

Examining Waste Disposal Practices of Women's Artificial Hair from a Circular Economy Perspective: A Qualitative Study of Hair Owners in Lusaka District, Zambia

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Abstract

The global beauty industry has witnessed rapid growth in the use of synthetic hair products, yet the disposal of these non-biodegradable materials remains poorly documented, particularly in developing countries. In Lusaka District, Zambia, where artificial hair holds cultural and aesthetic significance among women, limited empirical evidence exists on how this waste stream is managed or how circular economy approaches could support sustainable disposal practices. This study examined women's artificial hair disposal practices in Lusaka District from a circular economy perspective. Specifically, it explored current disposal practices, barriers to circular waste management, and opportunities for developing sustainable management systems within the beauty sector. An exploratory qualitative case study design was employed and guided by the Theory of Planned Behavior, Circular Economy, and Stakeholder Theories. Participants were purposively selected from key actors within the artificial hair value chain and recruited until data saturation was achieved, resulting in 36 participants comprising consumers (18), salon operators (10), and hair waste pickers (8). Data were collected through semi-structured interviews and a focus group discussion and analyzed thematically. Findings revealed that artificial hair is predominantly disposed of through mixed household waste and open burning, reflecting a largely linear waste management system. Barriers to circular practices included limited awareness of circular economy principles, inadequate recycling infrastructure, socio-cultural concerns surrounding the misuse of hair for ritual purposes, and economic constraints affecting salon operators. Despite these challenges, participants expressed willingness to engage in collection initiatives when supported by incentives and institutional partnerships. The study concludes that while artificial hair waste management in Lusaka remains predominantly linear, significant potential exists for transition toward circular systems through improved infrastructure, public awareness, incentives, and stakeholder collaboration. The study contributes empirical insight into an under-researched plastic waste stream and offers policy-relevant recommendations for sustainable urban waste management.

Keywords: Circular Economy, Synthetic Hair Waste, Waste Disposal Practices, Extended Producer Responsibility, Sustainable Waste Management, Lusaka District.

Introduction

The global transition toward a circular economy, which seeks to eliminate waste and keep materials in use, has gained significant traction across numerous industries (Kirchherr et al.,

2023). In Zambia, research and policy attention have increasingly focused on waste streams such as general plastics, electronic waste, and municipal solid waste and their environmental and public health implications (Mwanza & Mbohwa, 2019; Sanana & Mwanza, 2024). However, comparatively little attention has been directed toward artificial hair waste, despite its growing use and its potential contribution to plastic pollution, landfill accumulation, and resource loss associated with the disposal of non-biodegradable synthetic fibers (Oloyede, 2025). Across many African societies, synthetic wigs, weaves, and extensions have become important forms of beauty enhancement, identity expression, and professional presentation. As a major urban center, Lusaka reflects these broader trends through the extensive use of affordable synthetic hair products (Wilson et al., 2019; Chudi-Duru, 2024). Despite their widespread use, the post-consumer journey of these materials remains largely undocumented, with disposal practices occurring informally and often invisibly within households, salons, and public spaces (Wilson et al., 2019; Chudi-Duru, 2024).

This qualitative study therefore sought to examine the waste disposal practices of women's artificial hair among hair owners in Lusaka District. In the context of this study, the term "hair owners" was used to refer to both salon operators who install or handle synthetic hair and consumers who wear synthetic hair, as both groups contribute to the generation of synthetic hair waste. By exploring how, why, and where artificial hair is disposed of, and by identifying the cultural, social, and infrastructural factors that shape these practices, the study aimed to uncover both the barriers and opportunities for transitioning toward more circular systems such as reuse, recycling, or material recovery within the local context (The Ellen MacArthur Foundation, 2013). In doing so, the research addresses a critical gap in both circular economy scholarship and urban waste management research, offering empirically grounded insights that are essential for policymakers, environmental practitioners, and the beauty industry alike.

Research Problem

The global demand for artificial hair products has increased considerably, with plastic-based synthetic hair widely produced to supplement or replace natural hair. Their growing use is driven by beauty standards and cultural norms, particularly among Black women, who collectively spend more than US\$1 billion annually on artificial hair products (Gonçalves, et al., 2026). This increasing demand is also reflected in commercial market projections, which estimated that the global artificial hair market was valued at approximately US\$7.5 billion in 2022 and is projected to reach US\$13.5 billion by 2031 (Transparency Market Research, 2022). Against this backdrop, Zambia is experiencing rapid urbanization, increasing consumption of plastic-based consumer products, and growing pressure on urban waste management systems (UN-Habitat, 2022; Sanana & Mwanza, 2024), making the management of emerging plastic waste streams such as artificial hair an increasingly important environmental concern.

Despite the expansion of this industry, the environmental implications of artificial hair disposal remain largely overlooked. Most synthetic hair products are made from plastic polymers that can take between 20 and 200 years to degrade, during which they release harmful substances into soil and water systems (Chudi-Duru, 2024; Oloyede, 2025). Globally, plastic waste recycling rates remain low, with less than 10% of plastic waste being recycled while the majority is landfilled, incinerated, or mismanaged (OECD, 2022). Similar challenges are evident in Zambia, where approximately 438,000 tons of plastic waste are generated annually in Lusaka, yet only about 10–15% is recycled (UN-Habitat, 2022; LISWMC, 2023). With these statistics, it is clear that much of what is deemed as plastic may not be inclusive of synthetic hair because existing literature primarily addressed general plastic waste management strategies (Mwanza & Mbohwa, 2019) without delving into the unique challenges posed by synthetic hair waste in Zambia.

If this research was not conducted therefore, the negative implications on the environment could be profound. The study aimed to fill this gap by qualitatively assessing the current disposal practices among hair owners, and their readiness to adopt circular economy practices in Lusaka District which is both a hub of beauty and a city that grapples with waste management problems (Banda, et al., 2023). By focusing on this sector, the research sought to provide tailored insights that could inform effective waste management strategies and promote sustainability in the beauty industry.

Purpose of the Study

The purpose of the study was to qualitatively examine the waste disposal practices of women's artificial hair among hair owners in Lusaka district from a circular economy perspective. The study further sought to provide insights into how circular economy principles could be applied to improve the management of artificial hair waste and reduce its environmental impact.

Objectives of the Study

1. To describe current disposal practices for women's artificial hair among hair owners in Lusaka District.
2. To examine the challenges hindering the adoption of circular economy approaches to artificial hair waste in Lusaka District.
3. To explore opportunities for developing sustainable circular economy practices for artificial hair waste within the beauty sector in Lusaka District.

Research Questions

1. How are women's artificial hair disposal practices currently carried out among hair owners in Lusaka District?
2. Why are the adoption of circular economy approaches to artificial hair waste hindered among consumers and salon operators in Lusaka District?

3. What opportunities exist for developing sustainable circular economy practices for artificial hair waste within the beauty sector in Lusaka District?

Theoretical Framework

This study adopted a multi-theoretical framework incorporating the Circular Economy, Theory of Planned Behavior, and Stakeholder Theories to capture the complexity of artificial hair waste generation and recovery. The multi-theoretical approach was adopted because no single theory adequately explains the behavioral, institutional, and sustainability dimensions of artificial hair waste management. Using multiple theories enables a more comprehensive understanding of complex phenomena by integrating different analytical perspectives (Creswell & Poth, 2018). In this study, the Circular Economy theory explains resource recovery and sustainable waste management systems, the Theory of Planned Behavior explains behavioral intentions influencing disposal practices (Ajzen, 1991), and Stakeholder Theory highlights the roles and interactions of actors involved in waste management (Freeman, 1984). The integration of these theories therefore provides a holistic framework for understanding both behavioral and systemic factors shaping artificial hair waste management (Creswell & Creswell, 2018).

The three theories complement each other by addressing different dimensions of artificial hair waste management. The Theory of Planned Behavior explains the behavioral dimension of the problem by examining how attitudes, subjective norms, and perceived behavioral control influence the disposal decisions of artificial hair users and salon operators (Ajzen, 1991). These behavioral factors help explain why artificial hair is commonly discarded through conventional waste streams. The Circular Economy framework provides a systems perspective by focusing on how synthetic hair materials could be recovered, reused, or recycled instead of following a linear “use-and-dispose” pathway (The Ellen MacArthur Foundation, 2013). This framework thus informs the identification of circular opportunities such as collection systems, recycling initiatives, and product redesign within the beauty sector. Stakeholder Theory on the other hand complements these perspectives by highlighting the role of multiple actors involved in artificial hair waste management, including consumers, salon operators, waste collectors, regulators, and product suppliers (Freeman, 1984). The theory emphasizes that successful circular economy interventions require collaboration among these stakeholders to establish effective recovery and recycling systems. In a nutshell, these theories provide a multi-level analytical lens for the study and they are discussed in details in the proceeding paragraphs.

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) was developed by Icek Ajzen in 1991 and posits that individual behavior is primarily driven by behavioral intentions, which are influenced by three key components: attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). This framework suggests that if individuals believe that

their actions will lead to positive outcomes, and if they perceive social support for those actions, they are more likely to engage in those behaviors. The TPB has been widely applied in various fields, including health psychology, environmental behavior, and consumer studies, demonstrating its versatility in explaining how attitudes and social influences affect decision-making (Armitage & Conner, 2001).

In the context of this study, the TPB is particularly relevant as it helped to understand the intentions of women and girls regarding the disposal of synthetic hair. By examining how environmental awareness, social norms, and perceived ability to recycle or reuse affect their behaviors, the study gained insights into the factors that drive sustainable waste disposal practices. Previous research has shown that enhancing awareness of environmental issues can significantly influence intentions and behaviors related to waste management (Amir, Miru, & Sabara, 2025). Thus, applying the TPB allowed the study to identify specific interventions that could promote more responsible disposal practices among users of synthetic hair, contributing to a more sustainable beauty industry.

Circular Economy Theory

The Circular Economy Theory, as articulated by the Ellen MacArthur Foundation in 2013, advocates for a systemic shift from the traditional linear economic model of "take-make-dispose" to a circular model that emphasizes designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. This approach encourages the reuse, recycling, and remanufacturing of products, thereby closing the loop and minimizing environmental impact (The-Ellen-MacArthur-Foundation, 2013). The Circular Economy Theory has gained traction in various sectors, including fashion and beauty, where the emphasis on sustainability is becoming increasingly critical (Muthu, 2025).

In this study, the Circular Economy Theory was applied to analyze the lifecycle of synthetic hair products and identify opportunities for reuse, repurposing, or recycling within the local supply chain. By understanding how synthetic hair can be integrated into a circular economy framework, the research aimed to highlight practical solutions for reducing waste and promoting sustainable practices in the beauty industry. Studies have demonstrated that implementing circular economy principles can lead to significant reductions in resource consumption and waste generation, making this theory particularly relevant for addressing the environmental challenges posed by synthetic hair waste (Purushothaman, Alamelu, Selvabaskar, & Sudha, 2025). By applying this theory, the study sought to contribute to the development of sustainable waste management strategies that align with circular economy principles.

Stakeholder Theory

Stakeholder Theory, introduced by R. Edward Freeman in 1984, posits that organizations should consider the interests of all stakeholders those who affect or are affected by the organization's actions rather than focusing solely on shareholders. This theory emphasizes

the importance of engaging various stakeholders, including consumers, employees, suppliers, communities, and regulators, in decision-making processes (Freeman, 1984). Stakeholder Theory has been widely supported by research indicating that organizations that adopt a stakeholder-oriented approach tend to achieve better long-term performance and sustainability outcomes (Awa, 2024).

In the context of this study, Stakeholder Theory was utilized to identify and engage key stakeholders involved in the lifecycle of synthetic hair products, such as salon owners, importers, waste collectors, environmental regulators, and local communities. By considering the diverse perspectives and interests of these stakeholders, the study aimed to foster collaborative and inclusive circular economy interventions for managing synthetic hair waste. Research has shown that stakeholder engagement is critical for developing effective sustainability strategies, as it enables organizations to address the concerns and expectations of various groups (Huynh & Nguyen, 2025). Thus, applying Stakeholder Theory in this study not only enriches the understanding of the complexities surrounding synthetic hair waste but also facilitates the co-creation of innovative solutions that benefit all parties involved.

The integration of the Theory of Planned Behavior, Circular Economy Theory, and Stakeholder Theory provides a comprehensive framework for examining artificial hair waste management in Lusaka District. The Theory of Planned Behavior informs the study objective on understanding current disposal practices by explaining how attitudes, social norms, and perceived behavioral control influence how women and salon operators dispose of artificial hair. Circular Economy Theory guides the identification of opportunities for sustainable waste management by emphasizing material recovery, reuse, and recycling within the beauty sector. Stakeholder Theory supports the examination of structural and institutional barriers by highlighting the roles and interactions of key factors such as salon owners, consumers, waste collectors, regulators, and product suppliers in enabling or constraining circular waste practices. Together, these theoretical perspectives provide a multi-level analytical lens for understanding behavioral patterns, systemic waste management challenges, and potential circular economy interventions within the artificial hair value chain.

Literature Review

Overview of Waste Disposal Practices

Waste disposal practices vary globally, shaped by regulatory capacity, economic conditions, and cultural norms. At the global level, large volumes of waste are still poorly managed, with more than two billion tons generated annually and a significant proportion ending in landfills or uncontrolled dumping, contributing to environmental degradation and resource loss (Kaza et al., 2018). Consequently, sustainable waste management strategies such as recycling and recovery are increasingly emphasized within global environmental policy frameworks (UNEP/ISWA, 2024).

In developed regions, waste governance has progressively shifted toward circular approaches supported by regulatory targets and public awareness, such as those promoted under the European Union's circular economy policies (ECDGE, 2020). In contrast, many developing regions, including Sub-Saharan Africa, continue to face weak infrastructure, limited financing, and low recycling coverage, resulting in persistent reliance on open dumping (Kaza et al., 2018; Adedara et al., 2023).

In Zambia, similar structural constraints exist, including weak recycling systems, limited infrastructure, and low enforcement capacity (Mwanza & Mbohwa, 2019). National policy acknowledges challenges such as poor waste handling practices and limited awareness (MGEE, 2025). However, existing literature focuses mainly on general waste streams, with limited attention to niche waste such as artificial hair, highlighting a clear research gap.

Current Hair Waste Disposal Practices among Product Owners or Consumers

The disposal of women's artificial hair (wigs, braids, and extensions) is increasingly recognized as an environmental concern because synthetic hair is predominantly manufactured from non-biodegradable plastic fibers and is widely used to supplement or replace natural hair. Reflecting its growing significance within the beauty industry, Black women alone spend more than US\$1 billion annually on artificial hair products, underscoring the scale of consumption and the potential for substantial post-consumer waste generation (Gonçalves et al., 2026). Although precise estimates of artificial hair waste remain unavailable, synthetic hair products typically have relatively short lifespans of between three and six months (Wilson et al., 2019), suggesting that considerable volumes of plastic waste are generated but remain largely unquantified.

Across the available literature, there is broad consensus that artificial hair waste is managed predominantly through linear disposal pathways, with limited opportunities for reuse, recycling, or material recovery. Wilson et al. (2019), using survey data from users in the United Kingdom, found that between 58% and 96% of synthetic hair products were disposed of through general household waste, indicating minimal recovery at end-of-life. Similarly, Oloyede (2025) highlights the environmental persistence of synthetic hair, emphasizing its long-term accumulation in landfills and its potential contribution to microplastic pollution. While these studies converge in that they identify linear disposal as the dominant practice and raising concerns about the environmental implications of synthetic hair waste, they differ in methodological focus. Wilson et al. (2019) provides empirical evidence on consumer disposal practices, whereas Oloyede (2025) offers a conceptual discussion of the environmental consequences of synthetic hair use and the need for more sustainable alternatives. Despite these complementary contributions, both studies are situated outside the Zambian context and provide limited insight into disposal behaviors, socio-cultural influences, or circular economy opportunities in sub-Saharan African cities. Consequently, important knowledge gaps remain regarding how artificial

hair waste is generated, managed, and valued within urban contexts such as Lusaka District.

Although empirical evidence on artificial hair waste remains limited across sub-Saharan Africa, the available studies point to a consistent pattern of predominantly linear disposal. Research from Nigeria (Chudi-Duru, 2024), Ghana (Gonçalves et al., 2026), South Africa, and Kenya (Effossou, 2025) indicates that synthetic hair is commonly discarded through household or salon waste streams, with little evidence of organized recycling or material recovery. Across these studies, there is broad agreement that artificial hair remains largely excluded from formal circular systems. However, they also demonstrate that poor recovery cannot be attributed solely to individual disposal behavior. Rather, weak waste management infrastructure, inadequate waste segregation facilities, and the absence of dedicated recovery pathways collectively constrain opportunities for reuse and recycling. While the studies agree on the persistence of linear disposal practices, they differ in emphasis, with some focusing primarily on consumer behavior and others highlighting the material characteristics and environmental implications of synthetic hair waste. Despite these complementary contributions, artificial hair continues to receive limited scholarly and policy attention compared with other plastic waste streams. This knowledge gap is particularly evident in Zambia, where research has examined broader plastic waste management challenges (Mwanza, 2018; Mwanza & Mbohwa, 2019) but has not specifically investigated the disposal and circular management of artificial hair waste.

Existing Hair Waste Disposal Practices among Salon owners and Circular Economy Awareness

Salons are key actors in synthetic hair waste generation due to their central role in installing and handling wigs, braids, and extensions. However, evidence indicates that salon waste is largely disposed of through general waste streams, ultimately ending in landfills or, in some cases, entering waterways, with minimal recovery or recycling (Oloyede, 2025; Chudi-Duru, 2024; Effossou, 2025). This reflects a predominantly linear system, despite salons occupying a strategic position within the value chain where circular interventions could be implemented.

Evidence from high-income settings suggests growing recognition of the hairdressing sector as a potential contributor to circular economy objectives. Oloyede (2025) highlights emerging efforts to divert synthetic hair from landfill through recovery and repurposing initiatives, including the transformation of hair waste into products such as absorbent booms and mats. Expanding on these developments, Hodgson et al. (2024) found that circular economy practices within the hairdressing industry increasingly encompass waste reduction, reuse, recycling, and resource recovery, although implementation remains uneven. Together, these studies suggest that salons can serve as strategic collection and aggregation points within circular systems when supported by appropriate infrastructure and partnerships. This potential is further illustrated by industry-led initiatives such as Green Circle Salons and TerraCycle's SalonCycle programme, which provide practical

examples of salon-based waste recovery systems (TerraCycle, 2026; Green Circle Salon, 2026). These initiatives illustrate the practical feasibility of circular economy integration at salon level, particularly when supported by organized collection infrastructure and industry partnerships.

In contrast to high-income contexts where salon-based circular economy systems are seemingly becoming structured and supported by organized recovery mechanisms, evidence from African contexts indicates that synthetic hair waste generated within salon and household settings remains largely unmanaged within formal systems. Across these contexts, salons function as key nodes in the installation and removal of synthetic hair, yet waste is principally channeled into general household or municipal streams due to limited infrastructure and weak segregation systems. Empirical evidence from Ghana shows that synthetic hair is mainly discarded through household waste or incineration, resulting in substantial unregulated waste flows and minimal recovery outcomes (Gonçalves et al., 2026). Similarly, South African salon contexts demonstrate that weak institutional support and inadequate waste management infrastructure constrain the adoption of circular practices within beauty service environments, reinforcing linear disposal pathways (Mokhethi, 2024). Within these structurally constrained systems, limited informal recovery and repurposing of synthetic hair into secondary products is occasionally observed, as reported in regional media accounts from West and East Africa, although these practices remain fragmented and outside formal waste management frameworks (SABC News, 2026; DW, 2026; Majanga, 2026). Collectively, the evidence suggests that while salon-generated synthetic hair waste is widespread across African urban contexts, its management remains largely linear, with only marginal and uncoordinated forms of circularity emerging at the informal level.

In Zambia, salon environments and household settings that generate synthetic hair waste operate within a broader municipal waste system characterized by predominantly linear material flows and limited recovery capacity. In Lusaka, approximately 438,000 tons of plastic waste are generated annually, yet only about 10–15% is recycled, reflecting structural constraints in collection, segregation, and recycling systems (UN-Habitat, 2022; LISWMC, 2023). Within such a system, emerging plastic-based waste streams, including synthetic hair, are likely to be assimilated into general waste flows rather than managed through dedicated recovery pathways. Although a growing body of literature addresses plastic waste management and circular economy transitions in Zambia, these studies largely focus on general municipal solid waste, packaging plastics, and electronic waste, with little to no empirical attention directed toward synthetic hair as a distinct and emerging waste stream (Mwanza, 2018; Mwanza & Mbohwa, 2019; Sanana & Mwanza, 2024). This highlights a clear sector-specific gap in both academic and policy discourse, despite the relevance of salon-based consumption to urban plastic waste generation.

Across the reviewed literature, Zambia and other African contexts converge in the dominance of linear disposal systems and weak circular economy support within salon

environments. Divergence is evident in informal recovery, which is reported in Ghana and Kenya but remains largely undocumented in Zambia. However, the reviewed literature did not identify studies specifically examining synthetic hair waste within Zambian salons, revealing an important empirical gap in circular economy research within the country's beauty sector.

The Primary Socio-Economic and Logistical Barriers Preventing the Adoption of Circular Hair Waste Practices

Several studies identify socio-economic and logistical constraints as major barriers to the adoption of circular economy practices within waste management systems. Across the literature, there is broad conjunction that inadequate waste segregation infrastructure, limited environmental awareness, weak stakeholder coordination, and insufficient institutional support constrain the transition to circular waste management (Mokhethi & Knight, 2024). Similar challenges are evident in Zambia, where recycling systems remain underdeveloped, waste segregation is limited, and public participation in recycling initiatives remains low (Mwanza & Mbohwa, 2019; LISWMC, 2023). While these studies provide important insights into general plastic and municipal waste management, they give little attention to niche plastic waste streams such as synthetic hair, leaving the socio-economic and logistical barriers within the beauty sector largely unexplored.

Limited collaboration among stakeholders further constrains the adoption of sustainable waste management practices. Across the literature, there is strong convergence that effective circular economy systems depend on coordinated engagement among governments, industry, waste service providers, and local communities (Pratama et al., 2022; Bajare et al., 2024). While both studies recognize collaboration as fundamental, Pratama et al. (2022) primarily emphasize stakeholder governance and shared responsibility, whereas Bajare et al. (2024) place greater emphasis on integrated value-chain coordination and institutional arrangements. Collectively, these studies suggest that fragmented stakeholder engagement limits the establishment of effective collection, recycling, and resource recovery systems.

Beyond the lack of stakeholder collaboration, the absence of Extended Producer Responsibility (EPR) frameworks presents even more challenges where structured mechanism for addressing synthetic hair waste is concerned. EPR extends a producer's responsibility beyond the point of sale to include the post-consumer stage of a product's life cycle, thereby shifting part of the waste management burden from municipalities and small businesses like salons to manufacturers and importers (OECD, 2016). However, there is currently little evidence that manufacturers of artificial hair products are implementing take-back or recycling initiatives, this becomes a very difficult trajectory to embark on especially because for Zambia, most manufacturers and primary distributors of synthetic hair products are located outside the country (specifically China, Japan and Korea), reducing the feasibility of enforcing national take-back or recycling obligations at the local level (Wilson et al., 2019). This structural disconnect constrains domestic policy

effectiveness despite the recognized value of EPR as a mechanism for shifting post-consumer waste responsibility from municipalities to producers (OECD, 2016). Consequently, waste streams such as synthetic hair fall outside existing regulatory attention under EPR, leaving municipalities and informal actors to manage their disposal. Economic constraints are yet another factor that significantly influence the capacity of small salon operators to invest in sustainable waste management practices. Small and Medium-sized Enterprises (SMEs), particularly in developing economies, often operate under tight financial margins and prioritize short-term operational survival over long-term environmental investments (OECD, 2018; Banda et al, 2024). This short-term financial orientation can limit the adoption of sustainability measures that require upfront capital, even when long-term environmental benefits are evident (Gupta & Trivedi, 2021). In the absence of targeted government incentives, subsidies, or regulatory enforcement mechanisms, businesses may lack both the motivation and financial capacity to transition toward circular practices (UNEP, 2021). However, all these findings suggest that economic barriers may similarly hinder the adoption of circular synthetic hair waste practices among salon operators.

Cultural beliefs may also influence waste disposal practices by shaping how individuals perceive and handle discarded materials. Beyond environmental and economic considerations, disposal decisions are often embedded within broader social and cultural norms, including beliefs about the symbolic or spiritual significance of certain materials (Ajzen, 1991). Although the literature on synthetic hair waste has largely focused on environmental and circular economy concerns, there is limited empirical attention to how cultural beliefs and local practices influence its disposal, particularly within African contexts. This represents an important gap, as culturally informed behaviors may either facilitate or hinder the adoption of circular waste management practices.

Potential Opportunities for Implementing Sustainable Hair Waste Systems

Despite persistent waste management challenges in Zambia, including limited awareness, weak infrastructure, and weak enforcement of environmental policies (Banda et al., 2023), the literature also identifies several opportunities for advancing circular waste management. A recurring theme across studies is the importance of environmental education and capacity building in promoting sustainable waste practices. UNESCO-UNEVOC (2022) argues that integrating circular economy principles into technical and vocational education can equip future practitioners with the knowledge and skills needed to support resource recovery and waste reduction. This suggests that strengthening environmental education within the beauty sector could improve awareness of sustainable synthetic hair disposal and create a foundation for more circular waste management practices.

Stakeholder collaboration was also identified in the literature as a key enabling factor for effective circular waste management systems. According to Pratama et al., (2022),

coordinated engagement among governments, businesses, waste service providers, and consumers is essential for establishing efficient collection and recovery systems. In this regard, improving collaboration within the waste value chain presents an important opportunity for strengthening circular practices in emerging waste streams such as synthetic hair, particularly where current systems remain fragmented and uncoordinated. Policy incentives and innovation further present potential pathways for improvement. Research shows that SMEs are more likely to adopt sustainable practices when supported by regulatory frameworks, incentives, or financial support mechanisms (Chisanga et al., 2024; Clube & Hazembe, 2024). In addition, emerging material innovations, such as biodegradable alternatives to synthetic fibers, demonstrate potential for reducing plastic-based hair waste in the long term (Chelangat, 2025; Nakkazi, 2024). Extended Producer Responsibility (EPR) also represents a possible policy mechanism for addressing post-consumer waste by shifting responsibility from municipalities to producers (OECD, 2016). However, implementation remains challenging because most synthetic hair products are manufactured outside Zambia, limiting the feasibility of national enforcement despite growing global advocacy for EPR adoption (UNEP, 2021). Overall, although several opportunities for advancing sustainable hair waste systems exist, most circular economy initiatives focus on general plastic waste rather than beauty-sector products. Consequently, synthetic hair waste remains largely overlooked in both policy and research, particularly within African urban contexts such as Lusaka.

Research Methodology

Research Philosophy and Approach

The study adopted an interpretivist philosophy, which focused on understanding individual lived experiences within real-world contexts (Creswell & Poth, 2018). This perspective was appropriate because artificial hair waste management is shaped by social perceptions, cultural norms, and economic considerations. A qualitative approach was employed to enable in-depth exploration of stakeholder experiences and perspectives regarding waste disposal practices.

Research Design

This study employed an exploratory qualitative case study design to examine women's artificial hair disposal practices among hair owners in Lusaka District from a circular economy perspective. The design was appropriate given the limited research on artificial hair waste management in Zambia and enabled in-depth exploration of participants' behaviors, perceptions, and contextual factors influencing disposal practices (Creswell & Poth, 2018).

The Population and Location of the Study

The study population comprised stakeholders directly involved in or affected by artificial hair waste disposal in Lusaka District, particularly the Central Business District (CBD),

including salon owners, consumers, and informal waste pickers. Lusaka was selected due to its high concentration of beauty salons and artificial hair product retailers.

Sampling

Sampling Techniques

The study employed purposive (judgmental) sampling to select salon owners, consumers, and hair waste pickers in the Central Business District (CBD). This approach enabled the selection of information-rich participants with direct experience in artificial hair use, disposal, and waste recovery practices. The technique was appropriate for the qualitative design and the absence of a reliable sampling frame for artificial hair users and informal waste pickers.

Sample Size

The study comprised a total of 36 participants, including 18 artificial hair consumers, 10 salon owners, and 8 informal waste pickers. These groups were purposively selected as key stakeholders in artificial hair use, disposal, and recovery within the study area. In qualitative research, sample size is not statistically determined but guided by data saturation, which refers to the point at which data collection yields no new themes or insights (Creswell, 2014). In this study, data collection continued until responses from participants began to repeat across interviews (for example, mixed waste disposal, burning practices and limited awareness of recycling options) hence indicating that saturation had been reached and no further interviews were necessary. The selected sample size was considered sufficient as it enabled the study to capture diverse yet repeated patterns of experience across the three stakeholder groups. This aligns with Fusch & Ness (2015) and Creswell & Poth (2018), who note that qualitative studies typically rely on small, focused samples that allow for depth rather than generalization. Data collection was concluded once thematic saturation was reached within each participant category, indicating that additional interviews were unlikely to generate new insights.

Data Collection Instruments

Data were collected using semi-structured interview guides and a focus group discussion guide. Separate but thematically aligned instruments were developed for consumers, salon operators, and informal waste pickers to reflect their distinct roles in the artificial hair value chain. The instruments were structured around common thematic areas derived from the study objectives, including disposal practices, awareness of circular economy and recycling pathways, barriers to sustainable waste management, and opportunities for improving circular economy systems.

The instruments were further informed by the study's theoretical frameworks; Theory of Planned Behavior guided questions on attitudes, subjective norms, and perceived behavioral control in relation to disposal choices and recycling behavior. Circular Economy

principles informed questions on material recovery, reuse, and waste valorization, while Stakeholder Theory informed exploration of roles, responsibilities, and interactions among consumers, salon operators, waste pickers, and institutional actors. Across all instruments, open-ended questions and probing techniques were used to enable participants to provide detailed accounts of their experiences. This alignment between objectives, theoretical constructs, and interview content enhanced consistency across participant groups while allowing for contextual depth, thereby strengthening triangulation.

Trustworthiness of the Instruments

To ensure trustworthiness of the qualitative instruments and findings, the study adopted Lincoln and Guba (1985)'s criteria of credibility, dependability, confirmability, and transferability.

1. Credibility was enhanced through pilot testing of the interview guide with four participants (two salon owners and two consumers), which improved clarity, flow, and alignment with the research objectives. Methodological triangulation was also applied through the use of semi-structured interviews and focus group discussions across multiple stakeholder groups (salon owners, consumers, and informal waste pickers), allowing comparison and corroboration of findings. In addition, member checking was conducted by summarizing participants' responses during interviews and confirming accuracy in real time.
2. Dependability was ensured through the maintenance of an audit trail comprising interview transcripts, field notes, and documentation of the data collection and analysis process, enabling transparency and procedural consistency.
3. Confirmability was strengthened through reflexivity, where the researcher kept a reflective journal to document assumptions, biases, and decision-making processes, ensuring that findings were grounded in participant responses rather than researcher subjectivity as detailed in section 3.7 below.
4. Transferability was supported through the provision of rich descriptions of the study context, participants, and settings, enabling readers to assess applicability to similar contexts.

Reflexivity Statement

The researcher conducted this study as a postgraduate student with a background in Geography and an interest in environmental sustainability and circular economy approaches. While most participants were previously unknown to the researcher, a small number of consumer participants were known through existing social networks. The researcher recognized the potential influence of prior familiarity and therefore employed a consistent interview guide, encouraged open responses, and maintained confidentiality throughout the study. Consumers were selected based on their use of artificial hair, salon operators based on their involvement in handling artificial hair products, and waste pickers based on their engagement in artificial hair recovery activities. Themes were developed

from participants' accounts and supported by direct quotations to ensure that interpretations remained grounded in the data.

Data Analysis

The data collected from interviews and document analysis were analyzed using thematic analysis, following Braun & Clarke (2006) six-phase process: familiarization with the data, generation of initial codes, identification of themes, review of themes, definition and naming of themes, and reporting. The analysis focused on exploring themes related to waste disposal practices, barriers to sustainable practices, awareness of circular economy principles, and factors influencing the adoption of circular economy practices in the beauty industry. This method allowed for flexible identification of patterns of meaning while remaining closely connected to the participants' narratives as possible.

Ethical Considerations

Ethical approval was obtained from the University of Zambia's Directorate of Research and Development with IRB number 00006464 prior to data collection. Participation in the study was voluntary, and informed consent was obtained from all participants after the researcher clearly explained the purpose of the study, procedures, and expected time commitment (approximately 30 minutes). This ensured that participants made informed decisions regarding their involvement. Interviews with salon owners were conducted at their salons at times convenient to them, while consumers were approached based on the researcher's judgement that they were users of artificial hair. The focus group discussion with informal waste pickers was held at the Lusaka City Council Dumpsite, where they regularly operate, to ensure the discussion reflected their lived working context and experiences.

Confidentiality, anonymity, and privacy were strictly maintained throughout the study. Participants were assigned pseudonymous codes such as CR (consumers), SR (salon owners), and WR (waste pickers), with numerical identifiers (e.g., CR1, SR2, WR3) used when presenting findings to ensure that no individual could be identified. The study also ensured that participants were not exposed to physical or emotional harm during data collection. Where necessary, local language was used to facilitate clear communication and avoid language barriers. Finally, the study adhered to academic integrity by avoiding plagiarism and ensuring that data were not altered or misrepresented during analysis and reporting.

Research Findings and Data Analysis

To ensure participant anonymity, respondents were assigned identification codes. Consumer respondents were coded as CR, salon operators as SR, and waste pickers as WR, with the number indicating the specific participant (e.g., CR1, SR3, WR2). These codes are used throughout the presentation of verbatim responses.

As indicated in the methodology chapter, the study employs a qualitative research design to address the following research questions:

1. How are women's artificial hair disposal practices currently carried out among hair owners in Lusaka District?
2. Why are the adoption of circular economy approaches to artificial hair waste hindered among consumers and salon operators in Lusaka District?
3. What opportunities exist for developing sustainable circular economy practices for artificial hair waste within the beauty sector in Lusaka District?

Demographic Profile of Respondents

Structured demographic data was available for the 18 consumer respondents. The salon interviews and dumpsite discussion did not provide a full socio-demographic breakdown in the same format. The consumer sample was dominated by respondents aged 26–35 years, showing that the study mainly captured views from economically active women who are regular users of artificial hair products. In addition, the sample was highly educated, with nearly all respondents indicating college/university education. This profile suggests that even among relatively educated users, awareness of circular economy practices for artificial hair remains limited, which is an important finding.

Table 4.1: Consumer demographic profile (n = 18)

Variable	Category	Frequency	Percentage
Age	18–25	4	22.2%
	26–35	11	61.1%
	36–45	3	16.7%
Education	Secondary	1	5.6%
	Tertiary	17	94.4%

It is also important to note that the salon dataset comprised 10 salon-owner/operator interviews, while the focus group discussion at Lusaka City Council dumpsite involved 8 female informal waste pickers. Although these two data sources did not provide full demographic tables, they were crucial in explaining how artificial hair waste moves from salons and households into municipal waste systems and, in limited cases, into informal recovery channels.

Summary of Themes and Codes

Table 4.2: Themes and codes Emanating from the data

Objective	Theme	Code 1	Code 2	Code 3
Objective 1	Mixed disposal with general waste	Artificial hair is disposed of together with general waste	There is over reliance on council waste collection for disposal	There is absence of segregation systems for artificial hair

Objective	Theme	Code 1	Code 2	Code 3
Objective 1	Burning as a common disposal route	Open burning used as the cheapest disposal option for artificial hair waste	Burning artificial hair considered as the most convenient disposal method	Awareness that burning produces harmful smoke that pollute the environment
Objective 1	Limited reuse and informal value recovery	Used artificial hair is given away to others for reuse	Wigs are remade from previously used weaves (synthetic hair)	selective salvage is conducted on used artificial hair so as to keep what is nearly new and discard the rest
Objective 2	Low awareness of circular economy	The concept of Circular Economy is unfamiliar to the users	Recycling knowledge of artificial hair is poor	There are no known contact points on hair recycling/ repurposing
Objective 2	Weak infrastructure for circular practices	No recycling centers are currently available	There are few collection systems that exist	Available waste collection provides irregular/ undifferentiated services
Objective 2	Socio-cultural and economic barriers	There are existing ritual fears among hair owners	Users are unwilling to pay extra for hair specific waste collection	Convenience-first behavior viewed to be more relevant than the effects of burning on the land or environment
Objective 3	Incentives as drivers of participation	Provision of financial incentives or cash rewards to encourage participation in hair waste collection	Exchange of discarded artificial hair for cash due to perceived economic value	Public recognition or reward systems for individuals and salons participating in recycling
Objective 3	Partnerships and collection networks	Utilization of hair salons as designated collection points for artificial hair waste	Collaborative linkages between artificial hair producers, salons, and recycling enterprises	Partnerships between local councils and private sector actors to support collection systems
Objective 3	Institutional support and	Public awareness campaigns on environmental	Provision of waste separation bins specifically for	Provision of training programs and operational

Objective	Theme	Code 1	Code 2	Code 3
	public sensitization	impacts and recycling of artificial hair waste	artificial hair disposal	guidelines for proper artificial hair waste management

Findings in Relation to Objective One

Objective One: To Describe Current Disposal Practices for Women's Artificial Hair Owners in Lusaka District

Theme 1: Mixed disposal with general waste

The findings indicate that the dominant disposal practice for artificial hair among consumers and salon operators in Lusaka District is co-disposal with general waste, where the material is treated as ordinary refuse rather than a distinct waste stream requiring segregation or recovery. Consumers commonly reported discarding artificial hair in household or communal bins, with participants stating, *"I throw in the waste bin"* (CR1) and *"throw them in the bin"* (CR3), Salon operators described similar practices, for example, SR2 noted that waste is placed in a salon bin before the council collects it within the CBD, while SR9 explained that it is first placed in a shop bin and later emptied into the building's main bin. Participants also confirmed that artificial hair is typically mixed with other refuse because no waste separation systems exist. One consumer explained that the absence of separate disposal options *"cause[s] me to mix it with any waste like food"* (CR2), while salon operators similarly acknowledged that *"there is no waste separation... we put everything together"* (SR4). Viewed from the Theory of Planned Behavior, this practice reflects the influence of attitudes and particularly perceived behavioral control, as participants highlighted the lack of bins or guidance that would enable segregation (Ajzen, 1991). From a circular economy perspective, mixed disposal channels artificial hair, a plastic-based material, directly into linear waste streams such as landfills, limiting opportunities for reuse or recycling (Ellen MacArthur Foundation, 2013). The persistence of this practice further reflects weak coordination among stakeholders responsible for waste management, leaving consumers and salon operators with few alternatives for more sustainable disposal (Freeman, 1984).

Theme 2: Burning as a Common Disposal Route

Burning emerged as another disposal route for artificial hair among some consumers and salon operators, largely driven by convenience, cost, and the desire for immediate control over waste disposal in the absence of reliable municipal collection systems. Several participants indicated that they burn used artificial hair as a routine practice, with CR4 noting, *"I normally burn them"* while CR17 explained, *"I burn the hair in most cases and dispose of it in a bin when it resists heat"*. Salon operators expressed similar practices, with SR4 stating that hair waste is collected and later burned because it is *"a cheaper way of managing waste"*. Despite this, some participants acknowledged the drawbacks of burning,

noting that artificial hair *"doesn't easily burn and the smoke is choking and unpleasant"* (CR18), reflecting an awareness of its environmental and health implications. From the Theory of Planned Behavior, this practice appears to be shaped primarily by perceived behavioral control, as participants resort to burning due to the absence of alternative disposal infrastructure or reliable collection services (Ajzen, 1991). From a circular economy perspective, burning represents a linear disposal pathway that destroys potentially recoverable materials and contributes to environmental pollution (Ellen MacArthur Foundation, 2013). These practices reflect both individual choice and broader systemic gaps, including limited waste management infrastructure and weak coordination among relevant stakeholders (Freeman, 1984).

Theme 3: Limited Reuse and Informal Value Recovery

Although disposal practices dominated the findings, limited forms of reuse and informal value recovery were also identified, indicating small but notable instances of circular activity within the artificial hair value chain. Some consumers reported reusing or giving away hair that remained in good condition; for example, CR17 explained that they sometimes *"keep them or give them away,"* while CR6 noted that reusable wigs are given away while damaged ones are discarded. Salon operators also described occasional reuse, particularly for wigs and weaves that could be washed and resold, with one participant indicating that they *"get, wash and then sale"* hair left behind by clients (SR7), while another reported reusing good-looking wigs before eventually disposing of them (SR2). Evidence of informal value recovery also emerged from the focus group discussion with waste pickers at the Lusaka City Council Dumpsite, who reported selectively retrieving usable artificial hair from waste streams; for instance, one participant explained that they *"selectively retrieve hair that appears usable"* (WR3:2:7), particularly when trucks dump defective hair from suppliers. According to the waste pickers, recovered hair may be *"used personally or resold within our communities"* (WR4), and WR8 added that *"we assemble wigs for resale."* However, participants emphasized that most used post-consumer hair is avoided because it has little resale value, meaning recovery tends to focus on unused or lightly used hair. The observation of suppliers dumping defective artificial hair was also supported through field observation as shown in figure 4.1.



Figure 4.1: Supplier defective hair being dumped at the Lusaka City Council Dumpsite.

Source: Field Observation (2026)

These practices suggest positive attitudes toward reuse where economic value is perceived to exist (Ajzen, 1991). The findings further reflect limited forms of material recovery and product life extension within the artificial hair value chain (Ellen MacArthur Foundation, 2013), although these activities remain largely informal and uncoordinated across stakeholders involved in waste management and recovery processes (Freeman, 1984).

Findings in Relation to Objective Two

To Examine the Challenges Hindering the Adoption of Circular Economy Approaches to Artificial Hair Waste in Lusaka District

Theme 4: Low Awareness of Circular Economy and Recycling Pathways

A major challenge identified in the study is the low level of awareness of circular economy concepts and recycling pathways for artificial hair among both consumers and salon operators in Lusaka District, reflecting both conceptual and operational knowledge gaps. Consumers consistently reported no familiarity with the concept, with responses such as *"not heard of it"* (CR5), *"don't have any knowledge of what circular economy means"* (CR10), while salon operators similarly stated, *"I have never heard of the term"* (SR9) and *"The term as it is I have never heard of it"* (SR3). Beyond conceptual ignorance, participants also lacked knowledge of practical recycling pathways, with responses such as *"No"* (CR1), *"I know of nothing"* (CR13), and *"I have never heard about the existence of such a place"* (SR10), indicating absence of actionable disposal alternatives. Despite this, some participants expressed willingness to act if information were available, including requests for *"proper information or public announcements about where and how to reach the recycling centers"* (CR17) and *"step-by-step instructions"* (CR15), showing latent demand constrained by information deficits. These experiences suggest constrained perceived behavioral control regarding sustainable disposal practices (Ajzen, 1991), as participants lacked both awareness of available options and practical knowledge of how to participate in recovery

systems. The findings further point to broader circular economy challenges related to the absence of public education, awareness structures, and accessible knowledge systems necessary to support material recovery and reuse (Ellen MacArthur Foundation, 2013). In addition, the limited dissemination of information across consumers, salon operators, municipal structures, and industry actors reflects weak stakeholder coordination in the governance of artificial hair waste management (Freeman, 1984).

Theme 5: Weak Infrastructure and Limited-Service Systems

Another major barrier to sustainable artificial hair waste management identified in the study is weak infrastructure and the absence of tailored service systems for collection, recycling, or recovery in Lusaka District, which leaves disposal as the only functional option. Consumers consistently reported lack of alternatives, with CR17 stating *"There are no such services in my area,"* CR4 noting *"no specific collection services for such,"* and CR12 identifying *"lack of recycling centers"* as the key constraint, while salon operators similarly emphasized that although general waste collection exists, *"no recycling centers"* are available (SR2), indicating a system designed for disposal rather than recovery. This infrastructure gap directly shapes behavior, as participants explained that they default to mixed disposal or burning due to lack of options, with CR3 stating *"I have no other options than to just throw in the bin together with other wastes,"* illustrating how structural absence determines practice. These experiences suggest limited perceived behavioral control regarding sustainable disposal practices (Ajzen, 1991) and reflect broader circular economy concerns regarding the absence of infrastructure necessary to support material recovery and circulation (Ellen MacArthur Foundation, 2013). The findings also point to fragmented stakeholder involvement in artificial hair waste management systems (Freeman, 1984).

Theme 6: Socio-Cultural and Economic Barriers

Disposal choices for artificial hair are shaped not only by infrastructure and convenience but also by deeply embedded socio-cultural beliefs and economic constraints that reinforce existing practices and limit circular alternatives. Socio-cultural beliefs, particularly fears that used hair may be used for witchcraft or rituals, strongly influence behavior, with CR17 stating, *"Most times when I burn, it is because... it was believed that witches use hair to do magic,"* CR10 noting, *"I believe that my natural hair... can be used for witchcraft,"* and CR18 stating, *"Once you use the hair you have to burn it because witches can use it for charms,"* while SR3 observed that some clients *"fear to just have their hair thrown,"* leading to self-managed disposal. These beliefs position artificial hair as a sensitive personal object rather than ordinary waste, complicating centralized recovery systems. Economically, salon operators resisted paying for specialized services if available, with SR4 stating, *"I would not be willing to pay for the service... what I pay to the council is already enough,"* while consumers indicated willingness only if services were affordable or otherwise defaulted to free disposal methods such as bins or burning. These findings suggest that artificial hair

disposal practices are shaped by both socio-cultural beliefs and economic realities. Fears surrounding witchcraft and ritual misuse appear to influence attitudes and norms toward burning and self-disposal practices (Ajzen, 1991), while financial concerns affect willingness to adopt alternative disposal systems. The findings further reflect broader circular economy challenges regarding the need for recovery systems that are both culturally acceptable and economically accessible (Ellen MacArthur Foundation, 2013). In addition, the limited integration of cultural and economic concerns within existing waste management arrangements points to weak stakeholder coordination in artificial hair waste management (Freeman, 1984).

Findings in Relation to Objective Three

To Explore Opportunities for Developing Sustainable Circular Economy Practices for Artificial Hair Waste Within the Beauty Sector in Lusaka District

Theme 7: Incentives as Drivers of Participation

The findings strongly suggest that incentives could play a central role in encouraging participation in artificial hair recovery and recycling systems by bridging the gap between current disposal practices and circular behaviors, as both consumers and salon operators consistently emphasized monetary rewards, exchange value, and recognition as key motivators. Consumers frequently referenced *"Incentives"* (CR4:12:18), *"Cash rewards"* (CR1:3:7), and *"monetary incentives"* (CR6), while CR15 highlighted that *"a combination of environmental awareness, convenience, incentives, and community recognition"* would encourage participation, indicating that incentives are most effective when combined with accessibility and convenience. Salon operators were even more explicit, with SR3 stating, *"If they can provide some money so that we keep the hair for them it can be a good initiative,"* and SR1 arguing that recyclers should pay salons because *"they will make money out of it,"* reflecting an expectation of value sharing within the recovery chain, while SR9 warned that without incentives they might *"tell them that we don't have the hair even when we have it,"* indicating potential resistance in the absence of compensation. These narrations show that incentives are not peripheral but decisive in shaping willingness to participate in circular systems. That participants linked willingness to engage with monetary rewards, convenience, and recognition, suggests that perceived benefits strongly shape disposal behavior. Incentives also reduce perceived costs and strengthen positive attitudes toward participation (Ajzen, 1991). From a circular economy perspective, the findings reflect expectations of fair value sharing in recovery systems (Ellen MacArthur Foundation, 2013), while also highlighting the need for coordinated stakeholder engagement in enabling sustainable waste management (Freeman, 1984; Huynh & Nguyen, 2025).

Theme 8: Partnerships and Collection Networks

The study found strong support for partnerships as a practical mechanism for developing circular economy systems for artificial hair waste, with participants across consumers, salon operators, and informal waste workers emphasizing collaborative arrangements as the

most feasible pathway for organized recovery. Consumers proposed structured systems linking actors, with SR7 suggesting *"Partnership with salons. Customers can return used synthetic hair to salons then waste management to collect from them,"* while SR2 recommended *"partnerships with local salons and women in communities as collection points,"* and SR4 emphasized collaboration between *"hair producers and end users,"* collectively positioning salons and retail points as key aggregation nodes. Salon operators expressed openness to collaboration, with SR8 stating *"Any form of partnership would be welcome,"* while SR1 noted, *"Yes, we would collaborate especially if the incentives are put in place,"* linking partnerships to economic viability. The focus group at Lusaka City Council dumpsite further confirmed that informal recovery already exists, with waste pickers retrieving usable hair, reselling it within communities, and sometimes assembling wigs for resale (WR4; WR8), demonstrating an existing but uncoordinated circular flow that could be formalized. These findings suggest that structured partnerships could strengthen coordination across actors and improve the visibility and efficiency of existing informal recovery practices (Ajzen, 1991; Ellen MacArthur Foundation, 2013). They also highlight the importance of aligning roles across consumers, salons, waste pickers, and municipal actors in developing workable recovery systems (Freeman, 1984).

Theme 9: Institutional Support, Public Sensitization, and Segregation Infrastructure

The findings reveal that participants across consumers and salon operators consistently identified institutional support, including public sensitization, practical guidelines, and segregation infrastructure, as essential for enabling circular practices for artificial hair waste, emphasizing that individual willingness alone is insufficient without formal systems that make circularity accessible and routine. Consumers called for structured awareness mechanisms such as *"Create public awareness conferences or programs to educate the people"* (CR2), *"TV adverts, or radio adverts"* (CR14), and *"clear guidelines"* and *"educational resources"* (CR7), reflecting a demand for accessible, practical information delivered through trusted channels. They also stressed infrastructure needs, including *"place wig bins in the residential areas"* (CR4), *"provide specific trash bins for synthetic hair"* (CR8), and *"easy access to synthetic hair disposal points"* (CR12), showing that convenience and proximity are key to adoption. Salon operators reinforced this need, with SR3 stating, *"We need more information on what else artificial hair waste can be used for,"* SR10 proposing *"holding workshops with salon operators,"* and SR5 calling for *"more waste bins if waste separation is to be made possible,"* alongside SR9 requesting *"bin liners which will make waste separation more sensible."* These findings reflect constrained perceived behavioral control in relation to waste separation and disposal practices (Ajzen, 1991), as participants' willingness is shaped by the availability of enabling systems. They also align with circular economy requirements for segregation and collection infrastructure as prerequisites for material recovery processes (Ellen MacArthur Foundation, 2013). In addition, the emphasis on institutional provision of information and infrastructure indicates the central role of public

institutions in enabling coordinated waste management systems across stakeholders (Freeman, 1984).

Discussion of Findings

The Dominance of Linear Disposal Practices

The dominance of linear disposal practices for artificial hair in Lusaka District is strongly shaped by weak waste management infrastructure and the absence of systems designed for material recovery, indicating that disposal behavior is structurally conditioned rather than individually determined. Participants consistently reported the absence of recycling centers, segregation systems, and specialized collection services, with one stating, "*There are no such services in my area*" (CR17), while another highlighted a "*lack of recycling centers*" (CR12). These accounts demonstrate that circular disposal is not merely underutilized but structurally unavailable within the current system, which is oriented toward general waste removal rather than recovery. This pattern aligns with Wilson et al. (2019), who found that even in the United Kingdom, despite advanced waste systems, synthetic hair is predominantly disposed of through general household waste. However, while Wilson et al. (2019) implicitly frames this as a behavioral outcome within an otherwise functional waste system, the present study extends their findings by demonstrating that in Lusaka, the absence of dedicated infrastructure is not a secondary factor but the primary determinant of linear disposal, effectively eliminating circular options at the point of generation.

From a behavioral perspective, this infrastructural gap directly undermines perceived behavioral control in the Theory of Planned Behavior (Ajzen, 1991), as participants repeatedly indicate that they have "*no other options*" (CR3) beyond bin disposal or burning. This suggests that disposal decisions are not based on preference but on constrained choice within a structurally limited system. While Ajzen (1991) conceptualizes perceived behavioral control as a determinant of intention, the present findings extend this by showing that when infrastructural support is absent, control is not merely reduced but rendered practically nonexistent, making behavior system-determined rather than volitional. Within Circular Economy Theory, this reinforces the argument by the Ellen MacArthur Foundation (2013) that circular systems require dedicated infrastructure such as collection, sorting, and recovery networks. However, this study advances that argument by demonstrating that without such infrastructure, even environmental awareness and willingness to act cannot translate into circular behavior, thereby exposing a structural disconnect between intention and feasibility in low-resource contexts.

Stakeholder Theory (Freeman, 1984) further explains this persistence by highlighting fragmented responsibility across the value chain, where municipal authorities focus on general waste services, producers remain disengaged from end-of-life management, and informal actors lack capacity to build recovery systems. This aligns with Huynh and Nguyen (2025), who emphasize that effective sustainability transitions depend on coordinated stakeholder engagement. The key contribution of this study, however, is that it demonstrates how this fragmentation does not merely slow circularity, it actively

reproduces linearity by default, as no actor assumes responsibility for creating the infrastructure required to enable alternative disposal pathways.

Informal Value Recovery: The Margins of Circularity

The limited reuse and informal recovery of artificial hair observed in Lusaka reflects an economically driven response to waste rather than a deliberate environmental strategy. This finding converges with emerging evidence that discarded synthetic hair possesses recoverable value beyond conventional disposal pathways. In the United Kingdom, Oloyede (2025) documents organized initiatives that recover discarded synthetic hair for conversion into products such as oil-absorbent booms and mats, illustrating its potential for value-added applications within circular systems. Similar potential has also been demonstrated in African contexts. In Nigeria for example, Akinwande et al. (2022) showed that waste synthetic wig fibers can be successfully incorporated into cement-adobe building materials, improving their physical performance, whereas Brown & Danso (2024) demonstrated that waste synthetic hair fibers can be incorporated into cement mortar, improving tensile strength and confirming the material's potential for construction applications in Ghana. Although peer-reviewed evidence on operational recovery systems in Africa remains limited, reports from Kenya describe informal collection, repurposing, and resale of discarded synthetic hair within local communities (Majanga, 2026; SABC News, 2026; DW, 2026). The present findings reflect a similar pattern of informal value recovery, where waste pickers at the Lusaka City Council dumpsite monitor trucks delivering supplier waste and *"selectively retrieve hair that appears usable"* (WR3, 2 & 7). However, unlike the more structured recovery pathways reported by Oloyede (2025), recovery in Lusaka is highly selective. Actors concentrate on near-new supplier waste while avoiding used post-consumer hair because it is tangled, worn, and perceived to have little resale value. This identifies an important mechanism underlying informal recovery: value perception. Artificial hair is recovered only when it retains visible economic worth; once worn through consumer use, it is reclassified as valueless waste and allowed to enter linear disposal streams. Consequently, the findings suggest that informal recovery in Lusaka represents a fragmented form of circularity driven primarily by residual market value rather than environmental intent, extending the life of only a narrow portion of the waste stream while the majority of post-consumer hair continues to be disposed of through landfill or burning. A similar logic of value perception shapes the limited reuse practices reported by consumers and salon operators. Some consumers redistribute wigs or extensions informally when they still appear usable, with one participant explaining that *"If the wigs are reusable, I give them away, if not I throw them away"* (CR6). Salon operators also described occasionally recovering abandoned hair after unplaiting, noting that they sometimes *"get, wash and then sale"* (SR7). These practices illustrate that reuse decisions are not random but are guided by informal assessments of aesthetic quality, hygiene acceptability, and potential resale value. From a Circular Economy perspective, these practices represent fragmented

and opportunistic forms of circularity that extend product life but do not constitute a closed-loop system. The persistence of marginal recovery therefore reflects not only economic constraints but also the absence of coordinated institutional engagement across the artificial hair value chain. Producers, importers, and municipal waste authorities remain largely disengaged from end-of-life management, leaving informal actors to operate in isolation (The Ellen MacArthur Foundation, 2013). As highlighted by Stakeholder Theory, sustainable resource systems require coordinated participation from all stakeholders; without such engagement, existing recovery practices remain small-scale and incapable of addressing the broader post-consumer waste problem (Freeman, 1984).

Foundational Barriers to Circularity: Awareness Deficits and Infrastructure Gaps

The findings suggest that the absence of circular practices in artificial hair waste management in Lusaka is rooted in two interconnected barriers: limited operational awareness and inadequate infrastructure. While previous studies have shown that circular economy practices in Zambia remain underdeveloped (Mwanza & Mbohwa, 2019) and characterized by low public participation in recycling and waste segregation (Zambia Circular Economy Study, 2024), the present study demonstrates that the awareness deficit is largely practical rather than merely conceptual. Participants not only lacked familiarity with circular economy terminology, but also lacked knowledge of how artificial hair could be separated, collected, or recycled. Requests for *"proper information or public announcements about where and how to reach the recycling centers"* (CR17) and *"step-by-step instructions"* (CR15) suggest that linear disposal practices persist less because of resistance and more because of limited procedural guidance.

In contrast to the structural focus of previous themes, the findings here highlight a cognitive and institutional dimension of circularity failure. For example, the Theory of Planned Behavior demonstrates that such knowledge deficits weaken perceived behavioral control and limit the translation of pro-environmental attitudes into practice (Ajzen, 1991). These awareness deficits are further reinforced by severe infrastructure limitations. Although existing literature highlights weak waste management systems and limited recycling facilities in Zambia and Sub-Saharan Africa (Kaza et al., 2018; Mwanza & Mbohwa, 2019; MGEE, 2025), this study identifies a more specific gap: the absence of infrastructure designed for synthetic hair waste. Participants described having *"no other options"* (CR7) beyond mixed disposal or burning due to the lack of dedicated collection points or recycling systems. From a Circular Economy perspective, this finding reinforces the argument that circularity depends on enabling systems capable of supporting resource recovery rather than individual willingness alone (Ellen MacArthur Foundation, 2013). More critically, it reveals that emerging waste streams remain structurally excluded from existing recycling systems, despite growing policy attention to plastic waste management in Zambia. The findings further suggest that these individual and structural barriers are mirrored at the institutional level. Consumers, salon operators and other actors across the artificial hair value chain exhibit the lack of shared understanding of how synthetic hair could be

managed within a circular system. From the Stakeholder Theory point of view, this indicates that the challenge extends beyond fragmented responsibility highlighted in Section 5.1 to encompassing limited collective capacity for coordinated action (Freeman, 1984). Without a common understanding of disposal pathways, recovery options, and stakeholder roles, collaboration is unlikely to generate meaningful circular outcomes.

Taken together, the findings indicate that operational awareness, enabling infrastructure, and institutional capacity are mutually reinforcing conditions for circularity. Limited procedural knowledge reduces participation in sustainable disposal practices, while the absence of visible recovery systems prevents such knowledge from developing. At the same time, weak stakeholder capacity constrains the coordination needed to establish those very systems. The result is a self-reinforcing cycle in which individual, structural, and institutional barriers collectively sustain linear disposal practices.

Cultural and Economic Dimensions of Disposal Behavior

The findings reveal that disposal behavior surrounding artificial hair in Lusaka is shaped by cultural meanings attached to hair as well as economic considerations. Existing literature on waste management largely frames disposal practices as technical or economic decisions (Wilson et al., 2019; Oloyede, 2025; Chudi-Duru, 2024; Effossou, 2025), yet the present study shows that cultural beliefs can strongly influence how materials are handled. Participants described fears that discarded hair could be used for witchcraft or ritual harm, meaning artificial hair, particularly when mixed with natural hair, is treated as a personal and potentially vulnerable material rather than ordinary waste. One participant explained that she burns hair because *"where I come from growing up we were discouraged from exposing or disposing hair waste anyhow because it was believed that witches use hair to do magic"* (CR17). These beliefs illustrate how disposal behavior is shaped by cultural logics of protection and control, extending broader observations that waste practices are embedded in social and cultural meanings rather than purely environmental considerations (Envynature, 2026). Consequently, disposal methods such as burning are not simply acts of convenience but culturally informed strategies intended to prevent perceived spiritual harm.

Economic constraints further shape disposal behavior, particularly among salon operators who must manage waste within already constrained business environments. While circular economy models assume that individuals will participate in collection systems when they are accessible and incentivized (Ellen MacArthur Foundation, 2013; Pratama et al., 2022), the findings indicate that salon operators perceive additional waste separation or collection services as financially burdensome. Similar to broader SME sustainability research (OECD, 2018; Gupta & Trivedi, 2021), operators expressed reluctance to pay for specialized waste management because they believe waste services are already covered through rent or council payments. This perception creates resistance to circular initiatives that require additional costs, particularly when existing disposal methods such as mixed waste disposal

remain free. Consumer responses reflected similar cost sensitivity, with participants such as CR₃ and CR₁₈ indicating willingness to participate only if services were affordable, while others such as CR₁ and CR₁₂ rejected payment entirely. These responses suggest that disposal behavior is influenced not only by environmental attitudes but also by practical economic considerations that shape what options are perceived as feasible.

Rather than being driven primarily by environmental considerations, disposal practices surrounding artificial hair are structured by culturally embedded meanings and cost-related decision-making logics as viewed through the TPB lens. Cultural beliefs shape attitudes toward disposal practices by framing burning or concealment as safer and morally appropriate, while discouraging participation in centralized collection systems. They also reinforce subjective norms, as participants referred to long-standing community teachings discouraging exposure of hair waste. At the same time, economic limitations influence perceived behavioral control, since participants who cannot afford waste services perceive circular options as beyond their practical reach. This interaction between cultural norms and economic constraints helps explain why environmentally preferable disposal practices may not emerge even when awareness of waste issues exists (Armitage & Conner, 2001). The Circular Economy theory further adds an uncommon perspective suggesting that circular systems for artificial hair must address both the symbolic meanings attached to hair and the economic realities faced by waste generators. Without culturally sensitive handling mechanisms and cost structures that do not impose additional financial burdens, participation in circular initiatives is likely to remain limited (Kaza et al., 2018; UNEP, 2021; OECD, 2016).

Incentives as Catalysts for Behavioral Change

The findings indicate that incentives operate not merely as supportive motivators but as structural conditions that determine whether participation in artificial hair recovery systems is likely to occur in Lusaka District. Participants consistently framed used artificial hair as a material that retains economic value once it enters a recycling chain, leading to the expectation that those who supply the material should share in that value. This reasoning was clearly articulated by a salon owner who argued that recyclers should pay because *"they will make money out of it"* (SR₁). Such responses suggest that participants interpret circular systems not simply as environmental initiatives but as economic exchanges in which value distribution matters. Participation therefore becomes contingent on perceived fairness within the emerging waste value chain. While policy discussions around circular waste management often emphasize Extended Producer Responsibility (EPR) as a financing mechanism for collection and recycling infrastructure (OECD, 2016; UNEP, 2019), the present study indicates that financing alone does not guarantee participation. What appears decisive is whether end-users and salon operators perceive themselves as beneficiaries of the system rather than unpaid contributors. This insight complicates assumptions in circular economy policy frameworks by highlighting that actors located at the point of disposal exercise control over material flows, and their willingness to release

those materials depends on whether the value generated downstream is perceived to be shared equitably. In this respect, the findings extend Bajare et al. (2024)'s argument that sustainable circular systems require value distribution across stakeholders rather than concentrating benefits solely among recyclers and manufacturers.

The evidence further suggests that incentives function as threshold conditions rather than marginal motivators. Several participants indicated that participation would depend directly on whether compensation was offered, with one salon owner stating that without payment she might *"tell them that we don't have the hair even when we have it"* (SR9). This statement reveals that the absence of incentives may produce not only passive disengagement but active resistance when actors believe that others will profit from materials they supply. This dynamic diverges from conventional interpretations in the waste management literature, where incentives are often treated as tools for increasing participation rates within already functioning systems (UNEP, 2021). In the context examined here, incentives appear to determine whether cooperation with circular initiatives occurs at all. The contrast with findings from high-income contexts illustrates this point. For example, Wilson et al. (2019) reported that UK consumers were willing to donate hair waste when convenient collection facilities were available. The Lusaka findings indicate a different behavioral logic: convenience alone is insufficient when disposal alternatives such as burning or mixed waste disposal carry no financial cost. Instead, economic compensation becomes the primary mechanism that offsets the additional effort required to separate, store, or transport hair waste. Behavioral economics provides a useful explanation for this dynamic, suggesting that incentives become particularly influential when the desired behavior introduces new effort or opportunity costs relative to established habits (Gupta & Trivedi, 2021). Thus, incentives compensate for perceived costs associated with shifting from habitual disposal practices to deliberate material recovery.

A notable implication of these findings is that participation in artificial hair recovery is shaped less by environmental commitment than by perceptions of value distribution. For instance, the Theory of Planned Behavior lens suggests that incentives influence behavioral intention by reshaping attitudes, perceived norms, and perceived behavioral control simultaneously. To mean that economic rewards transform artificial hair recovery from a burdensome waste practice into a potentially income-generating activity, thereby altering attitudes toward participation. At the same time, the expectation of compensation introduces new social meanings around hair waste, potentially influencing subjective norms as individuals begin to view participation as economically rational within their communities. Most significantly, incentives enhance perceived behavioral control by offsetting the effort required to separate and store hair waste, thereby making participation appear feasible (Armitage & Conner, 2001). From a circular economy perspective, these findings highlight the importance of value capture and distribution across the entire material chain. While circular economy frameworks emphasize retaining material value through recycling and reuse (Ellen MacArthur Foundation, 2013), the present study demonstrates that the

perceived fairness of value distribution at the point of disposal is equally critical. Participants did not interpret artificial hair as valueless waste but as a resource with potential downstream profitability, which implies that circular systems must function not only as environmental infrastructure but also as value-sharing arrangements. This insight suggests that incentive mechanisms financed through EPR frameworks could play a pivotal role in enabling participation by ensuring that those who supply the material receive tangible benefits rather than bearing the costs of system participation.

Collaborative Pathways: Partnerships and Collection Networks

The strong support for partnerships across participant groups indicates that artificial hair recovery in Lusaka is understood not as an individual waste behavior but as a coordination problem within the value chain. Participants consistently described circular disposal as something that becomes possible only when actors are connected through structured collection systems. For example, SR7 proposed a structured pathway where consumers *"return used synthetic hair to salons then waste management [collects] from them,"* while SR2 suggested *"partnerships with local salons and women in communities as collection points."* These narrations reveal that participants are already conceptualizing circular recovery as a networked flow of materials rather than isolated disposal acts. Existing circular economy literature emphasizes collaboration across value chains (Ellen MacArthur Foundation, 2013; Pratama et al., 2022), but it often assumes that such coordination is driven by institutional or corporate actors. The present findings complicate this assumption by showing that grassroots actors themselves are articulating operational collection models, indicating that circular system design knowledge may emerge from everyday waste experiences rather than top-down planning.

The findings also reveal that salons occupy a structurally strategic but under-recognized position within the artificial hair waste system. Salon operators demonstrated strong willingness to participate in collaborative recovery systems, with SR8 stating that *"any form of partnership would be welcome,"* while SR1 added that collaboration would be feasible *"especially if incentives are put in place."* This highlights two analytical insights. First, salons act as aggregation nodes, concentrating large volumes of post-use hair at predictable locations where recovery could occur before material enters mixed waste streams. Second, their conditional openness to incentives suggests that circular systems must acknowledge the economic value of waste supply, a dimension often underdeveloped in circular economy discussions that emphasize environmental benefits while overlooking the micro-economics of participation. While studies such as Bajare et al. (2024) and Civera et al. (2025) highlight the role of partnerships in circular transitions, they tend to frame businesses primarily as implementers of sustainability strategies. The present findings instead show salons as intermediate actors whose participation depends on recognition of their logistical role and economic contribution within the recovery chain.

Perhaps the most important theoretical contribution of this study is the evidence that informal circular networks already exist. Waste pickers at the Lusaka City Council dumpsite

described recovering synthetic hair and reselling it within communities or using it to produce wigs, demonstrating that material circulation already occurs outside formal waste systems. This finding challenges a common assumption within circular economy literature that circular systems must be newly created through formal institutional interventions. Instead, the Lusaka context reveals a hybrid circularity, where informal recovery practices operate beneath formal waste systems. From a theoretical standpoint, this reinforces the relevance of stakeholder theory because circular recovery depends on integrating actors who currently operate in fragmented roles across the system (Freeman, 1984; Huynh & Nguyen, 2025). However, existing stakeholder models often assume relatively equal institutional recognition among actors. In this case, informal waste workers possess critical recovery knowledge yet remain structurally marginalized. The implication is that circular economy transitions for artificial hair in Lusaka will likely succeed not by replacing informal recovery systems but by formalizing and strengthening them through structured partnerships that connect salons, communities, waste pickers, and municipal systems into coordinated collection networks.

The Role of Institutional Support in Enabling Circular Transitions

The findings position institutional support not as an auxiliary component of circular economy implementation, but as a precondition for behavioral possibility within Lusaka's artificial hair waste system. Participants consistently linked the feasibility of segregation and recovery to the presence of externally provided infrastructure such as bins, bin liners, and accessible collection points, alongside structured sensitization mechanisms. Statements such as the need to "*place wig bins in the residential areas*" (CR₄) and "*provide specific trash bins for synthetic hair*" (CR₈) illustrate that what is framed in policy discourse as behavioral change is, in this context, first and foremost an infrastructural question. This challenges the implicit assumption in the Theory of Planned Behavior (Ajzen, 1991; Armitage & Conner, 2001) that behavior primarily follows from attitudinal formation and normative influence. In Lusaka's case, attitudes and intentions are already present in fragmented form, but they remain non-operational because the institutional architecture required to convert intention into action is absent. The limitation is therefore not motivational deficit but structural non-provision.

This finding diverges in an important way from Circular Economy literature that tends to conceptualize institutional support as a facilitating layer added onto behavioral systems rather than a constitutive condition of them (Ellen MacArthur Foundation, 2013; UNEP, 2021). In those frameworks, circularity is assumed to emerge through coordinated systems of design, collection, and recovery once stakeholders are aligned. However, the Lusaka case demonstrates a sequencing problem: alignment cannot occur where the basic infrastructure for participation is missing. Participants' repeated references to TV, radio, and workshops as necessary channels of awareness, such as "*TV adverts, or radio adverts*" (CR₁₄), should therefore not be read as simple information gaps, but as evidence that

institutional absence is being substituted with individual coping strategies. In other words, awareness is being requested not to improve behavior, but to compensate for the absence of a functioning system. This reframes institutional support from a complementary intervention into a foundational system condition without which circular economy principles remain theoretical.

These findings partially confirm Freeman's (1984) argument that sustainability requires coordinated roles across actors, but they also extend and problematize it. While stakeholder theory assumes that actors operate within an existing system of coordinated responsibility, the Lusaka context shows that such a system is itself underdeveloped. Huynh and Nguyen (2025) emphasize coordination across stakeholders as central to sustainability transitions; however, the present findings suggest that coordination presupposes institutional capacity that may not exist in practice. As a result, responsibility attribution in this study is not merely about role distribution but about structural substitution, where government and municipal authorities are expected to perform enabling functions precisely because no other actor can operationalize them. The key contribution of this finding is therefore that circular economy transitions in low-infrastructure contexts are not primarily constrained by behavioral resistance, but by the absence of institutional "conversion mechanisms" that translate willingness into executable action.

Conclusion and Recommendations

Summary of Findings

Disposal Practices for Artificial Hair in Lusaka District

The study found that disposal practices for artificial hair in Lusaka District are predominantly linear. The most common method is mixed disposal, where artificial hair is discarded together with general household and salon waste in bins and municipal collection systems. Burning also emerged as a frequently used disposal method, particularly among consumers and some salon operators, due to its perceived convenience, immediacy, and ability to eliminate waste on-site.

Limited forms of reuse and informal recovery were identified. Some consumers reported giving away reusable wigs or extensions to friends and family, while salon operators occasionally washed and resold used weaves left by clients. Waste pickers at the Lusaka City Council dumpsite were also found to selectively recover near-new artificial hair from supplier waste streams for resale or personal use. However, used post-consumer artificial hair was largely excluded from recovery activities due to its perceived lack of value.

Challenges Hindering Circular Economy Adoption for Artificial Hair Waste

The study identified multiple interrelated barriers affecting the adoption of circular economy practices. A key finding was low awareness of circular economy concepts and limited knowledge of practical recycling or collection pathways among both consumers and salon operators. Participants demonstrated little or no exposure to structured systems for artificial hair recovery. Weak infrastructure was another major constraint. The study found

an absence of dedicated recycling facilities, specialized collection services, and designated disposal points for artificial hair waste. As a result, participants had no structured alternatives to mixed disposal and burning.

Socio-cultural factors also influenced disposal behavior. Some participants expressed fears related to witchcraft and the potential misuse of discarded hair, which discouraged them from releasing used hair to third parties or collection systems. In addition, economic constraints were evident, particularly among salon operators, who were unwilling to pay for additional waste services, viewing them as duplicative of existing municipal waste charges. These barriers were found to reinforce one another, contributing to continued reliance on linear disposal practices.

Opportunities for Circular Economy Development of Artificial Hair Waste

Despite the challenges identified, the study revealed several opportunities for developing circular systems. Incentives emerged as a strong motivating factor, with participants indicating that monetary rewards or exchange value would significantly influence their willingness to participate in collection or recycling systems. The study also identified existing informal recovery practices, particularly among waste pickers who already retrieve and resell usable hair materials. This indicates that elements of a circular system already exist in fragmented form within informal networks.

There was also strong demand for institutional support. Participants consistently requested public awareness campaigns, targeted education for salon operators, and the provision of infrastructure such as dedicated bins, bin liners, and accessible collection points. In addition, participants suggested collaborative arrangements between salons, municipal authorities, community groups, informal waste actors, and manufacturers and distributors to support structured collection systems.

Conclusion

This study set out to examine disposal practices, barriers, and opportunities for developing circular economy approaches to artificial hair waste in Lusaka District. The findings demonstrate that artificial hair waste is currently managed through predominantly linear systems characterized by mixed disposal and burning, with only limited and informal forms of recovery occurring within existing community and waste picker networks. These practices persist not simply due to individual preferences, but as a result of deeper structural, cultural, and economic constraints that shape what disposal options are realistically available.

A key contribution of this study is the demonstration that barriers to circularity in this context are not isolated or independent, but mutually reinforcing. Low awareness of circular economy principles, weak infrastructure, cultural concerns regarding the handling of hair, and economic reluctance to bear additional costs collectively sustain linear disposal behavior. Importantly, these barriers operate within a system where no formalized recovery

pathway for artificial hair currently exists, meaning that circularity is constrained at both behavioral and structural levels.

At the same time, the study reveals that circular economy transitions are not only constrained but also potentially viable under specific enabling conditions. The presence of informal recovery activities, strong responsiveness to incentive-based mechanisms, and clear demand for institutional support indicate that foundational elements of a circular system already exist in fragmented form. However, these elements remain uncoordinated and under-supported.

Overall, the study contributes to circular economy literature by demonstrating that transitioning artificial hair waste systems in urban informal contexts requires more than awareness or infrastructure provision in isolation. Instead, it requires the alignment of economic incentives, institutional support, cultural trust, and existing informal recovery practices within a coordinated system. In this sense, circularity in this context is not a technical endpoint, but an emergent system condition dependent on interaction between actors, institutions, and material flows.

Recommendations

- i. The Ministry of Technology and Science, in collaboration with the Ministry of Green Economy and Environment and selected private sector partners, should establish a pilot recycling and upcycling program for artificial hair waste in Lusaka District. This should begin with a university–industry innovation grant scheme to fund applied research on feasible processing methods for synthetic hair. Pilot facilities should be set up in collaboration with one public university and one private waste management company, focusing initially on small-scale mechanical or material recovery trials. Successful models from the pilot phase should be scaled through targeted investment incentives, including tax relief for firms that establish certified recycling capacity.
- ii. Importers and manufacturers of synthetic hair products should implement a mandatory Extended Producer Responsibility (EPR) take-back scheme regulated through ZEMA and enforced by the Ministry of Green Economy and Environment. This should include a levied contribution per imported unit of synthetic hair, deposited into a dedicated “Artificial Hair Circularity Fund”. The fund should finance three components: (1) consumer and salon return incentives, (2) logistics for collection from salons, and (3) establishment of local processing facilities. A phased rollout should begin with a pilot take-back program in selected high-density salon clusters in Lusaka, coordinated with the Lusaka City Council.
- iii. Lusaka City Council, in coordination with the Ministry of Local Government, should implement a dedicated artificial hair waste separation stream within existing municipal waste services. This should involve installing clearly labelled collection bins in registered salons and designated public points in selected wards, beginning with a pilot in the CBD or high-density residential areas. The council should assign

- contracted waste collectors to a scheduled weekly collection route specifically for artificial hair waste. Implementation should be supported by a simple tracking system linking collection points to council depots to monitor volumes and participation rates before scaling citywide.
- iv. The Ministry of Green Economy and Environment and ZEMA should design and roll out a targeted behavioral change communication campaign on artificial hair waste management, implemented in phases across Lusaka District. The campaign should be delivered through radio and television broadcasts in local languages, supported by ward-based community outreach led by trained environmental health officers. In parallel, salons should be used as fixed communication points where printed step-by-step disposal guides are displayed. The campaign should include clear instructions on sorting, storage, and return options, and should directly address cultural concerns around hair disposal identified in the study.
 - v. Lusaka City Council, in partnership with the Zambia Federation of Employers (ZFE) and informal sector associations, should implement a formal registration and integration program for waste pickers operating at dumpsites and collection points. This should include issuing identification, providing basic protective equipment, and allocating designated sorting zones within or adjacent to council-managed waste facilities. Registered waste pickers should be integrated into the artificial hair recovery chain through formal agreements with recyclers or pilot processing facilities, with payment structured per kilogram of recovered material.
 - vi. The Ministry of Small and Medium Enterprise Development, in collaboration with Cosmetology Institutes and Lusaka City Council, should implement a structured salon-based capacity-building program on artificial hair waste management. The program should be delivered through scheduled quarterly workshops at salon clusters across Lusaka District. Training should cover practical sorting techniques, safe storage of used hair, participation in collection systems, and access to incentive schemes under the proposed EPR framework. Completion of training should be linked to salon registration incentives or certification to encourage participation.

Directions for Future Research

While this study has provided valuable insights into artificial hair waste disposal practices in Lusaka, several areas warrant further investigation. Future research should conduct quantitative waste characterization studies to measure the volume and composition of synthetic hair entering waste streams, establishing baseline data against which circular economy interventions can be evaluated. Materials science research is needed to explore viable recycling and upcycling technologies for used post-consumer hair, which currently holds no value in informal markets, building on existing studies that have demonstrated potential applications in construction materials and footwear. Research should also

examine the feasibility of Extended Producer Responsibility frameworks in contexts where manufacturers are located outside Zambia, exploring mechanisms such as import levies or voluntary industry agreements to finance end-of-life management. Deeper anthropological investigation into the cultural beliefs surrounding hair disposal, including variation across ethnic groups and communities, would inform the design of culturally sensitive collection systems. Intervention-based research using participatory or quasi-experimental designs should pilot and evaluate specific circular initiatives such as salon-based collection programs with incentive payments, community awareness campaigns, and dedicated segregation infrastructure, documenting implementation challenges and lessons for scaling. Finally, future research should explore the linkages between artificial hair waste management and broader urban sustainability goals, including climate change mitigation, plastic pollution reduction, and women's economic empowerment, situating this waste stream within national policy frameworks such as the Eighth National Development Plan and Zambia's circular economy roadmap.

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Declaration

The author(s) declares that this manuscript presents original work that has not been previously published and is not under consideration for publication elsewhere. All data, findings, and analyses presented in this study are authentic and were conducted in accordance with relevant ethical standards. Appropriate acknowledgement has been made through proper citation and referencing of all sources consulted. The author(s) further confirm that all institutional support and resources utilized during the process of conducting this study have been duly acknowledged and that approval for submission has been granted where required.

Ai Usage Declaration

The author(s) used Chat GPT-5.5 (May 2026) for language editing and grammar correction of the manuscript draft and outputs were critically reviewed, verified, and approved by the author(s), who take full responsibility for the content of this article.

Conflict of Interest

The author(s) declare no conflict of interest related to this study.

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Ethical Considerations

The study followed all ethical standards for this kind of research.

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