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# Stakeholder knowledge and perceptions of the circular economy in Ugandan cities

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Transitioning to a circular economy (CE) has been touted as the necessary paradigm shift to counterbalance the ever-increasing socio-economic metabolism in the face of global challenges such as climate change, biodiversity loss, population growth, pollution, and unemployment. Previous research has indicated that the transition to CE requires stakeholder collaboration. Yet, at present, a dearth of literature exists about stakeholder knowledge and perceptions of CE, more so in Africa. This begs the question; how will stakeholders collaborate when their understanding on the subject is dissimilar? To contribute to closing this knowledge gap, this research employs a mixed-methods approach to investigate the knowledge and perception of CE among key stakeholders in selected cities in Uganda. Interview data from 230 respondents selected via a snowballing process in the Ugandan cities of Gulu, Jinja, Masaka, Mbale, Mbarara and the Greater Kampala Metropolitan Area indicate that several stakeholder groups are involved in Uganda's CE space. These include government, businesses, civil society, the public as well as academia, research and think tanks. In terms of CE knowledge, the findings show that respondents were generally knowledgeable about CE. However, much of the knowledge is about the 3Rs (reduce, repair, and recycle) and waste management to the point that many respondents misconstrued recycling to be synonymous with CE. Overall, participant knowledge and perception of CE are determined by the level of education, sector of operation, position at the workplace, how long one has been in the CE space and whether one participated in decision-making. The findings indicate that respondents believe that the government had not done enough in promoting CE concepts and practices including creating avenues for stakeholder collaboration. The findings offer insights for CE proponents on attributes to consider when advocating and communicating about CE. This research could also inform the formulation of policies that stimulate CE development particularly with determining entry points for CE interventions and effective stakeholder engagement.

## KEYWORDS

circular economy, stakeholders, knowledge, perceptions, Uganda, cities

## 1. Introduction

Globally, the use of natural resources has more than tripled and continues to grow (IRP, 2019). This is more prevalent in Africa, where almost all socioeconomic development is tied to the intensive extraction and/or use of natural capital (Fedele et al., 2021). In most places, these natural capitals are being depleted much faster than they can be replenished, if at all. The drastic decrease in natural resources is due to environmental and socioeconomic forces

such as urbanization, population growth, and climate change (Gruber, 2015; Bishop, 2017). This is further compounded by economic trends and wastage during production, haulage and use (Economic Commission for Africa, 2009; Sheahan and Barrett, 2017) attributed to the below-optimum technological investments necessitating high resource use per unit rise in GDP (Pityana, 2019). Consequently, the African economies are less productive than competitors in the global space (United Nations, 2016).

The need to address global challenges has led to a proliferation of sustainability concepts (Fernholz et al., 2020). Among these is the circular economy (CE) concept which is currently promoted by stakeholders as a perfect replacement for the incumbent linear economy (Govindan and Hasanagic, 2018; Valverde and Avilés-Palacios, 2021). Built on a feedback-rich systems perspective, CE seeks to replace the “take-make-dispose” tendencies typical of the traditional linear economy (LE). This is because LE practices deplete natural capital (Geissdoerfer et al., 2017), burden the environment, and threaten economic sustainability (Sariatli, 2017; Rincón-Moreno et al., 2021).

CE in its holistic form is premised on the actions and mutual support of multiple stakeholders (Lieder and Rashid, 2016; Mishra et al., 2021). Gupta et al. (2019) and Ghinoi et al. (2020) have emphasized that for CE to take hold and for its benefits to be fully realized, relevant stakeholders ought to be proactively involved. This is shown by the calls for a paradigm shift to circularity by stakeholder groups ranging from socio-economic sectors, policymakers, and corporations to environmental groups (Govindan and Hasanagic, 2018; Savini, 2019; Salvioni and Almici, 2020).

Whilst it has been noted that CE is not an entirely new concept and has been practiced all over the world (Andersen, 2007), documentation and acknowledgment has been more pronounced in the last decade. However, much of the documentation is on perspectives in the Global North and transitional economies such as China, Brazil and India (Jabbour et al., 2019) with only scanty literature on the developing world and more so Africa (Mishra et al., 2021). This is despite the unique political and structural conditions, progressive innovation and policy formulation trajectory in these developing countries (Preston et al., 2019) as well as the multifaceted environmental and socioeconomic challenges they face (Mishra et al., 2021). Nonetheless, there is a growing body of research on CE in the developing world particularly Africa. CE research in Africa revolves around the aspects of sustainable use of natural capital, job creation, income diversification and generation as well as the mitigation of adverse of environmental impacts (Desmond and Asamba, 2019). Nonetheless, research on CE in Africa has also explored aspects such as the status of CE implementation and practices (Rademaekers et al., 2020), prospects (Preston et al., 2019; World Economic Forum, 2021), benefits and rationale for engaging in CE (Desmond and Asamba, 2019); opportunities and barriers for stakeholder involvement in the CE space (World Economic Forum, 2021); the stakeholders involved in the CE space (Desmond and Asamba, 2019; UNDP, 2020), among other sector-specific studies on CE.

In Uganda, while studies have not explicitly used the terms circular economy, noticeable research has been done on CE-related

aspects ranging from municipal solid waste management (Okot-Okumu and Nyenje, 2011; Ojok et al., 2014; Aryampa et al., 2019), regenerative agricultural practices (Nkuba, 1999), the plastic conundrum (Wandeka et al., 2022), electronic waste management (Nuwematsiko et al., 2022), among others. However, a dearth of research has been undertaken in Africa and Uganda specifically to critically examine stakeholder perceptions and knowledge of CE in its entirety. For example, while studies by Ojok et al. (2014) and Nuwematsiko et al. (2021) also explored aspects of stakeholder perceptions and knowledge, these studies were focused on particular CE-related approaches i.e., solid waste management and electronic waste management respectively. Yet, achieving a holistic transition requires that CE proponents not only understand who the key stakeholders are but also what they know and perceive of CE in its entirety and not its elements.

This study, therefore, attempts to contribute to the growing body of literature on CE in Africa by exploring what CE looks like in Uganda. The aim is to document stakeholder knowledge and perceptions of CE. In this study, it is hypothesized that stakeholders in Uganda’s CE space have the same understanding (knowledge and perceptions) of CE and related concepts. It is further hypothesized that this common understanding amongst stakeholders in Uganda’s CE space is a crucial initial step to implementing, scaling up and transitioning to CE in Uganda. The research was guided by the following research questions:

- Who are the key stakeholders in Uganda’s CE Space?
- What do these key stakeholders in Uganda know about CE?
- What are their thoughts and aspirations for a CE transition in Uganda?

## 2. Literature review

### 2.1. CE origins, definitions, and strategies

Circular economy (CE) is neither a new nor a lone concept. Despite being high on the global sustainability agenda today (Korhonen et al., 2018), CE practices, principles and concepts are as old as mankind (Andersen, 2007). Early humans, for example, coped with whatever resources were available to them and could be used as, or transformed into, shelter, food, products or tools (Stahel, 2020). In Africa, resource-sharing within communities, ownership transfer within households, permaculture practices, and ethnobotany, among others have existed for a very long time (African Development Bank, 2022). With two critical junctures, the agricultural revolution and the industrial revolution resource use increased more so in the latter phase (Winans et al., 2017).

Reike et al. (2018) distinguish the evolution of CE into three distinct phases. The first phase (the 1970s–1990s) focused on dealing with waste, the second phase (1990–2010) focused on win-win strategies between the environment and businesses through eco-efficiency whereas the third phase (post-2010) is geared toward value maximization from resources. Blomsma and Brennan (2017) have called the third and current CE phase the validity check phase. This is in the sense that modern-day CE strategies are (should be) holistic and adaptable to current and foreseeable global challenges such as natural capital depletion.

According to the [Ellen MacArthur Foundation \(2013\)](#) CE seeks to encourage regeneration to preserve and enhance natural capital; circulate products and materials to optimize resource value as well as design out negative externalities such as waste and pollution. In addition to these principles, scholars ([Stahel, 2016](#); [Robinson, 2022](#)) have encouraged the use of energy from infinite sources (renewable energy) and system thinking approaches in production for increased resilience. [Preston et al. \(2019\)](#) have highlighted that CE operationalisation involves slowing resource flows (rethinking product design and operations for longevity), narrowing resource flows to bolster use efficiency (e.g., by sharing or introducing product-as-a-service model) as well as creating new loops at end of life (reuse, repair or recycle). CE, therefore, represents the production and consumption strategies that support the repair of ecological systems ([Nakajima, 2000](#)), optimize raw material use efficiency whilst maximizing resource value ([Korhonen et al., 2018](#)), reduce production costs ([van Buren et al., 2016](#)) and foster socio-economic growth ([Social Circular Economy, 2017](#)).

CE has direct links with the concept of sustainable development concept ([Ghisellini et al., 2016](#)). The CE concept also integrates ideas from schools of thought such as industrial ecology and symbiosis, cleaner production, green economy, products-as-service models, cradle-to-cradle, biomimicry, net zero, and performance economy, among others ([Madzar, 2022](#)). Hence, as with all umbrella concepts ([Hirsch and Levin, 1999](#)), CE may mean different things to different people ([Gladek, 2017](#); [Kirchherr et al., 2017](#)). Stakeholders (academics, practitioners/businesses, policymakers, etc.) in the CE space have been reported to have different interpretations of the CE concept ([Blomsma and Brennan, 2017](#)). This implies that no single stakeholder group has undisputed authority to define what CE means exactly ([Gladek, 2017](#)). Despite the many attempts to define and conceptualize CE that exist, several interpretations still exist ([Kirchherr et al., 2017](#); [Rizos et al., 2017](#)). Moreover, it is argued that the transition to circularity is rooted in an individual or group or changing their perception and practices ([Schulz et al., 2019](#)).

The lack of a common understanding of what the CE concept entails, therefore, opens avenues for circular washing ([Salazar, 2022](#)) as well as other criticisms ranging from the overzealous yet narrow focus on resource challenges and resource efficiency whilst ignoring critical systemic societal concerns ([Corvellec et al., 2022](#); [Robinson, 2022](#)). For example, given CE's links with long-standing strategies aimed at addressing waste and pollution such as recycling it is sometimes understood by stakeholders to be the same as such strategies ([King, 2022](#); [Syberg, 2022](#)). Moreover, CE goes further to consider significant re-design and “de-coupling” within linear production and consumption systems ([Preston et al., 2019](#)). This is in addition to addressing social issues like unemployment ([Social Circular Economy, 2017](#); [European Union, 2020](#)) and environmental justice ([Amorim de Oliveira, 2021](#)).

## 2.2. Stakeholder theory, CE knowledge, and perceptions

As a sustainability tool ([Korhonen et al., 2018](#)), CE is considered a solution to global challenges that have been increasingly

recognized as wicked problems ([Geissdoerfer et al., 2017](#)). CE, its adoption and its practices can broadly be considered as forms of environmental sustainability ([Opferkuch et al., 2021](#)) and/or social sustainability ([Jamali, 2008](#)). Moreover, to understand the rationale for supporting and adopting sustainability concepts like CE, scholars, [Zhu et al. \(2010\)](#) and [Jabbour et al. \(2020\)](#) have argued for the use of the stakeholder theory. [Elias and Cavana \(2000\)](#) reported that the stakeholder theory embodies a system thinking approach which according to [Robinson \(2022\)](#) is also a crucial element of CE.

In this study, the stakeholder theory is adopted as the appropriate framework to explore stakeholder knowledge and perception of CE. [Freeman et al. \(2010\)](#) define stakeholders as groups of people with a legitimate stake in an entity. They include any individual or group that can be formally or informally affected by an entity and/or its operation. Accordingly, the stakeholder theory postulates that for an entity to be successful, it ought to add value to interest groups relevant to its operations ([Gibson, 2012](#)). The theory posits that stakeholder engagement and collaboration offer an opportunity toward dealing with challenges of value creation, ethics and mindset. For this study, however, CE stakeholders are viewed beyond the realms of business. This broad view allows us to cover other groups of people that directly or indirectly operate within Uganda's CE space. Calls have been made for multidisciplinary and multi-stakeholder collaboration ([Gupta et al., 2019](#); [Salvioni and Almici, 2020](#); [King, 2022](#)) in the CE transition. [Lieder and Rashid \(2016\)](#), [Mishra et al. \(2021\)](#), and [Eisenreich and Füller \(2023\)](#), for example, maintain that mutual support from all relevant stakeholders is pivotal in the transition from linear to CE futures. This is because CE operationalisation inevitably affects and/or is affected by other groups of people ([Roloff, 2008](#)). Yet, managing (including adding value to) these multi-stakeholder groups is no easy feat ([Hörisch et al., 2014](#)). This is because their interests, power and influence ([Hörisch et al., 2014](#); [Marjamaa et al., 2021](#)) as well as their demands, urgency and legitimacy ([Elias and Cavana, 2000](#)) vary considerably and could even conflict ([Freeman et al., 2010](#); [Marjamaa et al., 2021](#)).

Stakeholder interest is, among other things, dependent on their knowledge and perceptions. As such these attributes are crucial elements of the stakeholder theory. Understanding stakeholder knowledge and perceptions of CE is critical in informing a national and business strategy to implement and integrate CE. Stakeholder perceptions often inform the establishment of acceptable and effective policies and strategies ([Bond et al., 2018](#)). For businesses, [Moggi and Dameri \(2021\)](#) have pointed out that understanding stakeholder knowledge and perceptions offers insights to enterprises on how to satisfy a wide range of stakeholders. The beliefs and opinions stakeholders hold of CE will determine whether they (either directly or indirectly) use their influence and/or power to foster a transition to CE let alone engage or pressurize others to partake in CE activities. This pressure and/or nuanced knowledge of stakeholder utility functions can unlock the potential for CE product and/or process innovation and the creation of new intra- and inter-organizational relationships ([Jakhar et al., 2019](#)).

Previous studies in the wider field of environment indicated that knowledge of environmental aspects led to positive ecological behavior amongst stakeholders. [Kaplan \(1992\)](#), for example,

pointed out that decision-making is considerably influenced by one's knowledge regarding an issue. Similarly, Mostafa (2006) and Vinojini and Arulrajah (2017) have argued that knowledge of sustainability typically impacts pro-environmental attitudes, which in turn, induces eco-friendly behavior. However, sustainability knowledge does not necessarily always translate into positive sustainability action. Chen and Taylor (2011) in a study on Chinese industrialists, for example, found that despite some respondents to the study being aware of low-carbon economies (LCE), they did not participate in implementing LCE programmes.

Just like sustainability, the transition to CE is predetermined by stakeholder knowledge. In the OECD, for example, CE adoption increased with rising knowledge levels among stakeholders (Zwiers et al., 2020). Similarly, Smol et al. (2018) pointed out that an increase in public awareness of CE culminated in a transition to CE in Southern Poland. However, CE knowledge does not necessarily translate into a transition to CE. Liu and Bai (2014) found that whilst some firms in China had a relatively good understanding of CE, they were unsure of how to integrate such knowledge into their operations. Similarly, Xue et al. (2010) found that increasing CE knowledge among policymakers in China did not necessarily lead to enactment/formulation of pro-CE plans, policies and strategies. This is because decision-making is a complex process influenced by several other factors (Calabrese et al., 2020).

CE knowledge (including awareness) and perceptions are determined by socio-economic factors such as demographics (age, gender), level of education attained and geographical location. Guo et al. (2017), in a study in the Midong district, indicated that respondents' CE knowledge and overall awareness of sustainability significantly differed with the location. Also, Smol et al. (2018) mention that CE is more popular among young people when compared to the older population in Poland. Generally, CE is viewed as a tool to achieve sustainable development, especially in the environmental domain (Walker et al., 2022). Much recently, there are beliefs that CE is a low-hanging fruit toward economic recovery following the disastrous COVID-19 pandemic that shrank economies around the world (Dorsouma, 2021) with Africa being most impacted despite having relatively fewer reported infections (Cilliers et al., 2020).

### 2.3. Stakeholders and their responsibilities in the CE transition

CE in its holistic form is premised on the actions of multiple stakeholders (Eisenreich and Füller, 2023). Govindan and Hasanagic (2018) point out that governments (national, municipal or local), suppliers, consumers, organizations, society (general public) and suppliers are important stakeholder groups in CE. These stakeholders also have extensive and intricate inter- and intra-stakeholder relationships and power dynamics and, therefore, impact (Hörisch et al., 2014). For example, while national and local governments are charged with providing direction and enabling conditions, consumers could make choices that encourage circularity whereas businesses could redesign their processes and products in line with CE principles. Successful implementation would thus require cross-sectoral integration and

cross-institutional capacity development (Joensuu et al., 2020). This is in addition to the holistic and meaningful participation of all relevant stakeholders.

In terms of responsibilities in the CE transition, stakeholders also have crucial but often differentiated roles which could vary with country, industry or otherwise. For example, whilst enterprise founders, Chief Executive Officers (CEOs) and brand managers were the most dominant actors in the Swedish fashion industry, Brydges (2021), Calzolari et al. (2021) report that manufacturers were the driving force behind the CE transition in European and multi-national enterprises. Yet still, Klein et al. (2020) highlight the crucial role played by the public sector in the CE transition. Further, Silva et al. (2019) report how pivotal small companies and individual entrepreneurs have been in Brazil's CE transition, especially by maintaining common product and by-product flows within the local network. In China, the successful implementation of CE in manufacturing industries requires accompanying its implementation with environmental-oriented supply chain cooperation practices (Zhu et al., 2010). The informal sector too, despite being mentioned marginally, has been recognized as a critical stakeholder group in the CE space especially in developing countries (Aryampa et al., 2019; Singh and Singh, 2022). Studies by Ellen MacArthur Foundation (2021) indicate that stakeholders generally believe that policymakers (e.g., local and central governments) and financial institutions (e.g., banks) ought to take lead.

In Uganda, the terms circular economy started appearing in national policy and strategic development frameworks after 2017 following the launch of the Uganda Green Growth Development Strategy. National legislation such as the National Environment Act—NEA (NEMA, 2019) and national strategic plans such as the third national development plan—NDP III for Uganda (NPA, 2020) explicitly highlight CE as a fundamental principle of environmental management and a critical intervention toward promoting green and inclusive cities/urban areas respectively. However, a dearth of literature exists about Uganda's CE space. This study attempts to close this knowledge gap by using six purposively selected Ugandan cities to explore stakeholder knowledge and perception of CE.

Regarding the relationship between cities and CE, Gresh (2017) has pointed out that many places all over the world are becoming urbanized. Urban centers such as cities, municipalities and towns are centers of increased economic productivity and consequently socio-economic growth (Collier, 2017), they are, therefore, critical locations in the CE transition (Ellen MacArthur Foundation, 2023). Further, cities are home to over half of the global population, a figure likely to increase to about 68% by 2050. It is in cities that 85% of the global GDP is generated (Haase et al., 2018). Moreover, economic development in cities is reliant on extensive consumption and production practices (Bolger and Doyon, 2019). Integrating CE thinking in city operations, therefore, presents multifaceted benefits to city management and dwellers. To tap into these benefits cities ought to become promoters, facilitators and enablers of CE. As activity hubs, cities could also cushion CE innovation *via* local regulation, especially where national regulations do not exist or help enforce such laws (OECD, 2019). Cities can also operationalise CE *via* their planning and governance systems like infrastructural development, procurement and disposal (Ellen MacArthur Foundation, 2023).

## 3. Materials and methods

### 3.1. Study area

The study was conducted in Uganda, a landlocked country in Eastern Africa. Uganda's population currently stands at about 48 million people with an annual growth rate of ~3% (Uganda Bureau of Statistics, 2021). The nation, hence, has the eighth largest population by country in Africa and the fourth largest in Eastern Africa (Singh et al., 2023). From 1990, Uganda has registered a steady economic growth evidenced by the consistent rise in Gross Development Product (GDP) (Rumanzi et al., 2021). In terms of national GDP contribution, the service sector is the most significant (Uganda Bureau of Statistics, 2021). This is closely followed by the industrial (manufacturing and processing) and agricultural (including forestry and fisheries) sectors both of which directly and/or indirectly depend on the exploitation of natural capital.

Urbanization in Uganda, just like elsewhere all over the world, significantly threatens the integrity of ecosystems such as forests, wetlands, lakes and others. These threats are further compounded by challenges such as rapid population growth, industrial establishment and commercial agricultural expansion. In terms of urbanization, currently at least 25% of Uganda's population live in cities, municipal councils and town centers (Hass, 2021), thereby, heightening material demands. These shortcomings are further exacerbated by challenges such as unemployment especially among the youth, climate change, waste management and pollution of water, air and soil (Gumm, 2011). To downplay and/or overcome some of these challenges, adopting CE-related approaches is proposed in Uganda's third National Development Plan as a viable option (NPA, 2020).

In this study, Gulu, Jinja, Masaka, Mbale, Mbarara, and Kampala cities together with peripheral towns and peri-urban extensions in Wakiso and Mukono districts which together form the Greater Kampala Metropolitan Area (Figure 1) are purposively selected to explore stakeholder knowledge and perception of CE in Uganda. Gulu, Jinja, Masaka, Mbale, and Mbarara are selected for this research because they are part of the 15 newly approved cities being rolled out throughout Uganda (Mbabazi and Atukunda, 2020). Also, the selected areas represent some of the fastest urbanizing areas in Uganda (Hass, 2021) which are consequently experiencing a transition from over-reliance on agriculture to industry, manufacturing, and service delivery. This is one of the reasons that Uganda's third National Development Plan (NDPIII) considers urbanization a critical catalyst for the attainment of middle-income status (NPA, 2020).

### 3.2. Study approach and data collection

This study is explorative and employs a mixed methods approach to investigate stakeholder knowledge and perceptions of CE in Uganda. The data collection started with a critical analysis of the literature to identify the key stakeholders in the transition to CE. The analysis was biased toward the CE space in the Global South with an emphasis on Africa. The study then employs a cross-sectional research design to collect both

qualitative and quantitative data using questionnaires developed in the KoboToolbox. In the study, except in a few instances only close-ended questions and pre-coded responses (choices) were presented to respondents to allow for comparison. The questions were derived from reviewing literature on relevant themes presented in the literature review section with some questions adapted from a similar study on Australia's CE space (Planet Ark, 2020, 2021). The pretested questionnaire comprised three main sections:

- Section 1 captured basic demographic information such as age, sex, level of education, etc.;
- Section 2 contained questions on CE knowledge;
- Section 3 contained questions on CE perceptions.

Data were collected between July and August 2022 using the KoboToolbox. Purposive sampling techniques were used to identify the initial points of contact (first respondents) in each city who were city environment and/or public health officers. *Via* a snowballing process, the points of contact then identified other stakeholders that were recruited in the study. In a nutshell, the cities where the study was done were purposively selected and using environment/ public health officers in these cities as the contact the researchers were then introduced to other respondents. After identifying the respondents, the research team interviewed the respondents starting by explaining the questions to the respondents before capturing their responses into the KoboTool, an Open Data Kit, that allows for mobile data collection using tablets, phones or similar gadgets (Anokwa et al., 2009; Hartung et al., 2010; Bokonda et al., 2020). A total of 230 responses were recorded across the six cities. To ensure validity, the research tool was pretested to ensure it was fit for purpose.

To complement and evaluate stakeholder responses from the quantitative interviews (Nyumba et al., 2018), the research team held 15 focus group discussions (FGDs), averaging about two FGDs per city, with stakeholders. The FGDs comprised 4–6 participants purposively selected by the research team from the pool of respondents to the quantitative interviews to represent the various stakeholder groups. During the FGD, the discussions were on the dominant strategies (common CE practices), motivations, challenges and opportunities for engaging or adopting CE. The research team also visited enterprises (businesses and initiatives) to observe and document existing CE practices. Since the findings from the site visits and FGDs is beyond the scope of this paper, no further analysis was conducted to data from these engagements. However, insights from these engagements partially informed the discussion section of this paper.

### 3.3. Data management and analysis

At the end of the data collection phase, data were downloaded from the online portal (KoboToolBox) to Microsoft Excel (MS Excel, Office 365 Package) and cleaned before being uploaded to the IBM Statistical Package for Social Scientists (SPSS Version 26) for analysis.

Descriptive statistics were generated to summarize the demographic data as well as the results of the key measures.

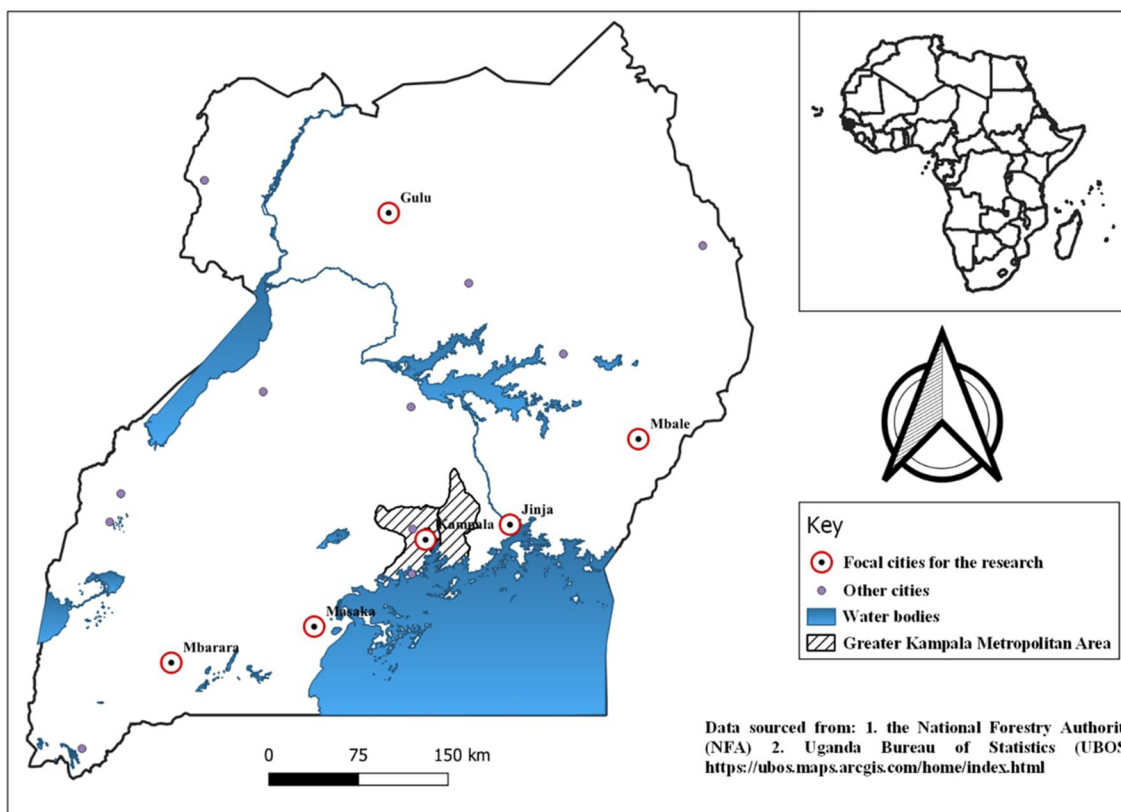


FIGURE 1 Location of study sites.

Attribute	Definition	City (figures in % of total respondents)						Total Percentage of Respondents
		GKMA	Gulu	Jinja	Masaka	Mbale	Mbarara	
Gender	Female	7.0	2.6	9.1	5.7	4.8	5.7	34.8
	Male	13.0	8.7	16.5	9.6	9.6	7.8	65.2
Age (in years)	18 - 35	8.7	4.8	8.7	6.5	3.9	7.8	40.4
	36 - 60	10.9	5.7	16.5	7.8	10.0	5.2	56.1
	Above 60	0.4	0.9	0.4	0.9	0.4	0.4	3.5
Highest Education Attained	None	0.0	0.0	2.2	1.3	0.4	0.0	3.9
	Primary	0.0	0.0	2.6	1.3	0.4	0.4	4.8
	Secondary	3.5	0.0	1.3	1.7	0.4	0.4	7.4
	Post-Secondary	0.0	1.7	1.7	1.7	1.3	0.9	7.4
	Graduate	16.5	9.6	17.8	9.1	11.7	11.7	76.5
Stakeholder Category	Academia	0.9	0.4	0.0	2.2	0.4	1.3	5.2
	Business	4.8	4.8	7.8	5.7	2.6	6.1	31.7
	Government	7.0	1.7	12.6	3.5	6.1	3.0	33.9
	Civil Society	4.8	4.3	3.5	3.5	3.9	2.6	22.6
	Other	2.6	0.0	1.7	0.4	1.3	0.4	6.5

FIGURE 2 Socio-demographic attributes of respondents.

To explore stakeholder knowledge of CE, a contingency between respondents' perceived knowledge and actual knowledge, a crosstabulation analysis was conducted in SPSS. Further, to

establish the determinants of respondents' CE knowledge, a binary logistic regression analysis was conducted to establish the factors that explained respondents' CE knowledge. The Omnibus and

Business type	Status	Percentage of total No. enterprises	Description of enterprises
<b>Sole Proprietorship</b>	Formal	5.6	An owner running their own business
	Informal	37.5	
<b>Micro Enterprise</b>	Formal	6.9	Business employs 2-4 people and generally has an annual revenue less than 10 million Uganda Shillings
	Informal	8.3	
<b>Small Enterprise</b>	Formal	25.0	Business employs 5-49 people and generally has an annual revenue between 10-100 million Uganda Shillings
	Informal	2.8	
<b>Medium Enterprise</b>	Formal	5.6	Business employs 50-100 people and generally has an annual revenue more than 100 but not more than 360 million Uganda Shillings
	Informal	0.0	
<b>Macro Enterprise</b>	Formal	8.3	Business employs more than 100 people and generally has an annual revenue greater than 360 million Uganda Shillings
	Informal	0.0	

FIGURE 3  
Categories of CE enterprises visited.

Hosmer and Lemeshow tests were then used to evaluate the fitness of the resulting model. Regarding stakeholder perceptions of CE, the analysis generally revolved on generating descriptive statistics such as percentages and frequency.

## 4. Results

### 4.1. Socio-demographic profile of respondents

A total of 230 respondents were engaged from different cities and these comprised 34.8% females and 65.2% males (Figure 2). About 56.1% of the respondents were aged 36–60 years whereas those aged 18–35 years were 40.4%. In Uganda, people in the latter age bracket are referred to as the youth (Uganda Bureau of Statistics, 2017). A significant number (76.5%) of respondents were graduates. In this study graduates were respondents who had attained a bachelor's degree or master's degree or PhD. An equal number of respondents (7.4%) had attained secondary school education or post-secondary education (certificates and/or diplomas). The findings also reveal that 80.6% of the youth were graduates thereby being the most educated respondent group. There was an almost equal number of respondents that identified themselves as belonging to government (33.9%) and business (31.7%) stakeholder groups while respondents that identified themselves as civil society (CBOs, NGOs, IDAs, cultural and religious institutions) made up 22.6%, academia (5.2%) and "other" (6.5%). The "other" stakeholder group consisted of respondents working with professional groups and any other stakeholder group such as consultants (Figure 2).

Most respondents that identified themselves as business stakeholders operated sole proprietorships (43.1%) or small enterprises (27.8%). Almost half of the business enterprises (48.6%) were informal or unregistered (Figure 3). Also, the youth constituted the highest percentage (35.5%) of respondents in business albeit at mostly sole proprietorship and micro-level. On

the other hand, most respondents (38%) aged 36–60 identified themselves as government whereas 50% of those above 60 years identified themselves as civil society stakeholders.

Overall, the findings reveal that Uganda's CE space is a multi-stakeholder engagement that involves inter- and intra-stakeholder collaboration. The study identified stakeholders in government (both political and technical at the national and local level); the business community; academia, research and think tanks; civil society (comprising NGOs, CBOs, IDAs, as well-cultural and religious institutions); among others. Moreover, the findings also highlight the multi-disciplinary professional backgrounds of the stakeholders. While the majority of respondents (50.4%) worked in the environment and natural resource (ENR) management sector, other respondents worked in public health (8.3%), community development (5.2%), finance and banking (1.3%), industrial, manufacturing and processing (7.3%), infrastructural development (4.3%), policy and administration (4.3%), transport and communication (3.5%), waste collection, management, and processing (10.9%) and other (4.3%).

### 4.2. Knowledge about sustainability and the circular economy

The findings indicate that 78.2% of the respondents considered themselves to be familiar with the concept of sustainability, whereas others considered themselves either unfamiliar at all with the sustainability concept (5.7%) or heard of the concept in passing (16.1%). However, when this study presented a list of 22 terms related to sustainability to the respondents, all respondents recognized at least one term. Some of the respondents (10%) recognized all 22 sustainability concepts while 64.8% of the respondents were able to recognize 11 sustainability concepts. The term CE was among the least familiar terms with only 27% of respondents indicating that they were familiar with the term. Similarly, terms related to the circulation and/or closing of material loops were among the least familiar to the respondents. About

29.1% of respondents were familiar with remanufacturing, followed by 26.1% of the respondents that are familiar with biomimicry and 23.5% with the term share economy.

When explicitly asked to rank their CE knowledge, slightly over 60% of the respondents pointed out that they have only heard of CE and understood only the basics of the concept. On the other hand, 6.9% of the respondents claimed that they were extremely knowledgeable about CE. The findings also reveal that close to 39.3% of the respondents were hearing about the term CE for the first time while an almost equal number (35.7%) stated that they have known about CE for less than two (2) years. On the other hand, a portion of respondents (6.3%) have known about CE for over six (years).

Again, when presented with terms (words) associated with the CE, all respondents selected at least four (4) words they had come across. Most respondents were familiar with words such as recycle (98.7%), waste management (89.7%), repair (87.9%), and reduce (87.2%). On the other hand, terms like the green economy, blue economy and biomimicry were familiar to <25% of the respondents all of whom were graduates.

The findings of a crosstabulation analysis of the suggested definitions against stakeholder groups (Table 1) indicate that most respondents (43%) preferred option 1 (ensures products and materials are recycled where possible) whereas option 4 (means sustainable processes are utilized despite the cost) was only least preferred (1.3%). Some respondents (5.2%) felt the definitions were not appealing and instead opted for option 5 (other definition). Similar results were found when the suggested definitions were run against the education of respondents (Table 2). Interestingly, most businesses, civil society and government respondents preferred option 1 (ensures products and materials are recycled where possible), while 50% of the respondents in academia preferred option 2 (ensures regenerative processes and products). On the other hand, except for most graduates (38.6%) that preferred option 3 (ensures there is no excess waste in our supply chains), most respondents in other education categories preferred option 1.

Regarding the benefits of CE, most respondents (87%) identified eight (8) or more benefits of CE while 1.7% of the respondents could not recognize any CE benefit (Figure 4). Also, some respondents (11.8%) identified 13 benefits of adopting CE whereas about 7.4% of the respondents recognized all the 20 CE benefits listed in the survey. Interestingly, the respondents that recognized all the CE benefits presented were all graduates (with a minimum of a university degree) majority of whom worked as government officials in the environmental management and policy planning departments. Further, the most recognized benefits of CE among the respondents were job creation (96%), increasing profits and revenue (95%), natural resource conservation (86%), addressing resource availability (86%) and offsetting the adverse impacts of manufacturing (85%). On the other hand, CE benefits such as improving customer trust and loyalty (29%), improving brand equity (24%) and improving staff engagement were the least recognized (20%).

Only a small fraction of respondents (29.5%) was aware of any national or sub-national legislation, policy, strategy or otherwise that explicitly mentions CE. The level of awareness of such regulations and strategies among stakeholder groups was as follows:

academics (50%), "other" stakeholder groups (40%), government (37%), civil society (33%) and business stakeholders (14%).

To ascertain the respondents' CE knowledge, a set of 10 statements was presented to them. The respondents were to select whether the probe was true, false, or they are not sure. In the analysis, each perfect response (true-correct or false-correct) was scored as **1** whereas imperfect responses (true-incorrect, false-incorrect and not sure) were scored **0**. The findings indicate that many respondents (61.3%) believe that CE is synonymous with recycling (Figure 5). Also, most respondents are unfamiliar with technical aspects of CE such as the ranking of CE strategies (93.5% do not know that recycling is among the least favored CE initiatives). This is in addition to not knowing the CE stance on the use of renewable energy (62.6% believe production in CE revolves around the use of solar energy). The results further reveal that 74.8% of the respondents are actually knowledgeable about CE (Figure 6). It can be noted that in this study respondents in business were most knowledgeable about CE while respondents associated with academia were all moderately knowledgeable about CE.

A comparison between perceived knowledge (familiarity with CE) and actual knowledge (scores from the statements) revealed that most respondents (78.4%) were above the pass mark (i.e., correctly responded to more than four statements) implying that the respondents were knowledgeable about CE. Further, some respondents believed they had little-to-no CE knowledge, however, about 47.1% were knowledgeable about CE (Table 3). On the other hand, some respondents believed they were extremely knowledgeable about CE; however, it turned out that these respondents did not know as much as they claimed despite being above the pass mark.

A binary logistic regression analysis run between respondents' demographic attributes and their actual CE knowledge (scores from the knowledge-based statements) revealed that respondents' CE knowledge was determined by five (5) of the demographic attributes used (Figure 7). The attributes that determined respondents' CE knowledge were: education ( $r = 0.825, p < 0.001$ ); the sector a respondent worked in ( $r = 0.678, p = 0.023$ ); length of time a respondent has known about CE ( $r = 0.779, p < 0.001$ ); whether a respondent participates in decision making ( $r = 1.288, p = 0.006$ ) and a respondent's level at the workplace ( $r = -0.768, p = 0.011$ ). With an overall classification accuracy of 81.7%, a statistically significant value for the Omnibus Test ( $p < 0.001$ ) and a statistically insignificant value for the Hosmer and Lemeshow Test ( $p = 0.173$ ) we concluded that the results are valid. The analysis was conducted with  $p$ -value set at 0.05.

This implies that whereas respondents' demographic attributes such as age, gender, location and stakeholder category could not explain one's CE knowledge, a respondent's education level could. Respondents with higher education (say a degree), for example, had more CE knowledge than those without. Similarly, respondents that had been in the CE space for many years (say 3 and above) generally had more CE knowledge than respondents that were new to the CE space. Further, respondents that participated in decision-making in their respective workplaces as well as those at higher levels in their organizations had more CE knowledge. The sector a respondent worked in also contributed to their CE knowledge.



TABLE 1 Variations in CE definition with stakeholder group.

Stakeholder group		CE definition					Other	Total
		... ensures products and materials are recycled where possible	... ensures regenerative processes and products	... ensures there is no excess waste in our supply chains	... means sustainable processes are utilized despite the cost			
Stakeholder group	Academia	Count	2	6	4	0	0	12
		% within this stakeholder group	16.70%	<b>50.00%</b>	33.30%	0.00%	0.00%	100.00%
		% within those that selected this definition	2.00%	14.60%	5.30%	0.00%	0.00%	5.20%
		% of total number of respondents	0.90%	2.60%	1.70%	0.00%	0.00%	5.20%
	Business	Count	36	12	15	1	9	73
		% within this stakeholder group	<b>49.30%</b>	16.40%	20.50%	1.40%	12.30%	100.00%
		% within those that selected this definition	36.40%	29.30%	20.00%	33.30%	75.00%	31.70%
		% of total number of respondents	15.70%	5.20%	6.50%	0.40%	3.90%	31.70%
	Civil society	Count	24	12	16	0	0	52
		% within this stakeholder group	<b>46.20%</b>	23.10%	30.80%	0.00%	0.00%	100.00%
		% within those that selected this definition	24.20%	29.30%	21.30%	0.00%	0.00%	22.60%
		% of total number of respondents	10.40%	5.20%	7.00%	0.00%	0.00%	22.60%
	Government	Count	32	9	35	2	0	78
		% within this stakeholder group	41.00%	11.50%	<b>44.90%</b>	2.60%	0.00%	100.00%
		% within those that selected this definition	32.30%	22.00%	46.70%	66.70%	0.00%	33.90%
		% of total number of respondents	13.90%	3.90%	15.20%	0.90%	0.00%	33.90%
Others	Count	5	2	5	0	3	15	
	% within this stakeholder group	<b>33.30%</b>	13.30%	<b>33.30%</b>	0.00%	20.00%	100.00%	
	% within those that selected this definition	5.10%	4.90%	6.70%	0.00%	25.00%	6.50%	
	% of total number of respondents	2.20%	0.90%	2.20%	0.00%	1.30%	6.50%	
Overall	Count	99	41	75	3	12	230	
	% within this stakeholder group	43.00%	17.80%	32.60%	1.30%	5.20%	100.00%	
	% within those that selected this definition	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
	% of total number of respondents	<b>43.00%</b>	17.80%	32.60%	<b>1.30%</b>	5.20%	100.00%	

The bold values highlight the significant explanatory variables (this was based on the resulting p-value).

TABLE 2 Variations in CE definition with education level.

			Suggested CE definition				Other	Total
			... ensures products and materials are recycled where possible	... ensures regenerative processes and products	... ensures there is no excess waste in our supply chains	... means sustainable processes are utilized despite the cost		
Level of education	Graduate	Count	67	37	68	3	1	176
		% within this education category	38.10%	21.00%	<b>38.60%</b>	1.70%	0.60%	100.00%
		% within those that selected this definition	67.70%	90.20%	90.70%	100.00%	8.30%	76.50%
		% of total number of respondents	29.10%	16.10%	29.60%	1.30%	0.40%	76.50%
	None	Count	4	1	0	0	4	9
		% within this education category	<b>44.40%</b>	11.10%	0.00%	0.00%	<b>44.40%</b>	100.00%
		% within those that selected this definition	4.00%	2.40%	0.00%	0.00%	33.30%	3.90%
		% of total number of respondents	1.70%	0.40%	0.00%	0.00%	1.70%	3.90%
	Post-secondary	Count	12	1	4	0	0	17
		% within this education category	<b>70.60%</b>	5.90%	23.50%	0.00%	0.00%	100.00%
		% within those that selected this definition	12.10%	2.40%	5.30%	0.00%	0.00%	7.40%
		% of total number of respondents	5.20%	0.40%	1.70%	0.00%	0.00%	7.40%
	Primary	Count	4	1	1	0	5	11
		% within this education category	<b>36.40%</b>	9.10%	9.10%	0.00%	45.50%	100.00%
		% within those that selected this definition	4.00%	2.40%	1.30%	0.00%	41.70%	4.80%
		% of total number of respondents	1.70%	0.40%	0.40%	0.00%	2.20%	4.80%
	Secondary	Count	12	1	2	0	2	17
		% within this education category	<b>70.60%</b>	5.90%	11.80%	0.00%	11.80%	100.00%
		% within those that selected this definition	12.10%	2.40%	2.70%	0.00%	16.70%	7.40%
		% of total number of respondents	5.20%	0.40%	0.90%	0.00%	0.90%	7.40%
Overall	Count	99	41	75	3	12	230	
	% within this education category	43.00%	17.80%	32.60%	1.30%	5.20%	100.00%	
	% within those that selected this definition	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
	% of total number of respondents	<b>43.00%</b>	17.80%	32.60%	<b>1.30%</b>	5.20%	100.00%	

The bold values highlight the significant explanatory variables (this was based on the resulting p-value).

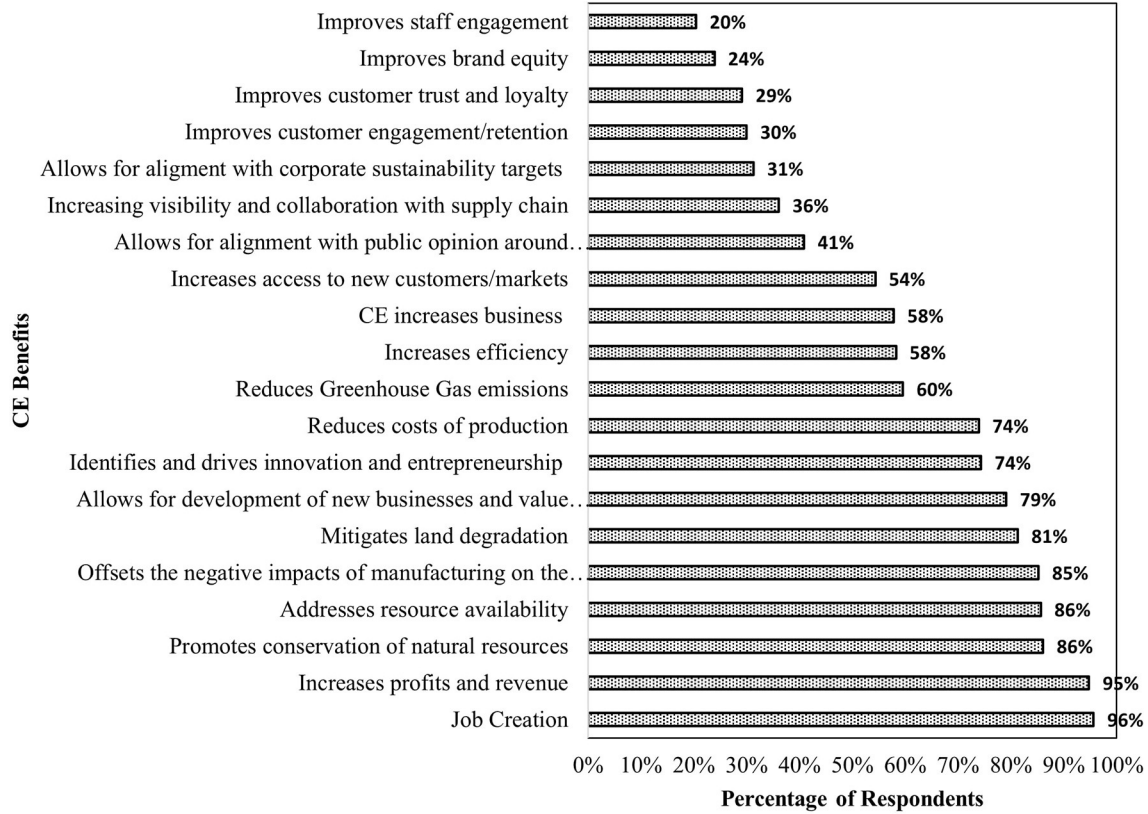


FIGURE 4 Rank of CE benefits by respondents.

CE Probe	Percentage of Responses			Percentage of Perfect Response	
	FALSE	Not Sure	TRUE	Wrong	Correct
Waste management is a small branch of the circular economy	13.66	22.91	<b>63.44</b>	37.4	62.6
Circular Economy is the same as recycling	38.7	21.3	<b>40</b>	<b>61.3</b>	38.7
CE only focuses on environment and economic aspects	<b>67.69</b>	25.76	6.55	32.6	67.4
CE eliminates waste and continuous use of resources	10	12.17	<b>77.83</b>	22.2	77.8
A common goal of CE and waste management is environmental, social and economic sustainability	2.17	20.87	<b>76.96</b>	23	77
In a linear economy you take resources from nature, produce items, use them, and throw away	1.74	21.3	<b>76.96</b>	22.6	77.4
CE involves producing items using solar energy and reducing waste	37.39	<b>50.43</b>	12.17	<b>62.6</b>	37.4
Using locally available material is a key aspect of CE	0.87	30	<b>69.13</b>	30.9	69.1
Recycling is among the least favoured initiatives in CE	18.7	<b>74.78</b>	6.52	<b>93.5</b>	6.5
CE is not relevant in developing countries	<b>93.83</b>	3.52	2.64	7.4	92.6

FIGURE 5 Statements to test respondents CE knowledge.

Stakeholder Group	Percentage of Respondents				
	No-to-Basic Knowledge (Got 0-2 probes correct)	Slightly Knowledgeable (Got 3-4 probes correct)	Moderately Knowledgeable (Got 5-6 probes correct)	Very Knowledgeable (Got 7-8 probes correct)	Extremely Knowledgeable (Got 9-10 probes correct)
<b>Government</b>	2.6	29.9	20.8	32.5	14.3
<b>Business</b>	0	2.9	8.6	58.6	30
<b>Civil Society</b>	14.6	34.1	36.6	12.2	2.4
<b>Academia</b>	0	0	100	0	0
<b>Others</b>	23.3	13.3	63.3	0	0
<b>Overall</b>	<b>6.5</b>	<b>18.7</b>	<b>29.6</b>	<b>30.9</b>	<b>14.3</b>

FIGURE 6  
Respondents' actual CE knowledge.

### 4.3. Attitudes toward global challenges and sustainable development

To link the three aspects (global challenges, sustainable development, and CE), the respondents were asked if they were concerned about the global challenges and what could be done to curtail their impact. It was found that a very small number of respondents (0.9%) do not acknowledge the existence of global challenges whereas twice that number (1.75%) acknowledged the existence of global challenges but did not think these challenges posed a dire threat to livelihoods and nature. On the other hand, almost all the other respondents (97.4%) expressed concern about the increasing threat of global challenges on livelihoods.

In terms of what needs to be done, about 52.8% of the respondents believed that the solution lies in a radical change in our consumption and use patterns while about 44.6% posit that increasing our efforts under the current model of development is the solution to curbing global challenges.

Reflecting on their responses about global challenges, respondents were asked what dimension of sustainable development is most relevant in curbing global challenges. The findings indicate that most respondents (37%) believed that to address global challenges, environmental aspects should be prioritized over aspects in the social dimension (35%) and then the economic dimension (27%).

### 4.4. Stakeholder roles in the CE transition

In this study, respondents were asked to rank stakeholder groups in terms of their responsibility in the CE transition. The overall rank was determined by comparing the average score. The average score was calculated using the formula below:

$$\text{Average score} = \frac{\text{Total score}}{\text{Number of respondents}} \quad (1)$$

whereby

$$\text{Total score} = \sum \text{rank given} \times \text{number of respondents}. \quad (2)$$

The results from this computation show that central governments had the highest average score (5.79), thereby outranking other

stakeholder groups (Figure 8). Central governments were closely followed by local governments (5.34) with international development agencies (2.45) coming in last. There were also notably very small margins between the perceived role of the general public (4.52) and businesses (4.50) as well as between civil society (3.57) and academia (3.56).

However, in terms of actual CE initiatives and activities undertaken, respondents believe that businesses, civil society—particularly CBOs and NGOs as well as the general public have implemented more CE initiatives than other stakeholder groups. The findings indicate that while businesses, civil society and the general public had 3.51, 3.38, and 3.34 average scores respectively, stakeholder groups such as government and international development agencies scored 2.72 and 2.61 implying that they ranked lower in the actual implementation of CE (Figure 9).

### 4.5. Priority sectors in the CE transition

The results of this study indicate that the priority sectors for Uganda's CE transition are business (80%), agriculture (57%) and financial services (42%; Figure 10). On the hand, sectors such as tourism, travel and accommodation as well as transport are only considered by only 13 and 10% of the respondents. In the study, some respondents (18.3%) ranked "other" sectors as a consideration for the CE transition and while the majority (60%) of the respondents that selected this option believed that the other sectors should be considered after all the others listed, 12% of the respondents believed that the "other" sectors should be highly prioritized. Further probing would reveal that these "other" sectors included education, mineral extraction and processing and public infrastructural development.

### 4.6. CE focus in the next few years in Uganda

CE as the operational arm of sustainable development embodies environmental, social and economic aspects. These three sustainability dimensions themselves cover a wide range of

TABLE 3 A cross tabulation of respondents perceived vis-à-vis actual CE knowledge.

Perceived \ Actual		Respondents knowledge							Total
		Rank of knowledge					Pass vs. fail		
		No-to-basic knowledge	Slightly knowledgeable	Moderately knowledgeable	Very knowledgeable	Extremely knowledgeable	Fail ( $\leq 4$ perfect responses)	Pass ( $> 4$ perfect responses)	
No-to-basic knowledge	Count	12	34	31	9	1	46	41	87
	% within perceived	13.8%	39.1%	35.6%	10.3%	1.1%	52.90%	<b>47.10%</b>	100.0%
	% within actual	80.0%	79.1%	44.9%	12.9%	3.0%	79.30%	23.80%	37.8%
	% of total respondents	5.2%	14.8%	13.5%	3.9%	0.4%	20.00%	17.80%	37.8%
Slightly knowledgeable	Count	3	5	17	25	3	8	45	53
	% within perceived	5.70%	9.40%	32.10%	47.20%	5.7%	15.10%	84.90%	100.0%
	% within actual	20.0%	11.6%	24.6%	35.7%	9.1%	13.80%	26.20%	23.0%
	% of total respondents	1.3%	2.2%	7.4%	10.9%	1.3%	3.50%	19.60%	23.0%
Moderately knowledgeable	Count	0	3	11	20	7	3	38	41
	% within perceived	0.0%	7.3%	26.8%	48.8%	17.1%	7.30%	92.70%	100.0%
	% within actual	0.0%	7.0%	15.9%	28.6%	21.2%	5.20%	22.10%	17.8%
	% of total respondents	0.0%	1.3%	4.8%	8.7%	3.0%	1.30%	16.50%	17.8%
Very Knowledgeable	Count	0	1	8	11	13	1	32	33
	% within perceived	0.0%	3.0%	24.2%	33.3%	39.4%	3.00%	97.00%	100.0%
	% within actual	0.0%	2.3%	11.6%	15.7%	39.4%	1.70%	18.60%	14.3%
	% of total respondents	0.0%	0.4%	3.5%	4.8%	5.7%	0.40%	13.90%	14.3%
Extremely knowledgeable	Count	0	0	2	5	9	0	<b>16</b>	16
	% within perceived	0.0%	0.0%	12.5%	31.3%	56.3%	0.00%	100.00%	100.0%
	% within actual	0.00%	0.00%	2.90%	7.10%	27.3%	0.00%	9.30%	7.0%
	% of total Respondents	0.0%	0.0%	0.9%	2.2%	3.9%	0.00%	7.00%	7.0%
Total	Count	15	43	69	70	33	58	172	230
	% within perceived	6.5%	18.7%	30.0%	30.4%	14.3%	25.20%	74.80%	100.0%
	% within actual	100.0%	100.0%	100.0%	100.0%	100.0%	100.00%	100.00%	100.0%
	% of total respondents	6.5%	<b>18.7%</b>	<b>30.0%</b>	<b>30.4%</b>	14.3%	25.20%	74.80%	100.0%

The bold values highlight the significant explanatory variables (this was based on the resulting p-value).

Explanatory Variable	Regression Coefficient (B)	Standard Error (S.E.)	p-Value	Wald	Odds Ratio (EXP(B))	95% C.I. for EXP(B)	
						Lower	Upper
Location	-0.385	0.131	0.235	8.601	0.68	0.526	0.880
Gender	0.592	0.393	0.132	2.263	1.807	0.836	3.906
Age	0.611	0.377	0.105	2.623	1.842	0.88	3.857
Education	<b>0.825</b>	0.194	<b>0</b>	18.148	<b>2.281</b>	1.561	3.334
Stakeholder group	-0.025	0.208	0.902	0.015	0.975	0.649	1.465
Position in organisation	0.768	0.303	<b>0.011</b>	6.438	0.464	0.256	0.840
Sector	<b>0.678</b>	0.436	<b>0.003</b>	1.412	<b>1.925</b>	0.913	2.520
Participation in Decision-making	<b>1.288</b>	0.469	<b>0.006</b>	7.528	<b>3.626</b>	1.445	9.099
How long one has known about CE	<b>0.779</b>	0.204	<b>0</b>	14.537	<b>2.179</b>	1.46	3.251

FIGURE 7  
Determinants of respondents CE knowledge.

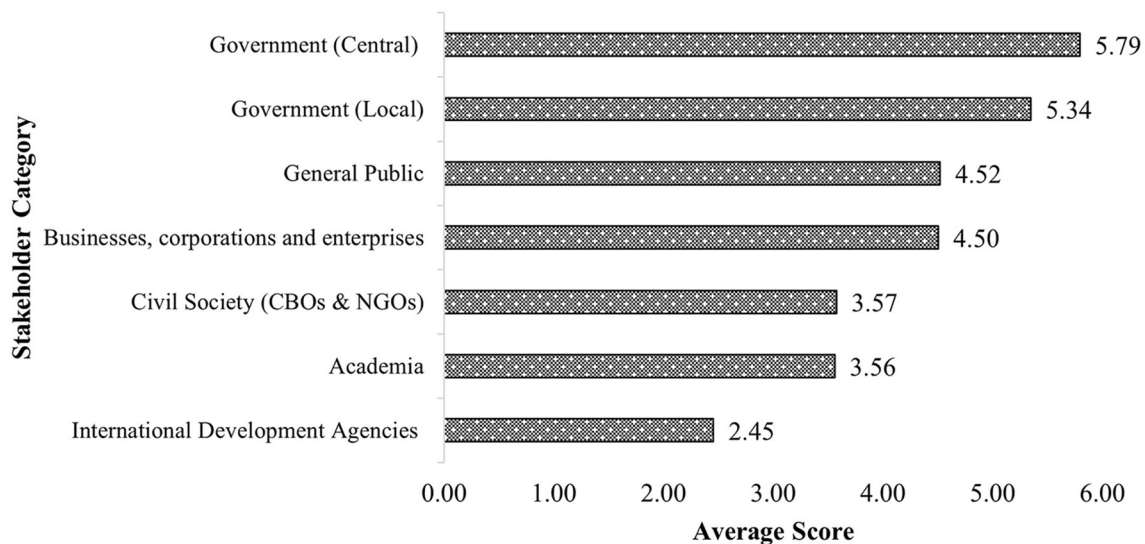


FIGURE 8  
Respondents' perception of stakeholder responsibilities in the CE transition.

aspects. From a set of areas, CE could contribute to, respondents ranked waste management (96.1%), biodiversity conservation and ecosystem restoration (94.7%) sustainable water management (91.4%), green and renewable energy (86.1%) and the fight against climate change (82.6%) as the critical environmental aspects that should be prioritized in Uganda's CE transition. On the other hand, the social aspects to be prioritized were job creation (96.5%) and human health and safety (86.1%) whereas the economic aspects were the recycling economy (90%) and the promotion of sustainable business models (86.5%).

## 5. Discussion

This study attempts to contribute to the growing body of literature on CE in Africa by exploring what CE looks like in

Uganda. A mixed methods approach is used to explore who the key stakeholders in Uganda's CE space are; what these key stakeholders know about CE and what thoughts and aspirations they have about transitioning to CE. The findings of the research will enable CE proponents to identify critical entry points for the CE transition for both policy and support including the development of a CE roadmap for Uganda.

### 5.1. Uganda's CE stakeholders

The research revealed that Uganda's CE space comprises several stakeholder groups. The stakeholder groups include businesses (informal and formal); government (local and central; political and administrative); civil society (international development agencies

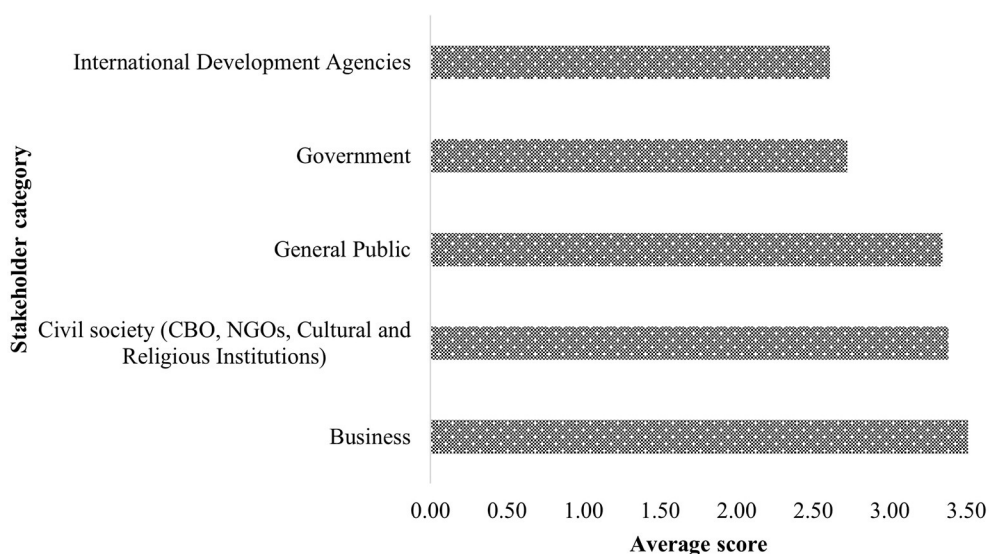


FIGURE 9 Respondents' perceptions on extent of CE initiatives implemented by stakeholder groups.

Sector		Rank						Total	Total Based on Rank 1 and 2	Rank
		1	2	3	4	5	6			
Businesses	Count	113	71	32	12	2		230	184	1
	% of respon	49%	31%	14%	5%	1%	0%		80%	
Agriculture, forestry and Fisheries	Count	59	72	42	29	28		230	131	2
	% of respon	26%	31%	18%	13%	12%	0%		57%	
Banking, Finance and Insurance	Count	49	44	46	21	64	5	224	93	3
	% of respon	22%	20%	21%	9%	29%	2%		42%	
Tourism, Travel & Accommodation	Count	4	24	46	67	69	9	210	28	4
	% of respon	2%	11%	22%	32%	33%	4%		13%	
Transport	Count	1	22	59	95	48	1	225	23	5
	% of respon	0%	10%	26%	42%	21%	0%		10%	
	% of respon	10%	2%	5%	10%	12%	62%		12%	

FIGURE 10 Priority sectors in Uganda's CE transition.

(IDAs), non-government organizations (NGOs), community-based organizations (CBOs), cultural and religious institutions; academia, research and think-tanks; general public and other (e.g., such as professional bodies, finance, banking and insurance service providers, etc.). While the wide spectrum of stakeholders involved in Uganda's CE is commendable, a further analysis revealed that active involvement in CE was limited to stakeholders associated with businesses, CBOs, IDAs and some actors within government. Yet as Eisenreich and Füller (2023) argue, you can't go circular

alone. In developing countries such as Uganda, multi-stakeholder collaboration has been highlighted as an important antecedent to CE implementation (Mishra et al., 2021). This is because each stakeholder group has something different to offer in the CE transition due to their nature of work and thus should not engage in CE peripherally.

The findings also show that business stakeholders are the most dominant players in Uganda's CE space. Amongst the business stakeholders is a vast informal sector comprising waste-pickers

(that collect paper, metals, and plastics), waste collection center attendants, small-scale recycling plants, repair shops, smelters, and small-scale urban farmers, among others. Similar findings have been reported by Singh and Singh (2022) and Singh et al. (2023) in their studies on solid waste management and plastic waste management in Africa (including a section on Uganda) respectively. The significant number of respondents operating informal or unregistered businesses is reflective of Uganda's economic landscape. Uganda, like many developing nations, has a hybrid economy, i.e., an economy where the formal and informal sectors coexist (Lloyd-Jones and Redin, 2017, p. 5–6). Uganda's informal sector makes up to 80% of the overall economy (Mugoda et al., 2020) and thus CE proponents ought to not only proactively include the informal sector in CE discussions but also bridge and encourage collaboration between the formal and informal sector. Aminoff and Pihlajamaa (2020), for example, assert that an impactful CE transition requires collaboration within internal and external stakeholders no matter the complexity of these interrelationships. In Uganda, it is noteworthy, however, that while in certain value chains collaboration already exists between the formal and informal sectors of the economy due to power dynamics, the informal sector is generally powerless (Mugoda et al., 2020). Going forward, therefore, there is need to change public perception of the informal sector (Lloyd-Jones and Redin, 2017). At present, people operating in the informal sector are looked down upon as failures due to the odd nature of their work and in some instances perceived as “illegal entities” despite being a critical and complementary effort to enterprise development in the country (Mugoda et al., 2020). Importantly, policy makers ought to explore avenues to bolster the bargaining power for informal enterprises. This could be by improving access to finance, provision and subsidizing of resources used for production (water, electricity, etc.), better tax regimes (exemptions, holidays, and progressive taxation, etc.) as well as support toward enterprise formalization and/or enterprise aggregation.

Further, during FGDs when asked about collaboration, many stakeholders pointed out either a single supplier or buyer they deal with. Whilst this is promising, there is need to go beyond bilateral collaborations and explore the entire network for possible linkages and collaborations including internal collaborations. According to Eisenreich et al. (2021), this multidimensional (horizontal, vertical or otherwise) approach to stakeholder collaboration is critical in the CE transition. This because some stakeholders are “sleepers,” in that they are unaware of the multiple economic, social and even environmental benefits associated with CE. The financial services sub-sector (banks, insurance and otherwise) is one such group that has not been proactively involved in CE despite being critical in enterprise development (Aranda-Usón et al., 2019).

The findings show that various age groups, just like stakeholder groups, exist in Uganda's CE space. The results reveal that the youth are also a formidable force in Uganda's CE space. They run enterprises ranging from development of mobile applications to sustainable fashion design to sustainable packaging to plastic waste upcycling and downcycling to urban farming, to mention among others. The prominent role of the youth (respondents aged 18–35 years) in Uganda's CE future particularly in business is refreshing. Similar findings were reported by Smol et al. (2018) who found the youth to be more vibrant than any other age

group in Poland's CE space. This finding points to a crucial entry point for the CE. It has been recognized globally that youth constitute the most important human resource potential that can contribute significantly spur national socio-economic development (ICRW, 2001). Moreover, in Uganda, the youth constitute the largest proportion of the population (Kwesigwa et al., 2019), and they are also the most socially active and productive age group (UNDESA, 2015). The youth, however, also face critical challenges ranging from poverty and unemployment to increased social pressures and responsibilities (Kwesigwa et al., 2019). CE, therefore, not only presents an opportunity for overcoming unemployment and other challenges but also helps build a moral fabric that despises consumerism. The role of the youth in the CE transition, however, goes beyond entrepreneurship. Through their consumption patterns, they could influence new tastes and preferences in society. As such, the youth could be the voice of consumers with different and/or higher expectations as well as the face of innovations that disrupt the current economic model (Generation Climate Europe, 2021).

The results also revealed, however, that the kind of businesses the youth were mostly engaged in were sole proprietorships and micro-level. These types of businesses are generally less capital-intensive and thus more appealing to the youth who generally have less capital available to them (Kwesigwa et al., 2019). Similar limitations were reported by Alamineh (2020) regarding youth involvement in micro, small and medium-scale entrepreneurship in Ethiopia. As such proponents of CE-related approaches such as Singh et al. (2023) have called upon responsible stakeholders especially governments to avail the necessary resources to the youth to encourage their involvement in CE-related activities.

## 5.2. Stakeholder roles in the CE transition

Intentional vertical and horizontal as well as multistakeholder collaboration is crucial in the CE transition. The respondents in this study believe that the greatest onus in Uganda's CE transition lies with governments (central and local). Similar sentiments have been reported by van Buren et al. (2016) in their study in the Netherlands as well as Munaro et al. (2020) in their review paper on CE in the built environment. The belief that governments have the greatest responsibility in the CE transition perhaps stems from the notion that governments have statutory responsibilities to promote socioeconomic development and protect the environment. During FGDs conducted for this research, participants emphasized that stakeholders expect governments (central and local) to set up the appropriate legal regime, establish pilot projects as well as create and maintain a favorable investment atmosphere for CE-related activity. Govindan and Hasanagic (2018) in their review on the drivers, barriers and practices of CE also highlighted government involvement in CE action *via* pro-CE regulation or otherwise as a driver toward CE adoption and indeed maintained that the role of governments (national, municipal or local) surpasses that of other stakeholder groups in the CE transition.

Local governments such as cities, on the other hand, present a critical entry point for the transition to CE. For example,



these sub-national governments could cushion CE innovation through local regulation, especially in situations where those from national governments are inexistent or possibly reinforce national regulations by enacting by-laws (World Economic Forum, 2018; OECD, 2019). Similarly, sub-national (local) governments often have jurisdiction over the waste collection, public transport networks, urban planning and local economic development (Okot-Okumu and Nyenje, 2011; Ojok et al., 2014), and are in many cases able to implement impactful changes more rapidly than national governments, especially in decentralized government systems (Okot-Okumu and Nyenje, 2011). Moreover, they are also better positioned to engage with local businesses, non-profits and community organizations to align their efforts toward circularity goals (ICLEI, 2018). In South Africa, for example, the city of Cape Town have formalized a partnership with GreenCape to identify and link manufacturing and retail sectors to increase their competitiveness, investment and job creation through a CE transition (GreenCape, 2022). Also, in their programmes, plans and projects, city governments could encourage CE practices and discourage consumerism by building sociocultural and environmental stewardship programmes (ICLEI, 2020). For instance, Bolger and Doyon (2019) noted that cities in Europe, for example Amsterdam, have experimented with new forms of circular planning for example for the transport and housing infrastructure and governance. As such, as Uganda transitions to CE, city-level stakeholders should be actively engaged not for just their influence but the crucial roles they could play in the CE transition.

In this study, while the responsibility of businesses came second to governments, a study by Lewandowski (2016) in Poland argued that the responsibility of business stakeholders surmounts that of any other stakeholder group. Similarly, the public is equally believed to be a frontline actor in Uganda's CE transition. The general public (consumers) could, for example, make choices that encourage circularity whereas businesses could redesign their processes and products in line with CE principles. The public sector, therefore, deserves significant consideration in the CE transition (Klein et al., 2020). Elsewhere, mixed findings have been reported on who the leaders of CE ought to be. For example, whilst business founders, C-suite executives and brand managers were reported to be most essential in the Swedish fashion industry according to Brydges (2021), Calzolari et al. (2021) found manufacturers to be the overall leaders in Europe's CE space. On the other hand, Silva et al. (2019) in a study in Brazil pointed out that sole proprietorships (individual entrepreneurs), and small and medium enterprises were the leaders of the CE transition. Similar to the findings in Brazil in terms of the actual implementation of CE enterprises, this study found that businesses ranked highest. This may be attributed to the direct economic benefits that businesses accrue from adopting CE practices in their operations. Moreover, integrating CE into business operations may also improve relations with authorities and other stakeholders who are keen on corporate social responsibility.

In a nutshell, different stakeholder groups have vital, yet differentiated roles in facilitating a shift away from the linear "take-make-use-dispose" model of production and consumption to CE. The roles of these stakeholders may vary from country to country and/or industry under study. However, for a successful

transition to CE multistakeholder collaboration and cross-sectoral integration is required (Aminoff and Pihlajamaa, 2020; Joensuu et al., 2020). Moreover, as they build stakeholder interrelationships, CE proponents ought to carefully examine which stakeholders to engage, when and how to engage them because no single stakeholder group is more important than the other (Eisenreich and Füller, 2023).

### 5.3. Knowledge about sustainability and CE

CE has been promoted as the operational arm of sustainable development (Geissdoerfer et al., 2017) and by extension sustainability. In this study, however, CE was among the least known sustainability terms by respondents. Interestingly, respondents were able to recognize several terms often associated with CE. Terms like reduce, reuse, recycle and waste management were recognized by almost all respondents. The respondents' familiarity with terms such as reduce, reuse and recycle points to the long-standing knowledge about the 3R framework among stakeholders. The 3R framework is also widely used as a waste management hierarchy (Reike et al., 2018). Kirchherr et al. (2017) and Reike et al. (2018) have also highlighted that the 3R framework is the most reported in research. Moreover, since the transition from a linear to a circular economy requires new production and consumption strategies (Sharma et al., 2021), several strategies and corresponding frameworks have been proffered to facilitate this transition (Reike et al., 2018). These strategies have been called different names by scholars; however, they all essentially relate to the different ways to operationalise CE and ultimately maximize resource value (Korhonen et al., 2018) whilst reducing production costs (van Buren et al., 2016). The findings indicate that outside the common 3R framework and waste management, only a few respondents could identify other CE-related concepts. It is no wonder, therefore, that even existing literature on CE-related activities in Uganda predominantly revolves around themes such as waste management and recycling. Concepts such as biomimicry, industrial symbiosis, eco-design and the share economy are hardly known. Moreover, in some cases, some of the business respondents were engaged in operations linked to these concepts.

Regarding the definitions provided, the results point to a lack of commonality in respondents' understanding of what CE is. The findings thus support earlier discussions on the multiplicity of CE definitions (Kirchherr et al., 2017; Rizos et al., 2017). However, there is a notable agreement among respondents around the definition that has an element of recycling i.e., CE ensures products and materials are recycled where possible. This definition was popular among all stakeholders despite varying education levels and stakeholder category except for a few graduates and some academics, respectively. It was concluded that most respondents believed that the concept of circular economy was about recycling or waste management. This assertion was confirmed when the majority of respondents pointed out that CE is synonymous with recycling. Similar findings have been reported by Planet Ark (2021).

The discussion around recycling as a CE strategy is one that generated much debate recently (King, 2022; Syberg, 2022). Stakeholders have been, for example, warned of false hope of

fronting recycling and its derivatives in the CE transition (Syberg, 2022). This is because recycling has been reported to have less retention value (Potting et al., 2017) and is thus among the lower-ranking CE strategies (Reike et al., 2018). It is clear, however, that recycling is and will continue to be a formidable CE strategy in the CE transition for nations, businesses and otherwise. The last two global circularity gap reports also highlighted recycling as one of the greatest contributors to the 8.6% and 7.2% global circularity (Circle Economy, 2022, 2023). Going forward, King (2022) argues that anti-recycling crusaders ought to appreciate that recycling comes at the very end of the product life and, hence, its contribution could be better felt if upstream CE strategies are improved instead of doing the bare minimum in terms of CE operationalisation and counting on recycling. Bottom line, CE proponents instead of discrediting recycling out to champion other CE strategies because indeed the potential for circularity goes well-beyond recycling and waste management to the heart of material extraction and use (Circle Economy, 2023).

Further, CE is considered an emerging paradigm that many different stakeholders have started to embrace and understand. It is argued that the transition to circularity is rooted in an individual or group changing their perception and practices (Schulz et al., 2019). However, since no universal definition for CE exists currently (Kirchherr et al., 2017), stakeholders have gone on to interpret and apply the concept in different ways (Gladek, 2017). This is because stakeholders may be at different levels of development, have different experiences and execute different roles. CE definitions and conceptualization are thus influenced by stakeholders' backgrounds and operations. Even the EMF's CE definition and conceptualization depicted in the "Butterfly" diagram, Ekins et al. (2019) point out that they are rooted in environmental sustainability yet social aspects (Social Circular Economy, 2017) and economic sustainability (Sverko Grdic et al., 2020; Valverde and Avilés-Palacios, 2021) aspects ought to be considered in equal measure in the CE transition.

The results from the study indicate that respondents are generally knowledgeable about CE, but this varied greatly. The findings on actual CE knowledge presented as respondent scores on the CE knowledge-based statements showed that respondents that identified themselves as business stakeholders were more knowledgeable about CE than other stakeholder groups. This is perhaps because some business stakeholders may already be involved in CE practices and thus have a better understanding of CE. Also, while the transition to CE is a multistakeholder process, most of the actions and interventions by the stakeholder groups are focused on transforming businesses (Baah et al., 2022). Businesses, therefore, benefit from the diverse knowledge directed to them by the other stakeholder groups.

The greatest variation in actual CE knowledge was among respondents that identified themselves as civil society. In this stakeholder group while some respondents were found to be extremely knowledgeable (got 9–10 statements correct), some knew nothing-to-a-few basic things about CE (got 0–2 statements correct). This could be attributed to this group being a conglomerate of many other distinct groups (CBOs, NGOs, international development agencies (IDAs), and cultural/ religious institutions). These sub-groups tend to operate on different scales

and could be either specialists or generalists in their operations (Chilengue, 2014). For example, while IDAs and NGOs may be able to recruit high-caliber professionals including those with CE knowledge this may not always be easy for CBOs who at best use graduate volunteers.

A comparison between perceived knowledge (familiarity with CE) and actual knowledge (scores from the probes) revealed that respondents know more about CE than they thought they knew. For example, 47% of the respondents had categorized themselves as having little-to-no CE knowledge but then scored highly on the knowledge-based statements. The findings in this study differ from those in a similar study conducted among stakeholders in Australia (Planet Ark, 2021). In the Australian study, some respondents claimed to know more than they actually knew, a phenomenon explained as the Dunning Kruger effect (Pennycook et al., 2017). The findings of this research imply that a participatory approach ought to be taken in the transition to CE. The reason is that while it may sometimes appear that stakeholders do not know anything about CE because of the terminologies being applied, this may not necessarily mean they do not know anything at all. In actual sense, with better explanations on these concepts, stakeholders may be better positioned to positively contribute to the CE transition. Joensuu et al. (2020) have similarly argued that successful CE [transition and] implementation would require cross-sectoral integration and cross-institutional capacity development among stakeholders. Collaboration among stakeholders not only builds trust and ownership for established initiatives but also allows for co-learning amongst stakeholders.

In this study, the difference in CE knowledge among respondents is explained by education level; sector of operation; position in the organization; whether one participates in decision-making and the length of time in the CE space. The findings indicate that respondents with higher education had more CE knowledge than their counterparts. More education comes with more exposure to information including that on sustainability and perhaps the circular economy. This coupled with the sector one works in, which is often aligned with one's educational background, may give someone access to more information and thus more knowledge about certain aspects as compared to counterparts. Ojok et al. (2014) in a study on waste management in Kampala have reported similar findings whereby respondents with higher education attainments were more willing to pay for solid waste management owed to their knowledge of the negative impacts of such waste in their neighborhoods.

Similarly, CE knowledge also increased with the length of time respondents spent in the CE space. This may be for the obvious reason that experience is the best teacher and as such respondents with relatively long experience in the CE space would know more about the inner workings of CE than those who are relatively new to the CE space. This result is partially supported by findings by Spano et al. (2021) in which they revealed that individuals with significant prior experience had a higher level of subject knowledge on wildfires which was the subject of discussion. Spano et al. (2021), however, noted that the extent of knowledge depended on the depth of discussion in that there was no significant difference in knowledge level when more advanced aspects were asked. The study also revealed that respondents in higher positions within

their organizations as well as those involved in decision-making had more CE knowledge. This may be because usually, it is people in higher positions within organizations that are responsible for making critical decisions and as such would require enormous information to guide their decision. With this hindsight, therefore, it would not be very surprising that they would have relatively more knowledge on CE which could be an aspect they may have grappled with when making decisions within their organizations.

#### 5.4. Attitudes toward global challenges and sustainable development

In this study, almost all respondents were concerned about the increasing threat from global challenges. The respondents, however, disagreed on what needs to be done to curtail the adverse impacts of these global challenges. There was an equal split between respondents that believed the solution was a radical change in our production and consumption patterns and respondents that posited that increasing efforts under the current linear economy model of development could downplay the global environmental challenges. In the latter case, respondents argue that actions in the current development system would be proficient if intensified, for example, if the action is planting trees, more trees need to be planted for impact. On the other hand, respondents that selected a radical shift imply that current actions are insufficient to prevent and/or overcome the adverse impacts attributed to global challenges.

Both approaches may foster sustainability, however, research has indicated that current sustainability actions are insufficient to overcome current and anticipated adverse impacts emanating from global challenges (ILO, 2008; OECD, 2019). Moreover, global challenges are regarded as wicked problems (Ludwig et al., 2022) and hence require solutions hinged on systems thinking (Elias and Cavana, 2000). A radical shift is, thus, required if the socioeconomic wins attained over time are to be maintained. Reconceptualization of our production and consumption patterns, as proffered in CE, is heralded as the key to curtailing and/or overcoming challenges and indeed the road to sustainability (Preston et al., 2019). In Uganda, such aspirations are now constituted in national legal frameworks such as the National Environment Act (NEMA, 2019) and strategic development frameworks such as the third National Development Plan (NPA, 2020).

#### 5.5. Priority sectors in the CE transition

The study underlines the need to prioritize the business sector in Uganda's CE transition. This could be explained by the business consequences of take-make-waste operations, which create irreparable stress to the environment, while CE generally reconciles business value creation with the adoption of resource efficiency strategies (Bocken et al., 2016). Also, a considerable number of respondents are already involved in CE-related businesses (Nkuba, 1999; Okot-Okumu and Nyenje, 2011; Aryampa et al., 2019; Nuwematsiko et al., 2021; Wandeka et al., 2022) and thus nudging others in the same direction would

be a low-hanging fruit in the CE transition. The business sector, such as agriculture, forestry and fisheries, supports a significant number of livelihoods (NPA, 2020) and hence prioritizing this sector allows for an effective and quick trickle-down of CE benefits to the population.

The lack of financing CE-related initiatives in both established enterprises and more so for start-ups is considered a critical barrier to the CE transition (Su et al., 2013; Aranda-Usón et al., 2019). Respondents to this study also re-echoed this challenge. Similar findings have been reported by Singh et al. (2023) in their study on the plastic waste management value chain in Africa. It is not surprising, therefore, that respondents in this study emphasized that the banking and finance sector is one of key priorities for CE transition in Uganda. The banking and finance sector could not only be a source of capital for CE enterprises (Aranda-Usón et al., 2019), but also stimulate the transition to CE by promoting smart services which bolster both innovation-driven growth and efficient resource use (Suzic et al., 2022).

## 6. Conclusion

Using purposively selected Ugandan cities as a case study, this research employed a mixed methods approach to explore what CE looks like in Uganda. The study aimed to document the key stakeholders in Uganda's CE space, the stakeholder's knowledge about CE as well as their thoughts and aspiration were in about the transition to a CE.

Following the launch of the Uganda Green Growth Development Strategy in 2017, there has been a growing interest in advancing CE and related activities in Uganda. While this interest has been registered in all stakeholder groups (government (local and central; businesses (informal and formal); political and administrative); civil society (such as international development agencies (IDAs), non-government organizations (NGOs), community-based organizations (CBOs), cultural and religious institutions); academia, research and think-tanks; general public and other), the findings in this study that business stakeholders (most of whom are in the informal sector) are most dominant and their interest in CE was driven by the need to improve their socioeconomic standing. Business stakeholders were also generally more knowledgeable about CE than other stakeholder groups.

The central government has also exhibited an interest in promoting CE approaches. This has been *via* the development of legal framework and national strategic development plans in which CE is explicitly mentioned as a goal in national development. Sub-national authorities such as cities are also actively developing physical plans for urban development that embed circularity. Academics, researchers and think tanks as well as civil society organizations (particularly environment-leaning NGOs, CBOs and international development agencies) were also identified as players in Uganda's CE space. On the other hand, stakeholder groups such as those in finance, media, etc. are less visible despite their critical role in the CE space.

The study revealed that while stakeholders had an overall positive view toward CE, their knowledge on the subject is limited. In terms of CE knowledge, CE as a term is less known compared to other sustainability terms. Moreover, in depth discussions with

respondents revealed that they generally had more knowledgeable about CE than they actually thought. However, much of their knowledge about CE was tied to the waste management hierarchy i.e., reduce, reuse and even more so recycling. For many respondents, CE simply meant recycling.

In the transition to CE, capacity building on what CE holistically covers is crucial to avoid misconception and enable stakeholders better appreciate CE potential. Further, participatory approaches across different horizontal and vertical levels of society. This is because currently, CE is better understood by, for example, respondents that are part of decision-making processes at their workplace, work in a higher position within the organization, and/or more educated (say a degree), yet stakeholder groups such as the youth, informal sector as well as indigenous people and local communities are mostly ignored in CE discussions.

As next steps in Uganda's CE transition, the respondents believe the government ought to take a more central and proactive role as at present they have delegated their responsibilities to other stakeholder groups. Respondents further suggest that CE ventures are supported with finances as well as training as these remain the biggest barriers to CE adoption. Lastly, a CE roadmap for Uganda should also be developed using participatory approaches to articulate national aspirations, explore strengths, weaknesses, opportunities and threats to the CE transition.

## 7. Limitations and future research recommendations

This study employed a snowball sampling technique, which meant that respondents could only introduce/refer the researchers to others they deemed potential informants, thereby, creating a selection bias. As such the findings are not representative of the entire population. Nonetheless, the findings offer critical insights into key aspects of Uganda's CE space.

Further, whilst the analysis of CE knowledge is hinged on nine socio-demographic factors, there is a likelihood that one-to-several other potential socio-demographic factors or otherwise that influence stakeholder CE knowledge could have been overlooked or not completely captured in this study.

Future research on Uganda's circular economy could appraise the "fitness" of the regulatory and policy framework for the holistic CE transition. Respondents in this study continuously spoke about the contradiction in some of the policies and laws and how they hinder CE adoption. Also important is the need to explore the informal sector in Uganda and its potential and wider contribution to CE futures in Uganda. Respondents in this study that belonged to the informal sector pointed out that access to finance and support from government and other funding sources e.g., banks is difficult. They attributed this to the nature of their enterprises which supporting agencies considered high risk and less impactful.

## Data availability statement

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

## Ethics statement

The studies involving human participants were reviewed and approved by Research Ethics Committee at the African Leadership University. The participants provided their written informed consent to participate in this study.

## Author contributions

TG conceived, designed, wrote, and carried out the fieldwork. ENi, ENt, and DN supported with designing of the research tools and reviewing and formatting of the manuscript in equal measure. All authors have read and agreed to the published version of the manuscript.

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## Conflict of interest

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

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## Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2023.1117814/full#supplementary-material>

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