also incorporates an assessment of the circular economy from a global and regional (African) context. Thus, this chapter creates a linkage between what has been previously studied and identifying gaps upon which the study sought to fill.

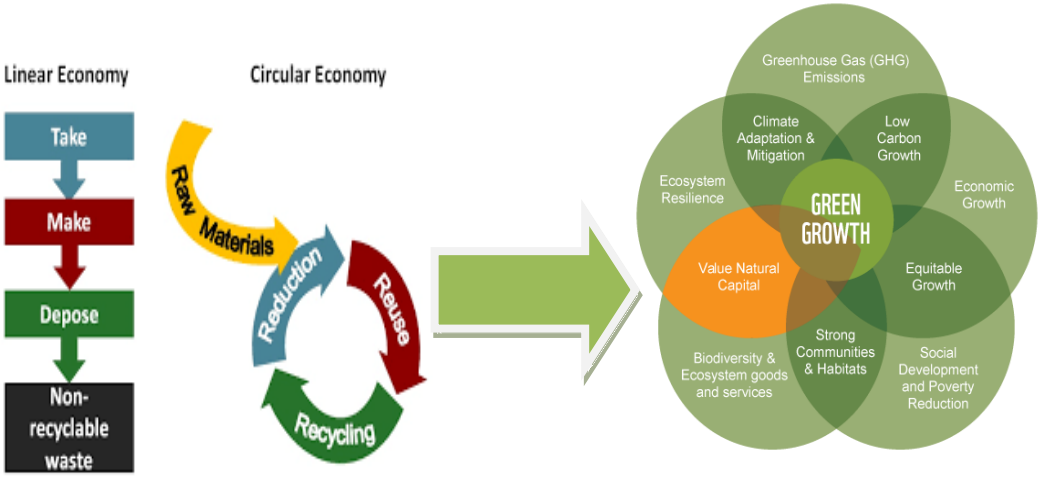
2.2 Conceptual Framework: The Circular Economy Concept

A conceptual framework consists of the theoretical perspective that supports the research including the main ideas, arguments and concepts used and evidences of the analysed literature (Maxwell, 2015).

The study adopted the Circular Economy concept, and the framework is used as heuristic lenses to examine how a circular economy can foster green growth in Zimbabwe with specific attention to the prospects and opportunities.

The circular economy is a restorative and regenerative economy that creates closed cycles of material loops supported by the three core principles of reduce, reuse and recycle (3Rs) (Campbell-Johnston, 2018). The application of the CE concept corresponds to the overall goal of creating a society that is economically viable and environmentally sustainable at the same time through promoting ecosystem resilience, climate adaptation and mitigation, reduction in greenhouse gas emissions (GHG), economic growth among other factors as illustrated in the framework (Figure 2.1).

Figure 2.1 Conceptual Framework



(Created by Reseacher)

2.3 Relevance of the Conceptual Framework to the Study

The persistent plastic waste and pollution generation coupled with unsustainable waste disposal has destroyed the capacity of the earth to sustain life indefinitely (WEF, 2018). The use of the circular economy model as the conceptual framework of this study is relevant in managing complex trade-offs as it helps in addressing the challenges that societies have been grappling with. The circular economy approach

aims at reducing waste generation with the intention of creating economically and environmentally sustainable societies. Hence the circular economy concept became relevant to the study focus.

2.4 Green Growth Model

Since the dawn of industrialisation, economic growth has been associated with a broad range of environmental impacts; from resource exhaustion, ecological degradation, climate change to waste and pollution generation (Hallegatte, 2015). In the quest to explain the relationship between economic growth and the environment; John Holdren and Paul Ehrilich (1974) proposed the explanatory; {I = PCT}, in which I = Environmental Impact, P = Population, C = Consumption and T = Technology or more specifically the productivity of technology in relation to environmental use (Ying & Wen-Ping, 2015). The equation sought to describe the impact of human activity on the environment (ecological footprint) and illustrate that with a rise in population and consumption, environmental impact would inevitably increase unless there is adequate technological improvement to surmount it.

The conception of green growth can be traced back to Pearce and Markandya in 1989 when they proposed it in their Blueprint for a "Green Economy" (Barbier, 2014). However, the idea of green growth or green economies had only been confined within a limited area until the United Nations Environmental Programme (UNEP) launched the Green Economy Initiative (GEI) in 2008 and the Global Green New Deal (GGND) in 2009 in the context of the prevailing climate change, global warming, environmental degradation and pollution generation to support governments move towards green economies by reshaping and refocusing policies towards an environmentally sustainable future (Hallegatte, 2015).

Moreover, it can be argued that the green growth model emanates from an observation that the natural environment is a factor of production acting as a form of capital in three main ways which include providing resources, waste assimilator and offering environmental services that sustain life such as climatic regulation and ecosystem health (Olivia, 2015). On the other hand, this 'natural capital' has been undervalued and largely unpriced both in economic theory and practice because it is regarded as a free gift of nature (Hallegatte, 2015).

Compounding to the above, a more inclusive characterization of green growth states that it is an economy that results in improved human well-being and reduced inequalities over the long term while not exposing future generations to significant environmental risks and ecological scarcities (UNEP, 2014). Furthermore, green growth promotes economic growth and development by reducing pollution, minimising waste and greenhouse gas emissions, minimising inefficient use of natural resources and preserving biodiversity (Barbier, 2014). It also entails improving health prospects for populations and strengthening energy security through a reduced amount of reliance on virgin materials and making investments in the environment for economic growth (Jackson, 2014).

In the outcome document of the Rio +20, "The Future We Want"; green economy is acknowledged as a major contributor to the eradication of poverty, enhancing social inclusion, creating employment opportunities and decent work for all, improving human welfare and sustained economic growth, while preserving the healthy functioning of the earth's ecosystems (Olivia, 2015). Further, the Rio +20 conference also highlighted the urgent need for actions against unsustainable patterns of

production and consumption to address environmental sustainability and promoting conservation of biodiversity and ecosystems (Nita et al, 2017).

The green growth model mirrors the inter-relatedness of economic and environmental concerns and is perceived as one in which the links between economy, society and the environment are taken into account where the transformation of production processes and consumption patterns, while contributing to a reduction per unit in reduced waste, pollution and the use of resources will regenerate and diversify economies (Magnier & Schoorman, 2015). For green growth proponents the current model of economic growth misallocates resources in-between the different factors of production and over-invest in practices that cause environmental degradation (Aldersgate Group, 2015). However, if these systematic failures are corrected through a shift from the current economic model growth might be higher (Bowen & Sam , 2015).

More so, it can be argued that the model of green growth has evolved from being a guideline of "greening" a "brown" economy to one that focuses on driving economic development (Nita et al, 2017). This transition has contributed to an increase in environmental consciousness and an emergent demand for products and services that are environmentally friendly and environmentally enhancing. Therefore, these prospects underline the notion that a green economy can address not only brown issues such as reducing carbon emissions and waste generation but also income generation and employment creation.

Comprehensively, green growth is like a vehicle expected to deliver critical outcomes such as new sources of income and employment (green jobs); low carbon and greenhouse gas emissions; reduced use of resources and generation of waste and

pollution; and contributing to broader societal goals through social equity and poverty reduction (Morrow, 2014).

Figure 2.2 The Green Growth Model

(Morrow, 2014)

In all these dimensions, it is imperative to note that "growth" as applied in this model is not the same as output growth which is the measure of growth in economics, but it is broadened to also cover economic progress (Weetman, 2016). Green growth goals are therefore not automatic; thus a paradigm shift from the current linear economic model and specific policies and collective efforts from institutions must be involved in green activities and innovations.

2.5 Origins and Development of the Circular Economy Concept

The circular economy (CE) evolution can be drawn to various backgrounds that include the general systems theory, environmental economics and industrial ecology (Perchard, 2018). The phrase 'circular economy' was introduced by (Pearce & Turner, 1989) although the concept is rooted back to (Boulding, 1966) who

advocated for the implementation of a cyclical ecological system as an alternative to the "wasteful" linear economic model. The cyclical economic model of Boulding was criticised for being fluid and this spurred further developments of the CE concept (Ying & Wen-Ping, 2015). Equally, the overarching structure, goals and principles of CE can be operationalized in various associated concepts like the Cradle-to-cradle (C*2*C), the performance sharing economy, Bio-mimicry and Industrial symbiosis (Lacy & Rutqvist , 2015).

The notion of a 'closed loop' system was introduced by (Stahel, 1982) recommending a self-replenishing economic construct which then developed into the idea of a performance sharing economy. The principle of a performance sharing economy is the redefinition of the processes of production, sales and preservation where goods and resources are rented or leased instead of being sold (Ying & Wen-Ping, 2015); thus instead of selling goods, companies should actually market performance economy.

Furthermore, incorporating the performance economy model was the development of the 'cradle-to-cradle' (C*2*C) model (Braungart & McDonough, 2008). The cradle-to-cradle model creates positive ecological footprints through remodelling environmentally effective solutions which considers all materials involved in industrial and commercial processes to be technical and biological nutrients (EMAF, 2017). The bio-mimicry model is another marvel concept of the circular economy which requires the economic system to mimic or to 'learn from' and imitate the ways in which nature cope with industrial and commercial challenges and measure operational efficiency against solutions experienced by nature (Andrews, 2015).

More so, bio-mimicry creates innovations for viable solutions to address human challenges (Ghisellini et al, 2016).

Through the concept of industrial ecology or industrial symbiosis, the circular economic model incorporates scientific approaches by focussing on energy and material flow of the industrial and other economic systems (Andrews, 2015). Therefore the aim of industrial symbiosis is to create a closed loop process that minimises waste by using interdisciplinary scientific methods regarding the local, the global natural and social environments (EMAF, 2015). Moreso, industrial symbiosis intends to create value through better utilization of technology, resources, energy and services; for example, the waste of one company could be a resource for the other and vice versa (Bocken et al, 2017).

2.6 Linear Economy vs. Circular Economy

The current economic model has been characterized by (EMAF, 2015) as a linear economic system. The Ellen MacArthur Foundation postulates that the prevailing economic design is historically rooted in the uneven distribution of wealth where materials and resources have been largely sourced from the global arena and that enabled materials to be cheaper compared to the cost of human labour. Resultantly, the consequence of cheap material and expensive labour was the neglect of recycling and reusing (EMAF, 2015).

In addition to (EMAF, 2015) argument, it can be stated that the system developed a natural lock-in effect because the official product approval procedures favoured the existing economic model over radical changes and reinvention of basic practices such as the 3R's (Becque & Hamza-Goodacre, 2016). Therefore, the upshot of this economic system was the linear economy model, generally characterised as the

"take-make-dispose" or "produce-consume-dispose" approach (EMAF, 2017); thus take or extract the resource you need, make the goods to be sold and consumed and dispose everything that you do not need, including the product at the end of its lifespan also referred to as 'cradle to grave' (Weetman, 2016).

The linear economic model was developed short of an integral recycling trend leading to the environment being a waste warehouse while the circular economic model is conversely based on nonlinear systems where resources are used for a longer period, utilising their maximum value and recovering materials at the end of their service life (EMAF, 2015).

Figure 2.3 Linear and Circular Economy Models

(EMAF, 2015)

The figure (2.3) essentially illustrates the radical approach that CE is aiming for. The linear model relies on the approach where materials extrapolated from the earth at the end of the process are discarded and not being recycled back into the system, whereas the circular economy model signifies the ideal model where raw materials are never exhausted. This up-cycling model underscores the constructive coupling capacity that can be established between economic growth and the growth of natural resources (EMAF, 2015).

2.7 Transitional Barriers to Circularity

Given the relentless challenges that the world continues to grapple with owing to the linear economic model, it is evident that a shift towards a circular economy is critical for sustainable development. However, there are various obstacles associated with the transition towards circularity from the linear status quo which include technological insufficiency, market and financial constraints as well as behavioural, institutional and regulatory barriers (Circular Academy, 2017).

Moreover, the lack of proven technologies for implementing a circular economy makes it difficult for up-cycling and production of high quality remanufactured commodities (Campbell-Johnston, 2018). Further, low virgin material prices and high upfront investment mean that circular products become more expensive, thus market and financial obstacles (Morris, 2018). The absence of a global consensus from policymakers on how circular economy operates can also be argued to be a major drawback to the transition towards a circular economy (Lindner et al, 2017)**.**

Additionally, ecosystem damage is frequently a by-product of activities such as unsustainable consuming and disposal of waste products (Carter, 2003). Subsequently, it becomes imperative that governments and policy makers intervene to regulate these damaging activities through regulatory interventions which sometimes may involve a mix of policy instruments both legal and political. However, it is also important to note that many environmental policies contrast with other policy areas and have significant distributive consequences, and against that background (Morris, 2018) argues that the transition from the linear economy to the circular economy may incite inconveniences among businesses and consumers due to

reduced competiveness, lost jobs and higher prices for goods and commodities. Therefore regulatory interventions become transitional barriers to circular economy.

Compounding to the above, temporal and spatial variability can also be significant barriers to circularity because many ecological concerns are complex by the fact that their impacts are long term, affecting future rather than present generations (Carter, 2003). Whereas remedial policies need to be adopted to address the shortfalls of the linear economy before the full negative effects are felt, there are various pragmatic constraints on policymakers and governments in addressing these concerns because they are pre-occupied with short term concerns and it is easier for them to make polices that respond to today's political pressures than policies which addresses tomorrow's environmental problems (Lindner et al, 2017).

Another biggest barrier in the transition to a circular economy lies in aligning the various stakeholders and in changing the prevailing perceptions on concepts and issues such as information transparency and ownership (Andersen, 2017). These challenges are more systematic and strategic to the implementation of a circular economy and therefore need to be effectively addressed. Thinking in the long-term perspective about resource use and impact, the business culture is difficult to shift from linearity to circularity and fundamentally consumer interests and habits are naturally linked to a linear mind-set (Lacy & Rutqvist , 2015).

It is evident; therefore, that the circular economy still requires the consolidation of the entire product life cycle from raw material provision to consumption and the transition to a circular economy needs a paradigm shift in systems thinking, where every actor in the system plays a role (Andersen, 2017).

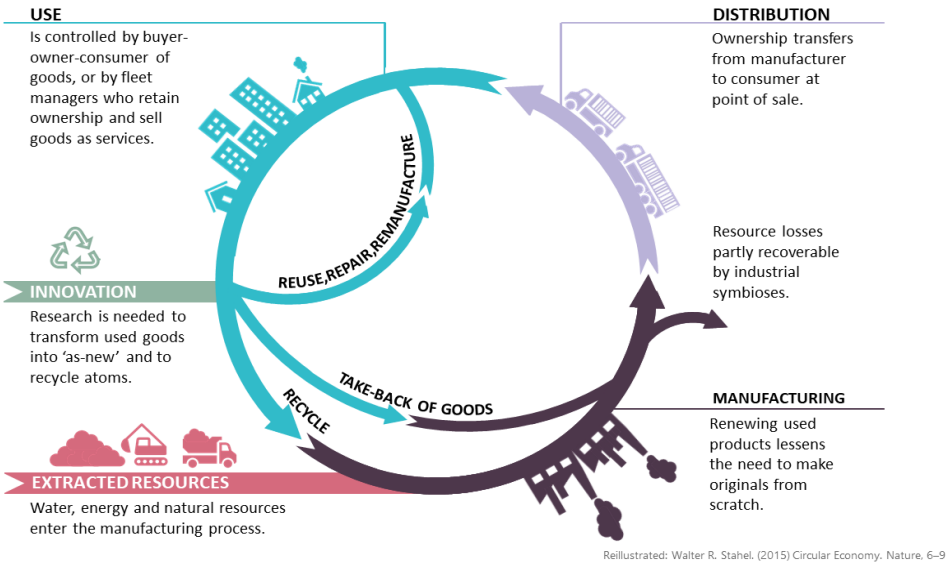
2.8 Circular Economy in Systems Thinking

The word ‘system’ was brought forward in the 1920s from ancient Greek to mean the entirety composed of various parts (Peng & Ding, 2006). More so, Von Bertalanffy, the general systems founder considered a system as the collection or continuum of mutual connections and interactive elements (Huang, 2004). A system is also defined by (Agrawal, 2005) as a special functional structure with some interactive and interdependent elements and this structure is also an element of a bigger structure or system which it belongs to. The contemporary description of a ‘system’ is a functional organic entirety that is composed of elements with a distinct structural form (Andersen, 2017).

Moreover, from a systems theory standpoint an important feature of any system is the layer, and against that backdrop it can be argued that the circular economic model also posses the structure of a layer (Huang, 2004). The functioning of a circular economy depends on the aggregation and entirety of the system and CE requires that human beings place themselves as part of the bigger system when thinking about production and consumption (Huang, 2004).

In systems thinking, the layer structure of the circular economy has ensured that CE has systematic stability (Peng & Ding, 2006), with the most basic layer of the circular economy indicating the production activity and the individual personal consumption behaviours. Further, the highest layer is the social layer, where the concept of a circular economy raises an approach of thinking about socio-economic governing through cascading it to the entire system (Peng & Ding, 2006). This governing principle guides the activity of each member of the system or society into a sustainable development mode.

Figure 2.4 Circular Economy in Systems Thinking



(Stahel, 2015)

Through a systems' indicator centred on the Pressure-State-Response model (PSR), the Organisation for Economic Cooperation and Development (OECD, 2014) presented the relationship between the economy and the protection of the environment (socio-ecological interrelations) and it is apparent that a systems thinking approach is critical in a circular economy. Everything should operate as a system; producers, consumers and businesses are members of different systems, but are all connected to each other and have a great bearing on the other system (Barrie, 2017). Therefore, an effective CE approach takes into consideration all systems involved.

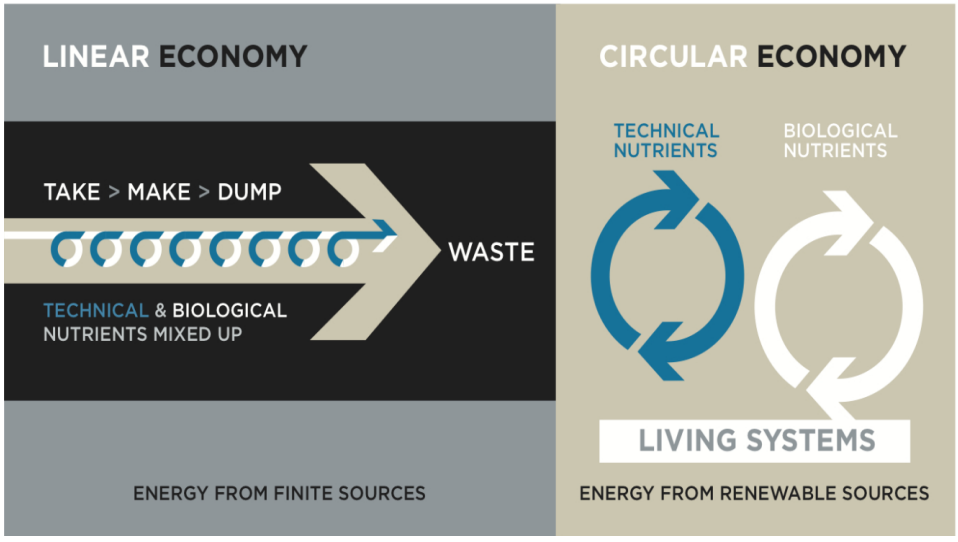
2.9 Circular Economy Goals and Benefits

The circular economy is underpinned by three principles of reduce, reuse and recycle known as the 3R's (EMAF, 2015). These principles are the fundamental operational structures for reducing resource depletion and waste generation. The 'reduce'

principle aims at significantly reducing the input of primary energy and waste by improving consumption and production processes (Campbell-Johnston, 2018). The 'reuse' principle is whereby materials are reused or recovered in their existing form instead of being wasted (Campbell-Johnston, 2018), and essentially the 'recycle' principle is the recovery of former waste materials that are repurposed into either original products or modified products.

A circular economy is a regenerative economy which aims to keep materials and products at their highest usefulness and a waste-free production that aims to reduce waste and pollution (Ghisellini et al, 2016). The Ellen MacArthur Foundation (EMAF, 2017) states that a circular economy is an industrial economy that differentiates between biological and technical cycles; where biological nutrients are redesigned to enter to biosphere safely and technical nutrients are not returned to the biosphere since they are designed to circulate at their highest utility in the production processes (Figure 2.4)

Figure 2.5 Circular Economy as an Industrial Economy



(EMAF, 2017)

Moreover, as a reformative system, the circular economy is a model that aspires to strip out all unnecessary waste materials, energy losses and related carbon emissions across all supply chains (Heshmati, 2017). Through innovation and integration, the circular economy also aims at closing these loops to allow materials, energy and resources to be 'fed' back into the cycle (Perchard, 2018); thus a more sustainable eco-cycle can be achieved through long-term planning, designing, maintenance, repair, remanufacturing, recycling, refurbishing and up-cycling.

From the perspective of environmental economics, the circular economy also applies the principles of material equilibrium (Guldager & Sommer , 2016), which implies that all material flows should be considered even though their economic value rather than physical characteristics will guide their management. Therefore waste should be regarded as a supplementary economic resource with an economic value that must be sustainably managed (Ying & Wen-Ping, 2015).

Furthermore, among the circular economy proponents the possibility to positively impact on the environment and at the same time sustaining economic growth is put forward as a strong drive for a circular economy (WEF, 2018). In the field of economics, economic growth is the ability of an economy to produce goods and services for societies measured in terms of Gross Domestic Product (GDP) and Gross National Product (GNP) indicators, while also improving cost savings, innovations and employment creation. Accordingly, a circular economy provides benefits and opportunities to all sectors in an economy; businesses, governments and to the society (Wijkman & Skanberg, 2015).

As aforementioned that economic growth is measured in terms of GDP and GNP, it essentially means that growth can be achieved due to the cost reduction of production

as circular activities will be increased (Andrews, 2015); therefore fewer resources will be used and less budget on extraction. Ellen MacArthur Foundation (EMAF, 2017) asserts that supply, demand and prices will also be heavily impacted because of the many changes in the output and input of economic production activities. Moreso, in the condition that a circular economy can create new values where producers and consumers' behaviour can be enhanced, where new opportunities can be created and different social groups integrated into the system; such scenarios may increase savings and expenses in the result of household income (Lewandowski, 2016).

In addition, the eradication of waste from the value chain has quantifiable benefits of decreasing systematic and direct material cost and diminishing resource dependence (Perchard, 2018). Similarly, proficiency in the reverse material flow cycle is a potential competitive edge to businesses (Lacy & Rutqvist , 2015). Due to the closed-loop processes that a circular economy advocates for, it can be argued that economies will grow less exposed to price fluctuations of resources and products and that the flattened cost curve eventually results in more efficient use of resources both in terms of value and volume (Bakker et al, 2014). More so, externalities that are associated with the use and flow of materials will also lower resource consumption and therefore decreases the exposure to externalities (Dordrecht, 2014).

The Circular Academy propounds that the incorporation of the attributes of a circular economy in the Research and Development (R&D) phase of operation will spur progress in material sciences and produces the development of higher quality and more durable components (Circular Academy, 2017). In the transition to CE it is imperative to consider the environmental benefits that may be recognised besides the

economic and business benefits (Pauli, 2015). A circular economy has the potential to reduce carbon dioxide emissions and reduce tonnes of greenhouse gas emissions by not letting organic waste permeate into landfills (Pauli, 2015). However, environmental benefits may need to be measured beyond waste recycling and keeping track of materials in the loops to enhance ecosystem resilience (Hobson & Lynch, 2016).

Through recycling, great energy efficiency is achieved by diverting the need for use of fossil fuels as raw materials (Heshmati, 2017), for example recycling of Polyethylene Terephthalate (PET) bottles into new ones, regarded as 'closed-loop recycling' or where low-density polyethylene (LDPE) bottles are converted into waste bins, toys or other similar products, regarded as 'semi-closed loop'. In addition to that, a life cycle analysis (LCA) projects that the use 100percent recycled PET rather virgin PET to produce plastic products could lead to a reduction of carbon dioxide emissions (Morris, 2018).

Moreover, recycling jobs offer a strong social benefit in reducing poverty and the dual needs of environmental improvement and income generation that face communities have stimulated the implementation of many recycling projects in developing countries (Lindner et al, 2017). Ellen MacArthur Foundation notes that with the combined actions of the public, industry and governments, it may be possible to divert the majority of plastic waste from landfills through recycling over the next decades, and that a circular economy can also bring $1 trillion to the world economy annually by 2025, create 100 thousand new jobs, saving $500 million on materials and preventing the emergence of a million tons of waste (EMAF, 2015).

As part of an economic and environmental sustainability solution, it can be argued that CE is just part of the solution and not a wholesome phenomenon (Lindner et al, 2017); hence the circular economy should not lead people to hide behind concepts instead of making big transformational changes. For (EMAF, 2017) the overall benefit of the circular economy depends on where it goes in practice. It therefore becomes imperative to note that they both concur on the importance of measuring the totality of the CE and not the efficiency of individual processes.

2.10 Circular Economy Limitations

Whereas the circular economy has attracted some attention as regards to its potential to merge economic activities and ecological limits, literature is immersed with the drawbacks of the circular economic model. A circular economy has to be about new business models and not only end of pipe solutions, cradle-to-cradle and less production and consumption through renting or leasing (Barrie, 2017). A circular economy is about a bigger transition in values than just consumption and production systems, thus more radical changes that at the same time lower consumption as well as demands are required; yet these appear to be lacking in the circular economy scope.

The consumption of a myriad of products and services provides an essential link between economic development and environmental impact; and as a locus of analysis a polarised view that considers consumption as the only problem of ecological decadence needs to be avoided (Nita et al, 2017). The CE paradigm is disputed that it will lead to what the neoclassical economists like Herman Daly called a ‘Steady-State Economy’ described as an economy made up of a continuous stock of physical wealth and constant demographics (Jackson, 2014). In effect, environmental

economists argue that such an economy does not grow in the course of time and it is unsustainable.

Moreover, a continuous economic growth is not physically possible using CE due to the natural laws because when a product is designed or re-designed to be re-used and re-circulated in the systems (Heshmati, 2017); the Laws of Thermodynamics dictates that there is an inevitable energy loss, yet recycling actually requires adding more energy. Circular economy advocates argue that with closed cycles the world will not exceed the planetary boundaries proposed by (Raworth, 2002), but however (Andersen, 2017) argues that totally closed loops are not possible, for example the recycling of PET-bottles will still release plastic particles when cleaned and eventually they will accumulate in aquatic ecosystem. Therefore, although it is feasible to circulate plastics than using virgin materials, it will still end up in nature and negatively affecting the environment.

On recycling, Morris (2018) postulates that recycling rates are relative to the economy as a whole, thus increased recycling does not automatically mean a reduction in overall quantities of non-recycled waste. For example, plastic recycling processes require the input of virgin materials and they are generally recycled in open loops into lower value products, regarded as down-cycling, hence in reality there is very little recycling taking place (Morris, 2018). Further, although plastic recycling rates and targets are important; in relation to the waste hierarchy, recycling is perceivably a less efficient method of waste management than prevention.

Figure 2.6 The Waste Hierarchy

(Cumming, 2015)

The discourse around plastics and the circular economy has concentrated on substituting materials and replacing plastics with alternatives such as bio-plastics and with conventional materials such as glass and paper (Guldager & Sommer , 2016), however the potential socio-economic losses in the plastic industry may be offset with growth in other material sectors (Hobson & Lynch, 2016). In environmental terms the substitution of plastic products with other materials is also not without risk to reconfigure the economic systems around material recycling (Wit et al, 2018).

Literature suggests that a circular economy could create employment in the recycling sector; therefore keeping plastics in the system would be beneficial. However, (Preston & Lehne, 2017) argue that much of the plastic that is recyclable have little value and many countries are actually in a global race to ship out these materials to process them were there is cheap labour; therefore it is even better to eliminate the production and consumption of single-use plastics although it may be

counterintuitive in the context of informal waste pickers who rely on plastic recycling for survival.

Evidently, it can be maintained that a circular economy does not consider the potential for a rebound effect (Lindner et al, 2017); environmental benefits from CE will only be realised if they result in a net reduction in the total consumption of resources from economic activities as well as the pressures on the biosphere. Therefore, from a Sustainable Development Goals (SDGs) perception, this entails absolute decoupling of resource use from economic development and within ecological limits or thresholds (EMAF, 2017). A circular economy may possibly produce negative path dependencies, for example with 'reuse' and 'recycle' approaches, materials that should be replaced are instead retained in the loop, hence the need to keep other ecological effects in mind and not only focusing on circulation (Perchard, 2018).

More so, decoupling is possible and achievable only if the economy is regulated by policies and taxes (Barbier, 2014). However it can be argued that even if regulations are liberally applied to encourage a circular economy, there are still fundamental individual liberties beyond the reach of regulation. Whereas conservationism and environmentalism have been collectively civilised, it has created a puzzle on how to address resource constraints to achieve sustainable development in an approach that incorporates livelihoods around human 'needs' or biophysical necessities and 'greed', which is a human psycho-social attribute that contribute to the quality of life that people desire.

Despite the circular economy limitations, problems such as plastic waste and plastic pollution need to be solved and futuristic policies will be implemented through less

use and systematic waste management schemes (Wit et al, 2018); but ultimately the current predicament requires more sustainable and environmentally friendly practices like the circular economy approach where used plastic becomes a feedstock rather than becoming waste.

The circular economy is nonetheless a model composing of old concepts with a potential to stimulate a paradigm shift with core ideals of waste elimination, respect for social, economic and natural environment and resource-conscious business behaviour (Ghisellini et al, 2016). Conceptualised on the backbone of these principles, the circular economy has proven its potential to deliver palpable benefits and its capability to address and redress the contemporary socio-economic and environmental challenges.

2.11 Global Dimensions to Circular Economy

The European Union (EU) as a bloc is leading in the transition to circular economies. EU has already set an action plan to shift to a circular economy through policy documents; “Towards a Circular Economy: A Zero Waste Programme for Europe” and “Closing the Loop: An EU Action Plan for the Circular Economy” (European Commission, 2014). These frameworks have laid the foundations for the promotion of the circular economy in EU member countries. According to the strategies, EU is setting up to recycle 65% of municipal plastic waste and 75% of package waste by 2030. Europe is also planning to promote mechanisms that would discourage landfills, encourage re-using and recycling among citizens, motivate producers to sell green goods on the market and use recycling as an essential part of the business operations (EMAF, 2017). The circular economy in EU member countries allows

competitiveness and growth, acting as a stimulus for local and regional development, creating new opportunities and outwitting environmental damage (EMAF, 2017).

More positively, a Scotland based company "MacRebur" uses recycled plastic waste to make road asphalt which it claims is 60% stronger than the standard asphalt (Gulf News, 2018). These methods of converting plastic waste into fuels and chemicals (waste valorisation) are being used across the globe, but the efficiency levels and environmental impacts of such initiatives need to be critically examined to determine how these solutions are closing the consumption loops without the plastic toxicity being introduced again into the ecosystem (Morris, 2018).

Like Europe, Asia is also following the trend and moving towards circular economies. China has developed legislation on the circular economy promotion to facilitate an economy based on renewable resources (Ying & Wen-Ping, 2015). Similarly, South Korea adopted "The National Strategy for Green Growth, 2009-2050" that is be backed by a circular economy, and Japan has also developed a plan establishing the "Sound Material-Cycle Society" that is linked to circularity (Ying & Wen-Ping, 2015). The common factor in these countries is the adoption of new concepts of national development trajectories, which precisely provides for a radical and fundamental change in the waste management systems from a linear economic model to a circular economic model (Circular Academy, 2017).

Moreover, against a background of global sustainability crisis caused mainly by the trans-boundary nature of plastic materials, products and waste; a growing number of international agreements and frameworks are providing action plans that incorporates a circular thinking, for example the United Nations' Sustainable Development Goals (SDGs) Frameworks, particularly under SDG 11 "Sustainable Cities and

Communities"; SDG 12 "Responsible Consumption and Production"; and SDG 14 "Conserve and Sustainably use oceans, seas and marine resources" (Circular Academy, 2017).

More so, through Resolution 2/11 of 2016 on Marine litter and micro-plastics, the United Nations Environment Assembly (UNEA) invited all nations in collaboration with industry and other stakeholders at the national, regional and international levels to organise and partake in annual campaigns for awareness raising, prevention and environmentally sound clean-ups of marine litter backed on circular economy principles.

2.12 Africa and the Circular Economy

In Africa, waste management is a major developmental challenge that has posed serious consequences for environmental quality, public health and sustainable development (Preston & Lehne, 2017). High population growths, massive urbanisation and new consumption pathways have exacerbated waste production that is projected to exceed 160 million tonnes by 2025 (EMAF, 2017). According to a World Waste Survey, 19 out of the world's 50 biggest dumpsites are located in Africa, but despite such a precarious state of affairs most African countries lack the resources, infrastructures, skills and the expertise necessary to tackle the amount and complexity of waste being produced (Preston & Lehne, 2017).

Unlike in the Global North and in the European Union (EU) in particular were they have adopted relatively concrete strategies like the "Circular Economy Action Plan" which identifies key priorities for Europe's transition to a circular economy; African countries do not yet have comprehensive circular economy policies and strategies. Strategic proposals for CE are often presented but however there has not been the

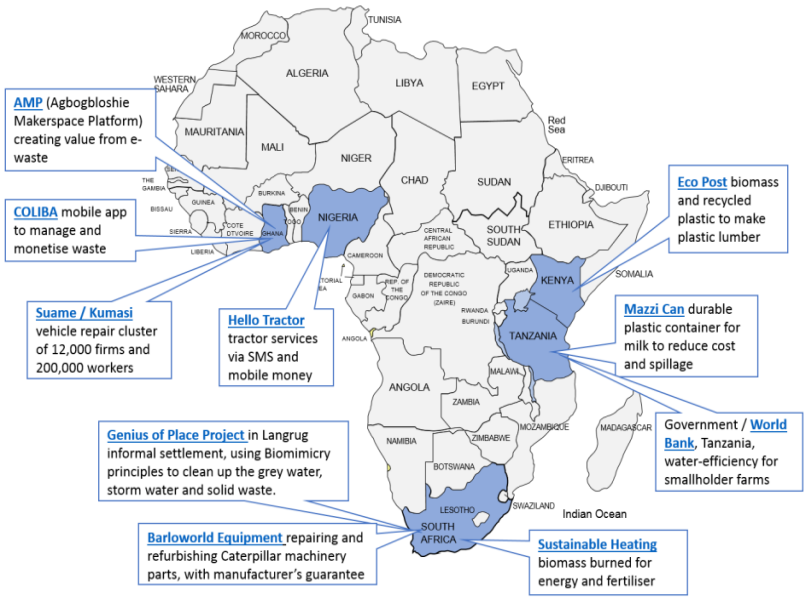
political willingness by African governments to push for circular economy and circular activities, rather much attention has been given to elections and political issues. The lack of an enabling environment; including financial resources and other incentives have also been the major constraints for circular activities in many African countries.

Moreover, although the circular economy is a relatively new concept, in the African context CE offers considerable opportunities for a more inclusive and sustained economic growth and development, which include employment opportunities and positive environmental/ecological practices essential for sustainable growth (Preston & Lehne, 2017). While the adoption of the circular economic model is still its infancy in Africa, there are some success stories that can be observed in some countries where through innovation, new business streams and industries have come to the fore in support of this type of thinking and economic model. During discussions at the National Circular Economy Forum in 2019, Rwanda sought to introduce a National Green Growth and Climate Resilience Strategy to guide and facilitate its transition to a low carbon and 'zero waste' economy by 2050 premised on circular activities; today Kigali, its capital city is considered one of the cleanest cities in the African continent.

More significantly, the drive to avert waste from landfill and dumpsites has resulted in the establishment of a great number of waste management companies merging into reprocessing industries with a focus on reuse, recycle, and repurpose (Desmond, 2017). Such initiatives have also facilitated the manufacturing industry to rethink their product designs as well as the type of resources and materials they use to make

sure that their goods and products of today can become raw materials of tomorrow in line with the cradle to cradle principle of the circular economy.

Figure 2.7 Circular Economy examples in Africa



(Desmond, 2017)

In Desmond (2017) view, for the various circular economy initiatives to successfully scale across the continent; governments must put in place polices, incentives and legislations that support entrepreneurs, social enterprises and innovation. Building on the defining characteristics of resilience and resourcefulness, the circular economy can open up a positive development path and enable Africa to leapfrog to a sustainable, equitable and prosperous future.

2.13 Research Gap

The review on circular economy literature brought out a number of research gaps which this study sought to address. Whilst literature outlined significant benefits and barriers to circularity, they have been largely investigated at the macro and regional

level; this study examined the CE challenges and opportunities from a micro point of view. Moreover, while literature regarded cities and urban communities as being key drivers of CE and positioned them as geographical proximate to circular activities and practices or theoretically as viable zones for CE, this study explored the circular economy concept exclusively from within an urban set up.

Furthermore, most literature has been carried out in the EU where circular economy is a strategy to guide the implementation of environmental policies for effective waste management and in China where CE is already a national development plan; this study sought to understand CE from a Zimbabwean (African) perspective against a background of the proliferation of waste coupled with poor waste management mechanisms.

2.14 Summary

The chapter has presented the conceptual framework which this study employed to explore the prospects and opportunities for green growth in Zimbabwe, and how the framework was relevant to the study area. A comprehensive discussion of the various arguments on the concepts under study was examined from different literature and schools of thought while some gaps in the current literature where observed which henceforth this study sought to fill.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter encompasses the procedures that were taken to conduct the research and the methodological tools that were used to come up with a comprehensive study. The chapter includes a discussion of the research process, the selection of data sites, the study population, the sampling methods and their justifications, as well as the sources of data/information. A discussion of the statics and the analytical techniques used for examining data is also incorporated in this chapter.

3.2 The Research Design

A descriptive research design was used to carry out the research based on the impacts of plastic waste and plastic waste management practices. The underlying philosophy guiding the choice of this design was in its ability to provide an explicit and disciplined systematic approach in gathering data. The study also employed a mixed-research approach, and because the study involved a large number of people the study used a survey method to ensure great statistical power in understanding the attitudes, opinions, behaviours and characteristics of the population which would infer the general conclusions of the study.

3.3 Population and Sampling

The study was carried out in the Glen View Suburb of Harare, (Zimbabwe's Capital City). It is a high density suburb located in the South-Western part, 14 kilometres from Harare's Central Business District. Among the seven other south-western suburbs in Harare, Glen View was purposively selected for three main reasons; it was the epicentre of the 2008, 2009, 2018 and 2019 cholera and typhoid outbreaks

due to poor waste management systems; it is one of the most populous agglomerations in the country and because of its socio-economic influences, not only in Harare but across the country, thus perfectly fitting into the study area. Glen View has various establishments; schools, offices, medical institutions, trading complexes and shopping centres, but however the population interest for the study was the residents or precisely the households in Glen View. Glen View falls under wards 30, 31 and 32 of the Harare Urban cluster consisting of 28 629 households (ZIMSTAT, 2012). The researcher purposively selected Ward 30 to be the area of focus because it covers the greater area of Glen View with 13 504 households as is in ZIMSTAT-2020 inter-census records.

Table 3.1 Total Population

Total Population	Selected Population
8 South-Western Suburbs	1 Suburb (Glen View)
3 Wards in Glen View	1 Ward (Ward 30)

The study employed the cluster random sampling method. The Glen View residents were assumed to provide a standardised set of samples because they are in the same geographical area and that Glen View has a network of streets and crescents from which households were accessed. Using convenience or deliberate sampling method determined by their accessibility; the high population density and the high levels of illegal waste dumping in the area, the researcher selected 23rd Street, 103 Crescent and 105 Crescent which have 96 households collectively to obtain data from residents therein. The study used a sample size of 0.5% of the households in each street/crescent where the investigation was conducted. Systematic sampling was then used in the distribution of questionnaires and every 2nd household unit from the sampling frame was selected. The respondents varied at each household depending

on who was available during the administration of the questionnaires; they were either the owners of the house, tenants or the house helper.

Table 3.2 Sample Size

Street/Crescent	Number of Households	Sample Size (%)	Sample Size
23rd Street	38	0.5	19
103 Crescent	26	0.5	13
105 Crescent	32	0.5	16
TOTAL	**96**		**48**

(n = 48)

Key Informants for this study included the Harare City Council (HCC), Environmental Management Agency (EMA), Ministry of Environment, Tourism and Hospitality Industry (METHI) and the Association of Zimbabwe Recyclers (AZR). These were selected purposefully because of their knowledge and expertise around environmental protection, waste management and sustainability issues, as well as their oversight role in making legislations and policy frameworks for waste management in the country; hence their input was critical for an objective study.

Table 3.3 Key Informants

Name/Group	Total Number of Members per Department	Number of Representative Selected
Harare City Council (Amenities Division)	5	1
EMA (Dept. Environmental Protection)	3	1
METHI (Dept. Environment & Natural Resources)	3	1
Association of Zimbabwe Recyclers	6	1
TOTAL	**17**	**4**

The response rate was calculated by dividing the distributed questionnaires and the returned questionnaires, then multiply by 100. Subsequently, all the questionnaires that were issued to respondents were completed and returned; the researcher also managed to meet with all the key informants giving the study a 100% response rate.

Table 3.4 Response Rate

	Administered	Responded	%
Households	48	48	100
Key Informants	4	4	100
TOTAL	**52**	**52**	**100**

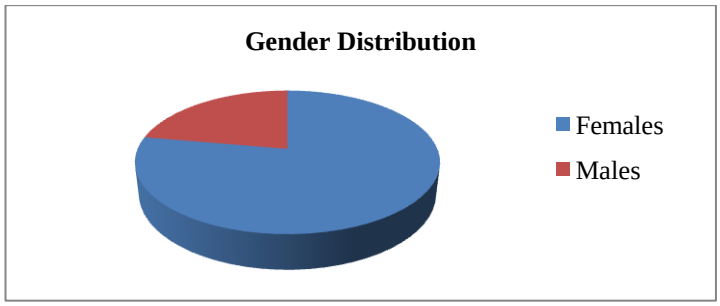
3.3.1 Demographics and Socio-Economic Characteristics of the Population

The study also established the demographics and socio-economic features of the respondents to infer their consumption of plastic products and their behaviour towards plastic waste management.

3.3.1.1 Gender Distribution

The gender perspective was essential to the study in explaining the decision making patterns in plastic waste disposal and its management at household level. This classification was fundamental given that in most households cleaning and housekeeping chores are done by females, thus they are the ones who generate a large amount of waste and consequently responsible for its disposal. Of the 48 respondents, 30 (63%) were females and 18 (38%) were males.

Figure 3.1 Composition of sample by gender



3.3.1.2 Age Frequency Distribution

The age frequency distribution from the sample population that participated in the research ranged from 18 years to 64 years. 80% of the partakers were in the range 25-34 years, followed by those in the range of 35- 44 years (15%), and 5% were in the 50-64 years age group.

Table 3.5 Composition of sample by Age

Measure of Central Tendency	Age Group (years)
Mean	25-34
Mode	25-34
Minimum	<18
Maximum	50-64

3.3.1.3 Level of Education

This category was important to the study to deduce participants' understanding of the concepts such as the circular economy, green growth and the idea of sustainability. The majority of the respondents (54%) indicated that they went through formal education up to the Tertiary level, while 25% of the partakers attained the Advanced Level Certificate. 21% of the respondents went up to the Ordinary Level and none of those who participated in the research were below the basic Ordinary Level.

3.3.1.4 Employment Status

Information pertaining to the employment status of the respondents was essential to understand their sources of income and to infer their ability to pay extra costs for waste management in circumstances where the City Council fails to collect refuse in time. Most of the respondents (38%) were self-employed; while 25% were employed formally. 31% recorded 'unemployed' and 6% of the respondents were students.

3.3.1.5 Accommodation Status

Data concerning the accommodation status of the respondents revealed that 56% were landlords or children of the owners of the property/house, while 44% indicated that they were tenants/lodgers**.**

3.4 Data Collection Procedure

For the purposes of generating fundamental and relevant information from all sources and to find answers to the research problem; primary data was collected through questionnaires. The questionnaires were both open ended and closed ended. These were administered to available residents in the study area. The researcher also

used the same questionnaire structure for interview guides used to collect data from key informants. Observations by the researcher were also used as a data collection tool.

The research questionnaire was designed to establish the nature of plastic (material and product) consumption and plastic waste management patterns in Glen View. It was also aimed at enquiring the extent to which the residents were conversant with the concepts of a circular economy model and green growth, as well as their awareness on the importance of appropriate and sustainable disposal of plastic waste. The researcher used questionnaires because they are a less intrusive manner of questioning, easy to analyse, reduce bias and most people are generally familiar with them. The questionnaires were written in English and during administration to respondents translation to Shona (local language) was done where and when necessary.

Key informant Interviews were also chosen as a data collection tool to comprehensively capture respondents' opinions and to pose extra questions where more clarity was needed. The interview guide was prepared in the same structure with the questionnaire guide, therefore there was systematic recording of information and it made the analysis of the collected data easy for the researcher. Semi-structured interview guides were used to ensure flexibility and allow respondents to explain issues and concepts in the way they understood them.

3.5 Analysis and Organisation of Data

Qualitative and quantitative analytical techniques were used to get inferences from the data regarding the variables in the study area and to understand, interpret and simplify abstract ideas collected in a narrative form, as well as to test and

authenticate facts. After the data was gathered, it was analysed in three main steps; data preparation, descriptive statistics and inferential statistics. Data preparation involved the researcher getting familiar with data, checking for accuracy, transforming the data and developing a database structure to look for basic explanations and patterns, as well as determining which data had value or was related to the study focus. Descriptive statistics involved the use of graphs, tables, charts and narrative quotations to give a synopsis about their measures.

3.6 Ethical Considerations

The researcher ensured that all participants were treated with respect. Before responding to the questionnaires, participants signed consent forms to endorse their willingness to participate in the research. The Consent Form incorporated the key ethical principles of academic research which include confidentiality, avoiding deception, truthfulness, voluntariness, privacy and anonymity, as well as the right of the participants to withdraw their consent or to discontinue participation without penalty. Moreover, the researcher also produced a confirmation letter from the Africa University College of Business, Peace, Leadership and Governance (CBPLG) as well as an approval letter from the Africa University Research Ethics Committee (AUREC) to confirm and authenticate the right and authority to carry out the research. The researcher also obtained an authorization letter from the Harare City Council Human Capital Department allowing authority to undertake the research in Harare and to interact with staff/officers within the City Council.

3.7 Summary

The chapter provided the methodological procedures and research processes that were used in undertaking this study. The chapter also spelt out the research design;

the research instruments; the study population and samples, as well as the analysis plan. Key ethical principles which the researcher adhered to whilst carrying out the study were also integrated in the chapter.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTREPRETATION

4.1 Introduction

This chapter details and present the research findings gathered through data collection. Data was collected through questionnaires, key informant interviews and observations by the researcher. Qualitative and quantitative approaches were used to analyse the data and the results are presented according to the objectives of the study. The chapter will also incorporate a thematic discussion and interpretation of the findings.

4.2 Data Presentation and Analysis

Data presentation and analysis involves exploring, categorising and combining information to address the preliminary propositions of the research. Therefore, the study presents the results in the following categories:

4.2.1 Drivers of the Proliferation of Plastic Waste in Zimbabwe

The main drivers and contributing factors to the proliferation of plastic waste/litter were found to be the following:

4.2.1.1 Public behaviour/attitude

The key informant interview with an authority from the Ministry of Environment, Tourism and Hospitality Industry (METHI) attributed the proliferation of plastic waste to public behaviour and attitude towards plastics and how it is disposed. The expert stated that Zimbabweans have generally developed a reckless attitude of throwing litter anyhow and everywhere even in situations where there is a trash bin around or near them. Another key informant from the Association of Zimbabwe

Recyclers (AZR) also pointed out that “people have this negative attitude of throwing plastic litter everywhere because they do not see any worth in it”, therefore asserting that “if a value and mostly a monetary value is added to plastic products especially those made from Polyethylene Terephthalate (PET), it makes it difficult for someone to just throw it away”.

4.2.1.2 Increase in population growth

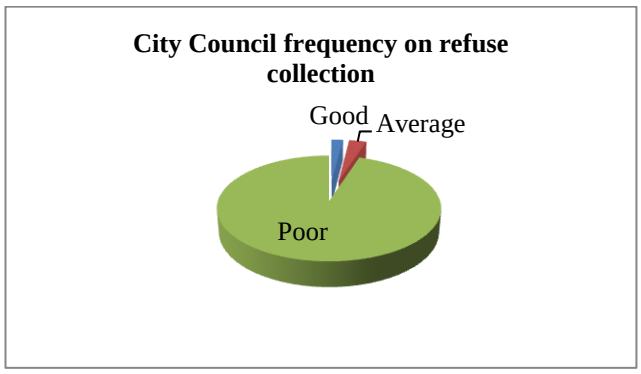
Through the key informant interviews, the researcher got an appreciation of how the massive growths in population have impacted on plastic waste generation in the country. An interview with a representative from the Harare City Council (HCC) Amenities Division brought out that conventionally refuse is collected at least once in a week in residential areas; but due to the increased numbers of inhabitants where “a household that normally or on average had 5 members, now has close to 15 members including lodgers or tenants”; waste bins and other receptacles now fill up before the one week period lapses, therefore leading to an increase of unsustainable plastic waste disposal systems. The authority from HCC also revealed that according the National Waste Generation survey that was carried by the Harare City Council in 2017 one individual generates approximately 0.4 Kilograms of plastic waste especially in high density suburbs of Harare.

4.2.1.3 Low rates of refuse collection

Household respondents in Glen View detailed a high level of dissatisfaction with the City Council in terms of refuse collection. Respondents accounted that according to the City Council’s schedules, refuse is supposed to be collected every Wednesday but that has not been the case over the past years. They also brought to light that on average the local authority now collect refuse irregularly once in a month, any day

and usually without any notice or announcement. As a result, they admitted to using unsustainable plastic waste management practises such as burning in open air and illegal open space dumping.

Figure 4.1 Perceptions on the frequency of refuse collection by the City Council



Compounding to that was an interview with an authority from HCC who confirmed that the City Council is falling short on its mandate on refuse collection and waste management citing challenges mainly caused by the unstable economic circumstances. The Landfills Superintendant accounted that the City Council have been encountering challenges such as access to foreign currency to buy and import spare parts for the compactors, insufficient finances and labour force for landfill and dumpsite clearances. The authority further explained that the "paltry $ZWL 6.50 that residents are currently paying as refuse collection fee is not enough to cater for all the services needed".

4.2.1.4 Change in lifestyle and consumptions patterns

Lifestyle is not static, it evolves over time and through observations, the researcher observed that there is a rapid change in lifestyle and consumption patterns of the general Zimbabwean citizenry. Confirming to this was an interview with the Officer from the Environmental Management Agency (EMA) in the Department of

Environmental Protection; who stated that because of affluence and health concerns such as cholera and other diarrhoeal diseases due to contaminated water; many people have adopted the culture of buying purified bottled water even for household consumption, hence the proliferation of PET waste. The EMA officer also noted that the convenience that has been brought up by the new PET packing especially for soft drinks have also led to an increase of PET litter in the environment, giving an example that "the traditional Coca-Cola drink was in a glass bottle and once opened it meant that one had to finish it up all at once, but conversely the new product is in a PET bottle, thus giving one the convenience of opening it and reserve some for later".

In the same context, key informants also reiterated that most Zimbabweans do not have a culture of planning to go for shopping but rather they practice impulse buying/shopping. For example, "if one does not plan to go for shopping and would only decide to pass through the supermarket on their way from work and in that way forced to buy a plastic shopping bag to carry their groceries; it translates to carrying home a new plastic bag each day". Hence, shopping plastic bags end up flooding at their households and ultimately will be unsustainably disposed and thrown away.

4.2.1.5 Low returns of recycling

The interview with a member from the Association of Zimbabwe Recyclers (AZR) brought out that recycling in Zimbabwe is still at its nascent stages and most of the players in this industry are mainly individuals or informal waste pickers as well as a few Community Based Organisations (CBOs). The expert from AZR accounted that the marginal profits that can be obtained through informal recycling have not inspired people to treasure plastic waste as a valuable resource, and revealed that a

tonne of plastic empty bottles in the category of Polyethylene Terephthalate (PET) commonly used for soft drinks costs about $ZWL 600, translating to 60 Cents per kilogram (kg); at the same time, a 500 millilitre (ml) of an empty soft drink bottle (PET) weighs approximately 3 grams (g). Therefore argued that "the practicality of picking up to a tonne of a material of that type and size is uninspiring; hence people tend to just throw it away".

4.2.1.6 Lack of infrastructure

Key informants noted that in the Central Business District (CBD) various stakeholders have come on board in providing litter bins and observations by the researcher were also that it is unlikely to walk a distance of more than 200 metres without accessing a litter bin or a waste receptacle in the Harare's CBD. Contrary to that, household respondents reported that they do not get support in accessing waste bins and or any other receptacles and mostly they just buy for themselves. However, an interview with an authority in the Amenities Division of the Harare City Council brought to light that the City Council used to roll out waste bins to residents after every quarter of the year; which technically translates to each household accessing 4 waste bins in a year, but due to financial constrains alluded earlier, the local authority is now incapacitated to carry out such programmes.

4.2.1.7 High importation of plastic-packaged products

Authoritative interviews with Officers from the Ministry of Environment, Tourism and Hospitality Industry (Department of Environment and Natural Resources) and from the Environmental Management Agency (Department of Environmental Protection) revealed that despite the ban of a range of imported plastics and plastic packaged products such as Styrofoam and Polystyrene though various Statutory

Instruments and Legislations; these products still enter the country through the illegal ports of entries at the country's borders. The experts asserted that these "cheap" plastic packed imports have also largely contributed to the plastic waste menace in the country and ascribed the high levels of plastic imports to the fact that locally produced goods are either expensive or of low quality, therefore forcing people and businesses to import from other countries.

4.2.2 The Legal and Policy Environment to Waste Management

Following an investigation of the major drivers of the proliferation of plastic waste in Zimbabwe; it was also imperative for the study to make an assessment of the legislative and policy environment to waste management and plastic waste in particular. Findings of the study were that in Zimbabwe waste management is legislated in the Ministry of Environment, Tourism and Hospitality Industry (Chapter 20:27); the Ministry of Local Government, Public Works and National Housing's Urban Councils Act (Chapter 29:15); the Ministry of Health and Child Care Public Health Act (Chapter 15:09); and the Rural District Councils Act (Chapter 29:13). Moreover, the Zimbabwe Integrated Solid Waste Management Plan (ISWM, 2014) also seeks to address waste management in the country.

Most significantly, the research found out that environmental rights are enshrined in the Constitution of the Republic of Zimbabwe that was adopted in 2013, in line with Section (1) as read with (Chapter 73) that "every Zimbabwean have a right to a clean and safe environment that is not harmful to their health and everyone has a duty to protect the environment for the benefit of present and future generations and to participate in the implementation of the promulgation of reasonable policies and measures that prevent pollution and environmental degradation". Adding to that is

the Environmental Management Act (Chapter 20:27) that provides for the sustainable management of natural resources and protection of the environment, the prevention of pollution and environmental degradation, the preparation of an environmental plan and other plans for the management and protection of the environment.

Nevertheless, the study established that despite a robust legislative and policy environment for addressing general environmental and waste management issues, Zimbabwe falls short when it comes to addressing specific plastic waste concerns. However, key informants from EMA and the METHI noted that given such an exclusive legislative and policy environment, it would be easy to promulgate laws and policies which directly influence appropriate practices towards plastic waste. In addition to law enforcement against illegal waste dumping, key informants reiterated that these rules and regulations should be made not through dictating but done through supporting and motivation.

4.2.3 Plastic Waste Management Practices in Zimbabwe

Subsequent to establishing the main causes of the increase of plastic waste/litter, and the legal and policy frameworks that seek to address the menace; it was critical for the study to examine some of the practices, initiatives and programmes that are being done to manage plastic waste at household; community and national levels.

4.2.3.1 Practices at Household Level

Respondents in the Glen View suburb accounted that they were not impressed with the rate at which the local authority collect waste in residential areas; the questionnaire also sought to establish what other alternatives and practices do

residents use or employ to dispose and manage plastic waste in the failure of the City Council to provide refuse/waste collection services.

Of the 48 respondents who participated in the study, 45% highlighted that they would dispose their plastic waste through illegal dumping, and the researcher's observations were that this is mainly done at open spaces; intersections of busy roads; storm water drains; unfenced housing stands awaiting development and on road verges. The most used method (52%) of plastic waste disposal in Glen View is through burning at the backyards, while separation (3%) to recycle is the least practised method.

Table 4.1 Methods used to dispose plastic waste

Method	Frequency (n=48)	Percentage (%)
Separate to recycle	5	3
Burning	25	52
Illegal dumping	18	45

4.2.3.2 Practices at Community Level: The role of Informal Waste Pickers

Waste pickers are self-employed informal recyclers and individuals mainly from marginalised social groups in the urban poor who make a living by collecting, sorting and recycling waste to obtain a small source of income for survival (Stubbs, 2018) (*see Appendix 3*). According to an expert from the Environmental Management Agency (EMA), informal waste pickers play a significant role in many parts of the world especially in the Global South where municipal waste management systems are often insufficient to meet the urban needs.

The expert from EMA further expressed that in the case of Zimbabwe, this group of people do not only play a role in making the communities clean but also help in reducing the amount of plastics in the environment. However, despite acknowledging the important role of the informal waste pickers in plastic waste management, a key informant from the Harare City Council (HCC) brought out that "it is also crucial to note that some of the waste pickers end up with non-recyclable residual materials that still need to be disposed off, and without financial and proper infrastructural resources for disposing materials responsibly, the materials may end up in the environment again". Household respondents also shared the same views about the waste pickers and pointed out that sometimes they get irritated and upset with the way these informal waste pickers rummage through their bins and receptacles looking for plastic litter.

The researcher also encountered with an informal waste picker who bemoan unsafe working conditions and hazardous working environments. The informal waste picker revealed that they are sometimes exploited and given "unfair" remuneration when they sell their pickings to recycling companies and organisations. In an interview with an authority from the Association of Zimbabwe Recyclers (AZR), the key informant stressed out the importance of waste picker inclusion, emphasising that it can be sustained institutionally through the formalisation of the informal waste pickers by "giving them municipal contracts for household collection and recycling; provision of collection, sorting and storage resources and infrastructures; support for capacity building as well as social protection like health care".

A key informant from the Ministry of Environment, Tourism and Hospitality Industry also asserted that waste pickers need to be organised, and "once they are

organised, it is easier for the various stakeholders to engage them to carry out different kinds of specialised services needed to combat plastic waste and plastic pollution, for example through outreach and awareness programmes as well as collection services in hard to reach communities that cannot afford systematised plastic waste management services".

4.2.3.3 Community Based Organisations Participation

Community Based Organisations (CBOs) are gatherings that exist inside of a group, either interest or place with a neighbourhood focus and an overwhelmingly deliberate nature that is separate from the core exercises of the state and business associations (Stubbs, 2018).

The 1992 Rio Declaration (*Principle 10*) also states that participation of interest group**s** at different levels is critical to achieve environmental sustainability. Against that background, in the midst of the challenges faced by the Harare City Council in waste management, the research found out that a number of Community Based Organisations (C.B.Os) have come on board in covering the gap left by the local authority. The researcher observed that most of these C.B.O.s work with volunteers who are directly recruited from their communities, thus they have the personal experience of the impacts of plastic waste and plastic pollution within their communities/neighbourhoods; hence have the awareness of what exactly need to be done.

Among the various C.B.Os working towards plastic waste management; the study discovered the conception of the 'Clean City' Innovation by CASSAVA Smartech, a subsidiary of the Econet Wireless Group to be one notable scheme towards sustainable plastic waste management in urban areas through community volunteers.

According to an interviewed expert working directly with the volunteers in Glen View, the innovation was formed in April 2019 at the backbone of the cholera and typhoid outbreaks that ravaged most of the high density suburbs in Harare, with Glen View having been the epicentre. Working through volunteers, the expert revealed that the key functions of 'Clean-City' are household waste collection, litter picking, street sweeping and unblocking drains.

More positively, the research established that they (Clean City) have a mobile phone application; the 'Vaya Application' that residents can simply download and schedule waste collections at their households. Key Informants' opinions were that given that the generality of the Zimbabwean population are becoming tech-savvy or are becoming well informed and proficient in the use of modern technology and mobile phone applications, the 'Vaya Application' presents a huge opportunity for sustainable plastic waste management in the country.

The study also found out that in collaboration with other actors in waste management; 'Clean City' has created what are referred to as Material Recovery Centres (MRC) (*see Appendix 4*), where all the litter obtained from households and streets is separated (waste segregation). It is at these MRCs that plastic waste is separated from solid waste and is sold to other big recycling companies in the country. Observations by the researcher were that informal waste pickers also come to the MRCs to sell their pickings.

4.2.3.4 Practices at National Level: The National Clean Up-Day

The study found out the National Clean-Up Day as one of the practices done at a national level to manage waste, plastics included. The National Clean-Up Day exercise came as a Presidential declaration on 5 December 2018, when the President

of the Republic of Zimbabwe, H.E Emerson Mnangagwa recognising the Constitutional mandate to uphold the fundamental environmental rights and freedoms as provided in Section 73 of the Constitution of Zimbabwe, declared the first Friday of each calendar month a National Clean-Up Day. According to the key informants; the Clean-Up Day was introduced in the spirit of creating a clean, safe and healthy environment and to manage waste in the country.

Against that backdrop, observations by the researcher were that in line with the Presidential declaration, on every first Friday of the each month from 0800Hrs to 1000Hrs, citizens across the country take time to clean their surroundings, from workplaces, schools, religion centres to recreational and market place centres. A key informant interview with an expert from the METHI in the Department of Environment and Natural Resources stressed out that the Presidential initiative was also in line with Zimbabwe's commitments to fulfil its multilateral environmental agreements that seek to address pollution such as the Basel Convention (1992), Bamako Convention (1998), Stockholm Convention (2004) and the United Nations Framework Convention on Climate Change (1994), albeit these Conventions pay specific attention to hazardous waste and organic pollutants; while the Presidential initiative aims at addressing all environmental and waste related issues.

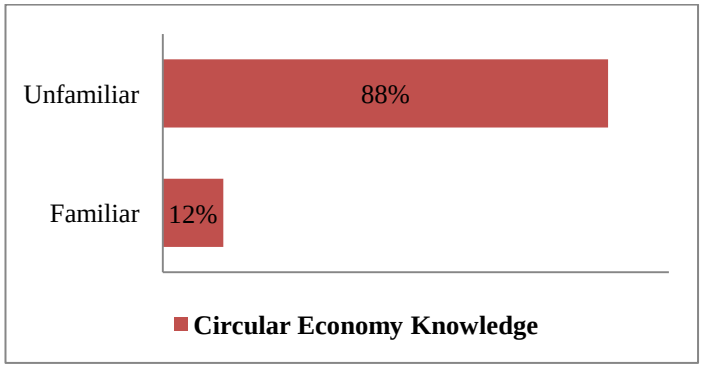
There was an agreement among interviewed key informants that the National Clean-Up Day is a stepping stone in the right direction to ensure sustainable waste management and economic growth in the country. These opinions concur with the assertion that a clean environment provides an opportunity for the reconstruction and transformation of the economy to one that creates maximum opportunities for its

citizenry to live a full and dignified life, not only for the present generation but for the future generations.

4.2.4 Challenges and Opportunities for adopting a Circular Economy

The study also sought to explore the challenges and the possible opportunities for adopting a circular economy in Zimbabwe. Before exploring on the challenges and opportunities; the researcher deemed it vital to establish the respondents' understanding of the circular economy concept. Findings from key informant interviews revealed that the circular economy was not a new concept and the interviewed experts reiterated that CE was just a new terminology whose ideas are not entirely new but old knowledge that has been rediscovered. Conversely, 88% of household respondents indicated that they have never heard of the concept before, while12% highlighted that they were aware of the circular economy model but only understand it as recycling of materials.

Figure 4.2 Respondents' acquaintance with circular economy



4.2.4.1 Challenges

Results from the research confirmed that there are indeed some challenges that can be encountered in adopting a circular economy in Zimbabwe. The study presents the challenges as follows;

4.2.4.1.1 Insufficient knowledge and awareness

The interview with an authority from the Environmental Management Agency (EMA) brought out that public opinion about circular economy is still insufficient and there is still a gap in terms of public awareness of environmental sustainability issues. The key informant from EMA noted that despite the awareness campaigns that EMA and other stakeholders carry out across the country and mainly in residential areas; these campaigns still do not inspire zeal among citizens to appropriately dispose plastic waste and to practise the basic principles of a circular economy of reduce, reuse and recycle.

The expert further revealed that instead of taking heed to the message and critical information that the EMA Officers will be giving, "residents will be actually thinking whether they will get food or T-shirts afterwards, and some basically attend the meetings particularly in anticipation of these things". The key informant from the Harare City Council also asserted that there is need to inculcate the right attitude to citizens and move them from a mentality that waste management "is a responsibility of the City Council, EMA or other organisations to an understanding that waste management is everyone's responsibility and it needs collective effort".

Another key informant from the Association of Zimbabwe Recyclers (AZR) stressed that whereas significant effort in awareness campaigns is vital, "it does not automatically lead to behaviour or attitude change or a change in purchasing decisions and consuming patterns, but a paradigm shift of the citizens' mindset from linearity to circularity is what is needed".

4.2.4.1.2 Path dependence syndrome (The lock-in effect)

Path dependence syndrome is a phenomenon where people are resistant to change and prefer to keep the old models and behaviours even though the circumstances may no longer be relevant or permitting (Wit et al, 2018). Observations by the researcher were that the consumption patterns and behaviour for many respondents was linked to a linear mindset; 'buy- consume- dispose'. The key informants mooted that despite the anticipated benefits that a circular economy would bring, "moving a society from traditional habits that they have grown to accept and feel comfortable with into new models and pathways would be challenging". These arguments also correspond to Olivia (2015) argument that many people find breaking out of old models and letting go of the time-tested approaches disturbing.

4.2.4.1.3 Lack of technology, relevant skills and expertise

Key informant interviews brought to light that there are some recycling practices taking place in the country, albeit at very low scales and by very few companies. An interview with an expert in the recycling sector confirmed that the lack of proper technologies and necessary machinery has hampered meaningful up-cycling and delivering high quality remanufactured goods and products. Moreover, the key informant stressed out that the few companies that are into recycling do not reprocess the plastic waste into finished products but only do 'plastic baling' and export to other countries, mainly to South Africa. It was the experts' opinion that without proper technologies, machinery and relevant skills, the transition to a circular economic model would be difficult.

4.2.4.1.4 Scepticism and financial contemplation by the business sector

Household respondents indicated that they consider the business/corporate sector to be the leading force in the transition to a circular economy. However, from the interview with a key informant from METHI, “there is a lot of scepticism in the business and corporate sector because for them environmental sustainability is against profit making, and most environmentally sustainable practices and programmes are a threat to them making profits as businesses”. Other key informants also stated that this “profits over planet” approach by the business sector is a big hindrance towards circularity.

4.2.4.1.5 Unclear market regulatory/legislative environment

The key informant from the METHI noted that the current market legislative environment is unclear in terms of product pricing against environmental consequences. The key informant stressed out that the externalities are not allocated properly in the sense that more environmentally friendly products usually costs more to the consumers as compared to those products that are not environmentally friendly; therefore “because nobody would want to put him/herself out of business by manufacturing products that consumers can not afford, chances are high that manufacturers will maintain the production of environmentally unsustainable goods and products”.

The key informant from METHI was therefore of the opinion that a fair market environment where environmental externalities are accounted for need be in existence through accurate pricing of products and implementation of standards like those set by the International Organisation for Standardisation (ISO).

4.2.4.1.6 Legacy of low credibility and increased costs

Key informant interviews also revealed that sometimes the most circular or sustainable goods and products are not always the most cost-efficient from a commercial (pricing) or production (technical) point of view, therefore creating tensions between the producers and consumers. A key informant from AZR noted that even in the introduction of circular business models; “the corporate sector may find it hard to convince their clients or customers to continue business with them especially in circumstances where business as usual stay in play and in parallel with the new models”. Hence, the transition to a circular economy may become complex.

4.2.4.2 Opportunities

Despite the factors that were noted to be possible barriers in the transition to a circular economy; the study also found out that there are various opportunities that a circular economy can bring. The opportunities are categorised as follows;

4.2.4.2.1 Employment creation

From the key informant interviews, the study found out a gloomy picture of the high rate of unemployment particularly among the youth in the country. An authority from the Ministry of Environment, Tourism and Hospitality Industry stressed out that in a country where unemployment is rife among the youths; “the transition to a circular economy is a potential game changer, providing various job opportunities in both the formal and informal sectors of the economy”. An authority from EMA also commented that unemployment have rendered many young men and women in the country vulnerable to fundamentalism, extremism and forced migration but however an adoption of the circular economy will absorb these youths especially in the

recycling sector; affirming to the Ellen MacArthur Foundation (EMAF, 2015) pronouncement that the plastic recycling industry can create up to a 100 thousand jobs globally by 2025.

4.2.4.2.2 Enhancing the humanitarian space

In the scenario that a circular economy can create employment and different social groups being integrated into the system; the key informant from AZR affirmed that "it will improve the humanitarian space through increases in savings in terms of household income" and therefore alleviating poverty and all other financial-related challenges that households encounter. Other key informants also stated that these increases in household income through labour remunerations will also have a positive effect on the country's Gross Domestic Product (GDP). An expert in the recycling sector (AZR) also brought to light that they have various programmes such as the "Waste for School Fees" that seeks to help the less privileged, where the children are asked to pick and bring a certain amount of plastic litter in return for school fees payment, uniforms and stationary support. The expert revealed that the scheme have had so many beneficiaries, hence playing a significant role to humanity.

4.2.4.2.3 Boosting the national economy

Key informants reiterated that even though arguably Zimbabwe has been making progress in stabilising its economy through the country's development blueprint known as the Transitional Stabilising Programme (TSP) of 2017; the adoption of a circular economy will also provide a powerful opportunity to design tailored solutions for various sectors of the economy, boosting local industries and contribute further to the national fiscal as well as human development and well being.

4.2.4.2.4 Facilitating globalization and regional integration

"The world is going circular" (WEF, 2018), and a key informant from the METHI stressed out that beyond its national economy, Zimbabwe is also involved in regional and global value chains, providing and receiving goods and products to and from across the globe. Against that background, the expert noted that as economies and markets evolve "there is also now a higher demand for environmentally friendly and environmentally enhancing products in the global market". Therefore, "if the country incorporates a circular economy in production and manufacturing sectors, the products will be globally competitive and at the same time encourage environmentally friendly exports from regional and other global markets".

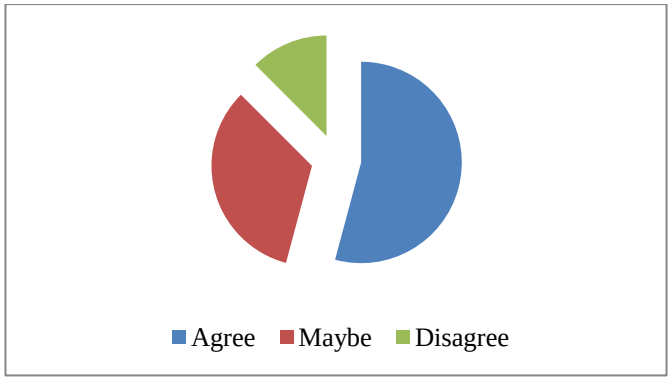
4.2.5 Prospects and Opportunities for green growth using a circular economy

The central objective of the study was to assess the prospects and opportunities for green growth using a circular economy in Zimbabwe. Despite the mixed feelings from household respondents about the circular economy, the overall findings of the study indicated that there are enormous prospects and many opportunities for achieving economic growth and environmental sustainability (green growth) using a circular economy in Zimbabwe.

The study used the questionnaire survey to establish the extent to which a circular economy could foster green growth, and 54% of household respondents indicated that they consider CE as positive force to achieve green growth; while 33% were not certain if CE would be the ideal model for attaining a green economy. Among those who participated in the research, 13% of household respondents felt that a circular economy would not bring about an economy that result in improved human well-

being and reduced inequalities over the long term, while not exposing future generations to significant environmental risks and ecological scarcities.

Figure 4.3 Perceptions whether a circular economy will foster green growth



The key informants noted that Zimbabwe is becoming a highly urbanised country and that makes it an ideal testing ground for new concepts and economic models. An authority from the Ministry of Environment, Tourism and Hospitality Industry (METHI) stressed out that the confluence of industry and business actors, government institutions and an informed population creates an essential innovation for the introduction of new practices such as the circular economy, hence a huge prospect for the attainment of green growth.

Compounding to the above, another key informant from the Environmental Management Agency (EMA) highlighted that the constant flow of information in the country through various forms and mediums, and the existence of a robust legislative and policy environment enables the facilitation of activities suitable for achieving green growth such as material collection, waste processing, energy and natural resource conservation as well as new business practices like reverse logistics and product design, which all incorporate a circular thinking**.** The expert asserted that the

prospects for green growth using a circular economy are high and the potentials are many.

Authoritative interviews with key informants from the Ministry of Environment, Tourism and Hospitality Industry and from the Harare City Council revealed that the country is losing a lot of money through landfill and dumpsite clearances; they however noted that the eradication of waste in the value chain through incorporating circular economy principles and models will essentially mean that the Government and the City Council will commit the funds currently used for landfill and dumpsite clearances and other waste management programmes to other productive sectors of the economy like mining, agriculture and housing schemes for citizens; therefore achieving a waste free environment and boosting the economy at the same time, which is green growth.

Moreover, observations by the researcher were that the already existing recycling sector and circular activities in Zimbabwe presents great prospects and opportunities for transforming the country into a green economy. The key informant from EMA also noted that these circular activities "provide an excellent entry point which can enable the government, the business sector, the public and the civil society as well as other stakeholders to promote innovative economic models". Thus, a circular economy will provide a powerful potential to build the momentum around a set of ideas and principles that can be tailored and applied to multiple sectors and cities to achieve green growth in the country.

Through the key informant interviews, the study also found out that across industries there is now a concerted effort in finding viable solutions that make active use of waste backed by the circular economy principle of 'reuse' whenever possible.

However, an expert in the recycling sector (AZR) noted that “there is still a great need to instil a complete culture change among citizens as well as shifting the market towards a ‘give back to the system’ approach on how we handle and treat resources versus waste”. The expert noted that this will avoid potential future crises and ensure that the country develops a resilient green economy backed by the circular economic model.

Furthermore, the key informant from METHI revealed that international donors are already exploring how the principles of a circular economy can be incorporated to support the Sustainable Development Goals (SDGs) in various sectors of the economy, thus “there is a great window of opportunity to achieve green growth using a circular economy model by aligning the efforts of these developmental organisations and wider international cooperation with other countries”. The expert further emphasised that “there ought to be a mandate that all stakeholders, citizens included follow suit, so that achieving green growth will not be merely a government responsibility but rather it becomes a public and private sector priority”.

Key informants argued that a circular economy was born out of necessity and revealed that some circular principles have been used in the Zimbabwean culture for generations; stressing out that increasing their adoption and scaling up their practices will definitely foster green growth. The small-scale examples that key informants brought out can be found at household levels were empty plastic containers are used to keep food stuffs; in waste management for collection and also in agriculture. More so, a key informant from EMA held that these represent great opportunities to maintain circular principles to achieve an “economic growth and development while reducing pollution, minimising waste and inefficient use of natural resources”.

4.3 Discussion and Interpretation

Succeeding to the detailed presentation and analysis of the research results and findings; the study makes a thematic discussion and interpretation of these findings through the following themes:

4.3.1 Proliferation of Plastic Waste

The study survey did not attempt to quantify and specify the amount of plastic waste generated by each household; but the research sought to find out the main drivers and contributing factors to the proliferation of plastic waste mainly in Zimbabwe's urban societies. Among the major contributing factors was littering which (Bulkeley et al, 2005) propounds that it is mainly a human behaviour. This negative human behaviour in the disposal plastic waste has also been exacerbated by the lack of real value of plastic waste as well as the low returns and remuneration from recycling activities.

Compounding to the above, the study therefore argues that the implementation of designs that make plastic waste attractive such as Container Deposit Refund Schemes (CDRS) and Reverse Vending Initiatives (RVI) where one returns the empty plastic bottle for a refund or a reward deposit would motivate people to treasure and value plastic waste. Although these schemes are perhaps limited to one type of plastic material; Polyethylene Terephthalate (PET), it can be argued that naturally there is a greater likelihood to change human behaviour where there is a money incentive involved; therefore CDRS' and RVIs are critical to instil a behaviour and attitude change towards plastic waste.

Increases in population and other demographics were also found to be a contributing factor to the proliferation of plastic litter. As Tsiko (2014) rightly states that as the population increases, the per capita waste generation also increases leading to a growing demand of plastic products and the generation of plastic waste. Thus, it can be argued that the proliferation has been as a consequence that these increases have not been adequately matched by similar increases of infrastructures and services for effective waste management.

In addition, the unstable micro-economic environment in the country has also hampered effective and efficient service delivery by the local authorities in as far as refuse collection and provision of waste receptacles is concerned. As argued by Makwara and Magudu (2014) that if the Council falls short in refuse collection, residents will naturally alternate to illegal dumping and burning. However, these methods of disposing and managing litter are not sustainable because burning plastic in open air releases some hazardous toxins which pollute the air and causing lasting damage to the flora and fauna within the ecosystem.

The failure of the local authority in providing waste bins and other receptacles have prompted residents to use sacks, cardboard boxes and metal tins; and the study argues that these materials are not sustainable because they can also be easily scavenged by dogs and wild cats, thereby littering everywhere. The importance of waste management infrastructures has also been propounded by Mafume et al (2016) who argue that proper receptacles and waste management infrastructures are vital for effective recycling initiatives because they enable the separation and sorting of different types of waste.

4.3.2 Management of Plastic Waste

The waste management system in Zimbabwe was argued to be traditional, which primarily focuses on waste disposal without controlling its generation and promoting waste reduction, re-use and recycling. However, a clean environment provides an opportunity for the reconstruction and transformation of the economy to one that creates maximum opportunities for its citizenry to live a full and dignified life, not only for the present generation but for the future generations.

Moreover, because policy set the tone and right policies ensure continuity, the study established that Zimbabwe has robust legislative and policy environment for addressing general environmental and waste management issues but lack policies that directly address specific plastic waste concerns. However, the study contends that given an already existing elaborate policy and legal environment, it would be easy for the country to promulgate laws and policies which directly influence appropriate practices towards plastic waste.

The residents in Glen View admitted to the practice of using unsustainable methods of disposing plastic waste such as illegal dumping at open spaces; intersections of busy roads; storm water drains; and on road verges, which the study establishes that these illegal open dumping occurs most often during the night possibly as a way to reduce the likelihood of apprehension by Municipal Police and or by Officers from the Environmental Management Agency.

Few households practice waste segregation and the study ascertains that this is mainly because the residents' perception is that waste segregation makes mess around the house, takes too much time and it is of little economic value to them. It can however be argued that waste separation enables easy recovery of waste and

promotes recycling. The study also recognises that encouraging this practice would need incentives and raising awareness about the overall benefits of waste separation. More so, the study argues that local authorities should earmark certain areas as legal sites for plastic waste collection, and these could be properly managed by providing waste separation facilities and regularly disinfecting the waste to reduce diseases and outbreaks.

At the community level, as is in The 1992 Rio Declaration (*Principle 10*) that participation of interest group**s** at different levels is key to achieve environmental sustainability; the role of community based organisations and informal waste pickers cannot be undermined. These groups of people have played a significant role in reducing plastic litter in the environment. The study therefore affirms the importance of economic justice through integrating and protecting the informal waste pickers, and that it is critical for policymakers to listen to these most vulnerable worker groups to lead them to solutions that are both environmentally and economically just.

For practices at the national level, the study can argue that participation in some cases have been largely politically motivated and on political basis rather than being a national and collective agenda. However, it would still be credible to maintain that the National Clean-Up day is a milestone in the fight against plastic waste proliferation.

4.3.3 Feasibility of adopting a Circular Economy

In systems thinking, the circular economy comes in at the leverage point by closing the loop in production and consumption patterns of plastics at all times through value preservation. This means that materials constantly flow around a closed loop system rather than being used once and then discarded; thus their value is not lost by being

thrown away. The feasibility of adopting a circular economy was found to be a mixed bag with both challenges and opportunities.

The idea of a circular economy is recognised not as new concept but an old idea that has only been rediscovered. Some of the obstructing factors or challenges to the adoption of the circular economy were found to be, inter-alia lack of public awareness about the concept, lack of technologies and market regulatory frameworks among other dynamics. The study therefore asserts that there is need to increase environmental awareness among citizens and inspire a mode of thinking that considers the value of products and avoid waste generation.

Moreover, the possibility to positively impact on the environment and at the same time sustaining economic growth is put forward as a strong benefit and opportunity for adopting a circular economy. Despite the fact that the business sector will look at their 'balance sheets' to consider how much will a circular economy or circular activities bring to the business and how much will it/they take from the business, the study affirms that the introduction of schemes such as Extended Producer Responsibility (EPR) or Product Stewardship where the creator of a packaging will have to cater for the collection of that packaging after disposal will motivate producers and the business sector to go the circular way to avoid financial ownership for product waste management. These proposals are essential against a background that similar schemes have also worked in Scotland and in the Nordic Kingdom of Norway were they are argued to have 92% - 97% success rate.

Moreover, a youth situational analysis report carried out from 2018 to 2019 by the Youth Empowerment and Transformation Trust (YETT) revealed millions of youths in Zimbabwe as being unemployed and it is against such state of affairs that the study

argues that an adoption the circular economy will be critical in addressing national employment issues.

4.3.4. Circular Economy as a driver for Green Growth

The key principle to green growth is stewardship, which means producing and consuming goods and services responsibly for own benefit and for the next generation to derive the same benefits (intergenerational equity) (World Economic Forum, 2016); thus through efficiency in production, sufficiency in consumption, conservancy of resources and deficiency in waste, this economic structure captures well the model of a circular economy, making it an ideal concept to achieve green growth.

From the findings of the research, it was established that Zimbabwe is becoming a highly urbanised country and these findings correspond to the Ellen MacArthur Foundation (EMAF, 2017) argument that more than 80% of global GDP is generated in cities; it therefore becomes apparent that such conditions gives an ideal testing ground for new concepts and economic models such as the circular economy. Therefore, the adoption and implementation of CE can be a driver to the attainment of green growth.

Categorically, the study established that there are huge prospects and many opportunities for Zimbabwe to achieve green growth using a circular economy, and more attention should be given to the establishment of sound regulatory and policy frameworks and investments in areas that support circular activities and stimulate the greening of economic sectors. The study asserts that this can only be done by limiting spending in areas that deplete natural resources and applying market based mechanisms that shift consumer preferences and promote green innovations and

investment. More so, the study argues that resilience thinking is paramount for a circular economy to achieve green growth, thus through an understanding and engagement with the changing world and systems; it is better to work with change than being victims to change.

4.4 Summary

The chapter presented the main findings and the results of the study that were obtained through questionnaires, key informant interviews and observations by the researcher. The findings, results and the observations were analysed, interpreted and presented to fulfil the main objectives of the study.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This Chapter provides a comprehensive brief discussion of the study and deduce general conclusions from the findings and the results gathered and analysed in the previous chapter. This chapter presents the implications of the study and proffer recommendations for circular economy to achieve green growth in Zimbabwe. Suggestions for further research are then conferred in the last segment of the chapter.

5.2 Summary

The study established that a world without plastics or synthetic organic polymers is unimaginable and almost all aspects of human daily life involve the use of plastics, it is everywhere and the evidence is unmistakable that we are living in 'The Plastic Age'. However, despite the many benefits that plastics offer, the current approaches to production, consumption and disposal of plastics have caused overarching negative effects on the ecosystem and human health. Evidently, urban spaces significantly exhibit these linear flows of plastic products and represent considerable hotspots of plastic consumption and waste discharge but however the 'take-consume- dispose' construct of the linear economy is not suited to meet the current, let alone the projected demographic increases and changes in consumption patterns.

The major causes of the proliferation of plastic waste in Zimbabwe have been attributed to factors such as low returns of recycling, increases in population, lifestyle and changes in consumption patterns, low rates of refuse collection by the local authority, high imports of plastics and plastic packaged products and a negative human attitude towards plastic waste coupled with a mindset that is linked

to a linear economy. Despite the role of Community Based Organisations (CBOs) and Informal individual Waste Pickers as well as other practices done to alleviate and manage plastic waste in the country; a transition to a circular economic model have been touted a viable and sustainable approach to achieve green growth, owing to its potential to address both economic and environmental concerns.

Notwithstanding the benefits that a CE offers, such as employment creation and bettering the humanitarian space both in economic and ecological terms; the transition to a circular economy to achieve green growth requires a multidimensional approach to make sure that on a systems level, every sector plays a role. This include the role of individuals and households through appropriate consumption and disposal of plastic waste; the role for industry through adopting green chemistry and by designing products for reuse or end-of-life recyclability and for the government and policy makers through informing and incentivizing circular economy development and activities. These mechanisms and policy instruments are interlinked and exploiting their synergies will be critical in increasing and maximising the prospects and opportunities for transforming the country to a green economy using a circular economic model.

5.3 Conclusions

The study avers that the world has been at a turning point before; in 1684 Thomas Savery invented the steam engine that kick-started the industrial revolution transforming everything and the ability of people to make things. Similarly, a circular economy is a new way to design, make and use things within the planetary boundaries. More so, for any model to succeed it must gather around it a ‘discourse coalition’ of other concepts that support it and actors with strong interest and

willingness to attain it; the green growth model is developing such a base, and the circular economy concept has been hyped as a feasible and sustainable approach to achieve green growth owing to its potential to tackle both economic and environmental problems, and also societies are beginning to realise that they need to live in accordance with the law of ecology. Regardless of the challenges and barriers associated with or that can be encountered in the transition to a circular economy, the study concludes that a circular economy is a transformative process that may not be implemented abruptly but a concept and an approach that is worth endeavouring. While the study does not claim to be exhaustive, it comprehensively provided an overview of the plastic waste and plastic pollution problem in Zimbabwe and provided resolutions to achieve better economic, social and environmental outcomes. Therefore, the success of the circular economy in achieving green growth in Zimbabwe lies in attitude change from all sectors and stakeholders and in that all 'green' initiatives should be inclusive.

5.4 Implications

The study makes a clarion call on the fundamental importance of eco-social democracy, thus addressing the socio-ecological and economic concerns critical for sustainable development. This research will be a resource to Zimbabwe's policy practitioners, the Government and other related stakeholders to implement policies, initiatives and legislations for circular economy and green growth to alleviate challenges associated with the linear and brown economies as well as to promote an equitable sustainable development. The research will also add to the broader global public policy discourse.

5.5 Recommendations

The study's recommendations intend to be outcomes-oriented in benefiting the citizens, the business sector as well as the environment, and from the findings of the research on how to achieve green growth using a circular economy; the study suggests the following recommendations:

i. A Complete ban of single use plastics and an introduction of compostable or bio-plastics. Compostable plastics have been scientifically proven to decompose within 90 days therefore making them a sustainable alternative.

ii. Introduction of Extended Producer Responsibility (EPR), Container Deposit Refund Schemes (CDRS) and Reverse Vending Initiatives (RVI) schemes. These initiatives will steer both business and consumers into a CE direction where with EPR or Product Stewardship the manufacturer will take responsibility of their products from creation to disposal, therefore motivating them to manufacture environmentally friendly products. CDRS and RVIs will encourage and stimuli consumers to responsibly manage plastic litter to get incentives when they return the recyclables.

iii. Formalising, regularising and incentivising the recycling industry. The recycling sector should be formalised like other sectors and mainstreamed into the national economy. The Government should enact labour laws and policies to protect waste pickers from exploitation and ensuring that they receive fair remuneration and

incentivise those who are already taking part in circular economy activities to motivate everyone into circularity.

iv. Incentive and Disincentive taxes. The government should introduce a mandatory tax on all imports made from virgin plastic material and offer a rebate on imports made from recyclable material. This will push businesses to import recyclable goods and also encourage exportation of environmentally friendly and environmentally enhancing products from the global market.

v. Funding for Research and Development (R&D) into alternatives to plastics. The Government should finance and support researches and inventions for products and materials that can replace the use of plastics.

5.6 Suggestions for Further Research

The study focused on circular economy's potential in facilitating green growth. Therefore, further researches may explore how a circular economy can be an ultimate sustainable waste management plan contextualized to local circumstances for relevance and applicability. Further researches may also examine the various principles of CE and their implementation within the various sectors of the economy, including processes of increasing environmental and social well-being (social ecology).

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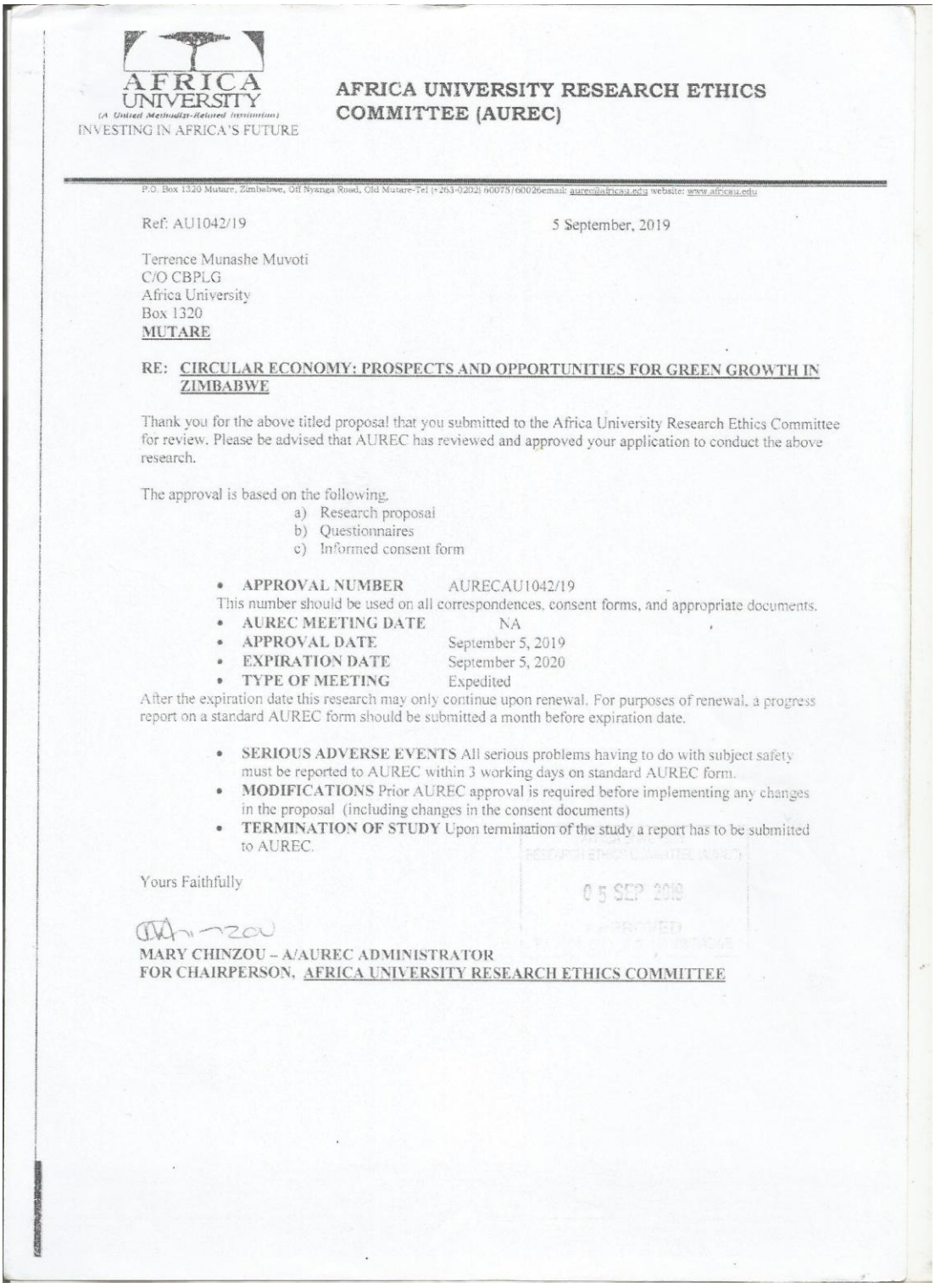
Appendices

Appendix 1 AUREC Approval Letter



AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-0202) 60075/60026email: aurec@africau.edu website: www.africau.edu

Ref: AU1042/19

5 September, 2019

Terrence Munashe Muvoti
C/O CBPLG
Africa University
Box 1320
MUTARE

RE: CIRCULAR ECONOMY: PROSPECTS AND OPPORTUNITIES FOR GREEN GROWTH IN ZIMBABWE

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Questionnaires
c) Informed consent form

- **APPROVAL NUMBER** AURECAU1042/19

This number should be used on all correspondences, consent forms, and appropriate documents.

- **AUREC MEETING DATE** NA
- **APPROVAL DATE** September 5, 2019
- **EXPIRATION DATE** September 5, 2020
- **TYPE OF MEETING** Expedited

After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.

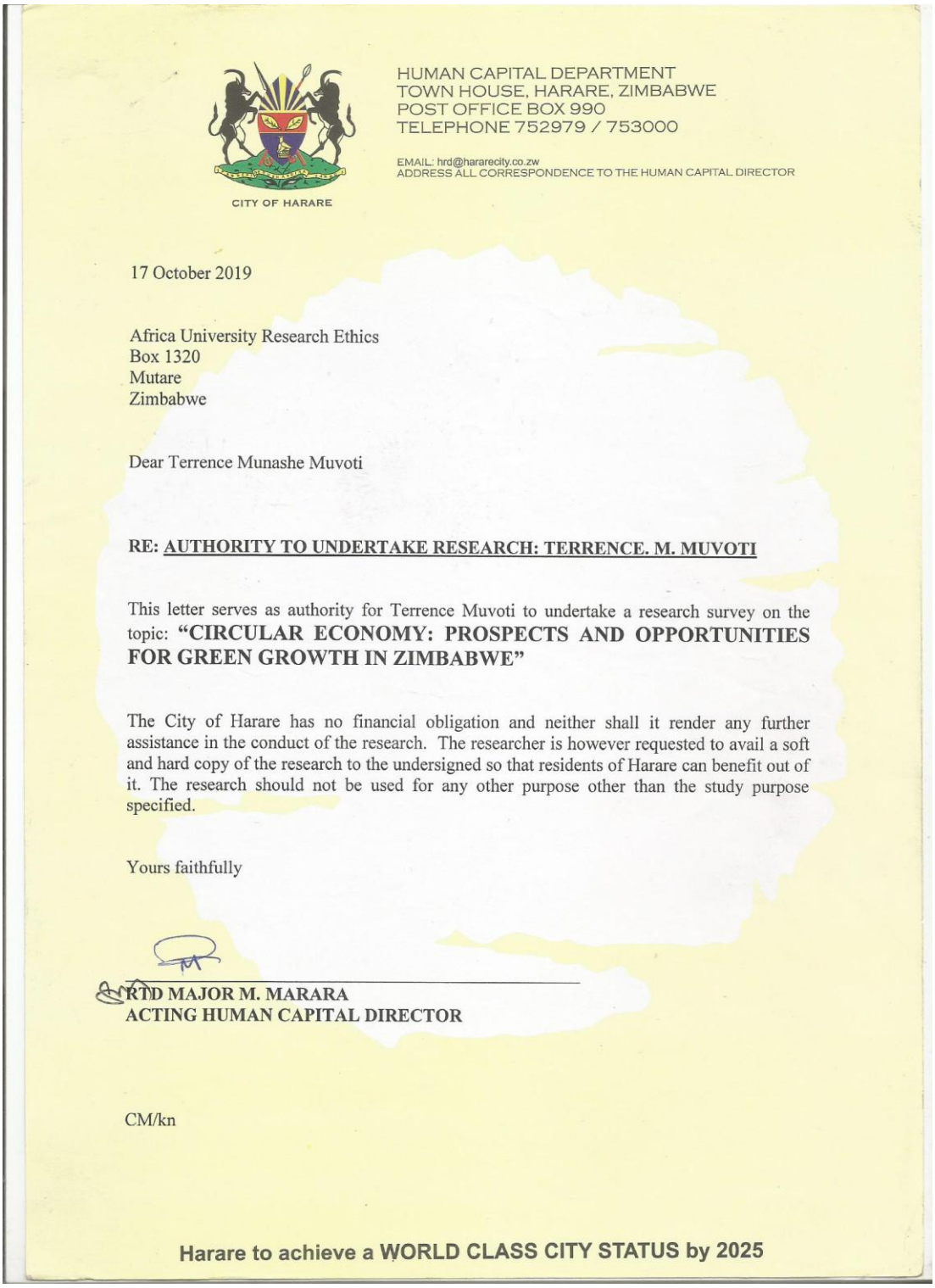
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

Yours Faithfully

05 SEP 2019

MARY CHINZOU – A/AUREC ADMINISTRATOR
FOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 2 Harare City Council Authorization Letter



CITY OF HARARE

HUMAN CAPITAL DEPARTMENT
TOWN HOUSE, HARARE, ZIMBABWE
POST OFFICE BOX 990
TELEPHONE 752979 / 753000

EMAIL: hrd@hararecity.co.zw
ADDRESS ALL CORRESPONDENCE TO THE HUMAN CAPITAL DIRECTOR

17 October 2019

Africa University Research Ethics
Box 1320
Mutare
Zimbabwe

Dear Terrence Munashe Muvoti

RE: AUTHORITY TO UNDERTAKE RESEARCH: TERRENCE. M. MUVOTI

This letter serves as authority for Terrence Muvoti to undertake a research survey on the topic: **"CIRCULAR ECONOMY: PROSPECTS AND OPPORTUNITIES FOR GREEN GROWTH IN ZIMBABWE"**

The City of Harare has no financial obligation and neither shall it render any further assistance in the conduct of the research. The researcher is however requested to avail a soft and hard copy of the research to the undersigned so that residents of Harare can benefit out of it. The research should not be used for any other purpose other than the study purpose specified.

Yours faithfully

RTD MAJOR M. MARARA
ACTING HUMAN CAPITAL DIRECTOR

CM/kn

Harare to achieve a WORLD CLASS CITY STATUS by 2025

Appendix 3 Informal Waste Pickers

Informal Waste pickers are self-employed recyclers and individuals mainly from marginalised social groups in the urban poor who make a living by collecting, sorting and recycling waste to obtain a small source of income for survival. This group of people play a significant role in many parts of the world especially in the Global South where municipal waste management systems are often insufficient to meet the urban needs. Informal waste pickers do not only play a role in making the communities clean but also help in reducing the amount of plastics in the environment.

Informal waste pickers scavenging for plastic litter.

Appendix 4 Material Recovery Centers (MRCs)

Material Recovery Centres (MRCs) are the centres or places where all the litter obtained from households and streets by the community volunteers is separated (waste segregation). It is where plastic waste is separated from solid waste, and Informal waste pickers also come to these MRCs to sell their pickings.

Material Recovery Centres (Photos by Researcher, 2019).

Appendix 5 Questionnaire Survey Instrument

FOR ACADEMIC PURPOSES

Africa University: Master in Public Policy and Governance [MPPG]

RESEARCH QUESTIONNAIRE FOR GLEN VIEW RESIDENTS

[A]. Demographics and Socio-Economic Features (***Please tick were applicable***)

Male	Female

Age Group:

18-24 years	25-34 years	35-49 years	50-64 years

Accommodation Status:

Landlord/Owner	Tenant/Lodger

Level of Education:

Below O'Level	O' Level	A' Level	Tertiary

Employment Status:

Formally Employed	Self-Employed	Not Employed	Student

[B]. Plastic Waste Management Practices (***Please Tick were applicable***)

1. How do you rate the City Council's rate of refuse collection in your area?

Good	Average	Poor

2. Do you separate plastics from solid waste?

Yes	No

3. How else do you manage plastic litter when the City Council fail to collect in time?

Separate to Recycle	Burning	Open space dumping

[C]. Challenges and Opportunities for adopting a Circular Economy

1. Have you heard about a Circular Economy before?

Yes	No

How do you understand it (*Please explain briefly*)

.....

2. Do you think there are challenges/barriers in adopting a Circular Economy?

Yes	No

If "Yes", *Please give one challenge/barrier*.....

3. Do you think there are opportunities/advantages in adopting a Circular Economy?

Yes	No

If "Yes", *Please give one opportunity/advantage*.....

[D]. Prospects and Opportunities for green growth using a Circular Economy

1. Have you heard about "green growth" before?

Yes	No

How do you understand it (*Please explain briefly*).....

2. A Circular Economy can lead to green growth, do you agree?

Agree	Maybe	Disagree

3. Is it possible to have a Circular Economy at a national scale?

Yes	No	Maybe

4. Who do you think should lead the transition to a Circular Economy?

Government	Private Sector/Business	Public Sector/Societies

[E]. Recommendations

1. What recommendations would you give to the Government to facilitate green growth using a circular economy? (***Please give one recommendation***)

......

2. Anything you would like to add or comment?

......

Appendix 6 Interview Guide Instrument

FOR ACADEMIC PURPOSES

Africa University: Master in Public Policy and Governance [MPPG]

INTERVIEW GUIDE FOR KEY INFORMANTS

Plastic Waste Management practices in Zimbabwe

i. What have been the main drivers of the proliferation of plastic waste in Zimbabwe?
ii. What are the major obstacles/barriers to appropriate plastic waste disposal and plastic waste management?
iii. What would be the best practices for disposing and managing plastic waste?

Challenges and Opportunities for adopting a Circular Economy

i. How acquaint are you with the concept of a Circular Economy? (How do you define/understand it)
ii. What could be the opportunities for adopting a circular economy? (in relation to plastics)
iii. What could be the challenges for adopting a circular economy?

Prospects and Opportunities for green growth using a Circular Economy

i. How do you understand the concept of green growth?
ii. Do you see CE as a paradigm shift or a transition from the current system towards a green growth?
iii. Do you think that CE could contribute to green growth? (How)

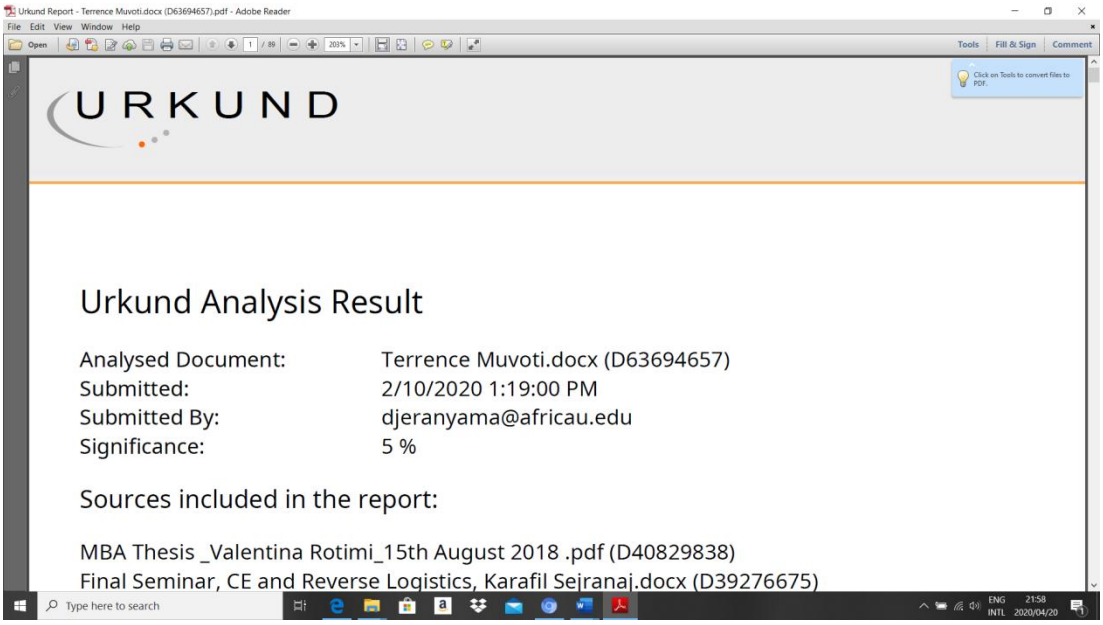
Recommendations and Comments

i. Is it possible to have a CE model at a national scale and what do you think is required for CE to be a positive force towards green growth?

ii. Who should lead the transition to a CE; the Private/Business Sector, Government or the Society?

iii. What policy frameworks or initiatives would you recommend to the Government?

iv. Anything you would like to add?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Urkund Analysis Result
Analysed Document: Terrence Muvoti.docx (D63694657)
Submitted: 2/10/2020 1:19:00 PM
Submitted By: djeranyama@africau.edu
Significance: 5 %
Sources included in the report:
MBA Thesis _Valentina Rotimi_15th August 2018 .pdf (D40829838)
Final Seminar, CE and Reverse Logistics, Karafil Sejranaj.docx (D39276675)
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