Eco-entrepreneurship challenging the status quo: waste as a resource in Uganda.

Sustainable waste management through eco-entrepreneurship.

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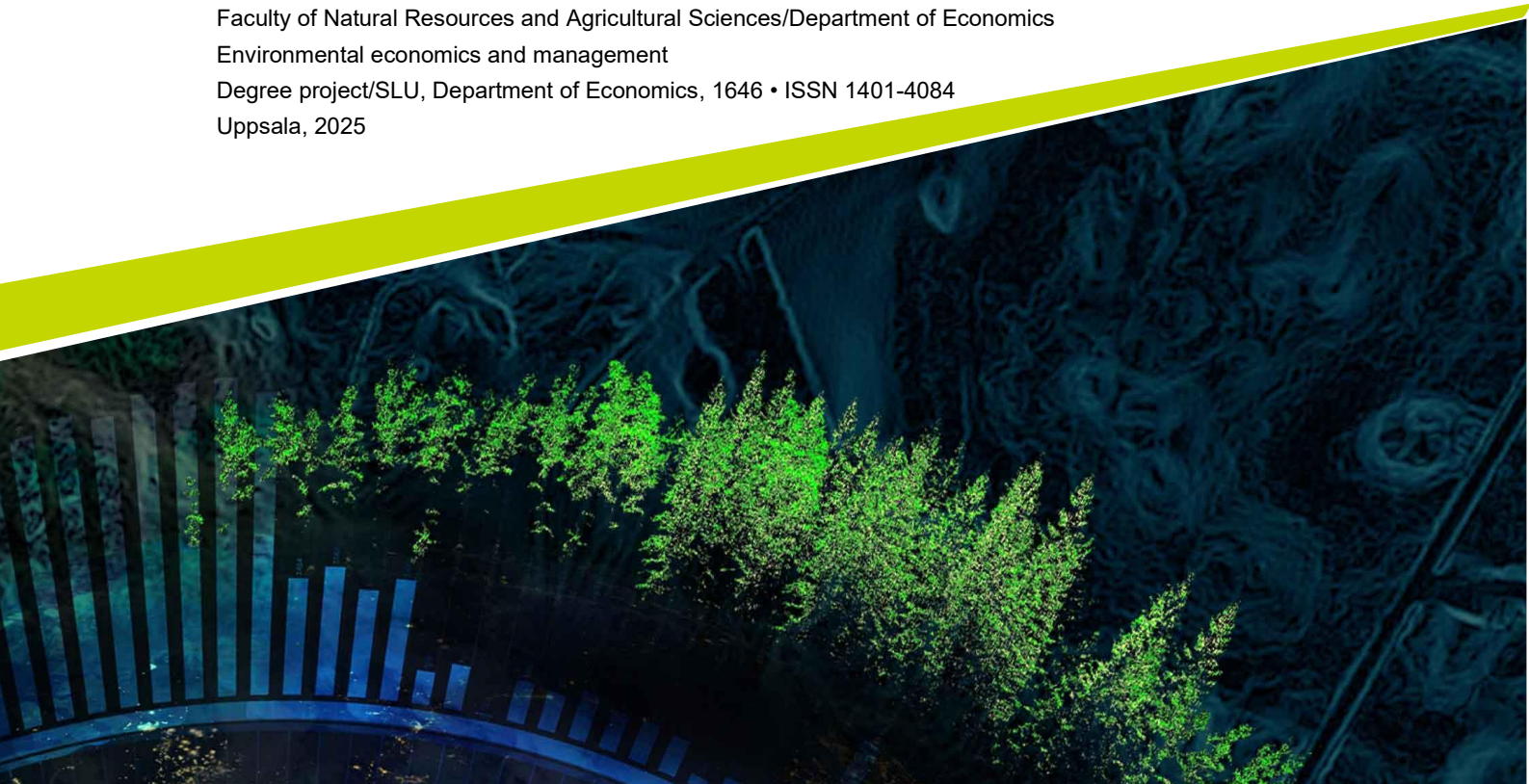

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Abstract

This study explores the transformative role of eco-entrepreneurs to disrupt the status quo in addressing waste management challenges in a developing country context particularly informal urban settlements of Uganda. It examines the internal and external factors shaping their operations and identifies strategies for enhancing their impact in the transition to sustainable waste management. A qualitative methodology was applied comprising of semi structured interviews with five eco-entrepreneurs in addition to a narrative literature review to for more theoretical grounding of the study. This data was analysed thematically in addition to using the SWOT framework to provide a comprehensive overview of these eco-entrepreneurs and their operating environments. Following an integrated theoretical framework of Green Absorptive capacity, circular economy, institutional theory, Schumpeter's innovation theory and social entrepreneurship theory, the findings from this study revealed these eco-entrepreneurs leverage innovative, context- relevant solutions to generate value from waste materials fostering social-economic benefits and environmental sustainability. Despite institutional difficulties and resource constraints, they utilize GAC, community engagement and technology to advance closed loop practices and promote inclusive and sustainable waste management. The study concludes revealing eco-entrepreneurship as a socially embedded, adaptive and disruptive process that bridges institutional deficiencies by leveraging bottom-up innovation and local knowledge contributing these valuable empirical insights into resource constrained environments.

Keywords: Eco-entrepreneurship, urban Uganda, informal settlements, strengths, weaknesses, opportunities, threats, strategies, community, circular economy, valorisation, community driven innovation, sustainable development, bottom-up innovation, GAC, environmental knowledge, adaptability, social &sustainable (entrepreneurship).

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Abbreviations

Abbreviation	Description
CE	Circular economy
GAC	Green Absorptive Capacity
SLU	Swedish University of Agricultural Sciences
SWOT	Strength Weakness Opportunity Threat
TA	Thematic Analysis
UNSDG	United Nations Sustainable Development Goals

1. Introduction

This introductory chapter of the study provides the background context of the research followed by description of problems the study addressed then the presentation of aim of the study, its research questions and limitations of study.

1.1 Background

The accelerated pace of industrial growth and global connectivity in recent times has undeniably boosted economic progress through fostering entrepreneurial ventures that have created substantial employment prospects. The motive behind this entrepreneurial drive is often centred in challenging conventional paradigms serving as an innovative force that uncovers and shapes new market landscapes within evolving economic systems (Venkataraman, 2019; Gaglio & Katz, 2001; Schumpeter, 1934). Nevertheless, in navigating intense competitive pressures, these entrepreneurs usually prioritise maximising their earnings. While this contributes to economic growth, it also leads to considerable ecological repercussions including increased waste levels, pollution, rising global temperatures, and land degradation (Sendawula et al., 2021; Dean & McMullen, 2007). In the Global South, entrepreneurial ventures that particularly address these environmental issues are scarce mostly due to context-specific limitations prevalent in numerous developing economies (Sun et al., 2020; Iqbal et al., 2020). Consequently, a pressing imperative has arisen for entrepreneurial ventures particularly within these contexts to embrace environmentally sound business strategies that also align with the United Nations Sustainable Development Goals (UNSDGs) (Rodic & Wilson, 2007; Kimuli, Sendawula, & Nagujja, 2022). This transformation demands novel strategies such as environmentally conscious business creation (eco-entrepreneurship) (Gibbs, 2006), sustainable waste management (SWM) and the advancement of a closed-loop economic model (CE) (Salmenperä et al., 2021; McDonough and Braungart, 2009).

In developing countries, the rapid increase in urban waste generation is overwhelming local authorities and national governments, posing significant challenges to effective waste management but also a significant opportunity for innovative eco-entrepreneurial ventures. (Tacoli, 2012; Yousif & Scott, 2007). Therefore, the outline of "waste as a resource" holds particular significance in these contexts as they often grapple with limited resources and burgeoning urban waste streams. Eco-entrepreneurs in these settings are uniquely positioned to leverage

local knowledge and materials to transform waste into valuable products and services. In doing so they are addressing critical environmental and social needs while simultaneously fostering economic growth (Sharma et al., 2021). These eco-entrepreneurs combine environmental awareness with entrepreneurial action, capitalizing on business opportunities that not only prioritize eco-friendly solutions but also challenge traditional business models (Mehta et al., 2021; Rodic & Wilson, 2017).

Eco-entrepreneurs leveraging their close relationship with sustainable waste management practices can significantly contribute to reduced waste, improved waste management systems, higher recycling levels, increased overall sustainability, and the creation of new jobs (Sharma et al., 2021) This not only reflects a reduction in the environmental footprint of waste but also has a potential to influence broader societal attitudes towards consumption and resource use (Gibbs, 2006). This influence highlights that eco-entrepreneurs are at the forefront of this essential transformation. They are driving a shift from the traditional, depletive 'produce-consume-dispose' model of the linear economy towards a more regenerative and restorative 'reduce-reuse-recover-recycle-redesign-remake' framework. Their enterprises span across diverse sectors, including sustainable agriculture, green technologies, biodiversity conservation, food security, and waste management. However, within this broad spectrum, waste-based eco-enterprises have emerged as crucial contributors, focusing on the reuse, recycling, and upcycling of materials through circular, closed-loop processes (McDonough and Braungart, 2009).

However, despite the increasing acknowledgment of eco-entrepreneurship as a crucial driver of sustainable development and resource efficiency (Castellani, Ferronato & Torretta, 2022), current scholarly understanding in this domain predominantly stems from research conducted in high-income nations. These contexts often benefit from favourable policy environments, robust financial support systems, and advanced technological infrastructures that facilitate the growth of green and eco-conscious enterprises (Cohen & Winn, 2007). Consequently, there is a notable gap in the literature concerning the specific transformative potential of eco-entrepreneurship within the unique contexts of developing countries particularly in understanding how these ventures can leverage the inherent value of waste as a critical resource. Therefore, this study seeks to address this significant void by examining the capacity of eco-entrepreneurial endeavours in a developing country context to unlock the latent economic and environmental opportunities presented by waste.

1.2 Problem statement

In this chapter, the theoretical and empirical problem will be presented. The problem statement will guide the reader to understand the significance of this study and why the chosen topic is relevant.

1.2.1 Theoretical problem

The current research on eco-entrepreneurship is largely general in nature and frequently lacking nuanced, context-specific insights. The current literature highlights the conceptualization of eco-entrepreneurship as a compelling vision of the alignment of economic activity with environmental preservation (Schaltegger, 2002). This is evident in existing studies that frequently posit eco-entrepreneurship as a key mechanism for stimulating economic growth and addressing pressing environmental and social issues which however creates a challenge for balancing these sustainability aspects (Santini, 2017). This literature offers limited discussions on how eco-entrepreneurship projects can sustain their positive impact over time (Sharma, 2024).

Scholar literature has further explored multifaceted contributions of eco-entrepreneurs especially in prominent sectors like renewable energy and green innovation, where they advance environmentally responsible practices (Gast, Gundolf, & Cesinger, 2017; Thompson, Higham, & Nesterova, 2011). Additionally, eco-entrepreneurship has been explored within the context of eco-tourism, promoting sustainable tourism models focused on environmental conservation and the preservation of culture (Rahmawati et al., 2021). The literature also highlights eco-entrepreneurship's alignment with the Sustainable Development Goals (SDGs), emphasizing its potential to support sustainable growth and responsible consumption and production (Moon, 2018). However, the real-world difficulties of executing eco-entrepreneurship initiatives aimed at sustainable development are often ignored, despite adaptation in numerous sectors and models (Sharma, 2024).

However, while a few theoretical frameworks and case studies focus on application of eco-entrepreneurship within developed countries contexts (Wagner, 2009; Schaltegger 2002; Schaltegger & Petersen 2001), there is a noticeable lack of research and context-specific analyses that address the unique challenges and opportunities present in developing countries. This gap is further compounded by the tendency to focus on eco-innovation, potentially overlooking the critical role of social innovation and community-based initiatives in these regions (Youssef, Boubaker, & Omri, 2018; Ramos-Rodríguez et al., 2015). Moreover, the frequent association of eco-entrepreneurship with the circular economy (Mondal, Kumar,Gupta, & Singh, 2023) often fails to account for the diverse socio-economic and environmental realities of developing nations.

These existing studies often overlook the importance of integrating contextual relevant eco-entrepreneurship initiatives that acknowledge and include contextual values, culture and knowledge of their areas into their models (Sharma, 2024). Therefore, this study theoretically enriches the understanding of the role of eco-entrepreneurship by capturing the dynamic interplay between environmental innovation, institutional conditions and localized social-economic realities of regions in the global south. By focusing on waste management, this study contributes to the literature by providing a more contextually relevant and nuanced understanding of eco-entrepreneurship's role in fostering sustainable development in the global south.

1.2.2 Empirical problem

Market forces and enterprises are presently at the centre of addressing or reinforcing environmental issues and fostering sustainability (Sun et al., 2020). This is especially evident in developing contexts where businesses have a high impact on the environment and local communities often due to prioritizing immediate profits over long term ecological impact (Redmond, Walker, & Wang, 2008). Solid waste management in these developing countries presents a pressing empirical challenge, characterized by unsustainable practices that contribute to environmental degradation, public health risks, and socio-economic disparities. While some of these challenges mirror those faced by industrialized nations, fundamental differences including weak institutional frameworks, rapid urbanization, and financial constraints exacerbate inefficiencies in waste management across most developing countries (Sthiannopkao & Wong, 2013). Socio-economic differences often hinder the success of externally developed strategies in developing countries (Hettiarachchi, Meegoda, & Ryu, 2018).

In many developing countries the primary waste disposal practice is majorly landfilling leading to rising land acquisition costs, methane emissions, and long-term environmental hazards (Mwiganga & Kansiime, 2005; Kumar et al., 2004). Informal scavenging at these landfills remains a key livelihood for marginalized communities, yet it exposes workers to hazardous conditions and perpetuates inefficient waste valorisation processes. Additionally significant portions of waste are informally discarded in open spaces, waterways, or unmanaged dump sites, highlighting the gaps in existing waste management initiatives (Okot-Okumu & Nyenje, 2011). Recent crises, such as the collapse of the Kiteezi landfill in Uganda (The Exchange Africa, 2024), further illustrate the critical deficiencies in waste management infrastructure and the urgent need for more sustainable solutions.

Beyond infrastructure challenges, the socio-economic dimensions of waste management in developing contexts cannot be overlooked. Institutional deficiencies hinder effective waste management, as municipal authorities often dominate decision-making processes through top-down governance structures,

limiting genuine community engagement and participatory planning (Agrawal, 2020). Additionally, inadequate public awareness and limited education initiatives further exacerbate the problem by hindering behavioural changes necessary for sustainable waste management practices (Muheirwe et al., 2023; Okot-Okumu & Nyenje, 2011).

While there is growing recognition of innovative waste management solutions such as composting, landfill gas capture, and circular economy approaches, their implementation remains limited in many developing nations (Dhokhikah & Trihadiningrum, 2012). Empirical research highlights the need for market driven sustainable business models that align the local environment with the existing opportunities (Hettiarachchi, Meegoda, & Ryu, 2018). Uganda facing increasing waste generation and limited formal waste management infrastructure serves as a compelling example of these challenges (The Exchange Africa, 2024).

Therefore, this study seeks to address this gap by examining how entrepreneurial waste valorisation initiatives can transform waste from an environmental burden into an economic resource in developing economies, using the case of Uganda to provide specific insights into this dynamic. Ultimately, this study advances knowledge on the intersection of eco-entrepreneurship, waste management, and sustainable development, providing context-specific strategies to mitigate the environmental and socio-economic challenges posed by inadequate waste management in the Global South.

1.3 Research aim and research questions.

In regard to the above problem statement, this study will contribute to the better understanding of the role of eco-entrepreneurship in addressing waste management challenges in developing countries by examining its key dynamics while also developing strategic approaches to enhance their impact within diverse socio-economic and environmental contexts for sustainable development. Therefore, this study will inform the following research questions:

1. What are the strengths and opportunities of eco-entrepreneurship in addressing waste management challenges in urban Uganda, particularly in informal settlement?

2. What weaknesses and threats do eco-entrepreneurs face in implementing innovative waste valorisation practices?

3. What strategies can be developed to enhance the role of eco-entrepreneurship in community-driven waste valorisation initiatives?

1.4 Delimitations of the study

The focus on this study is based on the Ugandan context and will therefore refer to the study from the perspective of eco-entrepreneurs. In line with this, the study adopts contextual, population, and geographical delimitations. According to Bryman and Bell (2017), delimitations for the chosen target group are important to define the scope of a study, helping to improve its quality and focus. Contextually, the focus is on the urban informal settlements, because these are inhabitants for most illegal dumping sites and actors that are most relevant in response to entrepreneurial action that emerges in waste valorisation initiatives (Katusiimeh, Burger, & Mol, 2013; Lederer et al., 2015). This population is limited to eco-entrepreneurs engaged in waste valorisation within these contexts referred to as "social bricoleurs" because they use context specific knowledge to create social value by addressing local concerns (Smith & Stevens, 2010). Geographically, the study is confined to selected areas in Uganda based on their urban population densities and socio-cultural diversity factors considered vital in influencing waste management dynamics and eco entrepreneurial ventures (Aryampa et al., 2019).

2. Literature review

This section presents the literature section providing what existing scholar literature informs about the subject matter studied.

2.1 Contextualising solid waste management in Uganda

Uganda is a landlocked country in East Africa, bordered by the Democratic Republic of Congo, South Sudan, Kenya, Tanzania and Rwanda. Covering an area of approximately 241,550 km², it ranks as the 27th smallest country in Africa and 81st globally (World Data, 2025). The country's population is estimated at 48 million, with about 4.3 million residing in the capital city, Kampala, while the majority live in rural areas (World Data, 2025). This study focuses on five urban centres (UCs) from diverse political and administrative regions of Uganda: central kampala city, entebbe municipality, mukono municipality, nakawa division, kawempe division.

2.1.1 Urban waste generation

Solid waste generation in Uganda's urban areas varies significantly, ranging from 1.2 to 3.8 kilograms per capita per day. Total waste generated by urban councils (UCs) spans from 44.5 to 1,320 tons daily with households as the primary contributors to this waste stream, a trend that emphasizes the importance of targeting domestic-level waste practices in policy interventions (Okot-Okumu and Nyenje, 2011).

2.1.2 Institutional and legislative framework

According to Guerrero et al. (2013), the effective implementation of waste management systems globally relies on the active participation of a diverse range of stakeholders. These stakeholders encompass governmental bodies, municipal authorities, NGOs, households, private organizations, relevant ministries, and recycling companies (Geng et al., 2009; Shekdar, 2009; Sujauddin et al., 2008; Tai et al., 2011). However, in Uganda the waste management framework operates on a decentralized model, bringing together national ministries, municipal administrations, and local councils. At the national level, entities such as the Ministry of Water and Environment and the National Environment Management Authority (NEMA) provide crucial oversight, regulatory guidance, and capacity-building support. Locally, the system is implemented through a tiered structure of

Local Councils (LCs), with LC5 holding the primary political authority at the district level (Okot-Okumu & Nyenje, 2011). This framework is underpinned by key legal documents like the Environment Act, the Public Health Act, and the Local Government Act, which collectively establish the legal basis for waste management practices and encourage private sector involvement (National Environment Act, 2019; Local Governments Act, 1997; Public Health Act, n.d.)

2.1.3 Waste management practices

Collection and Transportation

Urban waste collection in Uganda follows a two-tiered approach. High income households typically utilize private companies for direct, door-to-door pickup. However, most residents depend on communal skips and bunkers, managed by urban councils (UCs) (Okot-Okumu & Nyenje, 2011). Critically, low-income neighbourhoods often experience severe service gaps, hampered by poor infrastructure like narrow roads and unplanned housing layouts. Consequently, residents in these areas frequently resort to environmentally harmful practices such as open dumping, burning, and backyard disposal (Oyoo, Leemans, & Mol, 2014). Residents commonly express dissatisfaction with the inconsistent and infrequent collection services provided by local councils, along with the inconveniently long distances to designated collection sites. These reflect shortcomings to the waste management systems but however also contribute to the prevalence of informal waste pickers who take advantage in supplementing their incomes through selling the waste to small scale recyclers (Katusiimeh, Burger & Mol, 2013; Okot-Okumu & Nyenje, 2011).

Waste Disposal

Waste disposal practices in Uganda are generally inadequate. Official landfill sites, like kitezi in Kampala, are often situated in environmentally vulnerable areas, such as wetlands and near water sources. Though the kitezi site is officially managed and privately operated, many UCs operate their own disposal sites that are often under-resourced and poorly maintained (Aryampa et al., 2019; Okot-Okumu and Nyenje, 2011). Compounding the issue is the lack of segregation at source, leading to a mixture of domestic, commercial, healthcare and industrial waste being dumped together. In addition, waste from unlicensed collectors and low-income households frequently ends up in unauthorised sites, such as roadsides, illegal dumps and drainage channels, posing significant public health risks (Okot-Okumu and Nyenje, 2011)

2.1.4 Financial aspects of waste management

Funding for waste management in Uganda primarily comes from central government grants, supplemented by aid from development partners and NGOs.

However, these financial resources are often inadequate, and the dependence on external funding restricts the financial independence of local governments (Okot-Okumu, 2012). Compounding this issue is the mismanagement and inefficient allocation of the limited funds available (Okot-Okumu & Nyenje, 2011). Budget allocations to waste management are often deprioritised in favour of administrative expenditures, particularly wages (Henry, Yongsheng and Jun, 2006). Municipal budgets rarely reflect the true cost of waste services, leading to underfunding and ineffective service delivery (Okot-Okumu and Nyenje, 2011). In addition, waste collection services are charged to households, but compliance is low since many residents particularly in low-income communities perceive waste management as solely the responsibility of government authorities. This perception results in low willingness to pay for services, further contributing to the prevalence of open dumping (Okot-Okumu and Nyenje, 2011; Oberlin and Szántó, 2011).

2.1.5 Socio-cultural factors

Socio-cultural factors significantly influence waste management practices in Uganda. highlight that informal settlements in Kampala rely heavily on community-driven waste management initiatives that operate outside formal regulatory systems (Muheirwe et al., 2023) These initiatives, rooted in social networks and local knowledge, often prove more adaptable to community needs than official interventions. However, community awareness and participation in formal waste management is generally low and unstructured. The waste collection is often done by informal waste pickers who operate without training or safety protections, contributing to health risks (Okot-Okumu and Nyenje, 2011). In addition, the residents rely shared waste infrastructure, such as communal bins, which is often insufficient or poorly located, leading to conflicts and illegal dumping (Muheirwe et al., 2023). This results in a culture of dependence and lack of civic responsibility which weakens the effectiveness of formal waste management strategies and sustains unsustainable informal practices (Agrawal, 2020; Okot-Okumu & Nyenje, 2011)

2.2 Sustainable waste management and eco-entrepreneurship.

The sustainable management of waste is a multidisciplinary problem that connects the social, environmental and economic pillars of sustainability (Rodić and Wilson, 2017). Addressing such multidisciplinary issues require a holistic approach and delinking the existing linear economy model with a subsequent transition towards a close loop economy. Such transition will further facilitate progress towards attaining sustainable development goals (SDGs) (Sharma et al., 2021). Sustainable Waste Management (SWM) is defined as a comprehensive system, integral to broader environmental management, that encompasses all responsibilities,

practices, procedures, processes, and resources necessary for effectively managing waste while ensuring strict adherence to environmental regulations (Elsaid & Aghezzaf, 2015). It involves overseeing waste-related activities including waste generation, handling and utilization to safeguard the environment, protect human health, and conserve resources. Beyond preventing waste, the primary objective of waste management is to transform waste into non-waste (Pongrácz, & Pohjola, 2004).

2.3 Eco-entrepreneurship

Eco-entrepreneurship emerges as a vital bridge between economic activities and environmental preservation, contributing significantly to business sustainability and broader SDGs. As the field of eco-entrepreneurship has grown, different authors have been proposed typologies of eco-entrepreneurship. This study recognizes eco-entrepreneurship as encompassing business operations that actively promote sustainable practices moving beyond simply profit-driven motives but consciously integrate environmental considerations into core strategies (Larsson, 2012). Other scholars distinguish it from merely an environmental initiative and reflect that eco-entrepreneurship is not simply about doing good for the environment but doing business in an environmentally responsible (Schaltegger, 2002). It aims to launch and develop ventures that protect the environment, disseminate clean technologies, promote recycling, and enhance public understanding of ecological issues, thereby contributing to a sustainable, green economy (Mieszajkina, 2016). Critically, it's recognized as a vital tool for reducing the harmful effects of businesses and individuals on the environment. Eco entrepreneurship is viewed as a practice of leveraging entrepreneurial opportunities to generate profit while minimizing negative environmental impacts (Kotchen, 2009). This author also posits that it represents a subset of traditional entrepreneurship with 'eco 'which emphasizes the connection between entrepreneurial ventures and environmental safeguarding. However, due to its multidisciplinary nature it has been approached from various perspectives, resulting in a wide array of theoretical perspectives. This diverse landscape reflects the interplay between economic, social, and environmental considerations therefore this study adopts the following terms are synonymous with eco entrepreneurship.

- Sustainable Entrepreneurship (SE): This approach emphasizes the pursuit of environmental sustainability through entrepreneurial activity, directly addressing environmental problems by integrating the triple bottom line (economic, social, and environmental) into business operations (Terán-Yépez et al., 2020). SE can be viewed as both a tool for achieving broader sustainability goals and a distinct entrepreneurial process that builds sustainable businesses from the ground up (Cohen & Winn, 2007; Schaltegger & Wagner, 2011).

- Environmental Entrepreneurship: This focuses on capitalizing on opportunities arising from environmental degradation, viewing market failures as potential solutions through ecological business models. It seeks to create both economic and ecological benefits, balancing commercial logic with environmental goals (Dean & McMullen, 2007; Thompson, Kiefer, & York, 2011).

- Social Entrepreneurship: This prioritizes the creation of social value, including environmental stewardship, through entrepreneurial behavior. It emphasizes the identification and exploitation of opportunities that address social needs, rather than purely economic ones (Certo & Miller, 2008; Peredo & McLean, 2006).

- Green Entrepreneurship (GE): This is a practical approach that involves creating innovative products and services that simultaneously generate economic opportunities and mitigate environmental harm. It focuses on integrating eco-friendly practices into all business operations, fostering a circular economy (Mondal, Singh, & Gupta, 2023; Haldar, 2019; Rasheed et al., 2024).

For the purposes of this study, the term eco-entrepreneurship will primarily be used as an overarching concept that encompasses the principles and practices of sustainable, environmental, social, and green entrepreneurship. This terminology will allow for a comprehensive examination of how entrepreneurial ventures in Uganda's waste management sector balance economic viability with environmental and social responsibility.

2.3.1 Role of eco-entrepreneurship in sustainable waste management

Eco-entrepreneurship plays a pivotal role in transforming waste management practices by integrating innovative, sustainable solutions into traditional systems. This approach aligns with the principles of the circular economy, which emphasizes resource efficiency and waste reduction by promoting the reuse and recycling of materials (North, 2023). Recent studies highlight the potential of organic waste, such as food scraps and garden waste, to be converted into valuable resources like compost, thereby creating economic opportunities and reducing environmental impacts (Mngomezulu et al., 2024). Eco-entrepreneurs in this sector are leveraging advanced recycling technologies and data analytics to optimize resource use and minimize waste, contributing to a more sustainable future.

The literature reinforces the role of eco entrepreneurship in fostering economic development and innovation through enforcing local economic development (LED) waste to wealth initiatives by creating an environment conducive to innovation and job creation opportunities (Mngomezulu et al., 2024; Liang et al.,2022). Literature highlights that these waste to wealth initiatives further boost

these firms to receive support from broader eco-innovation programmes for instance the United Nations Environment Programme (UNEP) which not only boosts their resilience and competitiveness in the market but also improve the environmental (UNEP, 2020).

Recent case studies and research also link the success of eco-entrepreneurial ventures to the presence of enabling institutional and policy frameworks, as well as strong community involvement (Mngomezulu et al., 2024). Contrary to this, literature by Haugh (2005) contends that even in the absence of these enabling conditions these eco-entrepreneurs excluding mainstream entrepreneurs have a capacity to grow since they are powerful in gathering scarce resources and capitalizing on market opportunities. Moreover, research highlights that in developing regions with low-tech and decentralised community-driven models have proven successful in promoting waste valorisation and reducing reliance on centralized systems (Zurbrügg et al., 2004). By combining these elements, eco-entrepreneurship can drive transformative change in waste management, aligning economic development with environmental sustainability and social responsibility.

2.3.2 Strengths and opportunities of eco-entrepreneurship

The existing literature on eco-entrepreneurship has detailed its strength in waste management emphasizing its transformative potential in advancing sustainability, especially through circular economy principles through the keeping resources in use for as many cycles as possible (SPP Enterprise, 2025). Furthermore, the scholars highlight that eco entrepreneurs give high importance use resources that are local and engage with the community that can result in equitable economic growth as well as job creation in the less served areas (North, 2023). In addition, strengths of eco entrepreneurs are represented the adoption of cutting-edge technologies and innovations such as AI enabled waste sorting systems and IoT enabled smart bins to make operational more efficient and reduce the carbon footprint of waste collection vehicles (Jaworski, 2023).

Startups like Rekosistem exemplify scalability through digital platforms that gamify waste disposal via reward systems, directly engaging households and businesses in circular practices (East Ventures, 2023). These ventures also strengthen local economies by creating green jobs in material recovery hubs and fostering partnerships with municipalities a strategy that aligns with institutional theory's emphasis on formal-informal institutional collaboration (Tabibi, 2024). In addition, the literature identifies several opportunities of eco entrepreneurship in waste management including the growing demand for sustainable practices and green solutions (Jayasinghe, Liyanage & Baillie ,2021). Opportunities are further amplified by tightening regulatory frameworks, such as extended producer responsibility (EPR) policies and tax incentives for circular innovations, which reduce market entry barriers (The SBN, 2025). These factors combined offer

entrepreneurs a unique entry point into the green economy, where they can build profitable businesses while contributing to environmental conservation (SPP Enterprise, 2025).

While current academic discourse offers helpful insights into the economic viability and social impact of eco-entrepreneurship in waste management across the Global South (Jayasinghe, Liyanage & Baillie, 2021), a great body of the existing literature focusses on high-tech developments (Jaworski, 2023) alongside supportive regulatory frameworks in heavily industrialised and infrastructurally established contexts (East Ventures, 2023; Jayasinghe, Liyanage & Baillie, 2021). However, these studies frequently fail to include the context-specific strengths and possibilities that emerge in informal settlements, particularly in low-income marginalised regions of developing nations like Uganda. To address this gap, the current study builds on and expands on previous research by focusing on eco-entrepreneurship in Uganda's urban settlements, which are more marginalised, informal, and understudied and therefore addresses the first research question of what are the strengths and opportunities of eco-entrepreneurship in addressing waste management challenges in urban Uganda, particularly in informal settlements?

2.3.3 Eco-entrepreneurship challenges

The journey of an eco-entrepreneur, while driven by a profound commitment to sustainability, is often fraught with obstacles that can significantly impede their progress. While entrepreneurial intention is a strong predictor of business creation (Krueger, Reilly, & Carsrud, 2000; Liñán & Chen, 2009), the transition from intention to action is often hindered by a complex interplay of external and personal factors. Eco entrepreneurship seeks both economic and non-economic benefits (Shepherd & Patzelt, 2011; Dean & McMullen, 2007), requiring an economic, institutional, and environmental understanding of its impact (Shepherd & Patzelt, 2011; Dean & McMullen, 2007). Therefore, obstacles to eco entrepreneurship can be grouped into external (financial and non-financial), internal individual categories (Rusu, & Roman, 2017; Gurel, Altinay, & Daniele, 2010) as outlined below:

External factors

Eco-entrepreneurship operates within a dynamic external environment shaped by societal norms, governmental policies, and institutional structures. Various studies have identified key external factors affecting eco-entrepreneurship, including financial support, regulatory frameworks, cultural values, technological advancements, educational opportunities, and economic incentives (Butkouskaya, Romagosa & Noguera, 2020; Stoica, 2024) as elaborated below:

- Social-cultural factors

Socio-cultural factors play a critical role in shaping the success and acceptance of eco-friendly practices and ventures. Existing research highlights the influence of socio-cultural barriers in hindering the implementation of eco-friendly practices (Wang, Hung, & Huang, 2019; Adams et al., 2021). Studies highlight the complexity in communicating the causal relationships of the direct impact of consumers actions to the environment reflecting the slow diffusion of environmental consumer awareness (Linnanen, 2002). Similarly, Studies on eco-entrepreneurship in India highlight that entrenched sociocultural values and a hostile business environment can impede the success of sustainable ventures (Pastakia, 2002). In similar vein, research on small-scale and micro eco-enterprises in Sri Lanka points to market-related challenges, particularly societal resistance to novel eco-friendly products and services, exacerbated by low consumer awareness and demand (Jayasinghe & Liyanage, 2018).

Market dynamics further exacerbate these issues. For instance, in the UK, recycled plastic costs significantly more than virgin plastic (£1,500 vs. £1,000 per tonne), making it difficult for businesses to choose sustainable materials without governmental interventions like taxes or subsidies (Voulvoulis & Kirkman, 2019). Additionally, the literature emphasizes that cultural norms influence individuals to prioritize short-term financial gains over long-term environmental sustainability which creates a challenging landscape for eco-entrepreneurs (Adams et al., 2011). This limitation of the niche focus is reflected by a study on environmental entrepreneurs' legitimation strategies of audiences where eco entrepreneurs faced mock criticisms for being too or not green enough which led to lost business initiatives and reflective adjustments (O'Neil, & Ucbasaran, 2016).

- Institutional factors

Literature highlights that complex legal procedures and bureaucratic obstacles create further challenges for eco-entrepreneurs, restricting the establishment and growth of sustainable businesses (Wang, Hung, & Huang, 2019; Trivedi, 2017). A study on eco-ventures like Eco-pads highlights highly complex institutional landscapes as they face overlapping and contradictory logics (health vs. environment, global vs. local practices) and cultural rules (taboos vs. traditions). This creates a very complex environment for these business ventures to succeed (Cherrier, Goswami, & Ray, 2018).

- Finance barriers

Financial constraints are widely recognized as a fundamental limitation to eco-entrepreneurship. Transaction costs and external financial pressures act as significant barriers to the adoption of sustainable business practices (Randa &

Atiku, 2021). Literature highlights that eco-entrepreneurs frequently encounter resistance when pitching novel environmentally driven business concepts to investors. A case study involving a textbook re-use business illustrates this point facing skepticism from venture capitalists due to its unconventional model (Linnanen, 2002). Literature also emphasizes that much as financial resources would be a significant barrier to acquire funding, it also creates a clash in funding hurdles as elaborated by Linnanen (2002) as investors shift focus from long term ecological gains to short term financial gains. There by the risk of financial partnerships diluting eco-entrepreneurs' core values thus emphasizing the need for careful funding navigation. Similarly, studies on renewable energy companies in developing economies further emphasize financial constraints as a key challenge faced by sustainable entrepreneurs (Bell & Stellingwerf, 2012).

- Knowledge gap

Additionally, insufficient business education and training such as the absence of workshops and mentoring programs create barriers to new eco-startups (Chinomona & Maziriri, 2015). Research assessing sustainable entrepreneurs in the EU and USA also reveals that a lack of startup information hinders eco-entrepreneurial success (Hoogendoorn, Van der Zwan, & Thurik, 2019).

Internal factors

Beyond external barriers, internal psychological and individual characteristics significantly influence eco-entrepreneurial behaviour including:

- Ethical dilemma

Changing the organizational culture and systems to green management practice is often met with internal resistance to change and lack of leadership commitment (Supriyanto & Matantu, 2024). The broader literature reveals an inherent tension for eco-entrepreneurs where efforts to drive social and environmental responsibility must be reconciled with meeting financial motives. This complexity demands significant resources, intricate operational processes, and considerable long-term commitment (Butkouskaya, Romagosa, & Noguera, 2020; Trivedi, 2017; Hall & Wagner, 2012). Literature by Linnanen (2002) further explores this tension, highlighting how eco entrepreneurs navigate the competing drives of financial gain and impactful social change revealing a core challenge at the centre of sustainable businesses.

- Infrastructural issues

One of the main difficulties is poor infrastructure in activities requiring proper equipment like collecting vehicles, recycling facility and landfill sites can be an issue for these eco entrepreneurs managing waste (Domeshelter, 2023). Moreover,

a study on SMEs in USA by Purwandani and Michaud (2021) shows that many small and medium-sized enterprises face significant financial constraints, which limit their ability to invest in advanced waste management technologies. This does not only hinder the operational efficiency of eco-entrepreneurs but also poses a social health threat to the public.

- Failure risk

Low self-efficacy which is the individual's doubt in their ability to engage in business creation emerges as a critical challenge (Bae et al., 2014). Perceived risks and psychological stress further deter individuals from pursuing eco-entrepreneurship (Daniel et al., 2017). Notably, research on sustainable entrepreneurs in the EU and USA indicates that eco entrepreneurs experience a higher perceived risk of failure compared to traditional entrepreneurs (Hoogendoorn, Van der Zwan, & Thurik, 2019).The existing literature on eco-entrepreneurship challenges while expanding provides valuable insights into the general challenges faced by sustainable ventures in the EU, USA and India contexts including studies by (Bell & Stellingwerf, 2012; Hoogendoorn, Van der Zwan, & Thurik, 2019; Cherrier, Goswami, & Ray, 2018) that differ significantly from the realities of eco entrepreneurs operating in Uganda. Therefore, this study seeks to address this gap by examining the specific barriers to eco-entrepreneurship within the urban areas of Uganda and addresses the second research question: What weaknesses and threats do eco-entrepreneurs face in implementing innovative waste valorisation practices?

3. Theoretical and conceptual model.

This study adopts an integrated theoretical model to examine eco-entrepreneurship, particularly within the context of waste management in Uganda. The framework combines individual capabilities, contextual framework, and interpretative lenses to explore the role of eco-entrepreneurship in addressing waste management challenges. This model is built on two levels of interrelated theories: enabling constructs and contextual interpretation. These include the Social Entrepreneurship theory, Schumpeter’s innovation theory, Circular Economy model, Institutional theory, and the concept of Green Absorptive Capacity (GAC). Together, these perspectives provide a multidimensional understanding of the internal and external factors that drive innovation, sustainability, and community engagement while also addressing the barriers that hinder growth.

3.1 The enabling constructs

These comprise of the internal and external processes that guide the eco-entrepreneurial practices including:

3.1.1 Circular economy model

Pearce and Turner (1989) offered an early articulation of the circular economy, arising from their critique of linear economic systems characterized by the consumption of natural resources as production inputs and the subsequent environmental deposition of waste outputs (Geissdoerfer et al., 2017). This is supported by Veleva, & Bodkin (2018) who emphasize CE as a sustainable alternative to the traditional linear economic model, which follows the take make dispose approach (Veleva, & Bodkin, 2018). It emphasizes efficient resource utilization through waste minimization, extended value retention, reduced reliance on primary resources, and the creation of closed-loop systems for products and materials (Morseletto, 2020).

Despite definitional variations, a core principle of the CE is enhanced resource utilization as suggested in literature by (Korhonen, Honkasalo, & Seppälä, 2018). However, the interpretation of what constitutes this principle remains a subject of ongoing discussion. Nonetheless, the imperative to address the escalating depletion of natural resources, alongside the parallel accumulation of waste is widely acknowledged (Bandh, Malla, Wani, & Hoang, 2024). The CE envisions waste as a valuable resource that can be reintegrated into the economy through recycling, reuse, refurbishment, and remanufacturing there by promising both financial and environmental benefits (MacArthur, 2013; Veleva & Bodkin, 2018; Deselnicu et al., 2018).

Eco-entrepreneurial ventures, focused on waste utilization, are crucial in translating CE principles into practice as they drive circularity by specializing in the recovery and reuse of materials from discarded products, effectively reintegrating valuable resources into the production cycle. This significantly lessens reliance on finite, virgin resources, a core tenet of the circular economy (Ellen MacArthur Foundation, 2013). Through practical initiatives such as recycling, upcycling, and waste-to-energy conversion, eco-entrepreneurs drive meaningful progress toward waste reduction and resource conservation (Prihandoko et al., 2021). This entrepreneurial drive extends beyond environmental concerns fostering economic growth and responsible production and consumption, solidifying eco-entrepreneurship as a key enabler of a sustainable and circular economic future.

However, despite the efficiency of the circular economy framework, its practical application in is embedded with limitations that necessitate careful consideration

(Corvellec, Stowell, & Johansson,2022). The framework ignores the social context of its practical application. Neglecting social dimensions, especially in areas with prevalent informal waste management, is a critical flaw (Corvellec, 2019). However, understanding local consumer behaviours and attitudes towards recycled products because of circular initiatives is crucial to preventing increased social inequity. In addition, the CE while promising, risks becoming a corporate tool and not a radical shift. Critiques highlight its market-driven focus reclassifying waste as resource can consolidate corporate power of businesses with a pursuit of only profits and not drive true sustainability initiatives (Lazarevic & Valve, 2017). Furthermore, the "waste as a resource" concept may inadvertently increase waste demand leading to increased waste production thereby counteracting sustainability goals (Niskanen, Anshelm, & McLaren, 2020). Therefore, this study adopts the circular economy (CE) theory that operates at the systemic level by offering guiding principles to eco-entrepreneurs to be adopted to achieve sustainability through emphasizing waste minimization and resource efficiency as desirable goals.

3.1.2 Green absorptive capacity

Green absorptive capacity (GAC) refers to the capacity of an organization to absorb, assimilate, transform and exploit external environmental knowledge through incubating green innovation and enhancing environmental performance. Previous studies show that green entrepreneurial orientation and the successful implementation of ecofriendly innovation was made feasible by GAC (Makhloufi et al. 2023). Using GAC facilitates companies to realize higher effectiveness in converting the knowledge generation into executable strategies, such as creating environmentally friendly products and achieving improvements in processes to lessen pollution and resource consumption. This capacity is necessary in today’s particularly dynamic environment of rapidly changing regulations and markets where being able to act proactively and efficiently in response to external environmental knowledge is critical for achieving the firm’s competitiveness and sustainability (Javeed et al., 2023).

The empirical studies reveal that GAC not only promotes green innovation performance, but it also prevents internal capabilities from relating to green manufacturing performance. For instance, in manufacturing firms, embracing real new knowledge ensures the transformation and exploitation of the green manufacturing practices skills that have a positive effect towards green manufacturing practice adoption leading to high green innovation outputs (Amaranti et al., 2024). Although green absorptive capacity (GAC), defined as valuable, rare, inimitable, and no substitutable, is a popular driver of green innovation and green performance, its effectiveness is contingent upon the extent to which a firm embeds it with internal strategic capability, for example, green entrepreneurial orientation and process innovation, in the context of dynamic

regulations and markets (Makhloufi et al., 2023; Javeed et al., 2023; Amaranti et al., 2024).

However, the intersection between eco-entrepreneurship and green absorptive capacity is an underexplored concern particularly in cutting edge environmental aspects including how eco-entrepreneurs in Uganda acquire, assimilate, and apply environmental knowledge to drive innovation and achieve measurable sustainability outcomes (Amaranti et al., 2024). Therefore, this study adopts green absorptive capacity as key moderator in translating eco-entrepreneurial intent into actual environmental and economic impact, yet few studies provide empirical evidence on this relationship within the Ugandan context

3.2 Interpretive theories:

To understand the dynamics within this ecosystem, three descriptive theories are integrated across all levels to explain the social transformation and resistance to change dynamics. These include:

3.2.1 Institutional theory

This theory provides a critical perspective on how formal and informal institutions shape the operational context for eco-entrepreneurs. This theory examines how regulatory frameworks, social norms, and cultural values influence the emergence, development, and success of sustainable waste management initiatives (Ratnasari et al., 2023). In many cases, eco-entrepreneurs must navigate complex regulatory landscapes and align their business models with societal values to achieve legitimacy and long-term sustainability (Khaire, 2010). Existing studies reflect that comprehending entrepreneurial decision-making and the start-up process necessitates an awareness of the institutions operating at various levels (Zhai, & Su, 2019; Bjørnskov & Foss, 2013). Policies, incentives, and societal expectations can either facilitate or hinder eco-entrepreneurial efforts (Zhai, & Su,2019). For instance, government subsidies for green technologies or stringent waste disposal regulations can create favorable conditions for eco-entrepreneurs. Conversely, cultural resistance to change or weak enforcement of environmental policies can present significant challenges. However, critics to this theory reflect it as establishing passiveness of organizations as they struggle to conform to established norms by striving to be seen as just members of a certain community (Meyer, & Höllerer, 2014; Powell, & DiMaggio, 2012).

This theory elucidates how formal and informal institutions (rules, norms, values) influence the conduct of organisations and individuals. Therefore, is adopted to the study to explain how the regulatory environment, social norms, and cultural values influence eco-entrepreneurs and their endeavours.

3.2.2 Social entrepreneurship theory

This theory focuses approach on innovative, mission-driven ventures that address social and environmental challenges (Gutberlet et al., 2016). It views eco-entrepreneurs as a mission driven change agent solving environmental and social challenges by creating new innovative solutions. This theory diverges from the conventional entrepreneurship theory and posits models that focus on addressing social and environmental change rather than just maximizing profits (El Ebrashi, 2013). This theory aims to correct market failures that go beyond price inefficiencies but also deeper systemic issues that address externalities and efficient distribution of resources. The driving mission in this theory is to create social impact not just as a byproduct of the firm's practices but also as a core driving force for these firms.

This theory enforces transformations that approach societal issues and contribute to long term significant improvements in individuals' lives (Martin, & Osberg, 2007; Austin, 2006). This theory posits that these actors develop intentions to form social ventures due to certain attitudes, subjective norms (El Ebrashi, 2013). Contrary to the earlier view, recent studies view these actors as not merely operating in a pure and untouched space of authenticity that is completely free from the influence of market logics and policy demands (Dey, & Steyaert, 2012). This draws to the challenge of these actors in navigating work tensions that arise from balancing social missions and economic realities.

Therefore, this theory is adopted to the study to emphasize the importance of combining business principles with social objectives, which is particularly relevant in the context of eco-entrepreneurship in waste management (Rasika & Praveena, 2024). It will used to explain how these eco-entrepreneurs in Uganda bring about transformation in waste collection, recycling, and upcycling practices while also addressing social impact issues of unemployment and community development (GIZ, 2023).

3.2.3 Schumpeter's innovation theory

In addition to the social entrepreneurship theory, this theory developed by Joseph Schumpeter posits that economic growth is driven by cyclical waves of innovation and creative destruction (Schumpeter, & Swedberg, 2021; Schumpeter, 1934). Innovation is fundamental for eco enterprises enabling them to introduce novel solutions and maintain their relevance in addressing societal needs (Sserwanga et al., 2014). These enterprises play a role in recombining resources into novel solutions for societal problems directly highlights the critical reliance of eco entrepreneurship on innovation. In addition, Schumpeter posits as referred in the literature that innovation is not a linear process but rather a pattern of ups and

slowdowns shaped by entrepreneurial breakthroughs followed by widespread adoption (Hospers, 2005).

This theory emphasizes the role of entrepreneurs as catalysts for change, introducing novel ideas and technologies that disrupt existing markets and industries (Landau, 2023). From this perspective, this theory views the entrepreneur as not just a unique agent of change but rather an innovator who comes forward and willing to take risks and combine existing resources and knowledge in novel ways to create new products, processes or even market structures. Contrary to this view, Schumpeter is criticised that innovation is not solely the result of entrepreneurial traits of taking on risk but is also shaped by systemic and relational pressures (Sweezy, 1943). Therefore, this study adopts this theory to explain this transformation change due the emergence of innovative solutions to environmental challenges.

3.3 Theoretical synthesis

With the study aim of exploring the role of eco-entrepreneurship in addressing waste management challenges in developing countries through examining its key dynamics while developing strategic approaches, this study employs a multi-framework that combines the enabling constructs: Green Absorptive Capacity and Circular economy model that are complemented with descriptive theories that give an understanding of social transformation and resistance to change dynamics. Together, these theories and constructs create a cohesive and interrelated framework. GAC and CE act as internal and external enablers and the central sustainable action is eco-entrepreneurship, which is the transformational mechanism, and together the descriptive theories that provide a broader understanding of the innovation process, social purpose, and institutional context of this transformation to sustainable waste management as illustrated in Figure 1

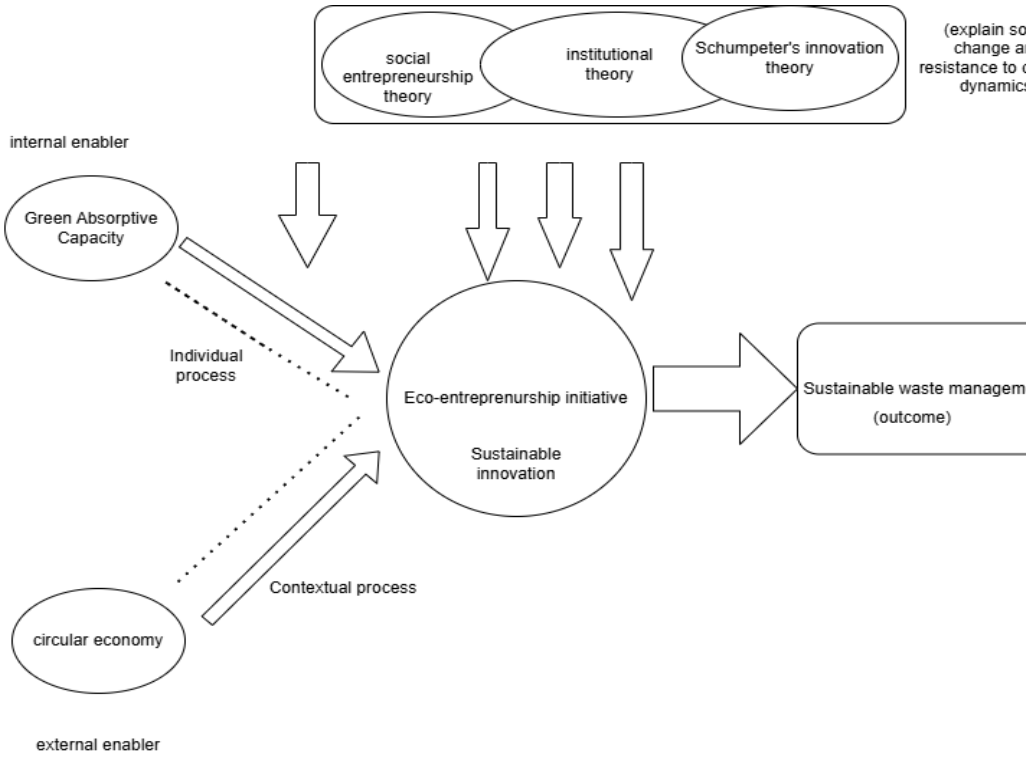

Figure 1.Integrated theoretical framework (own source)

The central action of this framework in figure 1 lies the eco-entrepreneurship initiative which serves as the transformative tool in this framework to bridge the gap between capacity and the outcome of sustainable waste management in the Ugandan context. The circular economy model offers systemic structure and process through which eco-entrepreneurs attain sustainable waste management through for resource reuse and recovery initiatives. Similarly lies the Green Absorptive Capacity (GAC) as an enabler of the organization's ability to recognize, assimilate, and apply external green knowledge. It acts as a linking mechanism that translates institutional and environmental pressures into actionable innovations, thus enabling firms to adapt swiftly and sustainably (Makhloufi et al., 2023; Javeed et al., 2023).

Furthermore, these constructs and eco-entrepreneurship are not independent activities as they are embedded in broader contexts that influence change. The dotted arrows from the Eco-entrepreneurship initiative to GAC and Circular Economy indicate feedback loops as that innovation impacts knowledge absorption and application, hence influencing GAC. The central action also impacts the CE as it influences the broader market structure that thereby influencing the CE processes. Therefore, underlies the institutional theory explores the understanding of the broader context that influences eco-entrepreneurial initiatives and enabling constructs by explaining the enabling or constraining role of regulatory structures, cultural norms, and informal practices (Kathambi & Ogutu, 2022; Andrianalizaha,

2024). In addition, the Social Entrepreneurship theory views eco-entrepreneurs as a mission driven change agent solving environmental and social challenges by creating new innovative solutions. It explains how they pursue both economic and social goals especially in communities where waste management is not only an environmental issue but also a livelihood issue (Gutberlet et al., 2016; Rasika & Praveena, 2024). To complement this, Schumpeter's Innovation Theory places eco-entrepreneurs as disruptors that offer novel solutions or approaches that revolutionize the traditional waste management systems while creating social and economic value (Kagoro, 2024; Landau, 2023). It explains how innovation occurs and how it can bring transformative change even in resource-poor contexts. By integrating these components, the framework offers a lens for analysing eco-entrepreneurial activity in the Global South and contributes to a deeper understanding of how local action can drive broader sustainability transitions.

4. Methodology

This chapter outlines the study's methodological choices and their significance to the study. Methodological choices include study philosophy, research design, and data collecting and analysis as well as quality assurance and ethical consideration.

4.1 Research philosophy

The study employs an interpretivism approach of research philosophy which posits that social reality is understood through subjective experiences of individuals within a specific context (Bell, Bryman, &Harley, 2019). Research philosophy refers to the framework that guides the development of research assumptions and aids the understanding of knowledge and the nature of reality (Bell et al., 2019). This thus provides the lens that shapes the development of research questions and interpretation of findings derived in the study (Saunders, Lewis, & Thornhill, 2009). This interpretivist approach acknowledges that reality is socially constructed there by aligning with the constructivism ontological position which holds reality as socially built through shared meanings, perceptions, and interactions which infers subjectivity (Saunders et al., 2019; Pouliot, 2004). As explained by Bell et al., (2019), ontology concerns the fundamental discussions that researchers have about the nature of reality and existence, and these ultimately shape the direction and focus of the study. In this regard, there are multiple meanings of perceptions and reality that are continuously shaped through interactions meaning that the understanding of reality evolves accordingly to the situation.

While the study acknowledges the epistemological position that focuses on how knowledge is acquired and interpreted in the existence of social research contexts, the study adopts an ontological position that explores the nature of the reality that exists. It views reality as socially constructed and shaped by experiences (Saunders et al., 2019; Lyotard et al., 1988). Accordingly, the study holds that the realities of waste management and eco-entrepreneurial efforts are not fixed and objective facts but rather dynamic and socially constructed through interactions, ongoing negotiations and the subjectively held meanings that individuals attach to them (Bernard, 2017; Pouliot, 2004). This approach is valuable for guiding the interviews and enabling the researcher to gain the participants` lived experiences as well as capturing their perceptions of the social phenomena.

4.2 Research strategy

Guided by the study's research philosophy, research aim and research questions, a qualitative study approach is considered most suitable. The study is grounded in an interpretivist approach which supports qualitative methods to capture the depth and complexity of social phenomena (Mackenzie & Knipe,2006). From the interpretivist research philosophy and given that the realities of waste management and eco-entrepreneurial efforts are not fixed and objective facts but rather dynamic and socially constructed through interactions, a qualitative approach is most suited. This approach is particularly well-suited for exploring the complex social and economic phenomena which are often difficult to quantify (Bernard, 2017). A qualitative research approach is employed to provide a comprehensive understanding of how eco-entrepreneurs in urban Uganda perceive, interact with and influence sustainable practices particularly in waste management. This is particularly relevant to the study's objectives which include identifying the challenges and opportunities associated with eco-entrepreneurial ventures within Uganda's urban landscapes. This method allows for a rich exploration of the contextual realities that influence the development and impact of eco-entrepreneurship, providing insights that may be missed by quantitative methods (Bell et al., 2018).

However, qualitative methods have been criticised for lacking generalization and scientific rigor since the nature of reality is socially constructed and open to various meanings, but this is offset with multiple criteria that has emerged for ensuring this methodological rigor (Taylor & Trujillo, 2001). Additionally, this approach relies on an inductive analysis to authentically represent the lived experiences and meanings of reality (Taylor &Trujillo, 2001). Therefore, this study employs an inductive approach as the study evolves (Mackenzie & Knipe,2006). This means that the insights and themes emerge from the data throughout the research process.

4.3 Research design

In reference to the research questions outlined in section 1.3, the case study design is deemed suitable for this study. Research design refers to the plan used in gathering and analysing data findings in a way that answers the research questions. This study thus adopts an exploratory case study design aiming to uncover new insights (Yin, 2003). The study also adopts a collective case study approach involving selected multiple eco-entrepreneurs engaged in waste valorisation practices in urban Uganda. This is deemed suitable for providing a broader and in-depth perspective of the phenomena than a single case study (Creswell, & Poth, 2016; Yin, 2003).

Case studies are insightful when testing theory in a new context" (Eisenhardt & Graebner, 2007). Also given the limited knowledge about the study phenomena in the Ugandan context, this study utilizes a collective case study design to examine the experiences and perspectives of various eco-entrepreneurs engaged in waste

valorisation in urban Uganda. This design approach provides a holistic understanding of real-world practices and decision-making processes within the specific context (Creswell, 2021). However, these also have drawbacks of their own as they typically concentrate on particularization of specific cases, which limits their generalizability to larger contexts (Flyvbjerg, 2006). This means that focus on eco entrepreneurial ventures in the urban centres while allowing for detailed case analysis restricts the generalizability of findings to the broader Ugandan landscape and other contexts. Furthermore, the qualitative nature of this research, employing an inductive coding approach, introduces potential subjectivity in data interpretation (Bell et al., 2018).

4.4 Data collection

The data includes both primary and secondary data sources. The primary data was gathered through qualitative semi-structured interviews. The choice to use semi structured interviews was to gather in-depth, nuanced data, capture the intricate details of eco-entrepreneurs' experiences, motivations, and strategies (Bryman et al., 2019). This approach allows for flexibility and guides the researcher in data collection with a predetermined set of questions while also enabling open ended responses and follow up inquiries. Therefore, enables a rich exploration of the contextual realities providing insights that would otherwise be missed by quantitative methods (Bryman et al., 2019). In addition, secondary data sources to add a comprehensive overview and understanding of eco-entrepreneurship in the context of waste management the study including a literature review of different articles and books. Included below is a detailed section of the selection of respondents for data collection, sample profile and secondary data sources.

4.4.1 Selection of respondents and interviews.

A purposive sampling method was utilized to identify six participants however one decided to opt out thus five individuals were used for this study of eco-entrepreneurial activities within Uganda's urban centres. This selection strategy aimed to ensure that participants possess extensive knowledge and practical experience in sustainable business practices and ensuring they reflected the diversity of eco-ventures present in urban Uganda (Etikan et al., 2016). These were chosen based on their demonstrated involvement in initiatives that integrate environmental sustainability with commercial goals with a particular emphasis on waste management and resource efficiency. However, this sampling method while convenient does not aim for statistical representation (Etikan et al., 2016). Therefore, the results may not fully reflect the diversity of eco-entrepreneurial initiatives and challenges present across Uganda's varied regions and other contexts. Considerations of the informal and formal eco entrepreneurial sector with in the social-economic context in Uganda are very important to consider when

reviewing this research. In addition, as highlighted by Bryman et al., (2019), research is not without challenges in the process of gathering data.

During the data collection phase, it became clear that a few participants were hesitant to fully participate and the reason for one to opt out. Most participants declined to sign the informed consent form due to expressing concerns wondering how they had been identified and selected for the study and signing a formal document sparked fear that their information could be used against them or for government purposes. This reluctance also was expressed with unfamiliarity with academic research procedures as they expressed concerns that this was new to them. The researcher also asserts this suspicion was driven by the informal nature of some of their operations. However, to ensure participation ethical considerations as stated in section 4.8 were utilised in addition also the researcher relied on verbal consent and clarified the academic context and objectives of the study in a clear simple way and the time required for the study (Bryman et al., 2019).

Much of this initial communication and follow-ups took place on local phone calls rather than emails as most of the participants did not have regular access to email services. This is particularly crucial to build trust especially in qualitative studies by adapting to specific contexts to understand the uniqueness of the studied context and the population (Duggleby et al., 2020). This resulted in confirmation of these participants who took part in the study as noted by Bryman et al., (2019) the significance of adaptability and being courteous in the research process. The interviews were conducted in a semi-structured way to facilitate the data collection. This approach allows for flexibility and guides the researcher in data collection with a predetermined set of questions to ensure uniformity among the study participants (Bryman et al., 2019). This approach enabled the creation of follow up inquiries based on the preliminary discussions. Therefore, it allows the rich exploration of the contextual realities providing insights that would otherwise be missed by quantitative methods (Bryman et al., 2019). The interviews were done face to face at the participants sites or the agreed public places with participants to ensure safety and comfort of researcher and participants (Bryman et al., 2019). Others were conducted on online platform google meet to facilitate the proximity as well as time constraints of the involved parties. These approaches facilitated comprehensive insights of the studied phenomena as all the parties involved were comfortable with the agreed data collection means.

4.4.2 Sample profile

During interactions with the chosen eco-entrepreneurs, key business attributes were recorded, including the business inception date, the nature of products or services offered and the entrepreneurs' initial business launch experiences. The research indicated a spectrum of entrepreneurial backgrounds. Several of the participants had launched their ventures in the recent past, showcasing their ability

to quickly adapt to the demands of Uganda's urban market. The businesses varied considerably, spanning across the development of environmentally friendly products including the production of sustainable roofing tiles, innovative arts and craft designs utilizing recycled materials, the creation of eco-friendly bricks, and the manufacturing of durable fence poles from recycled materials. A common theme among participants was the drive to address environmental challenges while generating economic prospects. Many of these eco-entrepreneurs launched their ventures upon recognizing deficiencies in existing waste management systems or resource utilization often leveraging prior professional experience or utilizing personal networks and limited initial funds to establish their businesses. An overview of the participants, their inception data and eco-entrepreneurial focus is provided below in table 1.

Table 1: Overview of participants profiles.

Participant	Eco-enterprise focus	Business age	Date	Duration
Case 1	Sustainable roofing tiles	5	6/02/2025	33 minutes
Case 2	Eco-friendly bricks	8	15/04/2025	36 minutes
Case 3	Up-cycled crafts and awareness creation	3	6/02/2025	41 minutes
Case 4	Organic manure and crafts	5	5/02/2025	30 minutes
Case 5	Plastic waste collection and supply.	15	5/02/2025	30 minutes

4.4.3 Secondary data sources.

A literature review is particularly necessary to assess the current state of knowledge of a given study topic as well as inform future research directions and highlight the existing research gaps (Synder, 2019). This guided the formation of the research topic and questions, the theoretical framework and in interpreting and analysing results for this study (Rowley & Slack, 2004). This study employed a narrative

literature review of several articles and books to capture the diversity of literature in the study context and as well relate to the broader sustainability concepts (Synder, 2019). In beginning this process, the researcher started by getting a deep understanding of eco-entrepreneurship in the context of waste management from the literature using online search data bases like Google scholar and PRIMO and from this the author also management to situate the relevant cited articles on this topic then expanded the research using other key terms.

Other search terms included key terms such as “eco-entrepreneurship”, sustainable entrepreneurship, green entrepreneurship, social entrepreneurship, waste management, developing economies, Africa, developed economies, circular economy, sustainable waste management, environmental innovation, eco-enterprises, informal settlements, sustainability, community waste solutions, stakeholder involvement. The author focused on peer reviewed articles to facilitate the authenticity of the research. The narrative literature review enables data to be revealed in an evolving manner which aligns with the study’s inductive interpretive design of information emerging from the data as the research process progresses (Jones, 2004; Synder, 2019). Conducting a literature review therefore provided the conceptual grounding and interpretation of data of this entire study.

4.5 Data analysis

Qualitative research produces broad context-specific data from sources like interviews, field notes, and observations which usually necessitates repetitive and interpretive methods of analysis to reveal hidden meanings (Bryman et al., 2019). Given the exploratory nature of this study and its particular focus on the lived experiences of eco-entrepreneurs in informal urban settlements in Uganda, the study employed thematic analysis (TA) as the primary qualitative data analysis method and supported by the SWOT analytical framework to structure and interpret the findings.

TA method allows for a systematic and rigorous process for exploring lived experiences, views, and behaviours thus its adaptability (Braun, & Clarke, 2006). TA was especially important in this study, to explore the challenging reality of eco-entrepreneurs functioning in informal urban settlements in Uganda. The strategy permitted the discovery of both explicit and hidden meanings embedded in participants' narratives by carrying out a thorough and iterative process of data familiarisation and themes were extracted from the interviews (Bryman et al., 2019). This process contributed to revealing the motives, obstacles, and contextual aspects that shape eco-entrepreneurship. To help structure and deepen thematic interpretation, the study used a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) as an analytical lens and add practical significance to the findings. This framework was utilised to categorise the theme findings into four strategic dimensions, providing a better understanding of both the internal and

external factors driving eco-entrepreneurship in the researched setting. Strengths imply to have internal capabilities including having resources like skilled people and modern technology and Weaknesses are the internal constraints like little expertise or money (Remi, 2023). External factors that can be regarded as opportunities are supportive external conditions that favour firms whereas Threats clearly are external factors that pose risks to a firm such as regulatory changes and challenges that are posed by the economy (Gerlach, 2018).While both TA and SWOT analysis have been criticized, TA for its subjectivity creating multiple perspectives of different researchers leading to probable lack of rigour (Castleberry & Nolen, 2018), and SWOT for its simplistic, unprioritized listing of data that lacks theoretical support (Helms, & Nixon 2010; Nixon, 2010). However, to address these shortcomings, this study included direct participant quotes and ensured reflexivity in addition to peer debriefing to increase quality of results. SWOT was utilised along with TA, rather than as a stand-alone tool to put together themes while maintaining contextual richness leading to a more actionable and nuanced knowledge of eco-entrepreneurial dynamics in urban Uganda.

Codes	SWOT THEME	Strategic focus
Innovative resource valorisation Community engagement Job creation Training of youth Local technology and mobile tools Local knowledge Relevant products	Strengths	Enabling support systen • Financial system • Policy reforms • Regulatory supp Digital innovation netw • Network apps • Mobilization programs
Operational issues Human resource constraints Conflicting motives Emotional Uncertainty	Weaknesses	

Potential partnerships Financial incentives Digital innovations	Opportunities
Funding constraints Market restrictions Institutional gaps Resistance of waste by products and work	Threats

The coding process began with thorough familiarization of the interviews as stated by (Bryman et al., (2019) to ensure comprehensive understanding of the data. This study employed inductive coding allowing the themes to emerge from the data. These initial codes were grouped into broader thematic patterns and further aligning with the SWOT framework which also provided direction for identifying practical feasible strategies to reinforce these eco-entrepreneurs' practices in the community as illustrated in table 2.

Table 2.Overview of codes and themes

4.6 Quality research criteria

Rigor is ensured in qualitative research to ensure thoroughness and reliability of study findings and entire research process (Patias, & Hohendorff, 2019; Whittemore, Chase & Mandle, 2001). Credibility, which is the cornerstone of trustworthiness, was achieved through prolonged engagement with the data, ensuring a deep immersion in the narratives shared by our eco-entrepreneurs. Member checking with participants to validate our interpretations ensuring that their voices are accurately reflected (Morrow, 2005). Transferability which refers to the ability for the study findings to be applied in other contexts, was fostered through rich, in-depth descriptions of the context and participants entrepreneurial realities (Flick, 2022). This will allow readers to assess the applicability of the study findings to other similar urban environments.

Dependability of the study to ensure stability and duplicability of study findings over time was achieved through a meticulous audit trail and documenting every step of the research process (Patias, & Hohendorff, 2019). Finally, confirmability was be demonstrated by grounding our interpretations in direct quotes from participants, allowing their voices to speak for themselves thereby reducing researcher bias (Clarke, & Braun, 2017). In addition, data adequacy which is the depth and breadth of our data was guided by the principle of saturation. The researcher ensured to gather information until no new insights emerged ensuring that the findings are comprehensive (Patias, & Hohendorff, 2019).

4.7 Reflexivity

Reflexivity was integral throughout this study through crucial self-awareness thereby acknowledging the researcher's inherent subjectivity bias and its potential influence in knowledge construction (Finlay,2002). In addition, as a researcher with a contextual experience like the participants having experienced life in Uganda and encountered personally the challenges and developments in waste management, there exists both a thorough familiarity with and a vested interest in the research issue. However, this close connection with the research context also provided rich insights but also increased the likelihood of bias particularly in interpretation and representation. To address this, a continuous reflexive journal was kept throughout the research process and to minimise this bias the researcher had a continuous self-dialogue journal documented with evolving understandings and potential biases, ensuring transparency (Finlay,2002). The researcher's knowledge position including prior experiences in sustainability was critically examined and its potential influence on data collection and analysis was considered (Berger, 2015). Additionally, peer debriefing sessions with research participants and triangulation methods with different sources of data and perspectives were used to challenge interpretations mitigating individual biases.

4.8 Ethical considerations

When conducting a qualitative study, maintaining ethical integrity is paramount in as its absence directly compromises the study's quality (Bryman et al., 2019). Recognizing that interviews delve into participants' lives, ethical considerations were incorporated throughout the research process. To uphold these standards, established guidelines, including informed consent, confidentiality, minimizing harm, and ensuring honesty, were rigorously applied (Bryman et al., 2019). Prior to participant engagement, essential permissions were secured from the Kampala Capital City Authority (KCCA) which is the body responsible for keeping the city clean thereby establishing a foundation for ethical research practices. Safeguarding of participants is crucial to ensure no harm including mental distress, physical injury is done to all the parties involved (Bryman et al., 2019). The parties ensured that all the engagement processes were convenient and comfortable to the participants without any strain. Crucially, participants were given with the possibilities to fully suggest, interact and offer feedback fostering a collaborative and respectful research environment.

Informed consent involves the author ensuring that the participants are fully aware of what they are involved in and any procedures involved in obtaining the information (Bryman et al., 2019). This involved ensuring the participants were fully informed of the study's purpose, procedures, potential benefits, and any possible risks, empowering them to make informed decisions about their

involvement. They were assured of their right to withdraw at any point, reinforcing the voluntary nature of their participation (Bryman et al., 2019). An informed consent was provided by the institution responsible for the researcher's study however some of the participants for this study chose to be involved in verbal consent due to unfamiliarity with academic research studies and they equate this formal paperwork to official investigations. This also relates to transparency and honesty that were achieved by clearly outlining the study's methodologies and findings, while also acknowledging any limitations. In addition, confidentiality was strictly maintained to build trust and protect the respondents against any further issues that could escalate from the information provided (Bryman et al., 2019). This was achieved by ensuring the anonymity of the participants and their personal information and restricting the use of findings to research purposes only (Bryman et al., 2019). This commitment to ethical principles ensured that the research was conducted responsibly, respecting the lives and experiences of those involved.

5. Empirical findings

This section presents the empirical findings collected from the data. In this section the author's analysis of the collected empirical data will be presented. Based on the analysis of the participants views and relating to the three research questions, five key themes consisting of strengths, weaknesses opportunities, threats and strategies with some corresponding sub-themes that emerged. These are detailed in the

subsequent subsections. Eco-entrepreneurs shared various practices and perspectives related to their inherent advantages and the favourable conditions they can leverage. These insights have been analysed and further synthesized into several key sub-themes which are presented in the subsequent subsections.

5.1 Theme 1: Strengths of eco-entrepreneurship in waste management

Under this theme, the study intended to capture the internal positive attributes of eco-entrepreneurs (Pickton & Wright, 1998). Eco-entrepreneurs shared various practices and perspectives related to their inherent advantages. These attributes demonstrate the potential of eco entrepreneurs to address waste management challenges while promoting environmental, social, and economic progress. The participants' perspectives revealed four sub-themes including: innovative resource valorisation, community driven social economic creation, technological adaptation, and contextual relevance and local knowledge as outlined below:

5.1.1 Innovative resource valorisation

Through innovative approaches, eco-entrepreneurs in Uganda's informal urban settlements are actively transforming garbage into valuable resources. According to the findings, most of these businesses are actively involved in resource valorisation a process in which waste is no longer deemed useless and is instead transformed into goods that are useful, marketable, and even necessary for daily living. Participants in the various cases discussed how they turn plastic waste materials including soda and water bottles, tins, and polythene into useful and long-lasting construction goods. These include roofing tiles, eco-bricks, lumber, fence posts, eco tiles and face shields that were very valuable during the global shocks like Covid-19 pandemic.

> One eco-entrepreneur emphasized the scale of their transformation, stating, “Our major aim is to close the loop and so far, we have managed to make roofing tiles from 550 tonnes of plastic.” (Case 1). Others are involved in replicating mainstream products by replacing conventional materials with recycled plastic. For instance, one entrepreneur described how they innovate by mimicking market goods, saying, “We directly address a tangible problem of visible plastic waste in Uganda with a tangible solution using a concrete and unconventional approach. We replicate what’s already on the market and make it out of plastic products like the office furniture with poles stronger than wood and can be fixed without nails and glue, eco tiles that can be added on tables, floor has been crafted from plastic waste.” (Case 2). Aside from construction and furniture, creativity thrives among some entrepreneurs who specialize in art and design. Using glass, plastic, and paper waste, they create unique and often beautiful products such as artificial flowers, glass chandeliers, mats, and bags. One participant described the creative process in their co- academy: “The academy makes over different creatives and artifacts and usually sometimes on demand like artificial flowers, glass chandeliers from the waste we give to them.” (Case 3) also highlighted how biodegradable waste is being reused in meaningful ways. These eco-entrepreneurs collect local biomass

> waste like food scraps, crop residues, and livestock waste and turn it into organic fertilizer. This fertilizer, locally referred to as Ekirisa, is reported to boost crop yields, especially for vegetables and coffee farmers.

In addition, some eco-entrepreneurs are further involved in trading activities contributing to the broader circular economy and value chain networks as they supply raw materials of waste to larger companies. This includes waste items such as waste metals, steel, plastic bottle tops, and polythene, and deliver them to external businesses. These materials are then used in the production of electrical machinery, car parts, and phone accessories as stated:

> we also deal in collecting of waste that is given to different companies in Uganda; however, these also export the crashed waste to give to companies abroad that make different products. (Case 5)

Through these diverse practical experiences, these participants demonstrated their ability to contribute to circular economy and challenge the status quo of perceiving waste as an invaluable resource.

5.1.2 Community-driven socio-economic creation.

Complementing their resource innovative practices, the empirical findings revealed that eco-entrepreneurs similarly working closely with local communities not just for environmental benefits but also direct economic and social opportunities. Their work goes beyond just collecting or processing waste but also, they are actively involving people, especially the vulnerable, and finding ways to improve their lives while solving the waste management problem. Several participants shared how their initiatives have helped build a network of trust and collaboration in their neighbourhoods. By training and supporting local people, especially marginalized youth and women, they are fostering a sense of ownership and participation in the waste value chain. One entrepreneur expressed this people-first mindset stating,

> "We recognize that economics is people, so we prioritize creating awareness and giving community sensitization to make our community people more self-sufficient and aware of poor waste disposal practices. We also aim at creating jobs for youth (usually school dropouts, street kids who have nowhere to stay) who collect the waste from households and those who create the different artifact materials like artificial flowers... like a flower can be sold 2 dollars each." (Case 3)

Other participants highlighted the structure they have built to support job creation, especially among those who might otherwise be unemployed:

> "We have a robust network of 58 waste collection agents and indirectly also target other vulnerable groups of women and youth that facilitate waste collection and resource management." (Case 4). In addition, case 5 stated "As you can see these people working here are the ghetto youth some are using drugs and alcohol but i employ them to collect

these waste materials and they love it otherwise it's hard for them to get employed elsewhere."

Another case 2 stated how they also they use community agents sometimes as intermediaries between households and eco-enterprises as stated described: "We humanize the supply chain with the different intermediaries including community-backed centres and micro-franchises and some supported others operate independently as own bosses doing the collection, sorting and sell the waste to us."

Similarly, the empirical data highlights that the engagement does not end at just employment but also have connected their services to other sectors including health services and education.

In one case, the eco-business has partnered with local hospitals to organize free health camps for community members: "We engage in free health camps through partnership with local hospitals to help the community through free diagnosis to those that attend thereby applying field networks." (Case 2). Others are helping people with skill building training sessions that focus on empowering people with the necessary skills to work as agents: "We do give trainings to people (some of which are usually people with no basic education and cannot find employment) on how to begin their agents' work of collecting the plastic from households." (Case 1).

However, while these education trainings are meant to empower, not everyone shows lasting interest as highlighted by the empirical data.

One participant noted a challenge with low motivation among some trainees: "A lot of people usually join, but some join with other motives like enjoying the beverages in the training sessions, so at the end we sieve out only the serious ones to become agents."

5.1.3 Technological adaptation and innovation

To grow and sustain their community initiatives, the findings revealed eco-entrepreneurs are embracing technology tailored to their local contexts in creative and accessible ways to make their operations more effective and inclusive. While many people may assume that innovation in waste management requires complex infrastructure, these entrepreneurs are proving that simple, locally adapted solutions can make a big difference.

One of the participants shared how their team created a mobile tool that helps people request waste collection without needing internet access. This innovation removes a major barrier to participation in low-income communities where smartphones and reliable internet connections are not always available. As explained: "We have localized tech with a USSD code that is a toll-free mobile application (can be used with or without internet) and can be used to ask the agents to come collect waste." (Case 1). Alongside this, they have also built a reward-based system that links the act of waste collection to widely used mobile money platforms like MTN and Airtel. This allows users to get real, tangible benefits from participating in the waste-to-value chain. The participant elaborated: "The software products we offer the waste-to-value reward pay app integrate the popular digital mobile money platforms of MTN and Airtel (major telecommunications networks in the global south)." (Case 1). Another eco-entrepreneur

shared how their business responded during the COVID-19 pandemic. When protective equipment was in short supply, they created face shields using plastic waste, turning an environmental hazard into a public health resource: “We produced different face shields that were used during the COVID pandemic period.” (Case 2). These examples how technology is locally adapted not just as an add-on, but a core part of how eco-entrepreneurs operate.

5.1.4 Contextual relevance and local knowledge

Although the earlier section reveals the adaptability of technology to facilitate these eco-entrepreneurs’ growth, they also enjoy the benefits of their practice’s alignment with the lived experiences of their contexts. The study revealed how strongly eco-entrepreneurs in informal urban settlements ground their initiatives in local context, culture, and community knowledge. Rather than importing solutions from outside, they adapt their practices to reflect what works best within their surroundings in sustainability spheres of socially, economically, and environmentally. One striking example came from an entrepreneur who described their production of organic fertilizer from locally available materials such as food scraps and agricultural waste.

> This fertilizer referred to as “Ekirisa” in the local language is already widely accepted by local farmers utilizing it in their agricultural practices. These report faster crop yields especially in fruits and vegetables, coffee plantations and resilience to pests and diseases.” (Case 4).

In addition, the empirical data revealed that these eco-entrepreneur practices are closely linked to the other sectors through voucher reward systems. These systems are carefully tailored to meet the immediate needs of the communities they serve. This innovative exchange system not only supports education but also promote waste segregation and responsible disposal.

> Case 2 stated that “In Uganda, education is pricey as parents must pay school fees to take their children to school, so pupils gather plastic, take it to school to be weighed. In exchange, they receive vouchers for school fees.”. In addition, case 1 described, people receive incentives like airtime, mobile money, and even help paying utility bills in exchange for properly sorted waste.

In addition, these eco-businesses also designed context-responsive business models which considers the poverty levels and the logistical realities in their communities.

> Case 2 described their business model as a “social contrast model”, which adds value closer to the waste source while also creating job opportunities. This approach reduces transportation costs and environmental impact by processing waste locally rather than moving it over long distances. Similarly, case 3 also stated they do direct buy ins of sorted waste directly from households, turning it into a reliable income stream for families.

5.2 Theme 2: Weaknesses of eco-entrepreneurs in waste management.

Analysis of the results reveals that despite their innovation and commitment, eco-entrepreneurs in waste management face inherent internal limitations that weaken their capacity to thrive, grow, and sustain operations effectively. These weaknesses fall into operational, human resource categories, emotional uncertainty and conflicting motives as outlined below:

5.2.1 Operational issues

Several respondents highlighted the overwhelming logistical demands associated with waste collection and production processes. Long travel distances to gather scattered waste and the high cost of transportation in congested urban areas severely strain resources stated by

Case 1 that it takes a lot of time to move around getting waste" and the "costly logistics in big cities".

In addition, reliance on manual tools and production methods slows down processing and creates delays, especially because of limited funding to invest in modern machinery stated by

> case 4; "All the production is done with manual tools and techniques which creates operational delays because of low funds".

5.2.2 Human resource issues

In addition to operational constraints, the participants expressed the managerial overload and strain due to limited workers to do the activities and most of all who are incompetent. This multitasking of activities while resourceful creates a strain on entrepreneurs and restricts their scalability and efficiency in operations as stated by

> case 3; "It's always alot of work, i hold many flags, "CEO but as you can see am also the project manager" as i must get around to do the groundwork of monitoring the waste collection initiatives from households."

5.2.3 Emotional uncertainty

The data also revealed an emotional strain that can affect the participants confidence, decision making and long-term planning especially in the context of low institutional support.

> One particular concern stated by case 2 is the emotional mentality of operating as a foreigner in a new land which creates a feeling of uncertainty especially with the changing political spectrums.

5.2.4 Conflicting motives

The empirical data also reveals conflicting motives between entrepreneurs and employees also giving rise to an ethical dilemma. This internal tension not only strains workplace dynamics but also puts the venture's ethical basis in jeopardy.

> As stated by Case 4, that employees create conflicts due to not agreeing with the long-term motives of the company and they think synthetic fertilizers are better since it's what the market prefers most of the time.

5.3 Theme 3: Opportunities for eco-entrepreneurship in waste management

Analysis of the study findings indicates a growing number of possibilities for eco-entrepreneurship in urban waste valorisation, particularly with the growing awareness about wastes economic potential and especially since it reduces on the health risks in the regions. Throughout each of the case studies, respondents emphasised how financial emerging markets, collaborative efforts, and advances in technology are fostering eco-entrepreneurship growth as outlined below:

5.3.1 Financial incentives

A key opportunity identified was the growing market for plastic credits as part of broader initiatives to cut down on plastic waste. This approach provides a promising financial incentive for recycling and rubbish collection.

> According to one interviewee (Case 2), "The emerging plastic credits market and backed by the world bank offers opportunities for people to engage in eco business and corporate social responsibility initiatives."

5.3.2 Strategic institutional partnerships

In addition to financial opportunities, several eco-entrepreneurs identified, and others emphasized the opportunity of building strategic partnerships with government bodies and large institutions using the B2C and B2B models to enhance visibility, streamline operations, and increase revenue.

> One participant reported on the potential of doing collaborations with the communications commission to streamline management services as stated: we are in the pipeline of doing partnerships with the Uganda Communications Commission to establish our green chain app for waste. Another representative from Case 1 shared that their business had developed strong B2C (business-to-consumer) and B2B (business-

to-business) models to different institutions like hospitals, worldbank for recycled roofing tiles: “We have strategic partnerships of selling roofing tiles with a B2C directly to consumers and B2B to different institutions like hospitals and the World Bank.”

5.3.3 Digital innovations

Additionally, the participants highlighted the transformative potential in digital innovations to streamline their eco-businesses in monitoring the waste management systems.

One entrepreneur (Case 3) explained their plans to launch a mobile application referred to as a "green chain app" that functions like novel solutions of logistics like Uber services but for waste collection.

5.4 Theme 4: Threats of eco entrepreneurs in waste management.

Beyond internal barriers, Ugandan eco-entrepreneurs face external obstacles that determine their trajectories. These difficulties extend beyond individual capabilities and reveal a deeper structural resistance, funding dilemmas, societal perceptions and institutional injustices are rooted in policy, economic and sociopolitical environments as elaborated below:

5.4.1 Funding dilemmas

A noted threat is the issue of donor funding of these eco-businesses which while beneficial to streamline their operations usually necessitates the reliance on donors and emerging conflicting dilemmas. This limits the potential of innovations to address sustainability motives.

Case 3 noted that “limited funding which brings about international donors who also have other motives there by creating mixed motives." The participant acknowledges that while the donor funding is beneficial, they are tugged in various ways diverting focus from local needs to donor driven deliverables.

5.4.2 Political market restrictions

In addition, the empirical data highlights that political barriers and market monopolies restrict entry of sustainable innovation. This concentrated market power makes it hard for new actors to navigate market imperfections as well as established systems that reward status quo over innovative solutions as stated:

Case 3 highlights that “the prevailing political structure and the monopolistic control of key sectors for instance the energy sector by Umeme (former major energy distribution company in Uganda) so other sustainable innovations are restricted.”

5.4.3 Institutional gaps

The empirical data also reveals that the institutional structure is unstructured, but it presents both an opportunity since its flexible and conducive for investments to begin but also a threat for these businesses to continue operating. This implies a lack of coordinated guidance and policy support for eco-ventures.

> case 2 stated; “Uganda is very conducive to investments, but it opens a blank canvas when starting a novel project”. The same respondent also reflected that “unlike countries where recycling is shaped by legal obligation, in Uganda, “it takes a bit of awareness, as it’s motivation that drives people, not regulation”.

Furthermore, the empirical data also revealed unfair institutional policies for these eco-businesses particularly disparity in corporate tax incentives which creates an uneven market field where sustainability efforts do not yield anything.

> Case 2 further stated that “there are big confrontations of large corporations that get substantial tax credits compared to those doing the green work creating a restrictive competitive capacity”.

Additionally, the empirical findings revealed inconsistencies in the regulatory system as the policies are outdated.

> Two participants (Cases 1 and 3) emphasized that the policy structure feels stuck in time. One stated, “the polythene bags are still produced locally, which creates a big cycle with no restrictions on producers of this waste or extended producer responsibility regulations in the laws.”

5.4.4 Societal resistance

Lastly, the empirical data revealed a societal resistance thread attached to the everyday difficulties of incorporating new ideas into existing institutions due to consumer preference for familiar products.

> Case 1 stated that working with eco-friendly roofing tiles revealed they face stiff competition as people choose to buy what they are used to even) when ours are bigger in size (need lesser) and with a difference of 10,000uganda shillings ~3 USD.

Additionally, the cultural perceptions of waste emerged as a barrier which creates attitudes among the society that make it hard for these eco entrepreneurs to attract local participation or even work in these ventures.

> The eco entrepreneur case 4 offered a vivid example stating, “Community perception of waste which is seen as a nuisance or burden and the sight of people working in a dumpsite (sorting and experimenting with products being met with scepticism”.

5.5 Theme 5; Strategies to enhance eco-

entrepreneurship

This theme addresses the third research question: What strategies can be developed to enhance the role of eco-entrepreneurship in community-driven waste valorisation initiatives? The analysis revealed several practical and visionary strategies proposed by the participants, grounded in their on-the-ground experiences navigating Uganda's sustainability landscape.

5.5.1 Enabling support systems

The empirical data revealed how important enabling support are for promoting eco-entrepreneurship especially when it comes to financial restructuring, legislative reforms, and regulatory support. One of the main themes that emerged out was the significance of restructuring financial assistance to better suit eco-entrepreneurs' long-term sustainability objectives. Participants advocated for more accessible and development-focused finance options rather than focussing on short-term performance indicators as elaborated:

> The participant in Case 2 suggests," refocusing development funds and giving low-interest loans to eco-entrepreneurs".

Policy reform was another key strategy stated by the same participant advocating for policies that encourage producers and people to be more accountable for their environmental footprints and shared responsibility as stated:

> The same participant advocated to "initiate more policy frameworks to create rules among people and producers of the waste like EPR (Extended Producer Responsibility)".

Moreover, regulatory support was deemed crucial for the success of eco-entrepreneurial enterprises as the empirical data identified inefficiencies in current governmental processes and pushed for a more dynamic and supportive regulatory framework.

> Stated by case 2, "we need more action-packed strategies with government fast-track certification to green projects and also investment due diligence programs".

5.5.2 Digital innovation networks

The empirical analysis reveals the strategy of digital technologies and networks in waste valorisation activities to create strategic alliances to help secure social capital bridges and expanding the reach of sustainability initiatives

> Case 3, the entrepreneur in case 3 stated "the solution is to "get people on networks of apps like blockchain to streamline processes". In addition, the same participant stated, "Need to do partnerships like clean ups and e waste competitions."

In addition, although some strategies like community mobilization through engagement and awareness programs had already been practiced by a few participants, they were still recommended as key drivers of long-term transformation.

> Stated by case 1, "giving engagement and awareness programs like community runs, involving schools and radio campaigns to foster sustained transformation".

6. Discussion

This section interprets the study's key findings through the lens of existing theoretical lenses used in the study including GAC, Circular economy model, institutional theory, Schumpeter's innovation theory, social entrepreneurship theory and the existing literature which explores the implications of eco-entrepreneurship in waste management, particularly within informal urban settlements in Uganda. The discussion is structured around the four emergent themes from the emerged data analysis.

6.1 Strengths of eco-entrepreneurship in waste management

The study reveals that eco-entrepreneurs in Uganda demonstrate strong internal capacities, including innovative resource valorisation, community embeddedness, technological adaptation, socio-economic value creation, and contextual awareness. These attributes align with literature by Sustainia (2014), who emphasize the resources sector as an innovative solution for the contribution of a circular economy. The empirical data shows that these practices replicate products already on the market but just use new processes which also reflects Schumpeter's view that innovations arise from novel combinations or processes that usually emerge from the existing structures (Hospers, 2005). Specifically, participants were found to engage in circular economy practices disrupting the traditional waste management practices and transforming plastic waste into roofing eco tiles, eco pavers, fence poles, furniture and is consistent with Hahladakis, Iacovidou & Gerassimidou (2024), who argue that value recovery from waste materials is central to the circular economy paradigm.

The findings on contextual relevance and community driven approaches affirm that eco-entrepreneurs generate competitive advantage and sustainable development by leveraging native capabilities. This is supported by literature on the impact of the triple bottom line on sustainability initiatives that reflects supportive community driven initiatives enhance the reputation and performance of firms (Gimenez, Sierra, & Rodon, 2012). This is also highlighted in the GAC literature as firms acquire external knowledge from their communities and thus develop innovative approaches to suit their needs (Albort-Morant et al., 2018). These eco-entrepreneurs leverage this knowledge and thereby enable efficient use of resources as well as simultaneously enhancing environmental outcomes (Makhloufi et al., 2023). In addition, this approach aligns with literature on "putting the last first" and the "principle of connectivity" in innovation systems to enable eco entrepreneurs engage with their stakeholders thereby building legitimacy as well as fostering long term sustainable growth for their businesses (Harper, 2018; Hart & Sharma, 2004).

Moreover, the socio-economic impacts because of eco entrepreneurial motives particularly in terms of job creation and education for the underprivileged groups of people affirms its potential as a driver of equitable development. This backed by literature that affirms eco- entrepreneurial initiatives offer avenues to overcome social exclusion, particularly for underserved populations (Seelos & Mair,2005). Furthermore, the empirical data revealed the use of low-cost and contextually adaptive technology using context responsive innovations which enables these eco-entrepreneurs to generate value from waste materials despite using limited resources. As literature according to Patel et al., (2015) suggests that firms with sufficient GAC have a capacity to leverage market opportunities by recognizing the contextual needs and having access to relevant information. This also aligns with insights on technology-driven performance improvements among SMEs in similar contexts highlighting that innovation need not be complex to be impactful and must be suited to the operating environment to enhance accessibility and responsiveness within the contexts (Chege & Wang, 2020; Valente, 2012). Lastly, the deep contextual awareness demonstrated by these entrepreneurs through providing context specific services with localized production models and adaptive needs-based reward systems of providing services like education, airtime, hospital bills showcase a tailored-specific responsive sustainability model. This is supported by literature of the potential of eco entrepreneurship to have inclusive business models that address the needs of the underserved communities (Seelos, & Mair, 2005).

6.2 Weaknesses of eco-entrepreneurship

There are several internal barriers of eco-entrepreneurs in waste management particularly in relation to logistical inefficiencies, resource constraints, and ethical

dilemmas that hinder the implementation of their ventures. One of the most frequently cited obstacles by the eco-entrepreneurs is the challenge of working with unskilled or incompetent workers. This issue is documented in existing literature highlighting that ecopreneurial SMEs often struggle with not only a shortage of skilled and trained professionals but also with mixed motivations among employees (Rodgers, 2010). These human resource constraints significantly pose a challenge of the firm's ability to advance the trajectory of eco-entrepreneurship as top management alone is insufficient to foster an innovative and cohesive work environment (Nayak & Pillai, 2024). And this is evident in the past literature of Makhloufi, Djermani, and Meirun (2024) who emphasize the critical role of employees at the forefront of a business`s innovative climate.

Ethical issues emerged as an internal constraint to these eco-entrepreneurs. Eco-entrepreneurs frequently have difficulties in reconciling social and environmental obligations with the realistic demands of operating in a competitive market. Existing scholarship aligns with this echoing that establishing and maintaining the triple bottom line goals of people, planet and profit is complex and costly (Belz & Binder, 2017). However, this trade-off is manageable through integration of humanistic capitalism that seeks to align financial goals with preservation of human dignity to a broader community of stakeholders (Liedong et al., 2022). Their findings offer the notion of "gracious growth," that emphasizes people and planet-centric principles including collaboration and engagement with all impacted stakeholders to be integrated into company operations thereby sustainability and profitability can be mutually reinforcing (Liedong et al., 2022). However, achieving this involves embedding sustainability throughout the organization's entire processes and operations thereby making it a fundamental part of the organization's structure.

It was also noted the occurrence of managerial overload, in which eco-entrepreneurs are spread across several corporate activities without enough support, resulting in tiredness and decreased strategic focus. Literature highlights time constraints as a critical limitation to the successful implementation of sustainability initiatives in SMEs because when urgent operational needs predominate the daily agenda, eco-entrepreneurs may unintentionally deprioritize greater social and environmental goals, reducing the strategic impact of their operations. (Sommer ,2017).

6.3 Opportunities of eco entrepreneurship in waste management

This section discusses the findings of the emerging potential for eco-entrepreneurs in Uganda's urban waste management industry. These opportunities are driven by institutional, market, and technology trends that are consistent with circular economy concepts. In addition, also discusses the grassroots initiatives offered by

the study participants for maximising these opportunities while assuring both environmental and socioeconomic impact.

6.3.1 identified opportunities discussion

Eco entrepreneurship in waste management presents several opportunities in several industries including waste to energy technologies, textile industries through innovative solutions of not only an environmental concern but also a business opportunity that contributes to circular economy goals and local development (Keshav, Banoth, Kethavath, & Bhukya, 2023; Haldar, 2021). In this study, it is evident that eco entrepreneurs have a promising potential to tap into emerging institutional and market-based opportunities including public and private partnerships, digital platform and Business to Consumer (B2C) or Business to Business (B2B) models. This is supported by findings from Veleva & Bodkin, (2018) that value creation within circular economy practices is driven by collaborations and partnerships which helps to close the linear gap between producers and consumers for example the individuals who use products may become suppliers, providing materials that eco-entrepreneurs transform and reintroduce into the market. In addition, reinforced by literature of the growing partnership movements for instance *Business for Social Responsibility* that are raising awareness and coordinating sustainability actions Volery, (2002) creates reciprocal relations.

The study findings reflect a growing opportunity of digital innovation of entrepreneurship in waste management. This is supported by Gu et al., (2019), on an “Internet + Recycling” digital waste platform in China about how mobile applications offer a potential to enable efficient waste management through participation and improves waste streams traceability. However, replicating these technologies varies across different contexts due to technology and infrastructure access and precautions must be taken into consideration to have these platforms user friendly to achieve a shift towards sustainable behaviour and practices. This is supported by Wang et al., (2018), who demonstrates the need to have a collaborative traditional recycling system that engages with the offline recyclers and waste collectors as well as households.

Furthermore, the findings on plastic credit markets reflect initiatives including plastic bank, clean hub which offer an alternative result based sustainable financing approach to support plastic waste reduction initiatives especially in developing countries with no tight regulations on waste generation (World bank, 2024). However, literature by GIZ (2022) argues that these initiatives bear risks of greenwashing through sustainability claims of plastic credits and no traceable tangible environmental projects undermining the market integrity. In as similar vein these initiatives are likely to reinforce dependency cycles (positively or negatively) on international organisations thereby displacing of local waste

management actors. This is supported by Lyssenko (2023), that narrates how international waste management initiatives can negatively affect marginalized local waste pickers and independent recycling businesses who rely on informal or small-scale recycling work for their income especially in areas where economic opportunities are limited.

6.3.2 Strategies to realise opportunities

The findings under Theme 5 revealed a range of grassroots-driven and contextually grounded strategies to transform these opportunities into scalable and sustainable solutions. enhance the effectiveness and scalability of eco-entrepreneurial ventures in urban Uganda. These strategies, while emerging organically from the lived experiences of participants, also align with broader scholarly insights on entrepreneurship that are sustainable in resource-constrained environments (George et al., 2016; Hall et al., 2010).

The empirical data has informed the author about a strategy of development of supportive regulatory frameworks, particularly through Extended Producer Responsibility (EPR) that shifts the responsibility of waste management from the taxpayers and municipal authorities to the producers (OECD, 2016). This is supported by scholars that argue that environmental policy regulations can serve as a benchmark for eco entrepreneurs and producers to develop strategies that align environmental sustainability with innovation while withstanding the realities of market conditions including competition (Makhloufi et al., 2024). However, for such regulations to translate into community-driven action they must integrate informal recyclers and waste pickers through inclusive recycling approaches of formalising the roles of these actors not just as labourers but also self-efficient entrepreneurs (OECD, 2016). This empowers informal eco-entrepreneurs and strengthens locals' participation in circular economy initiatives as it creates a win – win situation for all actors.

Another strategic direction emerging from findings is the integration of digital technology innovative solutions. Participants proposed the use of blockchain systems and mobile applications to facilitate efficient coordination between households, waste collectors and eco entrepreneurs. These techniques offer an opportunity to boost transparency, credibility, and operational efficiency, particularly in informal or fragmented waste systems. This corresponds to the digital eco entrepreneurship literature that demonstrates technology as an enabler in helping eco entrepreneurs adopt circular economy practices in waste management especially in emerging economies even with low infrastructural environments (Mondal et al., 2023). Literature by Maiurova et al., (2022) further confirm that such platforms can aid creating bottom-up services by allowing entrepreneurs engage with the community and this digital connectivity can also enable entrepreneurs and community to locate knowledge and value generation

activities closer to demand there by creating responsive community solutions (Niskanen, Anshelm, & McLaren, 2020).

The findings also revealed a significant strategy of social mobilisation campaigns that are anticipated to cause a shift in the long-term behaviour through initiatives including clean-up, school outreach campaigns, community runs. This is supported by literature that these activities not only raise the social cultural awareness regarding eco-entrepreneurial ventures, but they also develop a sense of shared responsibility and trust between the community and the entrepreneurs (Jack & Anderson, 2002). Furthermore, these strategies foster sustainability practices that promote circularity through building reciprocal relations not just socially but also environmentally (Ziegler et al., 2023; Jarl Borch et al., 2008; Jack & Anderson, 2002).

6.4 Threats of eco entrepreneurship

The findings from the case studies reveal that eco-entrepreneurs in Uganda's informal urban settlements dealing in waste management face multifaceted external challenges. While these challenges share broad similarities with those documented in other contexts, they also deviate due to the specific socio-political, institutional, and economic conditions of urban Uganda. These distinctions offer new insights into the contextual embeddedness of eco-entrepreneurship in low-income, resource-constrained environments. Consistent with previous studies the findings confirm that bureaucratic inefficiencies and regulatory frameworks pose significant barriers (Wang, Hung, & Huang, 2019; Trivedi, 2017). However, a deviation in the urban Uganda context findings reveals the continued production of polythene bags despite legislative bans demonstrating the redundancy and contradiction within existing policies. This is supported by existing scholars to mean "institutional voids" which is the situation where market supporting institutional arrangements are lacking, ineffective or fall short of fulfilling their intended roles (Mair, & Marti, 2009).

A key issue emerging from the findings reflect a lack of policy-based compulsion thus creating a weak regulatory institution. This is supported by scholars that argue that the absence of clear policy incentives and regulations creates an operating environment where sustainable practices are optional rather than required which in turn restricts the emergence of a coherent eco business culture (Makhloufi et al., 2024). Additionally, the findings indicate an issue of structural imbalances in market incentives with incumbent firms often receiving greater advantages than eco-startups. This asymmetry reflects institutional favouritism which reinforces structural barriers and suppresses sustainability driven innovation (Pacheco et al., 2010).

Moreover, eco-entrepreneurs in Uganda must navigate an institutional landscape marked by competing and often conflicting demands ranging from formal regulations to informal norms and community expectations. This tension creates what is termed as “institutional complexity” and undermines eco entrepreneurs’ legitimacy and weakens their competitive advantage especially when environmentally harmful practices remain unregulated or even indirectly supported (Greenwood et al., 2011; Cherrier, Goswami, & Ray, 2018). Nonetheless, these tensions may also serve as a catalyst for innovation. This is also supported in the GAC literature that is a fundamental motivator to enhance the eco-entrepreneur’s capacity to progress and scale under uncertain conditions (Teece, 2016). Additional literature states that in the face of institutional inertia, eco-entrepreneurs often adopt adaptive and creative strategies that redefine traditional business models and embed social and environmental value in novel ways (Cherrier, Goswami, & Ray, 2018).

6.5 Discussion summary

The study highlights a major strength of the innovative and resourceful nature of eco-entrepreneurs who valorise waste materials into different products including eco-tiles, pavers and furniture. These practices disrupt the linear “take-make and disposal” model by embracing circular economy approach, aligning with the view that value recovery from waste is central to sustainable development (Sustainia, 2014; Schumpeter,1934). In addition, these actors’ entrepreneurial activities are deeply rooted in local embeddedness of the community and is reflected with a deep understanding of the social-economic and cultural dynamics within their contexts. These eco-entrepreneurs leverage their GAC and absorb external environmental knowledge and translate it into tangible and context-responsive innovations (Makhloufi et al., 2023; Patel et al., 2015).This enables them to co-create value with their communities aligning with the fact that innovations are successful through establishing proper connections and thereby delivering contextually relevant solutions (Harper, 2018; Gimenez, Sierra & Rodon, 2012; Hart & Sharma, 2004). This demonstrates eco-entrepreneurship's transformative impact on resolving social exclusion through the establishment of market-based solutions that empower marginalised areas and promote inclusive economic development (Seelos & Mair, 2005). In addition, the findings demonstrate the ability of eco-entrepreneurs to leverage the use of low-cost and digitally adaptive technology models that reflect disruptive innovations in constrained environments proving that innovation does not need to be complex and costly to be effective (Makhloufi et al., 2023; Chege & Wang, 2020; Patel et al., 2015; Valente, 2012). The eco-entrepreneurs in these informal settlements customise their business models to directly respond to their communities' pressing socioeconomic realities using needs-based reward systems, such as covering hospital bills, school tuition, or

delivering needed services. These context-specific incentives foster social trust and build legitimacy among local inhabitants (Hart & Sharma, 2004).

However, the discussion does not overlook the internal weaknesses and challenges these entrepreneurs face. Skills gaps, ethical trade-offs, and management overload all make it difficult for eco-entrepreneurs to scale and sustain their influence. Supporting literature from Rodgers (2010) demonstrates that a lack of trained and skilled employees hinders innovation and strategic success in eco-entrepreneurial businesses. Furthermore, the ethical dilemmas that develop when integrating environmental goals with market needs reveals a major challenge. Supporting literature points out that establishing sustainable solutions in entrepreneurship is costly and complicated (Belz & Binder, 2017). This is validated by other academics, Srivastava, Dixit & Srivastava (2022), who argue that the triple bottom line lacks a means to an end structure because its conflicting goals make it hard to make rational decisions to balance the social, environmental, and economic aspects of sustainability. However, the concept of "gracious growth" offers hope for harmonizing profit with people and planet and doing so requires significant shifts in priorities, processes, and managerial structures (Liedong et al., 2022).

The empirical data also demonstrates potential opportunities for growth of eco-entrepreneurship particularly through market-based approaches such as digital platforms, plastic credit markets, and collaborative partnerships. The study builds on the existing literature by Veleva & Bodkin (2018), that value creation in circular economy practices is recognised through collaborative partnerships that play a key role in bridging the conventional gap between producers and consumers. This promotes resource efficiency as well as community involvement in sustainable value chain networks. Furthermore, these strategic partnerships like B2B and public-private partnerships also offer pathways to scale up and grow eco-entrepreneurial models sustainably (Volery, 2002). In addition, the study also recognises a potential for emerging technologies like blockchain and mobile apps which open traceable and efficient systems in waste management however their success depends heavily on digital inclusivity and their context (Gu et al., 2019; Wang et al., 2018). In addition, the study also uncovered various grassroot and literature strategies for strengthening and scaling opportunities for eco-entrepreneurship in urban Uganda.

One grassroot strategy as well as backed by literature is the creation of supportive legal frameworks, particularly Extended Producer responsibilities (EPR), which transfers waste management responsibilities from taxpayers and municipal governments to producers (OECD, 2016). These policy regulations can serve as guidelines to eco-entrepreneurs and producers to align environmental sustainability with innovation, even amidst market competition (Makhloufi et al., 2024). However, to drive community action, these regulations must integrate informal recyclers and waste pickers through inclusive approaches that formalize

their roles as self-sufficient entrepreneurs (OECD, 2016). This creates a win-win situation for all actors by empowering informal eco-entrepreneurs and strengthening local participation in circular economy initiatives.

The participants also highlighted a strategy of digital enabled innovations like blockchain and mobile platforms to enhance coordination, transparency and knowledge sharing. Digital eco-entrepreneurship literature shows technology enables eco-entrepreneurs to adopt circular economy practices in waste management, even in emerging economies with limited infrastructure (Mondal et al., 2023; Maiurova et al., 2022). These technological platforms in addition facilitate bottom-up services, community engagement through situating services closer to demand there by facilitating effective market responsiveness (Niskanen, Anshelm, & McLaren, 2020). Lastly, social mobilisation programs as a strategy through clean-ups, school outreach, and radio campaigns were revealed in the findings to boost powerful behaviour change. This is supported by literature that these activities raise socio-cultural awareness and develop a sense of shared responsibility thereby fostering reciprocal social and environmental relations that enhance circularity (Ziegler et al., 2023; Jarl Borch et al., 2008; Jack & Anderson, 2002).

Despite these opportunities and strategies to achieve these opportunities presented, externally the institutional weaknesses remain a substantial threat to these eco-entrepreneurs. The findings reflect that Uganda's policy enforcement is weak and fragmented. The continued production of plastic bags despite bans on plastic bags reveals institutional voids that undermine regulatory credibility (Mair & Marti, 2009; Trivedi, 2017). The lack of strong and enforceable incentives means sustainability remains optional in this context with supporting literature that this hinders the broader market transformation (Makhloufi et al., 2024). Compounding this the findings reflect a challenge of structural market biases in favour of incumbent firms which marginalizes bottom-up innovations there by creating institutional bias and threatening their scale-up (Pacheco et al., 2010). Furthermore, the empirical data illustrates that these entrepreneurs have a challenge of navigating through unstructured institutional frameworks in an environment where formal regulations and informal norms are at odds. This institutional complexity reduces their legitimacy since can be seen as non-compliant by authorities yet trying to meet community norms and stifles innovation by creating uncertainty about acceptable approaches (Greenwood et al., 2011; Cherrier, Goswami, & Ray, 2018). However, these unstructured systems through use of GAC, also open avenues for encouraging entrepreneurs to create adaptive and creative approaches there by achieve sustainability outcomes (Cherrier, Goswami, & Ray, 2018; Teece, 2016). This is all summarised in table 3 as presented below:

Table 3. Discussion Summary of findings in relation to the literature

Key findings	THEORETICAL MODEL	Discussion link to broader literature theory
❖ Community-driven innovation ❖ Locally adaptable innovations ❖ Contextual relevance and knowledge	Green Absorptive Capacity	❖ Leverage use of GAC to overcome uncertainty institutional policies to be successful (Cherrier, Ray, 2018; Teece, 2016). ❖ Co-creating value with their communities and connections thereby delivering context-specific (Makhloufi et al., 2023; Patel et al., 2015). ❖ GAC facilitates efficient use of resources (Mak 2023)
❖ Waste valorisation into eco-products (tiles, furniture) ❖ Partnerships and social mobilisation campaigns opportunities.	Circular Economy Model	❖ Circular economy emphasizes closing resourc value creation (Hahladakis et al., 2024; Veleva 2018) ❖ Building reciprocal relations not just socially b environmentally (Ziegler et al., 2023; Jarl Borc Jack & Anderson, 2002)
❖ Continued production of polythene bags despite legislative bans. ❖ Societal resistance of waste as a nuisance ❖ Institutional gaps ❖ Structural imbalances in market incentives ❖ Successful implementation of the eco-businesses. ❖ Political market restrictions	Institutional theory	❖ Institutional inertia facilitates flexible and creati that redefine traditional business models. (Che Goswami, & Ray, 2018). ❖ Institutional voids hinder sustainable business & Marti, 2009) ❖ Reflects institutional favouritism which reinforc barriers and suppresses sustainability driven in (Pacheco et al., 2010).
❖ Disruptive innovation in waste management ❖ innovations are low-cost, grassroots, and incremental ❖ Barriers due to resource constraints and managerial burden	Schumpeter`s innovation theory	❖ Innovation as driver of change (Chege & Wang Valente, 2012) ❖ Innovations emerge from existing economic paradigms(Hospers, 2005). ❖ Innovation requires overcoming constraints in contexts (Schumpeter, 1934).
❖ Job creation and education ❖ Addressing social exclusion and equity-Community engagement	Social entrepreneurship theory	❖ Social entrepreneurship aims at creating social alongside economic value (Seelos & Mair, 200 ❖ Enhances social inclusion and community trust Anderson, 2002)

7. Conclusion

This section gives a summary and conclusion of the study including the contribution of the study, its implications as well directions for future research.

7.1 Summary of key findings

This empirical analysis of eco-entrepreneurship in urban Uganda, particularly within informal settlements, reveals a complex landscape characterized by both

significant strengths, opportunities and challenging weaknesses and threats. Eco-entrepreneurs demonstrate a strong capacity for innovative resource valorisation, transforming waste into valuable products and contributing to circular economy principles. They also exhibit a community-driven approach fostering social capital and creating socioeconomic opportunities for marginalized populations. In addition, this community driven approach also helps them acquire external knowledge and integrate it in novel ways to achieve a competitive advantage. Furthermore, technological adaptation using low-cost and contextually relevant technologies further empower these entrepreneurs to address waste management challenges effectively.

A key aspect of this study is the presence of emerging opportunities that eco-entrepreneurs can leverage. These include the growing market for plastic credits, the potential for strategic partnerships with various institutions, and the transformative potential of digital innovations like mobile applications for waste collection. These opportunities can enhance the legitimacy of eco-entrepreneurial ventures, improve their access to capital, and align their activities with broader sustainable development goals. However, these eco-entrepreneurs also face several internal weaknesses, including operational challenges related to the logistics of waste collection and production, managerial overload due to limited resources, and human resource constraints. In addition, they also encounter external threats, such as limited access to funding, policy and institutional barriers as well as market monopolies and societal resistance to new ideas that hinder innovation.

Lastly, to enhance the role of eco-entrepreneurship in community-driven waste valorisation initiatives, several strategic directions and policy implications emerged. These include the development of supportive regulatory frameworks, particularly through Extended Producer Responsibility (EPR), that integrate informal recyclers and waste pickers, and the integration of digital technology solutions, such as blockchain and mobile applications, to improve efficiency and transparency. Social mobilization campaigns are also crucial for raising awareness, fostering shared responsibility and promoting long-term behavioural change. Furthermore, addressing the financial needs of eco-entrepreneurs through accessible financing mechanisms and policy reforms that promote accountability and shared responsibility are essential for long-term sustainability.

7.2 Theoretical and practical contribution.

Theoretically this study advances the scholarship of eco-entrepreneurship on understanding how an integrated theoretical framework that synthesizes Schumpeter's Theory of Innovation, Circular Economy Theory, Institutional Theory, Social Entrepreneurship Theory, and the concept of Green Absorptive Capacity (GAC) can be operationalized in the waste management framework of the global south. It adds to the understanding of how eco-entrepreneurs navigate

regulatory gaps and social norms through leveraging their GAC and translating environmental knowledge into localized, scalable practices by disrupting the traditional linear economy and introducing circular models tailored to the realities of informal and low-developed economies. It therefore expands on eco-entrepreneurship literature by emphasizing its hybrid nature of being socially inclusive, economically viable, environmentally driven and innovation led. Moreover, the study contributes to empirical research on eco-entrepreneurship in resource constrained environments with low-cost technologies which is scarce and offers a key departure from previous studies through examining these dynamics in informal urban settlements context.

7.3 Implications of the study

The findings of this study challenge conventional assumptions in both theory and practice, revealing that eco-entrepreneurship in informal urban settlements is not just an economic and environmental initiative, but a deeply political and social process. The study supports the notion that eco-entrepreneurship is not only about economic or environmental outcomes but is inherently socially embedded (Hart & Sharma, 2004). Entrepreneurs in the study were found to innovate in bottom-up ways conversely to the usual top-down structure (Harper, 2018) which simultaneously creates environmental value and social inclusion, aligning with Schumpeter's view of entrepreneurs as disruptors of the status quo (Schumpeter, 1934) and the social entrepreneurship literature that emphasizes solving community-based problems (Seelos & Mair, 2005).

Crucially, the findings reflect the significance of GAC in an unstructured informal context in a way that these eco entrepreneurs absorb the external environmental knowledge and devise locally adaptative strategies which helps to create market responsiveness since the firms are aware of the needs of the community (Albort-Morant et al., 2018). Surprisingly the lack of rigid institutional structures facilitates flexibility, adaptive innovation, and bottom-up initiatives however conversely it increases uncertainty and complicates scaling efforts. This duality implies that this lack of structure should not be idealised but rather handled via inclusive and responsive institutional frameworks balancing structure with support.

7.4 Critical reflections and future research

This study offers important findings and implications of how eco entrepreneurs operate in informal settlements. Although empirical saturation guided the selection of respondents, generalising or interpreting the results of this study in other settings should be carefully handled. Most of the participants are self-identified eco entrepreneurs which may have contributed to the bias in selection since those who are more confident in their professionals were more inclined to engage. This may underrepresent the people experiencing more advantages or disadvantages in the

sector. Therefore, future studies should consider doing more in-depth data within this sector by integrating more stakeholders including the municipal authorities, community people and the waste collectors to capture additional perspectives and help triangulate the results.

To gain a better understanding of the dynamics in this study, future research may take a longitudinal approach to track how eco-entrepreneurial practices, challenges, and opportunities shift over time. This would assist track changes in business approaches, institutional support, and community involvement as eco-entrepreneurs manage evolving circumstances. In addition, the data is self-reported which on one side is useful for exploring their perspectives and intentions however it may also lead to response bias especially when participants want to portray their work positively or feel pressured to show themselves as "transformative agents." Therefore, future research could integrate more objective indicators like number of marginalised people employed, percentage of waste diverted from landfills, level of community participation in awareness campaigns would improve the validity of findings. This will allow the assessment of the tangible environmental and social impacts of eco-entrepreneurial activities as well as the efficiency of their approaches.

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Appendix 1 interview guide

Introduction
Could you tell me a little bit about yourself and your entrepreneurial background?
What motivated you to start your eco-business and how did you start?
How long have you been in this business?

Nature of Activities
What kinds of waste materials do you handle?
What processes do you use to transform its value?
How do you collect the waste materials, and through which means?

Strengths of business
What factors have helped you to keep moving smoothly in your business.
What ways does your work bring about change in how waste is disposed and managed in your community and what do people in your community say about it?
What new ideas or practices have you introduced in your work and how did you come up with those ideas?
What keeps you different from the rest of other businesses and how do you think this helps your work?
What would help you improve your business?

Challenges of business
What problems have you experienced in operating your business?
How do they impact your business?
How have you managed to navigate these challenges?
How does the local community support or hinder your work?

Future plans and strategies for growth.
What are your long-term goals and how do you want your business to grow?
What support would help you scale up and which is most important of all.

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