UPCYCLING TEXTILE WASTE INTO BABY CARRIERS FOR YOUNG MOTHERS IN MAKINDYE, KAMPALA DISTRICT

BY

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A THESIS SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ART IN INDUSTRIAL DESIGN OF KYAMBOGO UNIVERSITY

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DECLARATION

I, Ainembabazi Martha 23/U/GMAID/0405/PE, hereby declare that this is my original work that has never been submitted to any other institution for the award of a Master's degree.

Signed: ..... Date: .....

APPROVAL

This is to certify that the thesis entitled **"Upcycling Textile Waste into Baby Carriers for Young Mothers in Makindye, Kampala District"** by Ainembabazi Martha, Reg. No 23/U/GMAID/0405/PE was carried out under our supervision and is now ready for submission to the Directorate of Research and Graduate Studies with our approval as University supervisors.

Signed:  **Date: November 11, 2025**

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DEDICATION

I dedicate this research to the Almighty God, whose grace, wisdom, and provision have sustained me throughout this academic journey. It is through His divine guidance that I have found the strength, perseverance, and clarity of purpose to complete this work. I am eternally grateful for the gift of life and the knowledge He has bestowed upon me.

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ABSTRACT

Uganda's growing urban textile waste issue presents both an environmental challenge and an opportunity for sustainable innovation. Despite their potential for reuse, old household textiles are often thrown away, especially in low-income areas where resources are scarce. However, these textiles could be repurposed to create useful products for the community. For example, young mothers in the care of their infants. Using a circular design approach, the current study aimed to develop baby carriers for young mothers in Makindye division to improve their ability to care for their babies while also contributing to protecting the environment. The study explored how household textile waste could be upcycled into cost-effective, versatile, and sustainable baby carriers suitable for new mothers. It also aimed to identify surface decoration methods that enhance aesthetic and cultural appeal, and employed participatory studio practices to create user-informed prototypes. Data was collected through interviews, observations, and hands-on studio experiments within a case study framework guided by an exploratory qualitative methodology. Participants included five tailors, five young mothers, and five households from Kisugu in Makindye Division. The iterative process of developing carrier prototypes was guided by thematic analysis of the collected data. The findings showed that although household textile waste has drawbacks such as decreased durability and inconsistent quality, it could still be used as a material if it is carefully selected and reinforced. Mothers prioritized ergonomic comfort, affordability, and cultural aesthetics over structural limitations. Techniques like patchwork, topstitching, and layering improved both appearance and functionality. Ergonomic straps, reinforced panels, and storage features were incorporated into prototypes modeled after the curves of bananas and banana leaves. The study concluded by demonstrating how carefully considered, context-sensitive design can successfully transform household textile waste such as discarded cotton, denim, and bedsheets into affordable and practical baby carriers. The prototypes drew inspiration from locally recognized natural shapes, particularly the curves of bananas and banana leaves, to represent ergonomic needs and local identity. By promoting responsible consumption and production through material reuse and participatory design, the research advances Sustainable Development Goal 12 and offers, a viable solution that addresses community needs for maternal caregiving and environmental sustainability.

CHAPTER ONE

INTRODUCTION

1.1 Overview

The global textile industry has a complex lifecycle that contributes to significant environmental challenges at various stages, including production, consumption, and disposal (Bick et al., 2018). Every stage, starting with the extraction of raw materials to manufacturing emissions and textile waste, negatively affects the ecosystems and human health (Niinimäki et al., 2020). There is a need for sustainable practices to mitigate these issues. We cannot ignore the use of eco-friendly materials, which could lead to low-impact manufacturing and proper waste disposal methods (Ellen MacArthur Foundation, 2017). Globally, the environmental challenges of the textile industry have led to the adoption of circular economy principles, which aim to minimize waste and maximize textile lifespan through durable design, reuse, and recycling (Ellen MacArthur Foundation, 2017). Consumer awareness of clothing's environmental impact needs to be emphasized to promote sustainable behaviors such as buying fewer but higher-quality garments, choosing second-hand clothing, and maintaining clothing to prolong usability (Niinimäki et al., 2020). This chapter introduces the study by outlining the research problem, purpose, objectives, guiding research questions, scope, justification, significance, conceptual framework, and key operational terms.

1.2.Background of the study

Fletcher (2017), observes that the textile sector was one of the most resource-intensive industries, requiring significant quantities of water, energy, and raw materials to meet the increasing demands of consumers. The surge in the global population has significantly increased the demand for textile goods, resulting in the over exploitation of natural resources for textile production leading to environmental harm. The increase in production, because of population expansion and fast fashion trends, brings about environmental challenges, particularly in waste generation and pollution. The population growth and fast fashion consumption patterns has increased demand for textiles leading to severe environmental consequences, particularly in terms of waste accumulation and pollution (Bick et al., 2018). Niinimäki et al (2020) observe that the rapid turnover of clothing trends and increased production volumes contribute significantly to resource depletion, chemical pollution, and textile waste in landfills.

In this regard, the MacArthur Foundation (2017), believes that global textile production has more than doubled in the past two decades, with devastating effects on ecosystems and resource depletion. The cited literature indicate that production of textiles has a major negative impact on the environment if not controlled and contributes significantly to global pollution. Emissions and trash from the entire process harm ecosystems and the climate. To reduce its effects, the industry should prioritize sustainable practices. Utebay (2020, p.13) notes that "Unfortunately, only a tiny fraction of the waste produced by the textile and apparel sector is recycled, even though technically, all of it could be." Stall-Meadows (2010, p.10) observes that "because of the lack of oxygen and sunlight in landfills, textiles even biodegradable natural fibers do not readily break down, and incineration pollutes the air." The average lifespan of clothing is about three years, after which many are discarded as outdated, even if they have not been worn much. This trend contributes significantly to textile waste and has sparked discussions about sustainability and mindful consumption.

The rapid urbanization in Uganda has exacerbated waste management challenges, particularly in growing urban centers like Kampala district, where the city council systems struggle to keep pace with increasing waste volumes (Nabukeera et al., 2020). The recent catastrophe of Kitezi landfill is a clear manifestation of strained waste management infrastructure (Ssebuwufu et al., 2024). The landfill failure in 2024 not only caused environmental contamination but also exposed the urgent need for sustainable waste management solutions as urban populations and textile consumption grow (Nabankema et al., 2023) becoming an emerging concern alongside traditional solid waste management issues (Kasozi et al., 2021). Eicher (2010) beyond their practical use as clothing, textiles have great cultural significance in Uganda. As symbols of tradition, celebration, and belonging, fabrics like kitenge, gomesi, and backcloth are essential to social identity. The communal qualities of inventiveness, humility, and care are reflected in their use in ceremonies, everyday wear, and gifts. Through repair, reuse, and adaptation, Ugandan households have historically valued the durability of textiles practices that upheld sustainability within cultural norms. However, these customs have been progressively undermined by the growth of quick fashion and imported used clothing (mivumba), which prioritizes throwaway consumption over artistry. This change has undermined the relationship between fabric and cultural expression and decreased appreciation for regional textile artistry. This work aims to revitalize those traditional practices of resourcefulness and creativity by reintroducing upcycling into textile design, turning everyday textiles into useful, meaningful goods that connect with Uganda's history of social care and invention.

A significant issue within this context is household textile waste, which is often overshadowed by the broader focus on industrial textile pollution. The fashion industry has recently come under scrutiny for its substantial role in generating textile waste, yet the contribution of household textiles remains largely overlooked. Many households use more textiles, especially with the liberalization of the economy hence accumulating discarded household textiles (Bick et al., 2018; Fletcher, 2014). In promote the circular economy, several artists have explored recycling household textiles. For instance, Bonneau (2023) describes transforming old jeans into a denim bag, demonstrating the potential of discarded materials. Similarly, Beaty (2023) highlights how old curtains, instead of being discarded, can be repurposed into table runners, aprons, and other functional items, highlighting the versatility of household textiles.

The current study argues that household textiles can be used as a material to make multifunctional baby carriers, which would provide an eco-friendly and affordable solution for mothers. This would be particularly useful for young mothers in Uganda who need to carry their babies and other items on short journeys. Instead of having to carry two separate bags, they can use these carriers, which are made from recycled materials and are therefore environmentally friendly. Moreover, these multifunctional carriers can reduce the burden on mothers and make their daily lives more manageable. Since household textile waste comes in various patterns and colors, baby carriers made from these materials can offer a unique and personalized look, allowing mothers to choose a carrier that suits their style and preferences.

Innovations like the example in Figure 1, where a bag was crafted from old jeans, exemplify how thoughtful design can address consumer needs while promoting environmental conservation and ensuring a sustainable future.

Figure 1: old jeans that have been transformed into a tote bag

Source; https://zerowastechef.com/2024/02/27/turn-old-jeans-into-awesome-denim-bag/

Old jeans, which are durable and widely available, and have been transformed into sturdy, versatile apparels like car chair covers, home shoe racks reducing textile waste and promoting eco-friendly practices. This approach not only minimizes environmental impact by diverting waste from landfills but also creates practical and affordable products.

1.3.Statement of the Problem

Due in large part to the importation of fast fashion and used clothing (mivumba), Uganda's increased demand for textile goods has resulted in a substantial buildup of discarded textiles in urban landfills. The Kiteezi landfill collapse in 2024 brought the severity of the nation's waste management crisis to light. Due to a lack of local innovation in textile reuse, these discarded materials remain underutilized while being a viable design resource. However, many young mothers in Kampala, especially in Makindye Division, struggle on a daily basis to carry their infants and possessions. Most are forced to use wraps and homemade cloths because they cannot afford commercially made baby carriers, which are either too costly or not available in local marketplaces. Fabric has great symbolic and social significance, but traditional ideals of workmanship and reuse have been undermined by contemporary materialism. The urgent need for innovative, economical, and sustainable design interventions is highlighted by the combination of inadequate waste management, and dwindling cultural awareness for textile resourcefulness. In order to address waste reduction and maternal convenience, this project investigates how upcycling household textiles into multipurpose baby carriers might restore value to fabric use and foster innovation within Uganda's textile design industry.

1.4.Purpose of the Study

The purpose of this study was to upcycle household textile waste into multifunctional, eco-friendly baby carriers for young mothers in Makindye division Kampala district.

1.5. Objectives of the Study

1. To analyze the potential of household textile waste as a sustainable material for creating multipurpose baby carriers within the framework of the circular economy in Uganda.
2. To explore possible surface decoration techniques that can be used to enhance the aesthetic appeal of household textile waste in Makindye Kampala District.
3. To design multifunctional, aesthetically pleasing, sustainable, and affordable baby carriers using household textile waste for mothers in Makindye, Kampala District.

1.6. Studio guide questions

1. How can household textile waste serve as a sustainable resource for creating multifunctional baby carriers within the framework of a circular economy?
2. What innovative textile surface decoration techniques can be explored to enhance the aesthetic appeal of household textiles for mothers in Makindye Kampala District?
3. How can we produce eco-friendly baby carriers from household textiles for functionality and aesthetics for mothers in Makindye Kampala District?

1.7. Scope of the Study

1.7.1 Geographical Scope

The study was carried out among urban mothers at Kisugu Health Center and the surrounding suburbs of Namuwongo and Bukasa in the Makindye division.

1.7.2 Content Scope

The research aimed to explore household textile waste as a sustainable resource for developing multipurpose baby carriers within a circular economy. It analyzed commonly discarded textiles like clothing, linens, and upholstery, categorizing them by durability, safety, comfort, and ease of processing criteria essential for baby carriers. The study then focused on design and prototyping, testing selected materials for structural integrity and comfort. It also investigated sustainable production techniques, ultimately resulting in a functional and attractive baby carrier prototype that reflects circular economy principles.

1.8. Justification of the Study

The pressing need to address Uganda's household textile waste problem, especially in urban areas like Makindye Division, is what justifies this study. The increasing amount of textile waste that is thrown away puts a burden on the city's meager waste management infrastructure and exacerbates environmental deterioration. There is little local innovation and scholarly research devoted to turning household textile waste into useful, high-need products, despite the growing global shift towards sustainability.

The study is directly in line with Sustainable Development Goal 12: Responsible Consumption and Production of the UN, which encourages waste reduction, recycling, and reuse in addition to sustainable management and effective use of natural resources. Upcycling is suggested as a practical way to prolong the life of textiles, lessen the load on landfills, and encourage a culture of environmental responsibility among customers and craftspeople, all of which support SDG 12.

Additionally, by encouraging indigenous innovation and sustainable entrepreneurship, the study helps the African Union's (AU) Agenda 2063, namely its goal of a prosperous Africa founded on inclusive and sustainable development. It enables communities, particularly young moms and tailors, to produce environmentally friendly goods that support both economic development and environmental preservation.

The study shows how circular design principles can be used at the household and community levels to generate value from waste, in keeping with the East African Community's (EAC) Vision 2050, which places an emphasis on resource efficiency, sustainable industrialization, and green growth. The National Development Plan (NDP) IV of Uganda, which places a high priority on industrial innovation, environmental sustainability, and job creation, is supported by the study. The research advances sustainable livelihoods in Uganda's textile and design industries by transforming waste materials into valuable goods.

Additionally, by turning waste textiles into multipurpose items for new mothers, the project provides an economical and environmentally friendly substitute for traditional baby carriers. By doing this, it encourages inclusive and equitable access to resources for maternal care in addition to supporting environmental sustainability.

1.9. Significance of the Study

This research holds significance across three major domains: academia, community, and policy-making. Each of these sectors stands to benefit meaningfully from the findings and implications

of the study. Academically, this study adds to the expanding body of information in the areas of product innovation, sustainable fashion, and textile design. In practical design education, it especially enhances the discussion of upcycling and the use of circular economy concepts. The study provides textile and fashion design students with a real-world example of how locally available materials can be used to create useful and socially appropriate goods. It also acts as a point of reference for upcoming studies on user-centered design, sustainable material use, and innovation in low-resource environments. At the community level, the study tackles pressing issues in maternal care, waste reduction, and local economic development. The study offers a workable way to reduce domestic waste while creating a product that young mothers desperately need by showcasing the potential of household textile waste to be recycled into multipurpose baby carriers. These carriers, which are made to be secure, comfortable, and convenient, assist mothers in better managing their infants and possessions, especially in crowded public areas like marketplaces and parking lots. The results and prototypes also open up a method for unofficial tailors and craftspeople to make money by producing baby carriers. Through the integration of sustainability, ergonomics, and aesthetics, the project encourages entrepreneurship and innovation in the community, particularly among women and young people.

For policy makers and government agencies, the study supports national objectives for sustainable development, youth and women's empowerment, and environmental preservation. Policies that support recycling and upcycling as practical substitutes for conventional trash disposal can be influenced by the findings. It may be possible to institutionalize the repurposing of textile waste and establish official avenues for product creation by promoting cooperation between local governments and municipal councils and artisan groups and community-based organizations. Furthermore, by enhancing environmental purity and lowering landfill pressure, these programs support better living circumstances and the possibility of economic growth through the creation of green jobs. The report also emphasizes how crucial it is to incorporate innovation and sustainability into technical and vocational education programs in order to create a workforce that is prepared to use design to address social and environmental issues in the future.

1.10. Definition of Operational terms

Aesthetics: Concerned with beauty or the appreciation of beauty.

Affordability: The cost-effectiveness of creating and purchasing upcycled baby carriers, making them accessible to young mothers in Kampala.

Circular Economy: An economic model that minimizes waste and maximizes resource use by promoting recycling, reusing, and upcycling materials such as textiles.

Durability: The strength and longevity of the upcycled baby carriers, particularly regarding the use of sturdy materials like denim from old jeans.

Eco-Friendly Practices: Actions that contribute to reducing environmental harm, such as diverting textile waste from landfills and reusing materials to create new products.

Functionality: The practical usability of the baby carriers, focusing on features like carrying capacity, flexibility, comfort, and extra storage spaces.

Household Textile Waste: Discarded or unused fabrics, such as old jeans or clothes, that are typically found in homes and can be repurposed into new products.

Multifunctional Baby Carriers: Baby carriers are designed for multiple uses, providing versatility for the user, such as carrying babies in different positions and offering additional features like storage pockets.

Studio: This will be used in this study to describe a space/ room where an artist works on their creations.

Sustainability: Practices that reduce environmental impact by conserving resources, reducing waste, and promoting eco-friendly alternatives, such as repurposing textile waste into new products.

Upcycling: Repurposing discarded materials (household textile waste) to create new, higher-value products, such as baby carriers.

Waste Management: Methods concerning the gathering, disposal, and recycling of household textile waste, with the goal of minimizing environmental effects.

Young Mothers: The target group of the study, specifically women in Kampala with young children, may benefit from affordable and practical baby carriers made from upcycled materials.

CHAPTER TWO

LITERATURE REVIEW

2.1. Overview

This section examines research on the potential use of waste textiles from homes to create functional and beautiful products. Following an introduction to the study's theoretical foundations, the different household textile waste materials that can be used to create different types of clothing are examined, as is the waste's potential as a sustainable material for multipurpose baby carriers within the context of the circular economy.

2.2. Theoretical framework of the Study

A theoretical framework serves as the foundational model that supports a theory of inquiry. According to (Joep Cornelissen 2021), a theory represents a scholarly effort by researchers to formulate well-informed assertions about knowledge. The Theory of Planned Behavior (Ajzen, 2005), a well-known psychological theory, is used in this study to analyze the internal and external elements that contribute to the preparedness for a circular economy by utilizing home textile waste to construct household items. This theory seeks to elucidate the rationale underlying people's decisions about eco-friendly behaviors such as recycling.

The Theory of Planned Behavior (TPB), which is founded on the Theory of Reasoned Action (TRA), highlights the importance of individual variables in a company's preparedness to embrace a circular economy (Ajzen, 2005). It helps to comprehend and forecast actions connected to sustainable practices, such as repurposing household textile waste, by establishing connections between beliefs, attitudes, intentions, and behaviors.

A useful framework for evaluating preparedness for the circular economy is offered by the Theory of Planned Behavior (TPB). It consists of three crucial elements: Perceived Behavioral Control, which is related to how easy or difficult a behavior is perceived to be, depending on experiences and expected barriers, like access to recycling facilities or the perceived skill needed to upcycle. Subjective Norms, which include the perceived social pressure to perform or not perform a behavior, including social expectations around sustainability and recycling and Attitude toward the Behavior, which represents an individual's positive or negative evaluation of engaging in behavior, such as recycling textile waste. TPB links these factors to behavioral intention, the strongest predictor of actual behavior. This theory is

beneficial for assessing the readiness of various stakeholders, such as young mothers and artisans, to participate in upcycling household textile waste and adopting sustainable products.

Stronger behavioral intentions raise the probability of carrying out a particular action, according to the Theory of Planned Behavior (TPB). Reducing, reusing, recycling, and upcycling materials are examples of circular economy practices that can be predicted with the help of this principle. By extending the lifespan of goods and materials, circular economy strategies seek to reduce waste and increase resource efficiency. Reusing household textile waste to create new, useful products, such as baby carriers, is one of these practices that, in the context of this study, divert waste from landfills and lower the demand for virgin materials.

According to Sansom(2021) the Theory of Planned Behavior suggests that people make logical decisions based on their attitudes, subjective norms, and perceived behavioral control. However, this theory has its drawbacks. Even when these elements are not explicitly mentioned, they can still influence decisions in ways that go unnoticed. Promoting sustainable practices requires an understanding of people's attitudes toward sustainability and reuse, their perceptions of behavioral control (the ease or difficulty of implementing circular practices), and subjective norms (social expectations or pressures to behave sustainably). A young mother's willingness to adopt an upcycled baby carrier, for example, is influenced by her perception of its value, the social acceptance of recycled goods, and her assurance of its dependability and safety. TPB also assists in identifying obstacles to the adoption of the circular economy, such as a lack of technical expertise, a lack of awareness, or restricted access to upcycling tools and resources. On the other hand, it emphasizes enablers like sewing skills, a culture that values repurposing, or the availability of textile waste in homes. These understandings are essential for creating interventions that promote positive attitudes, increase technical proficiency, and create conditions that support circular practices. TPB offers a strong framework for comprehending and encouraging upcycling behavior in local communities by tying personal choices to more general sustainability objectives.

TPB has been widely applied in environmental studies and sustainability research for example Armitage (2010), utilized The Theory of Planned Behavior (TPB) in numerous studies on health behaviors, highlighting its importance and relevance across various academic fields. (Sonnenfeld, 2018) The Theory of Planned Behavior (TPB) was also employed to examine public attitudes toward waste recycling. This framework is highly applicable to this study because it effectively illustrates the factors that impact individuals' decisions and behaviors related to recycling.

Lastly, Zheng, (2022) used TPB to analyze factors influencing consumers' intention to adopt green products, demonstrating how it can apply to circular economy and sustainable design. Whereas Falko F. Sniehotta, (2014, argues that, the Theory of Planned Behavior (TPB) fails to incorporate habitual behaviors or unforeseen changes in circumstances that could influence behavior, the theory was deemed fit to enable the current study to influence attitudes towards upscaling textile waste. The Theory of Planned Behavior (TPB) is essential to this study as it helps explain why individuals, particularly young mothers and tailors, engage in or avoid upcycling textile waste. It identifies key barriers, like perceived lack of control, and facilitators, such as positive attitudes toward sustainability, that influence circular economy practices. By applying TPB, the researcher can develop effective strategies to change attitudes, enhance perceived control, and leverage social norms to promote sustainable waste management and encourage eco-friendly product adoption.

People start to see waste as a useful creative resource rather than useless material when positive attitudes about repurposing discarded fabrics are cultivated. Community adoption of upcycled goods, such infant carriers created from household fabrics, strengthens social norms, promotes group involvement, and changes public perspective toward responsible purchasing. Improving perceived behavioral control by showcasing easy-to-use upcycling methods encourages people, particularly moms and tailors, to take action with locally available resources and abilities. By connecting awareness, cultural values, and empowerment to concrete action, these TPB components work together to encourage behavioral change and make sustainable waste management a socially acceptable and attainable practice within the textile design setting.

2.3. Household textile wastes and the Circular economy

In contrast to the idea of a circular economy, the traditional linear model entails sourcing raw materials for the production of goods, their consumption, and eventually their disposal. According to Franco (2017), this linear approach includes the steps involved in the extraction of raw materials, the production of goods, their consumption, and their eventual disposal. According to this model, companies and consumers can profit from the exploitation of nature as a resource. It is predicated on the idea that resource-dependent economic development can proceed unhindered.

Resource depletion, biodiversity loss, climate change, and increased pollution are some of the major environmental problems we are currently dealing with. Many businesses are aware that supply constraints and resource price fluctuations make them more susceptible to risk in a linear economic system (The Ellen MacArthur Foundation 2013). An estimated 3 billion people are expected to enter the

middle class by 2030, increasing consumer demand and escalating waste and environmental problems. By prolonging the life of products, the circular economy concept seeks to be both restorative and regenerative (Ellen MacArthur Foundation, 2013).

Rethinking supply chains, manufacturing processes, and product designs can reduce waste in a circular economy by ensuring a steady flow of resources in a closed-loop system (Yin, 2020). Despite efforts to reduce global consumption levels, it has become clear that more alternative ways are needed to reduce the impact of consumption. The struggle to significantly reduce global consumption levels has led to the exploration of alternative strategies to lessen its effects (Lehner, 2020).

As stated by (Radev 2023, p.6), a circular economy involves the activities of sharing, lending, reusing, fixing, and recycling resources and products for as long as they can be effectively used. When a product has completed its useful life, its parts are still repurposed for various uses. This process is repeated to reduce the volume of waste that is ultimately disposed of. People will continue to use textile items, which undoubtedly have a significant impact on our mental health. As individual economic standards rise, households use textile products more frequently, which leads to an increase in waste generation. Household textile waste is a growing issue in the apparel and textile industries with detrimental effects on the environment. This illustrates how the life cycle of textiles shortens when consumption patterns rise, with more items going from use to trash more quickly. Waste production is accelerated by the rising attachment to textiles for self-expression, comfort, and fashion, which leads to frequent replacement. In order to lessen environmental pressure and encourage sustainable material use, it becomes crucial to extend the textile life cycle through reuse, recycling, and upcycling. This is in line with the circular economy's tenets, which aim to reduce waste and environmental damage while maximizing the value and lifespan of textiles.

Gbolarumi (2021) notes that shifts in fashion trends, whether in clothing or home décor, have an impact on consumers. Clothing can easily be seen as out of style with each season, leading people to replace and throw away items that are still in good shape. Consequently, producers might concentrate on creating a lot of clothing that is not very durable to meet the demands of a throwaway culture (Agrawal, n.d.).

High-quality but unsold apparel and home textiles are frequently given to charities, shared with loved ones, or sold at garage sales and consignment stores. More often, people donate things that are too small, rarely worn, unwanted, or out of style. Approximately 50% of used clothing in the US is donated to charitable organizations (Stall-Meadows, 2012). Because of superstitious beliefs like witchcraft, clothing donation is practically nonexistent in Ugandan culture. Because it is easier for

Ugandans to donate brand-new clothing than items they have worn just once, their homes end up with mountains of clothing. In the end, these clothes are burned, which is hazardous to the environment. Reusing textiles is a great way to cut down on waste. Bags, blankets, and even pet beds can be made from used clothing. Reusable tote bags or cleaning rags can be made out of household textiles like towels and sheets. In addition to cutting waste, this approach encourages creativity and adds a unique, customized touch. (Davis 2023)

According to research, recycling and reuse are better for the environment than landfills and incineration. While down cycling creates lower-value products from recycled materials, upcycling turns lower-quality materials into higher-value items, and recycling preserves the original product's quality. (Tripa 2021) asserts that waste materials can re-enter the economy and create new job opportunities for workers when they are transformed into new products. Many consumers overlook the significance of donating all household items, regardless of condition, even though recycled textiles can have significant value in various markets. (Meadows and Stall, 2012)

Incorporating sustainable methods in the fashion sector, especially for "fast fashion" retailers such as Zara, H&M, and Primark, poses considerable obstacles. These companies speed up the fashion cycle, encouraging consumers to buy more clothing and often throw it away after just a few uses, mainly due to the frequent launch of new items (Miranda, 2023). Agrawal (n.d.) adds that the trend is also influenced by economic prosperity since waste production from both the manufacturing and domestic sectors rises in tandem with consumer spending on textiles.

Post-consumer textile waste consists of thrown-away garments and household fabrics, such as sheets, towels, and pillowcases, that are either no longer usable, have been damaged, or have diminished in value to consumers after their lifespan. The rising use of fashion textiles leads to an increase in waste creation. Since practically all fashion materials are recyclable, it is ideal for the textile and apparel industries to produce no waste. 35% of recovered clothes could be turned into wipes and recycled fibers, and over 60% could be reused, meaning that only 5% of it would need to be thrown away (Juanga-Labayen, 2022)

Throughout history, the Turkish population has faced poverty, prompting many to hold onto their old clothes for extended periods, anticipating that their children, nephews, and nieces will eventually wear them. If they do not save these garments, it is common for them to pass them on to family members or friends who can benefit from slightly used items still in decent shape. In city settings, the practice of reusing clothing is deeply rooted. People frequently transform their old apparel into rugs, mattresses, and furniture (Buyukaslan, 2015)

A successful story of recycling is in Ghana where Johnson visits the secondhand market in Takoradi to gather and occasionally purchase discarded textiles to produce functional items (Johnson, 2023). He utilizes abandoned car tires and conveyor belts, which are either thrown away or purchased, to create the soles. He repurposes unwanted jeans into stylish shoes. “He recognized the significant amount of textile waste – the landfills and beaches are in a terrible state. It is easy to acquire for little or no cost, so why not capitalize on it and develop a business model around it. We took the cheapest resource and turned it into something golden, which can be seen in Figure 2 where (Johnson, 2023) shows the potential of household textiles to be recycled into long-lasting apparel like shoes.

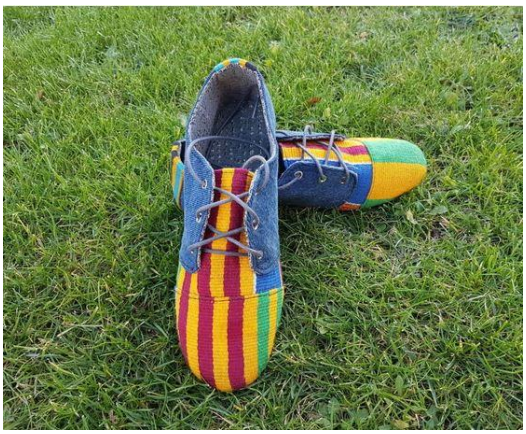

Figure 2 Shoes made from recycled household textiles

Source; https://www.theguardian.com/global-development/2023/aug/16/textile-waste-landfill-creatives-transform-rags-to-riches-upcycling-ghana-chile-pakistan

Encouraging the upcycling and recycling of materials is essential for conserving natural resources and reducing the energy-intensive processes involved in creating new products. By enhancing the collection of clothing and household textiles, we can make significant strides in environmental sustainability, highlighting its importance within waste management strategies. The fashion industry has perpetuated the idea that consumers need to purchase new items each season, which leads to a significant amount of textile waste. This waste is twofold, consisting of production waste from manufacturing processes and consumer waste generated during the use and disposal of products.

2.4. Exploring surface decoration techniques to elevate the aesthetic value of household textile waste

The textile sector contributes substantially to environmental pollution, and textile waste presents a considerable challenge (Pattnaik et al., 2018). Researchers have proposed investigating surface decoration methods as a possible solution to this problem (Riemens et al., 2021). Textiles usually need a change in surface to be brought back to life and recycled. The treatment and decoration of the surface of the waste textiles could be a potential solution to enhance the aesthetic appeal and promote their reuse (Pattnaik et al., 2018). The literature suggests that several surface decoration techniques can be used to achieve this goal.

The addition of embellishments, ornamentations, and décor to apparel or fashion accessories improves their look and raises their market value. Usually added to materials, these ornamental elements have no practical use (Shah, 2023) Surface decoration techniques include the art of embellishing plain fabric with patterns, designs, or embellishments is known as fabric decoration. It is a means to add visual interest and functionality to fabric, or even to show off your style. From basic sewing stitches to intricate embroidery or dyeing techniques, such as printing, dying, embroidery, smoking, quilting, appliqué, patchwork, and painting, there are numerous ways to adorn fabric. (Alnassaj, 2023) Adds that fabric decoration is important as it elevates design and expresses individuality.

Verma (2022) highlights how fabric can be enhanced through various construction and finishing techniques, along with surface embellishments like embroidery, quilting, appliqué, and beadwork, which are primarily done by hand. Surface embellishment is vital in freeform design, allowing for the expression of personality and style. Among the many techniques, printing such as screen and block printing can add patterns and designs to plain fabric, enhancing its overall beauty.

Figure 3 Stencil and block printing

Source; (Verma, 2022)

Appliqué is a popular way of decorating fabrics and garments. Shapes of one fabric are applied to the surface or background of another fabric. In Figure 4 it can be seen that applique work employs several stitches to attach the applied pieces onto the base material thus enhancing the aesthetic appeal of the surface.

Figure 4 The applique technique of surface decoration

Source; (Verma, 2022)

The process of quilting involves joining two or more layers of fabric with a needle and thread. As shown in Figure 5, the sewing machine is used to tack the fabric layers together prior to quilting. It is used for designer clothes, wall hangings, bedspreads, among others.

Figure 5 The quilting surface decoration technique

Source (Verma, 2022)

Smocking, a design technique that originated from England is used to gather fabric for stretch and flexibility. It serves as a decorative embroidery style and a status symbol, commonly applied to cuffs, bodices, waistlines, and necklines before the invention of elastic. It controls the fullness of fabric with intricate stitches. Ruth Singer (n.d.) notes that Eva uses naturally dyed fabrics and traditional smocking techniques to create delicate textile jewelry. Figure 6 illustrates use of the shibori pleating technique in smocking.

Figure 6 A pendant made using the shibori pleating technique of smoking.

Source; **(Ruth Singer, n.d)**

Patchwork refers to a type of needlework in which small, often square or triangular, pieces of fabric or cloth are stitched together (Minniemuse, n.d) Adds that an example of patchwork is seen in Figure 7 by Yves Saint Laurent's patchwork couture gowns of the late 1960s where he patches different pieces of cloth with different textures to create a gown.

Figure 7 Yves Saint Laurent's patchwork couture gowns of the late 1960's

Source; (Minniemuse, n.d)

In Uganda, patchwork is commonly seen in tote bags that are created by patching small pieces of fabric offcuts together to create one fabric as seen in Figure 8.

Figure 8 A patchwork tote bag.

Source; Pinterest.

In conclusion, the literature highlights the role of surface textile techniques in enhancing the aesthetic appeal and functionality of household textiles, making them valuable and multifunctional. Techniques like embroidery, smocking, appliqué, and printing not only enhance visual appeal but also improve durability and uniqueness. Research shows that these innovative treatments can revive discarded materials, supporting upcycling and eco-friendly practices. This review emphasizes that integrating these techniques can satisfy the growing consumer demand for sustainable and stylish products, demonstrating the potential of household textiles in personal expression and sustainable design innovation.

The studied literature offers a solid basis for understanding how user-centered innovation, upcycling, and sustainable textile design might address Uganda's expanding problems with textile waste and product accessibility. The textile industries linear "take-make-dispose" model adds greatly to global waste, according to scholars like Niinimäki et al. (2020) and Gwilt (2018), highlighting the importance of implementing circular economy ideas in design practice. The goal of this project, which is to turn used household linens into useful, valuable baby carriers, is directly influenced by these ideas. Additionally, research by Sung (2015) and Utebay (2020) shows that upcycling not only reduces waste but also fosters local entrepreneurship and creativity elements essential for communities like Makindye, where access to new textile goods is restricted due to material and financial constraints. In order to create baby carriers that are secure, comfortable, and culturally suitable, the literature also emphasizes the need of user-centered design in ensuring that goods satisfy functional and emotional demands. Furthermore, studies on the usage of fabrics in Africa demonstrate how textiles function as symbols of care and identification,

confirming the potential of culturally sensitive design to reestablish the connection between traditional reuse values and contemporary innovation. The methodological decision to combine sustainable design theories with real-world experimentation is thus supported by the studied literature, offering a conceptual path for tackling Uganda's textile waste problem while enhancing maternal convenience and cultural expression.

CHAPTER THREE

METHODOLOGY

3.1. Overview

The current chapter addresses the study's methodology and location, drawing from the problem statement description and the information gap in the literature provided in the previous chapters. Credibility and trustworthiness, data analysis, ethical considerations, study limitations and delimitations, research design, study area, population, sample size, sampling technique, methods of data collection and instruments, and data collection procedure were all covered in detail.

3.2. Research design

In order to directly address the goal of upcycling household textile waste into multipurpose, environmentally friendly baby carriers that are suited to the needs of young mothers in Makindye Division, Kampala District, and this study used is case study in conjunction with an exploratory qualitative approach. Because it enabled the researcher to actively interact with participants such as young mothers, households, and tailors through a cycle of planning, acting, observing, and reflecting, action research was especially appropriate (Whitehead, 2011). This was enhanced by the exploratory qualitative approach, which provided flexibility and unrestricted investigation in an area with little previous research. In order to meet the study's goals, the researcher was able to examine participants' experiences, sustainability practices, and willingness to use upcycled products thanks to this design (Creswell, 2014).

This strategy allowed for iterative data collection and analysis, modifying instruments and procedures in response to new findings, in contrast to conclusive research methods that seek to test hypotheses (Grove, 2010). A thorough examination of the socioeconomic, cultural, technical, and customer factors influencing the upcycling of household textile waste was made possible by the combination of exploratory and action research methodologies.

Insights were gathered through semi-structured interviews, observations, photography, and studio-based prototyping**,** which informed the next stages of the study. This approach was essential for investigating underexplored areas such as user preferences, fabric behavior, and sustainable production in the Ugandan context. It ultimately enabled the study to translate abstract concepts like circular design and environmental responsibility into tangible, culturally relevant, and user-driven solutions.

3.3 Theoretical and Conceptual Framework Integration

The Theory of Planned Behavior (TPB) and the Circular Economy Model served as the study's guiding principles for both design and data analysis. The methodological approach was influenced by the Circular Economy model, which encourages upcycling the reuse and repurposing of waste home fabrics. It ensured that every step of the design process reflected sustainable textile methods and value generation by directing material selection, design experimentation, and prototype development. The study's qualitative components were informed by the Theory of Planned Behavior, which offered a framework for comprehending participants' attitudes, perceived control over upcycling habits, and social effects. It helped the researcher understand participants' propensity to embrace sustainable textile technologies by directing the creation of interview questions and observations. When combined, these frameworks guaranteed a logical connection between the research methodology's theory, design practice, and behavioral findings.

3.4. Study area

This study was carried out in Kampala District's Makindye Division, which was chosen as a case study because it combines peri-urban and urban environments, reflecting a range of socioeconomic circumstances. The region is perfect for investigating sustainable baby carrier design within a circular economy framework because it is home to several young mothers, unofficial tailoring enterprises, and homes that produce textile waste. Makindye provided a targeted framework for analyzing how regional customs, requirements, and material accessibility impact the creation and adoption of repurposed childcare options.

3.5. Study population

Young mothers and tailors were included in the study because they both contribute significantly to the production and recycling of textile waste. As the primary caretakers, young mothers often use baby carriers and can offer important insights regarding their affordability, comfort, and functionality. On the other side, designers and tailors have the technological knowledge to invent and turn waste materials into useful and beautiful baby carriers.

The study placed a lot of emphasis on young mothers because they are the main users of infant carriers. Since many young mothers in Uganda face financial difficulties when purchasing baby care products, sustainable and reasonably priced alternatives are especially important. By including them directly in the research process, this study aimed to investigate their expectations, difficulties, and

preferences regarding baby carriers. It also sought to ascertain how receptive they were to affordable, green alternatives. Additionally, the study looked into appealing design elements like integrated storage compartments, adjustable straps, and ergonomic support that improve comfort and functionality.

Tailors were included in the study due to their expertise in textile manipulation and clothing construction. Their participation was crucial in investigating creative design concepts for upcycled baby carriers, evaluating the viability, quality, and durability of utilizing textile waste materials for baby carriers, and spotting possible upcycling process obstacles like sewing constraints and inconsistent material quality. Finally, recommending changes to enhance the finished product's usability and visual appeal.

3.6. Sample size

Sample size describes the individuals chosen from the larger population to gather information for the research (Hossan, 2023). In this investigation, the sample includes 10 young mothers, 5 households, and 5 tailors, selected to reflect the target population. The 10 young mothers capture a variety of perspectives and experiences related to carrying babies and managing household textiles, helping us understand different lifestyles, needs, and challenges they encounter. The 5 households provided insights into household textile waste generation, handling practices, and the potential availability of materials for upcycling. Additionally, the 5 tailors contributed their expertise on the feasibility of repurposing household textiles, addressing technical challenges, and exploring design innovations that enhance the functionality and sustainability of baby carriers.

The study's qualitative design, which prioritizes depth of understanding above numerical representation, guided the selection of the sample size. The goal of the study was to compile comprehensive information about the attitudes, behaviors, and experiences related to the upcycling of textile waste and the usage of baby carriers. Therefore, detailed, descriptive data could be obtained from a small, purposeful sample of participants, which included young mothers, local tailors, and household representatives. Creswell (2014) asserts that qualitative research, as opposed to statistical generalization, depends on smaller samples that enable in-depth investigation of phenomena. In addition to providing sufficient information to reach data saturation within the parameters of the study, the selected size allowed for meaningful interaction with participants.

3.7. Sampling technique

The researcher employed purposive sampling to select participants for the study, focusing on individuals with relevant expertise in recycling textile waste and young mothers who could share their

experiences with baby carriers. The sample included 10 young mothers selected for their current or past use of baby carriers, varied experiences, and diverse backgrounds related to textile waste. Additionally, 5 households were chosen based on their frequent generation of textile waste and their upcycling practices, along with 5 tailors selected for their knowledge of recycling textiles and willingness to explore sustainable designs.

Makindye Division was chosen on purpose because it is an urban location with a variety of socioeconomic conditions, a high production of textile waste, and active tailoring. The division is a perfect setting for researching textile reuse and creating sustainable, multipurpose baby carriers because it includes a large number of young moms working informally and dealing with childcare issues.

This purposive sampling approach ensured that participants possessed the insights needed to support the development of multifunctional baby carriers made from household textiles. The sampling technique concentrated on individuals with direct experience in tailoring, and baby-care products, which included young mothers currently using or previously using baby carriers, tailors and designers with experience in garment upcycling or sustainable fashion, providing insights into material availability and sourcing challenges.

3.8. Data collection methods and instruments

The methods used to gather information for this study included semi-structured interviews, observation, and studio experiments. These qualitative methods ensured that comprehensive and in-depth insights were collected from participants.

3.8.1. Semi-structured interviews;

Using a variety of open-ended questions, the researcher conducted semi-structured interviews with participants. Without being constrained by a rigid list of preset questions, this method enabled respondents to freely express their ideas and experiences in their own words. Because semi-structured interviews were flexible, it was possible to offer follow-up questions in response to participants' answers, which revealed more in-depth information about how they felt about upcycled baby carriers. Because the interviews were conversational, the researcher and participants were able to establish a rapport. The purpose of these interviews was to learn more about the opinions of young moms and tailors regarding the viability, appeal, and practicality of repurposed baby carriers. Understanding customer expectations and the real-world difficulties encountered during the upcycling process were

greatly aided by the information gathered from these interviews. With the participants' permission, the interviews were audio recorded and later transcribed. Key themes pertaining to material selection, design preferences, and adoption hurdles were later identified by applying thematic analysis to the transcriptions.

3.8.2. Observation;

The researcher used observation as a primary data collection method in order to better understand how young mothers handle baby care and how tailors deal with textile waste. By documenting real-time behaviors, environments, and design practices in a natural setting, this method made it possible to gather rich contextual data.

An observation checklist that focused on topics like how households handled and stored discarded textiles guided the process, how tailors prepared and chose materials, and the real-world difficulties that come with dealing with fabric waste. During the studio prototyping stage, observations were also made, and the researcher recorded the construction procedure, design choices, and the application of different upcycling and surface decoration techniques.

The researcher was able to record how tailors managed and worked with textile waste during construction and how design elements were incorporated during studio prototyping, despite the fact that participants did not directly touch or test the prototypes. Additionally, it provided information about user preferences and needs, which were incorporated into the iterative improvement of carrier designs.

Based on what was practically possible with the available textile waste, this method assisted the researcher in identifying functional priorities, such as material flexibility, seam strength, and visual appeal. By bridging the gap between field data and studio-based experimentation, the insights gleaned from observation helped to ensure that the final designs were both realistic and pertinent to the target users' needs.

3.8.3. Photography

In this study, the researcher employed photography as a method to visually document and archive the studio processes that contributed to achieving the study's objectives. As the saying goes, "A picture is worth a thousand words." The researcher utilized a smartphone to capture both the ongoing work and the outcomes that later helped in the studio exploration. This approach not only

supplemented the written narrative but also enriched the research by offering visual insights into the design and creation of the sustainable baby carriers.

3.9. Data analysis

Hardy (2004) defines data analysis as the process of distilling vast amounts of collected data in order to make sense of them. According to (Patton 1987), which (Hardy, 2004) quotes, data analysis consists of three essential steps: organizing data, condensing it through categorization and summarization, and recognizing and connecting themes and patterns.

The inscription, description, interviews, and observations marked the beginning of data analysis for this study. While some findings were recorded in writing, more information was recorded on audio to guarantee thoroughness for examination later.

Thematic Analysis

Thematic analysis was employed to make sense of qualitative data collected through interviews, observations, and discussions with young mothers, tailors, and households. Since the study sought to understand user experiences, perceptions, and creative input toward the use of household textile waste, thematic analysis was ideal due to its focus on uncovering patterns within participants' narratives. The researcher first transcribed all interviews and organized observational notes. Initial codes were generated to identify repeated ideas such as “comfort,” “storage,” “material strength,” “cultural appeal,” “reuse practices,” and “economic opportunity.” These codes were then sorted into broader themes like perceptions of textile waste as a resource, design and functionality needs for upcycled products. These themes were crucial in shaping both the interpretation of findings (Chapter Four) and the direction of studio-based design work, ensuring that prototype development was grounded in real community needs and insights.

Narrative Data Analysis

In this study, narrative data analysis was applied to understand and present the lived experiences of young mothers, tailors, and households in relation to household textile waste and upcycling. Rather than isolating responses into rigid categories, the researcher paid attention to the stories embedded in participants' accounts how mothers talked about their struggles with conventional baby carriers, how tailors described their journey from waste to creativity, and how households made decisions about storing or discarding textiles. For example, during interviews, young mothers did not

simply list product features they wanted they shared stories of the difficulty faced while moving through crowded taxi parks, managing their infants and belongings, and navigating daily tasks. Tailors recounted how they learned their skills, adapted to resource constraints, and experimented with leftover materials. These narratives gave rich context to the challenges and opportunities in repurposing textile waste.

Narrative data analysis helped the researcher preserve the complexity and emotion behind each response, allowing for a more human-centered understanding of the data. This approach was used alongside thematic analysis to capture both the recurring patterns and the deeper meanings behind participants' lived experiences.

3.10. Studio experiments

Studio experiments were used as a core methodology to explore the potential of household textile waste in creating multifunctional, aesthetically pleasing baby carriers. After collecting data from interviews and observations, the researcher transitioned into a practice-based phase where insights from participants were used to guide design exploration. The studio exploration was inspired by the banana and banana leaf.

3.10.1 Source of Inspiration

Finding an inspiration source to direct the design and development of the upcycled baby carriers was the first step in the study. Because of their organic structure and practicality, the banana and banana leaf were chosen as the main sources of inspiration.
The working drawings, design drawings, and sketches that influenced the prototyping stage were greatly influenced by this idea. The project sought to develop infant carriers that are both useful and sustainable by utilizing the natural form, texture, and structural adaptability of banana leaves. Furthermore, the availability and simplicity of manipulation of textile waste led to its selection as the primary source of inspiration.

The studio experiments involved several key phases:

The selection and testing of the materials was the first of three major stages of the studio experiments. A variety of discarded household textiles, including cotton, denim, kitenge, old bedsheets, and T-shirts, were chosen for possible reuse based on input from households and tailors. The suitability

of these materials for the production of baby carriers was evaluated through informal, practice-based testing. Colorfastness, softness, flexibility, and wear indicators were assessed visually and tactilely in the initial evaluations. To observe behavior like shrinkage, drying time, and fiber resilience, a selection of fabrics were subsequently hand-washed and sun-dried several times. Additional evaluations concentrated on sew ability, testing the strength of seams, especially through double and topstitching techniques, fraying, and ease of handling using machine stitching. Early prototypes that included promising materials were tested for functional durability, or the ability to support weight, tolerate strap tension, and maintain breathability and comfort under conditions that mimicked everyday use.

Experimenting with various upcycling and surface decoration techniques was part of the second phase, technique exploration. The chosen fabrics were subjected to various techniques, including patchwork, embroidery, layering, and detailed topstitching, in order to evaluate their structural soundness and visual impact. These embellishment techniques were selected to strengthen weak spots in the fabric and add to the carriers' overall strength and individuality in addition to their aesthetic value.

Several baby carrier designs were created during the prototyping stage, using the organic shape and structure of a banana leaf as inspiration. This theme served as a guide for the designs' ergonomics and aesthetics, attempting to blend practical efficiency with cultural symbolism. Every prototype was designed with the user experience in mind, taking into account important factors like comfort, support, and adjustability while also adhering to sustainable design principles.

Overall, the studio experiments converted theoretical concepts of sustainability and circular design into useful, verifiable results. The study showed how to successfully repurpose discarded textiles into useful baby carriers by interacting with real-world materials and user feedback. This practical method provided concrete proof of the feasibility of repurposed materials and enabled participants to engage with significant prototypes that connected theory and practice.

3.10.2 Collection and identification of the technique, tools, and materials

The collection and identification of techniques, tools, and materials were essential steps in the production of upcycled baby carriers. The researcher sourced textile waste, including discarded denim, and cotton fabrics, based on their durability, flexibility, and comfort for baby carriers. Techniques such as weaving, patchwork, quilting, applique and stitching were identified through field observations and interviews with tailors, ensuring the feasibility of working with upcycled materials. Tools such as sewing machines, scissors, needles, measuring tapes, and fabric adhesives were selected to facilitate

precise assembly and reinforcement of the carriers. This phase was guided by the need to create functional, aesthetically appealing, and sustainable baby carriers while incorporating user feedback to refine material choices and construction techniques.

3.10.3 Reason for selection of the materials mentioned above:

In order to create a long-lasting and ergonomic baby carrier, important functional, aesthetic, and sustainability factors were considered while choosing household textile waste, such as leftover cotton, and polyester. The key reasons denim was selected were its strength, resilience, and capacity to retain structure, which made the fabric perfect for bearing the baby's weight and guaranteeing long-term use. Because of its resilience to deterioration, the carrier lasts longer and is a dependable choice for new mothers.

Cotton textiles were chosen because of their skin-friendly qualities, suppleness, and breathability, which make them comfortable for both the wearer and the infant. In Uganda's warm environment, cotton's capacity to wick away moisture helps control temperature by avoiding uncomfortable or excessive perspiration.

Polyester was chosen because it is lightweight, strong, and resistant to stretching and shrinking. It is also wrinkle-resistant and quick drying, which makes it a great option for frequent usage and low maintenance. Furthermore, polyester mixes frequently provide more elasticity and flexibility, which might improve the baby carrier's comfort and adjustability.

Through the promotion of upcycling and the reduction of textile waste, the selection of these materials supports the sustainability goals of the study. In addition to reducing the environmental impact, the method offers young moms who might find it difficult to acquire commercial baby carriers a cost-effective substitute by recycling fabrics that are often found in homes or through tailors' leftovers. The choice to employ these resources was also influenced by observations and interviews, which revealed that young mothers preferred lightweight carriers.

3.11. Ethical considerations

The researcher formally requested and received an introductory letter from Kyambogo University's Directorate of Research and Graduate Training to help with the study. This letter provided official identification and permission to carry out research in the chosen community. In order to obtain institutional access and permission to interact with participants, it was submitted to the Kisugu Health

Center's management. To foster confidence and establish the validity of the study, the letter was also distributed to each respondent prior to data collection.

By clearly outlining the goal of the study, responding to their inquiries, and reassuring them that their participation was completely voluntary and confidential, the researcher made a deliberate effort to build rapport with the participants. Participants were told that their answers would only be used for academic purposes and that they might leave the study at any time without facing any repercussions. As required by ethics, informed consent forms were utilized to make sure all participants understood and consented to participate in the study.

No identifying information was recorded, and all data were anonymized during transcription, analysis, and reporting to preserve participant integrity and privacy. To further ensure confidentiality, pseudonyms were given to each study participant. For example, in observational notes and transcripts, generic identifiers like YM1, YM2, etc. referred to young mothers, while tailors were identified as T1, T2, and so on. This process made sure that no personally identifiable information was shared, especially when participants discussed their own thoughts, feelings, or difficulties regarding the use of baby carriers and textile waste.

Depending on the participant's preferred language, interviews were conducted in either English or Luganda when necessary. To guarantee comfort and privacy, the times and locations were mutually convenient. In compliance with academic standards, all authors and sources that contributed to this study were appropriately cited. Throughout the research process, this ethical framework promoted an atmosphere of respect and safety that promoted candid and open participation.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents and discusses findings from interviews, observations, and participatory studio practices conducted in Kisugu, Makindye Division of Kampala. Data was gathered from young mothers, households, and tailors to address the study's three objectives: assessing the potential of household textile waste for sustainable baby carriers, exploring surface decoration techniques for aesthetic and cultural value, and developing functional, affordable, and visually appealing prototypes. Using an exploratory research design, the study integrated field insights with studio experimentation, enabling flexible, in-depth inquiry into participants' experiences, sustainability practices, and openness to upcycled products.

4.2. Analyzing the Potential of Household Textile Waste

The study explored the feasibility of using household textile waste as a sustainable material for producing baby carriers within the framework of the circular economy. Key findings from interviews with young mothers highlighted the challenges they face with conventional baby carriers, particularly regarding weight, lack of storage, and discomfort during use. These limitations point to the need for innovative, lightweight, and multifunctional carriers designed with both environmental and user-centered considerations in mind.

YM1 stated, "I use a structured carrier. It's heavy but works for me when I'm moving out with the baby." Similarly, YM3 affirmed, "Yes, I use a structured carrier," and YM5 echoed this by saying, "Yes, I have a structured one, though sometimes I wish it wasn't so heavy." YM10 also mentioned, "I use a structured baby carrier. It helps, but carrying the baby gets tiring fast."

In contrast, YM 2, 6, and 7 noted that they do not use baby carriers. YM 2 simply stated, "No," while YM 6 added, "I don't normally use one. I find them hard to manage." YM 7 shared a similar view, explaining, "I've never really tried one, so I can't say if I'd like it." YM 4 indicated a different preference, stating, "I use a sling baby carrier. It's convenient, but it's sometimes tricky to tie properly." Meanwhile, Respondents 8 and 9 confirmed use but were less specific. YM 8 noted, "Yes, 3," which might indicate ownership or use of three different carriers, and YM 9 stated, "Yes, I use one quite often," without specifying the type.

These responses reflect a wide spectrum of experiences and attitudes toward baby carriers. While some mothers actively use structured carriers or slings, others avoid them due to discomfort or unfamiliarity. The feedback illustrates a gap in the current market, where existing products may not meet the comfort, usability, or stylistic preferences of all users. The frequency and context in which mothers used baby carriers varied considerably among respondents. Several young mothers indicated that they frequently used their baby carriers when leaving the house. Respondent 1 shared, “As long as I’m moving out to run errands with my baby, I carry it.” YM5 echoed this experience, saying, “Whenever I need to go out, especially for quick errands, the carrier comes in handy.” Similarly, YM 8 stated, “I use it often when I’m going out with the baby,” while YM 10 added, “Anytime I have to move around town with the baby, I make sure to carry the carrier.”

Other young mothers provided slightly different accounts. YM 3 noted, “I use the carrier mostly when moving short distances,” indicating that convenience and proximity influence her usage. YM 4 and 9 both described their usage as frequent, with YM 4 stating, “I use the sling quite often, especially when I need to keep my hands free,” and YM 9 noting, “I use it quite often whenever I go shopping or move through crowded places.” On the other hand, YM 2, 6, and 7 stated that they do not use a baby carrier. YM 2 said, “I don’t normally use it,” while YM 6 admitted, “I have ned one, so I don’t really see the need,” and YM 7 shared, “I just haven’t found one that works for me.”

These varied responses reveal that baby carriers are predominantly used during outdoor activities such as running errands, shopping, or moving through crowded urban spaces. The repeated emphasis on mobility and practicality underscores the importance of designing carriers that are lightweight, comfortable, and easy to operate. Mothers who actively use carrier’s value convenience and freedom of movement, suggesting that user-friendly features such as adjustable straps, ergonomic support, and accessible storage would significantly enhance their experience. Furthermore, the reluctance or lack of use among some participants reflects unmet design expectations, signaling the need for more inclusive and adaptable solutions that cater to diverse caregiver needs and lifestyles.

A common concern among many was the issue of weight. YM 1 remarked, “I wish it wasn’t so heavy... the baby already feels heavy enough, and the carrier just adds to that.” YM 5, who shared, “It has too much material, echoed this sentiment. Sometimes it just feels bulky and tiring to use.” YM 8 added, “A lighter design would make it easier to carry the baby around, especially for long periods.”

YM 10 similarly commented, “The material makes it heavier than it should be; that’s something I’d definitely change.”

Other young mothers focused on the lack of practical features in their current carriers. YM 3 suggested, “It would be really helpful to have some storage just small pockets for oils or wipes.” YM 9 agreed, stating, “Sometimes I wish it had space for things like a diaper or my phone, so I don’t have to carry another bag.” These insights reflect a clear need for integrating multifunctional elements into carrier design. YM 4 raised a different concern related to usability, noting, “It’s complex to tie. I struggle with it sometimes, especially when I’m in a hurry.” This feedback highlights the importance of simplicity and convenience in design, particularly for first-time parents or caregivers who may find traditional tie systems overwhelming.

YM 2, 6, and 7, who do not use baby carriers, noted that they could not suggest any improvements. YM 2 stated, “I don’t use one, so I can’t say,” while YM 6 mentioned, “I’ve never tried one, so I don’t know what could be better.” YM 7 echoed this by saying, “I have no idea, I’ve never really thought about using a baby carrier.”

The responses suggest that while baby carriers are appreciated for their practicality, there is significant room for innovation, particularly regarding weight reduction, storage functionality, and ease of use. These findings support the need for designing baby carriers that utilize lightweight, upcycled materials that offer both durability and comfort. Incorporating user-friendly fasteners, such as adjustable buckles or pre-stitched straps, could resolve the issues related to complex tying mechanisms. Additionally, the integration of built-in storage would greatly enhance the versatility of the carriers, making them more suitable for busy caregivers navigating daily tasks.

YM 1 stated, “I would prefer it as much lightweight as possible. Carrying a baby is already hard enough.” YM 3 echoed this by saying, “Yes, I want something light but still useful storage is a big help.” YM 4 added, “Yep, as long as it’s not bulky. I need it to be simple and easy to move around with.” YM 5 agreed with the need for a lightweight design, stating, “It should be light. I would like it to also have room for things like wipes or oil.” YM 8 responded affirmatively as well, explaining, “Yes, because carrying both the baby and a bag is a lot. It needs to be simple and light.” Similarly, YM 9 confirmed, “Yes. Lightweight and useful. I move around a lot, so it helps.” YM 10 also emphasized this preference: “I would like one that’s light and can carry baby items too.”

When asked whether they were familiar with the concept of upcycling, responses varied in clarity and confidence. YM 1 responded affirmatively, stating, “Yes, I know about upcycling. It’s when you use old things to make something new and useful.” YM 3 shared a similar view, saying, “Yes, I’ve heard of it. It’s about turning waste into something better.” YM 4 added, “Yes, especially with clothes. I’ve seen people turn old dresses into bags or skirts.” YM 5 affirmed, “Yes, I like upcycling. It’s a creative way to avoid waste.” Likewise, YM 8 noted, “Yes, it’s like recycling but with more creativity.” YM 10 also indicated awareness, explaining, “Yes, it’s when you reuse old things to make something beautiful or practical.”

In contrast, some respondents lacked familiarity with the term. These varied responses reflect a mixed level of awareness among the participants. Six young mothers showed a clear understanding of upcycling as a sustainable method of transforming waste into useful or decorative items. Their familiarity suggests an openness to environmentally conscious design solutions, such as upcycled baby carriers. Conversely, the lack of awareness or uncertainty expressed by four respondents highlights an opportunity for educational outreach. Providing information on the benefits and applications of upcycling could not only increase community participation in sustainability efforts but also promote the acceptance and appeal of upcycled products.

A significant number, including YM 1, 3, 4, 5, 8, and 10, confirmed that they were familiar with the term and understood its relevance. YM 1 said, “Yes, I know about it. It’s when you turn old things into something useful or beautiful again.” Similarly, YM 3 noted, “Yes, upcycling is about reusing materials to make something new instead of throwing them away.” YM 4 explained, “Yes, I’ve heard about it before. It’s a good way to save money and the environment.” YM 5 shared, “Yes, I know upcycling. I even tried it once at home with old clothes.” YM 8 stated, “Yes, I understand it. It helps reduce waste.” YM 10 added, “Yes, I think it’s smart. You reuse what you have instead of buying new things.”

On the other hand, some respondents had no prior knowledge of the term. These responses reveal a wide range of awareness regarding upcycling. Six participants demonstrated a clear understanding of the practice, recognizing it as a sustainable and creative method of reusing materials to minimize waste. One respondent was uncertain, indicating some exposure to related ideas but not upcycling specifically. Three participants were unfamiliar with the term altogether.

These responses reveal unanimous enthusiasm for upcycled baby carriers, demonstrating both the perceived practicality and eco-friendliness of such a solution. This strong consensus underscores the alignment between user values and the circular economy model, which encourages waste minimization and resource reuse. Furthermore, the collective support from all respondents reflects a growing market demand for environmentally conscious parenting products that deliver both functionality and sustainability.

Durability also featured prominently alongside comfort. YM 9 commented, “It must be comfortable, durable, and maybe have some storage space too. I move around a lot.” Some respondents emphasized storage features. Appearance, while not a top priority for most was important to YM 4, who said, “It has to look good. If it’s stylish and doesn’t look like it’s made from waste, then I’d consider it.”

These responses reveal that comfort is the leading consideration in adopting upcycled baby carriers, followed closely by durability. Practical storage is a desirable feature for several users, especially those who are frequently on the move. Aesthetic appeal, though mentioned by only one respondent, also plays a role in product acceptance. This balance of functional, structural, and visual qualities should guide the design of future upcycled baby carriers to ensure they meet the diverse needs and expectations of caregivers.

When young mothers were asked whether a hands-free, upcycled baby carrier with extra storage would make it easier to manage their baby and belongings in public spaces, all ten participants answered positively. The unanimous agreement among respondents highlights a strong preference for multifunctional baby carriers that offer both hands-free convenience and built-in storage. These features support caregivers by allowing them to manage daily responsibilities more easily while ensuring their child is secure and comfortable. The responses reflect a real need for practical, ergonomic, and sustainable design that aligns with both caregiving routines and public mobility. This confirms the opportunity to develop upcycled baby carriers that are not only environmentally responsible but also deeply aligned with the real-life needs of parents and guardians.

The interviews with five tailors provided valuable insights into the feasibility of utilizing household textile waste for baby carriers. Their responses highlighted key challenges, opportunities, and practical considerations for upcycling fabric scraps into functional and sustainable designs. Tailor 1 (T1) specializes in custom-made clothing, Tailor 2 (T2) focuses on ready-to-wear, Tailor 3 (T3)

handles repairs of old clothes, Tailor 4 (T4) creates bags, and finally, Tailor 5 (T5) is a new tailor acquiring tailoring skills.

When asked whether they had experience working with recycled or upcycled materials, all five tailors shared various degrees of involvement, reflecting practical approaches to fabric reuse within their tailoring practices. T1 explained, “Yes, I have worked with upcycled denim to make bags, but not baby carriers.” This shows familiarity with upcycling techniques, though not yet applied to more complex items like infant carriers. T2 said, “I have used leftover fabric to make patchwork bags, but I don’t usually work with used clothing,” highlighting a comfort level with offcuts but a hesitation towards full garment repurposing.

T3 took a different angle, saying, “Not directly, but I have repaired and adjusted secondhand clothes, which is a form of upcycling.” This demonstrates a practical understanding of reworking existing garments to extend their usability. T4 mentioned, “Yes, I have worked with secondhand T-shirts to create new outfits, but it’s challenging,” indicating both experience and awareness of the limitations and complexities of reusing pre-worn materials. T5 added, “I sometimes repurpose fabric offcuts for bags and tablemats, but I haven’t used full garments for new products,” suggesting exposure to upcycling on a smaller scale without fully transforming used clothing into new forms.

These responses show that while the tailors are already employing upcycling techniques in their daily work especially with items like bags, aprons, and tablemats the transition to structured products like carriers presents additional design and technical challenges. Converting household textile waste into durable, functional carriers requires a higher level of skill and planning, including knowledge of fabric strength, ergonomic design, and safe construction methods. Nevertheless, their existing familiarity with repurposing materials offers a solid foundation for further training and experimentation in sustainable product design.

For instance, T1 highlighted a persistent problem with material durability by emphasizing that "used fabric is weaker, and it's hard to ensure uniform quality." Existing literature echoes similar challenges. Post-consumer textile waste frequently exhibits irregularities in fiber strength, wear, and fabric behavior, which makes it less predictable and more challenging to work with during product development, claim Niinimäki et al. (2020). Additionally, Perry and Wood (2018) contend that although upcycling promotes sustainability, it also necessitates more technical work to guarantee

quality control and safety, particularly for products like children's toys that need to be durable and trustworthy.

T2 added, “Some fabrics fray too much or are difficult to sew, especially stretchy or synthetic materials.” This emphasizes the handling difficulties that arise with certain upcycled textiles, which may not respond well to conventional sewing techniques. T3 raised health and safety concerns, noting, “Hygiene is a big concern. We need a proper cleaning process before reuse.” This underscores the importance of fabric preparation and sanitization before repurposing materials into items meant for infants.

T4 discussed the technical challenges of combining various fabrics, explaining, “Different fabrics behave differently; mixing them can be tricky.” This issue relates to the compatibility of textures, weaves, and fiber compositions, which can affect both durability and aesthetic cohesion. T5 highlighted post-wash reliability, saying, “Some materials shrink or change shape when washed, making them unreliable for structured designs.” Such unpredictability can lead to fitting issues or failures in the finished carrier.

These responses reflect the reality that while upcycling offers environmental and economic benefits, it also presents notable technical barriers. Ensuring the safety, durability, and quality of upcycled baby carriers requires tailors to account for fabric strength, sanitation, material compatibility, and stability after washing. Overcoming these challenges will be essential for producing reliable, sustainable baby carriers suitable for everyday use.

Asked about the challenges involved in transforming household textile waste into functional baby carriers, all five tailors expressed concerns related to strength, consistency, and technical design. T1 emphasized the issue of material reliability, stating, “Baby carriers need to be strong, but household fabrics are not always sturdy.” This reflects a critical concern, as structural strength is essential to ensure the safety of both the baby and the caregiver.

T2 pointed out a design-related difficulty, explaining, “Finding enough matching fabric pieces to make a whole carrier would be a challenge.” This highlights the problem of achieving aesthetic and structural uniformity when working with assorted textile scraps. T3 noted the importance of safety reinforcement, stating, “Reinforcement and stitching techniques must be added for safety.” This

comment suggests that special tailoring methods, such as double seams and structural layering, would be necessary to compensate for the limitations of repurposed fabrics.

The functional limitations of working with textile waste were highlighted by the concerns expressed by tailors T4 and T5, particularly with regard to ergonomic support and long-term durability. T4's observation that "used fabrics may not hold up well under constant weight and movement" brought attention to how crucial it is to reinforce the baby carrier's base panel, shoulder straps, and seams areas that are subjected to stress. As a result, the studio experiments used double stitching and deliberate layering to reinforce areas that might be tense. Lighter textiles were utilized for linings or decorative panels, while denim and thick cotton, which are heavier textile waste, were purposefully set aside for structural elements. Strength and functionality were improved by the careful placement of the materials.

The inventive repurposing of folded or quilted layers of soft fabric waste (such as towel material or lightly worn flannel) to provide padding in the shoulder and back areas addressed T5's worry that "some designs might need padding or extra support, which is hard with thin fabric." Furthermore, padding was primarily placed where it would come into direct contact with the body, guaranteeing user comfort without sacrificing the design's sustainability. This makeshift technique offered sufficient cushioning while upholding the project's dedication to upcycling, even though traditional padding materials were not used. These adaptive studio practices showed that textile waste could be successfully engineered to satisfy the ergonomic and durability requirements of baby carriers through careful material selection and construction methods.

Collectively, these responses highlighted the critical need for thoughtful material selection, reinforcement strategies, and design adaptation when working with upcycled textiles. To produce safe and functional baby carriers, it is essential to combine sustainable practices with technical tailoring solutions that ensure strength, comfort, and structural reliability.

When asked about the modifications or adjustments needed to ensure that upcycled materials are durable and functional for use in baby carriers, all five tailors provided practical suggestions rooted in their tailoring experience. T1 emphasized the importance of structural reinforcement, stating, “Double stitching and reinforced seams will be important.” This method helps increase the workable strength of fabric joints, making them more resistant to wear and tear under the weight of an infant.

T2 focused on structural integrity, suggesting, “Adding lining with stronger fabric can help maintain structure.” By inserting a stronger inner layer, the carrier not only becomes more durable but also holds its shape better, improving both function and appearance. T3 addressed the issue of safety in adjustable components, noting, “Adjustable straps should have extra stitching for security.” This highlights the need for secure fastening mechanisms in areas that are frequently adjusted or bear significant load.

T4 recommended enhancing the strength of lightweight materials, stating, “Layering thinner fabrics can make them stronger.” This approach allows tailors to make use of available lightweight textile waste without compromising on safety, by combining several layers to distribute stress more effectively. T5 underlined the comfort aspect, saying, “Padding key areas will improve comfort and durability.” Padding not only enhances the ergonomic quality of the carrier but also reinforces areas under pressure, such as shoulder straps and the back panel.

Together, these responses demonstrate a shared understanding among the tailors of how to transform upcycled fabrics into reliable, user-friendly baby carriers. Their recommendations point to several practical techniques such as double stitching, added linings, fabric layering, and strategic padding that can be used to upgrade reused materials into products that are both comfortable and structurally sound.

All five tailors expressed a strong sense of responsibility and potential for impact. T1 remarked, “Tailors can lead the way in reusing materials creatively,” T2, added that, “Sustainability should be part of our training,” suggesting that integrating sustainable practices into vocational education could empower more tailors to adopt eco-friendly methods in their work.

T3 highlighted the cultural and stylistic value of upcycling, stating, “More people need to see how upcycling can be fashionable and practical.” This perspective points to the need for broader consumer education and awareness, showing that sustainability and style can go hand-in-hand. T4 underscored the importance of systemic support, saying, “If tailors were supported, we could reduce a lot of fabric waste.” Finally, T5 offered a business-minded perspective, noting, “Upcycling could be a business opportunity as well as an environmental solution.” This suggests that sustainability in tailoring does not only have to be about conservation it can also serve as a way for entrepreneurship and income generation.

These responses collectively underscore the pivotal role that tailoring can play in advancing environmental sustainability. They point to the need for both educational reform and structural support to fully leverage tailoring as a driver of change. With proper training, incentives, and public awareness, tailoring can evolve into a cornerstone of the circular economy, promoting the reuse of textiles while opening up new avenues for creative expression and livelihood development.

When asked if they had any additional suggestions to support the design of a functional and sustainable baby carrier, each tailor offered practical insights based on their experience with fabric and garment construction. T1 emphasized the importance of keeping the design process manageable, stating, “Ensure the design is simple so that upcycling does not become too complicated.”

T2 focused on structural reinforcement, suggesting, “Consider using interfacing for better strength.” By incorporating interfacing typically a sturdier material sewn between fabric layers the integrity and durability of the carrier can be enhanced, ensuring it withstands regular use. T3 brought attention to hygiene, noting, “Make sure the carrier is easy to clean since used fabrics might have different washing needs.” This highlights a key concern for parents, particularly when using upcycled materials, which can vary in fabric type and washing compatibility.

T4 recommended improving fastenings for safety and usability, saying, “If possible, use strong zippers or buttons instead of just ties.” T5 introduced a creative element, proposing, “A reversible design could make it more appealing and versatile.” This adds not only functional flexibility but also aesthetic variety, allowing users to alternate between styles. Together, these recommendations underscore the importance of combining simplicity, strength, hygiene, safety, and design appeal in developing a successful upcycled baby carrier.

This section presents responses from five households regarding the use and upcycling of household textile waste to create sustainable baby carriers. H1 one comes from a household with a young family that includes small children; H2 is from a household with a single adult living alone; H3 is from a household consisting of an elderly couple; H4 is from a household with a large family that has teenagers; and lastly, H5 is from a household with a young single mother. Each question is followed by participant responses and an analysis by the researcher, linking the findings to the study's objectives.

When asked how they typically dispose of unused textiles and whether they repurpose them for other uses, household respondents provided a range of practices that reveal varying levels of engagement with sustainable textile use. H1 explained, “I usually throw away old clothes, but sometimes I cut them into pieces for cleaning rags.” This reflects a partial approach to reuse, where some materials are redirected toward basic domestic needs. H2 shared, “Most of the time, I donate old textiles to relatives,” suggesting a socially responsible method of extending the life of textiles through redistribution.

H3 offered a more creative reuse strategy, saying, “I use some fabrics for small home projects, like making cushion covers or small bags. “On the other hand, H4 noted, “I don’t repurpose them; I just store them away in case they are needed later,” indicating a tendency toward stockpiling rather than discarding, but without active reuse. H5 explained, “I rarely throw textiles away. I keep them for patching clothes,” highlighting a practical reuse method that prioritizes utility and cost saving.

These diverse responses indicate that while some households are already participating in basic forms of textile reuse, others could benefit from guidance and encouragement to move toward more structured and sustainable upcycling practices. This supports Objective 1 of the study by confirming the untapped potential of household textile waste as a viable material for creating new, functional products within the circular economy.

When household respondents were asked whether they were familiar with the concept of upcycling and if they would be interested in repurposing old textiles into functional products such as baby carriers, their responses reflected varying levels of awareness and enthusiasm. H1 said, “I have heard about upcycling, but I don’t know much about it. H2 responded more confidently, stating, “Yes, I know about upcycling,” indicating prior knowledge and likely support for the concept. H3 expressed some hesitation, saying, “Maybe. H4 admitted, “I have never heard of it”. Respondent 5 showed strong enthusiasm, stating, “Yes, I love DIY projects and would definitely consider upcycling textiles into useful products.”

H1 remarked, “If the process is easy and doesn’t require special skills, I would try it,” H2 shared a more economic motivation, stating, “I like saving money by reusing old textiles,” reflecting how practical benefits can drive participation.

H3 said, “Knowing that I am helping reduce waste and protect the environment would motivate me,” demonstrating an awareness of the broader impact of textile reuse. H4 pointed out the need for instructional support, stating, “If I could learn simple techniques or if there was a guide, I would be more willing to participate.” This highlights the value of educational resources in making upcycling more approachable and less intimidating. H5 said, “A combination of all these factors ease, sustainability, and cost-saving would encourage me.”

H1 stated, “Yes, I would be happy to donate my old fabrics if they can be useful.” H2 showed partial willingness, saying, “I would give away some, but I might keep higher-quality textiles,” suggesting that the decision may depend on the perceived value of the fabric. H4 also responded positively, saying, “Yes, I would donate some.” However, not all responses were supportive. H3 expressed uncertainty, stating, “I am not sure,” while H5 preferred to keep their textiles for personal use, noting, “I prefer to reuse my fabrics.”

When respondents were asked about the challenges or limitations, they face in reusing or recycling household textile waste, several key barriers emerged, ranging from lack of skills to logistical difficulties. H1 highlighted a skills gap, stating, “I don’t have sewing skills, so I struggle to repurpose textiles properly.” H2 pointed to space constraints, explaining, “Space is an issue. I keep old textiles, but they take up too much room, so I end up throwing them away.” This shows how limited storage can undermine the intention to recycle or reuse.

H3 shared a lack of knowledge about appropriate uses for different materials, noting, “Sometimes, I don’t know what to do with certain types of fabrics.” This uncertainty may lead to waste even when there is a willingness to recycle. Similarly, H4 emphasized the time investment required, stating, “It is time-consuming to sort and clean old textiles for reuse,” H5 offered a more straightforward response, saying, “I usually throw them away,” indicating either a lack of interest or knowledge in recycling practices. These insights reveal that practical limitations such as insufficient skills, limited space, and the complexity of sorting and preparing fabrics are major obstacles to household textile reuse.

H1 emphasized the need for learning tools, stating, “Providing step-by-step guides or workshops would help.” This suggests that structured educational resources could empower individuals who lack prior knowledge or skills. H2 proposed a logistical solution, saying, “Having community centers where textiles can be dropped off for upcycling would make it easier,” pointing to the benefit of centralized, accessible collection points that remove the burden of processing from households.

H3 took a consumer-driven perspective, sharing, “If upcycled products were available to buy, I would be more interested.” H4 identified cost as a barrier, stating, “Affordable tools and materials for upcycling would make it easier for me to start,” highlighting how economic accessibility is essential for wider adoption. Meanwhile, H5 proposed collaboration with skilled professionals, suggesting, “Collaboration with local tailors could help turn old textiles into useful products,” a solution that could link community resources with technical expertise to streamline the upcycling process.

Asked about the importance of reducing waste and contributing to sustainability through upcycling or recycling household textiles, respondents unanimously acknowledged its significance, although some admitted to facing challenges in implementation. H1 expressed a strong commitment, stating, “Very important. I try to reuse items whenever possible to minimize waste.” This reflects a proactive approach to sustainable living. H2 also recognized the value of sustainability but admitted, “It is important, but I sometimes find it difficult to implement,” highlighting the gap between awareness and practical execution.

H3 shared a similar concern, saying, “I care about sustainability, but I need more knowledge on how to upcycle textiles.” This indicates a willingness to engage that is hindered by a lack of clear guidance or training. H4 emphasized the broader environmental impact, noting, “It’s essential for the environment, and I believe more awareness is needed.” Finally, H5 stated, “I support sustainable practices and would like to do more if given the right resources,” reinforcing the importance of accessible tools and community support.

Together, these responses underscore that while sustainability is a shared priority among households, practical barriers such as limited knowledge and resources often block the transition from intention to action. Addressing these gaps through targeted education, community workshops, and user-friendly tools can empower more households to actively participate in sustainable textile management.

4.3 Designing Multifunctional, Aesthetically Pleasing, Sustainable Baby Carriers

The information gathered from both young mothers and tailors plays a vital role in shaping the studio production of upcycled baby carriers. From the mothers' perspectives, several practical needs were identified that directly inform the design process. Most mothers emphasized the importance of lightweight carriers with integrated storage features, such as compartments for baby wipes, diapers, or

bottles. This calls for careful fabric selection in the studio, prioritizing materials that are not only durable but also light enough to avoid adding unnecessary weight. Moreover, mothers consistently mentioned comfort and safety, specifically requesting padded straps, ergonomic weight distribution, and user-friendly fastening systems. These inputs inform the structural design and tailoring techniques used in the studio, ensuring that each prototype is functional and considerate of the caregiver's daily needs. Additionally, mothers expressed appreciation for aesthetic details like patchwork and culturally meaningful decorations, especially those using vibrant African prints. As such, the studio production phase should explore decorative techniques such as embroidery, appliqué, and color blocking to enhance the visual appeal of the carriers while preserving cultural relevance.

On the other hand, tailors provided essential technical insights that support the structural integrity and feasibility of producing baby carriers from upcycled household textile waste. Their experiences with double stitching, interfacing, layering thin fabrics for added strength, and reinforcing adjustable straps serve as direct guidelines for studio construction methods. Tailors also pointed out practical limitations with textile waste, including inconsistent fabric strength, shrinkage, and hygiene concerns, which must be addressed during material sorting and preparation in the studio. Their suggestion to keep designs simple and even consider reversible features supports the idea of creating adaptable, easy-to-sew carriers that maximize the reuse of materials without compromising on quality. Furthermore, the tailors' openness to collaboration and their interest in upcycling as a business opportunity suggest that the studio can evolve into a participatory design space where tailors contribute to iterative prototyping, offer critical feedback, and later benefit from adopting and customizing these sustainable carrier designs.

The studio production process began with prototyping various design options based on this feedback, experimenting with padding placement, storage integration, and fabric combinations. Decorative techniques recommended by both mothers and tailors like patchwork, embroidery, and topstitching were tested to enhance product aesthetics while reinforcing structural elements. Material strength trials were conducted on common household textiles such as cotton to determine the best use for each type within the carrier structure. Sorting and choosing the textile waste materials gathered during the study's field phase marked the start of the studio process. Participating tailors and households, guaranteeing a clear connection between the process of creative design and data collection, supplied these resources. This method grounded the prototypes in actual waste availability and reaffirmed the study's dedication to participatory research.

4.4 Preliminary Studio Investigations

Prior to creating the final studio prototypes, several exploratory studies were conducted to determine whether household textile waste could be used to produce baby carriers. The primary studio practice's material selection, surface design, and ergonomic structure were all heavily influenced by these early investigations. Used bed linens, t shirts and uniforms were among the textile waste products gathered from Makindye Division tailoring shops and nearby homes. Softness, flexibility, fraying tendency, and strength were the basis for informal tests used to evaluate the quality of the cloth. Fiber durability, and colorfastness were observed during repeated hand washing and sun-drying tests. According to these tests, layering and double stitching techniques may increase the structural integrity of most commonly used fabrics for weight-bearing applications, even if they still require reinforcement.

Fabric offcuts were used to explore surface enrichment techniques such patchwork, appliqué, smoking, and pleating in order to determine how to add visual appeal to the carriers without compromising functioning. In order to ascertain how ornamental techniques could improve tactile quality, cultural meaning, and material strength particularly in stress-prone regions like the back panel or shoulder pad quilting and appliqué were initially explored on small fabric panels. These techniques were later refined and altered throughout final prototype. These early studio initiatives paved the way for later, more formal studio procedures. They enabled the researcher to explore real-world problems, adapt to real-world situations, and approach the final carrier designs with a deeper understanding of sustainable principles, materials, and user preferences.

Figure 9 Patch work of different kitenge offcuts

Source; Author

Figure 10 Appliqué with fabric offcuts cut into shapes and hand-stitched onto another fabric using running stitches with kitenge and jinja cotton.

Source; Author

Figure 11 A woven fabric made from worn-out cloth cut into strips for sturdiness, using kitenge and cotton fabric.

Source; Author

Figure 12 Lattice smoking

Source; Author

Figure 13 shows reverse smoking

Source; Author

Figure 14 A turked or pleated fabric folded in half to create a semblance of a leaf.

Source; Author

4.5. Studio Practice

4.5.1 Source of Inspiration: The Banana and Banana Leaf

There are both practical and aesthetic benefits to upcycling multipurpose baby carriers from textile waste by drawing inspiration from bananas or banana leaves. From a design standpoint, the folded structure of a banana leaf and the organic, curving shape of a banana complement the natural contours of the human body. Consequently, they serve as perfect models for designing ergonomic baby carriers that provide comfort and appropriate weight distribution for both the wearer and the infant.

In terms of surface design, the veining and texture of banana leaves offer a wealth of ideas for ornamental techniques such as patchwork, appliqué, quilting, and embroidery. These methods enhance the carrier's aesthetic appeal while promoting the innovative use of textile waste, aligning with upcycling principles. Moreover, various societies have long employed banana leaves to wrap and transport goods. This traditional usage can inspire multipurpose design elements in the baby carrier, such as foldable sections and built-in pockets for baby bottles, wipes, and a cell phone. Overall, this

concept blends sustainability and environment to create a thoughtful, functional, and aesthetically pleasing product.

4.5.2. Functional and Aesthetic Considerations

Building on the organic inspiration from the banana leaf, the carrier design incorporates curved, ergonomic straps that follow natural body contours for improved weight distribution. Layered fabric panels are inspired by banana leaf structures to enhance durability and flexibility. Storage compartments are designed to resemble the natural pockets found in leaf structures, allowing caregivers to conveniently store baby essentials. Surface embellishments mimic leaf textures through stitching and embroidery techniques, enhancing visual appeal while reinforcing structural integrity. By grounding the design in nature, the final baby carrier prototype achieves a balance between functionality, sustainability, and aesthetics. The banana-inspired design principles ensure that the carrier meets practical needs while maintaining an innovative and eco-conscious approach.

4.5.3. Sketches of the source of inspiration.

Objective drawings

The banana fruit and banana leaf, which are plentiful and culturally significant in Uganda, served as the inspiration for the baby carrier prototypes' structural design. This organic shape was selected for its practical guidance in forming the ergonomic features of the carrier, in addition to its aesthetic and symbolic significance.

The design of the baby carriers was directly inspired by the curves found in bananas and their leaf structure. The main body panel, shoulder straps, and side seams were shaped using these natural contours to create a design that securely supports the baby and fits gently around the caregiver's body. The goal was to replicate the protective, smooth curve of a banana peel, which represents safety and a natural embrace. At the same time, the design was made to distribute weight evenly and provide greater comfort when carrying.

In order to help cradle the baby's bottom while keeping a gentle curve against the caregiver's waist, the carrier's base, for instance, has a rounded lower edge that mimics the tapering shape of a banana tip. In keeping with the upward flow of a banana leaf midrib, the upper back panel is also slightly arched, giving the baby's neck and back a supportive contour. This structure uses a fluid geometry that improves comfort and flexibility rather than harsh straight lines and rigid forms.

In reality, the carriers' ability to accommodate different body shapes and sizes was enhanced by these banana-inspired curves, which also gave the product a biomorphic quality that links it to its environmental origins and added visual softness. By incorporating ecological consciousness and cultural identity into the physical structure of the product and taking inspiration from local nature, this method is in line with sustainable design principles. This bio-inspired approach gave the carrier designs a user-centered structure that improves wear ability and emotional connection while also reflecting sustainability in form development and material use.

Figure 15 A drawing of a young plant bringing out its first leaf.

Source; Author

Figure 16 A drawing of an old leaf breaking off and a new one coming out.

Source; Author

Figure 17 A drawing of banana plant emphasis on the banana leaves

Source; Author

Figure 18 A drawing of banana plants in a banana plantation

Source; Author

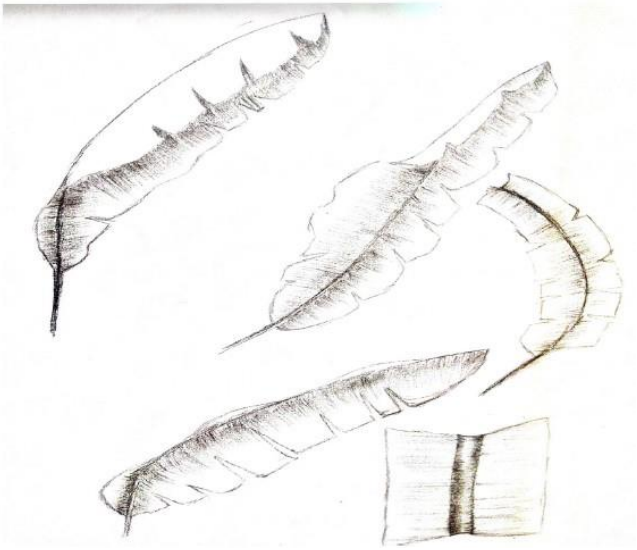

Figure 19 Drawn studies of a banana leaf

Source; Author

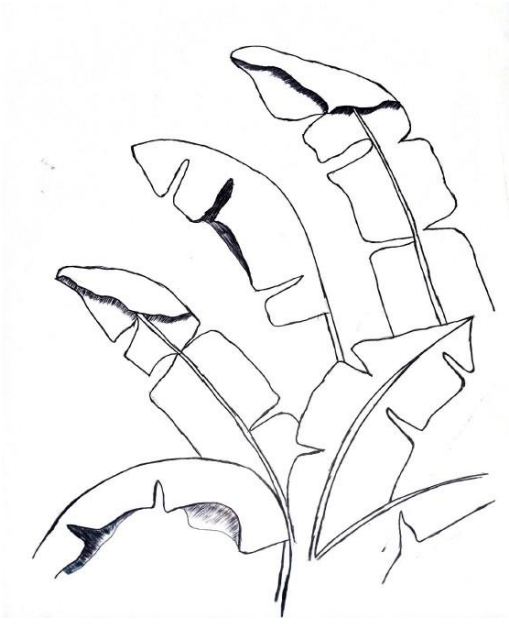

Figure 20 A drawn study of the movement of banana leaves

Source; Author

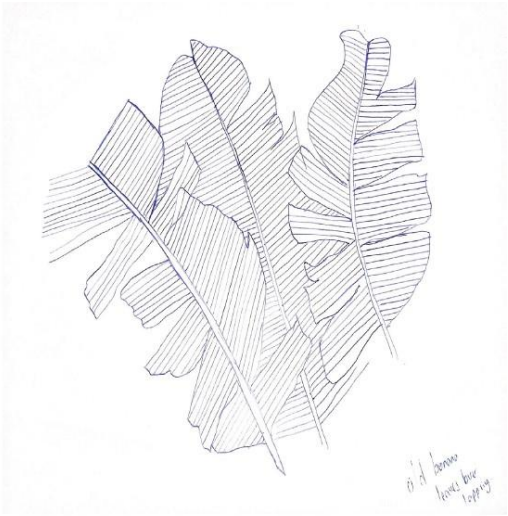

Figure 21 Drawn studies of the banana leaves emphasizing the veins

Source; Author

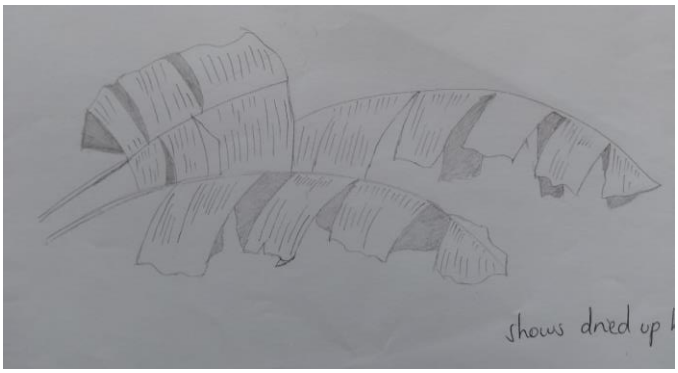

Figure 22 Drawn study of banana leaves that are withered

Source; Author

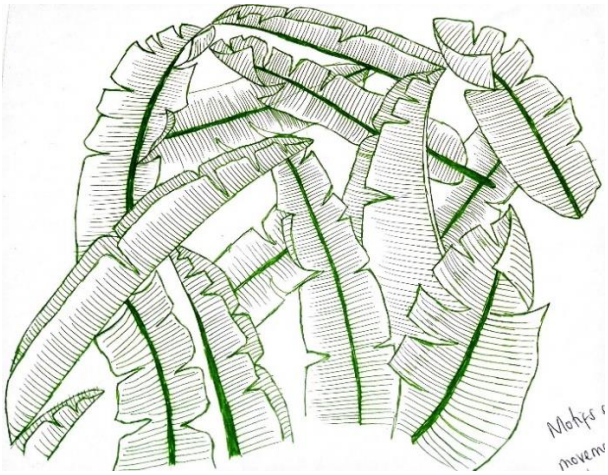

Figure 23 Motifs derived from the movement and veins of banana leaves

Source; Author

Figure 24 Drawing of a bunch of bananas on a banana plant

Source; Author

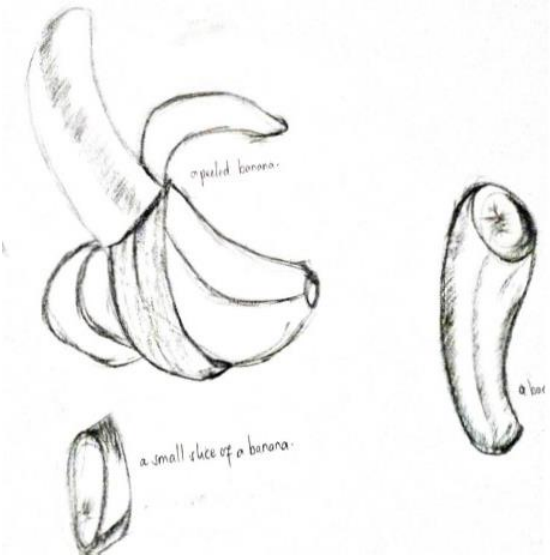

Figure 25 Drawing of studies of a banana

Source; Author

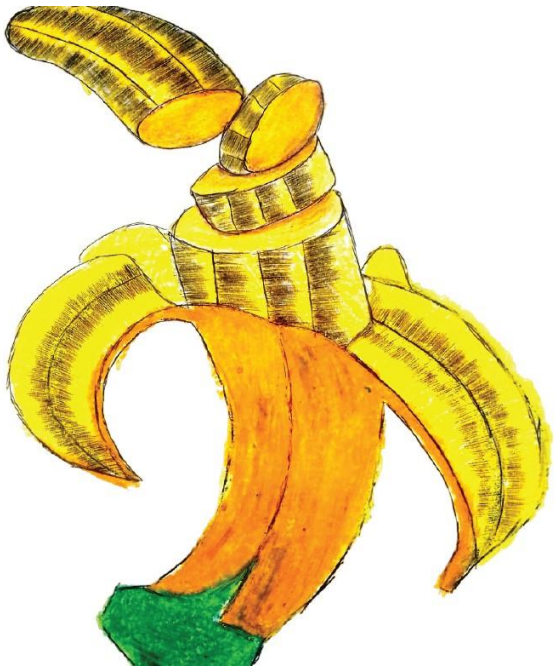

Figure 26 Drawing of a distorted banana

Source; Author

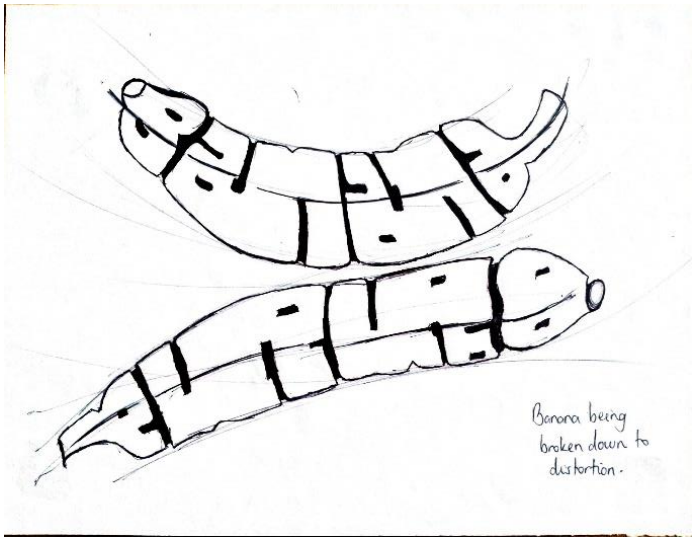

Figure 27 Another distorted banana

Source; Author

Figure 28 A drawing of a distorted banana with textures derived from the midrib of a banana leaf

Source; Author

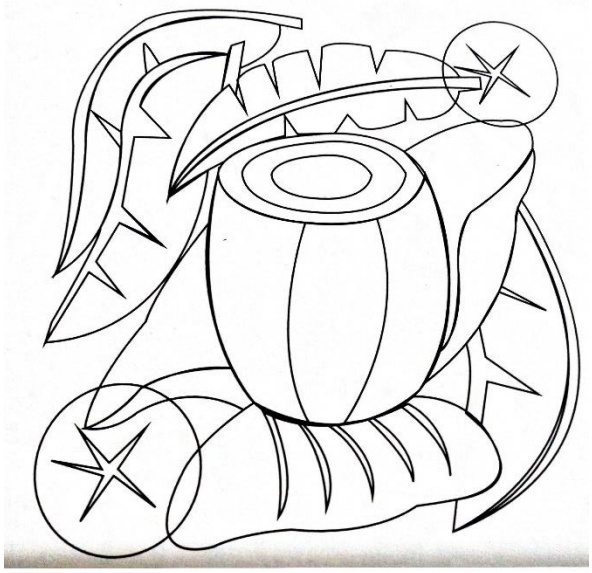

Figure 29 A drawing of a banana leaves, a sliced banana and empumupu done in illustrator

Source; Author

Figure 30 A drawing of banana leaves, a sliced banana, and empumupu in color done in Adobe Illustrator

Source; Author

4.5.4. Crafted drawings of the baby carriers

As part of the studio exploration process, crafted drawings were developed to translate the conceptual and observational studies of the banana plant into refined visual representations that could directly inform design construction. Unlike the objective or expressive sketches, these crafted drawings focused on accuracy, proportion, and functionality, serving as detailed guides for material manipulation, structural arrangement, and surface decoration in the baby carrier prototypes. Drawing from the banana leaf's layered form, central spine, and tapering edges, the crafted illustrations translated organic inspiration into structured design concepts highlighting how form could follow function. These renderings played a pivotal role in bridging abstract ideas with practical applications, ultimately shaping the layout of straps, compartments, and support panels within the prototypes. By grounding creativity in thoughtful artisanship, these drawings helped visualize a cohesive product rooted in both nature and purpose. Sorting and choosing the textile waste materials gathered during the study's field phase marked the start of the studio process.

4.5.5. Design Decisions: Color and Material Availability

While the structural inspiration for the baby carrier prototypes was drawn from the organic curves of bananas and banana leaves, the final color schemes were largely influenced by the nature of the upcycled materials available during the project. Since the study prioritized sustainability and relied

on textile waste collected from households and tailoring workshops in Makindye Division, some of the readily available fabrics were in shades of blue. In contrast, green or yellow materials, which would have more directly mirrored the colors of a banana leaf, were less accessible.

Consequently, the representation of the banana leaf in the prototypes was expressed more through form, stitching, and curved paneling, rather than literal coloration. The use of blue, though not a direct match to the source of inspiration, also resonated with several participants especially young mothers who appreciated the gender-neutral appeal of the color. This highlights the adaptive nature of sustainability-focused design, which often requires balancing conceptual inspiration with material accessibility and user preferences, particularly when working within the constraints of upcycled resources.

4.5.5.1. Story Stitch carrier

Description

The banana plant, especially its leaves and fruit, serves as a major source of inspiration for the Story Stitch Carrier. The banana leaf is renowned for its tenacity, layered, tapering curves, and inherent symmetry. Through meticulous fabric layering employing patchwork and appliqué techniques, these structural and visual characteristics were translated into the carrier's form.

The banana fruit itself influenced both the carrier’s construction and symbolic element. By affixing a soft, banana-shaped toy to the carrier, this parallel was incorporated into the design, acting as a sensory item for the infant as well as a symbolic reminder of the mother's protection and sustenance. Additionally, the Story Stitch Carrier's method of layering various fabric squares first with 6x6 inch patchwork, then with 3x3 inch appliqué was meant to resemble the way banana leaves are layered on a plantation, where new growth covers older ones, signifying the continuity of life and generational care. The ornamental panels' textures and hues highlighted spontaneous motion and growth by evoking the vivid, veined surfaces of banana leaves.

In terms of functionality, the carrier's curved ergonomic shape mimics the way a banana leaf naturally bends when underweight. This helped determine where to put the straps and padding to ensure that the baby's weight is distributed properly across the caregiver's shoulders and back. Textile waste is transformed into a cultural statement piece by the overall style, which is vibrant, textured, rich, and symbolic, channeling the grace and tenacity of the banana plant.

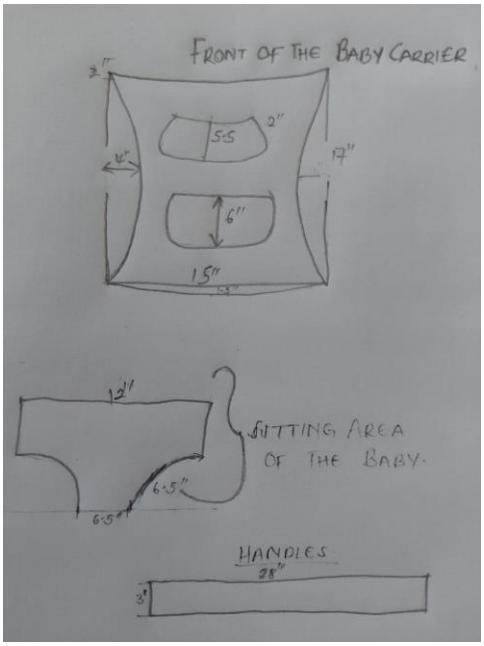

Figure 31 A sketch for baby carrier with patchwork and applique techniques

Source; Author

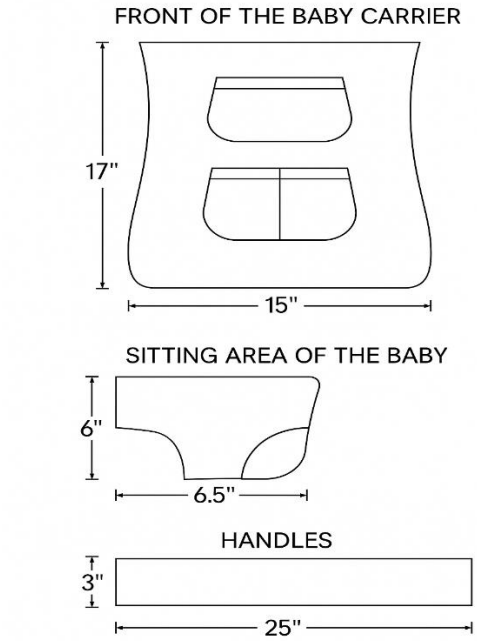

Figure 32 A computer aided drawing of the baby carrier

Source; Author

Materials used

The size of the applique square was 3by3 inches.

The patchwork square was 6by6 inches.

After joining the pieces together It should be one meter and a half.

Cotton lining of meter was used on the inner surface and straps of the carrier.

One meter of sponge was used in the interfacing.

Figure 33 Drafts for the baby carrier

Source; Author

Figure 34 The researcher joining the different parts together

Source; Author

Figure 35 The front part of the baby carrier

Source; Author

Figure 36 The back part of the baby carrier

Source; Author

Figure 37 The part of the baby carrier where the baby would sit.

Source; Author

Figure 38 The baby carrier with a toy in the shape of the banana attached so that the baby can play with it as they are in the baby carrier

Source; Author

4.5.5.2 The Leaf nest carrier

Description

The leaf nest carrier is an artistically and functionally enhanced infant carrier that draws inspiration from the organic shape and meaning of banana leaves. Its design honors the organic folds, creases, and layered patterns of banana leaves, transforming them into a product that is both visually and functionally useful. Repurposed green home linens were used to create the carrier's body, which mimics the vibrant color and vigor of banana leaves. The leaf-like pocket, which mimics the organic taper of a banana leaf and has a soft, rounded base and a sharp upper edge, is the focal point of its design. In addition to being ornamental, this pocket serves a practical purpose by offering easy storage for baby necessities like bottles, wipes, or rags.

A sequence of vertically extending pleats beneath the pocket is expertly embroidered to mimic the soft ridges and core vein structure found in banana leaves. These pleats enhance the carrier's visual character and give it a sculptural form by adding an inherent rhythm and movement. By adding softness and dimension, the textured layering also gently supports the front panel's structural stability. The Leaf Nest Carrier's ergonomic features, which support both caregiver and child while in use,

include padded, adjustable shoulder straps, a tight infant seat, and secure closure mechanisms. Although it serves a functional purpose, its design is full of symbolism, referencing the banana leaf's connection to protection, nurturing, and natural wealth.

The Leaf Nest Carrier is aesthetically pleasing due to its nature-inspired form, harmonious green color, and handcrafted details. Drawing from the graceful structure of a banana leaf, it blends functional beauty with cultural symbolism, offering a visually distinct and emotionally resonant alternative to mass-produced baby carriers.

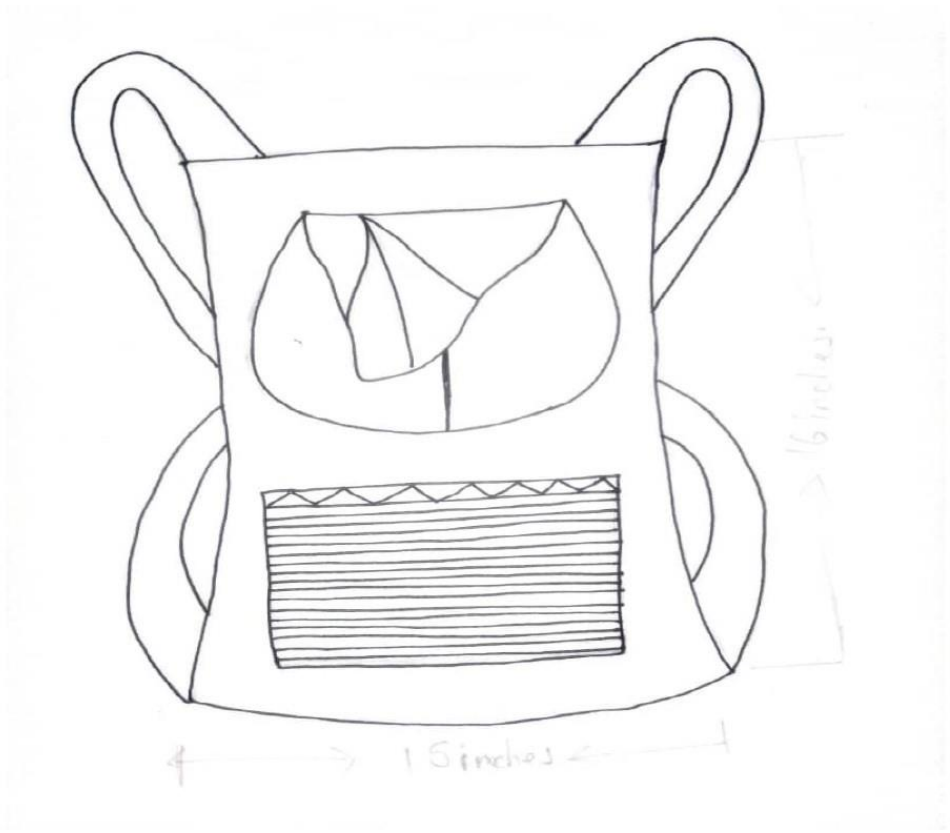

Figure 39 The hand drawn sketch of leaf pocket baby carrier

Source; Author

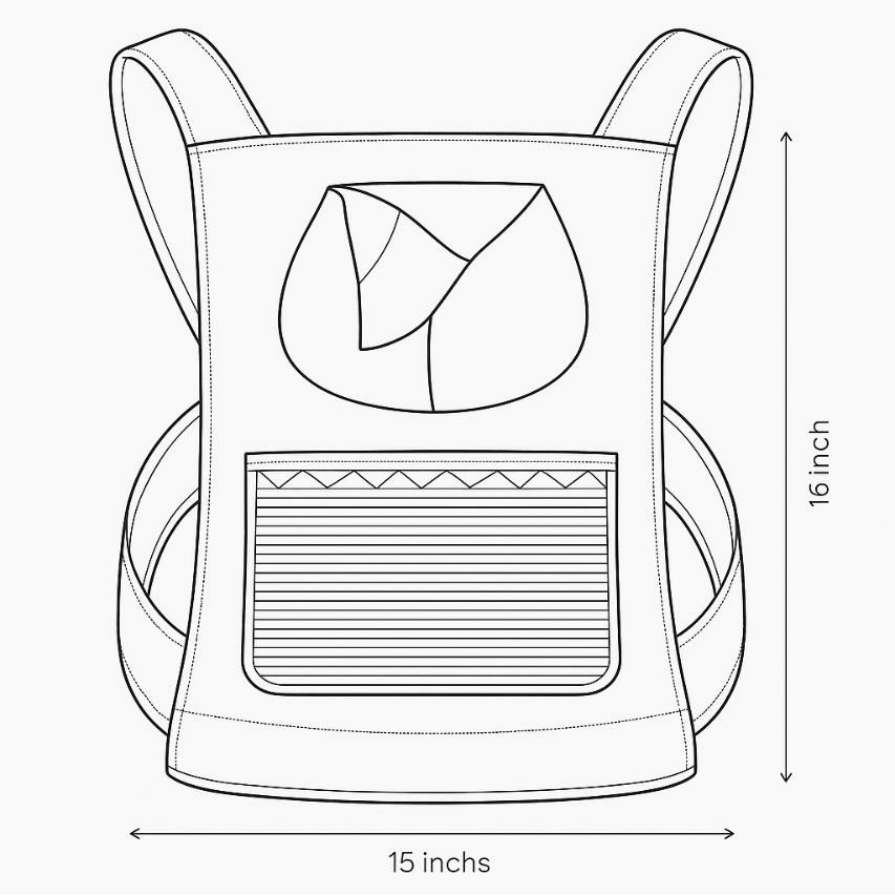

Figure 40 A computer aided draft drawing of the carrier

Source; Author

Materials used.

A fabric measuring 2 meters was obtained, and lines were sewn onto it using gold-colored thread to imitate those of banana leaves. The fabric was then cut and sewn together.

one meter of sponge was used as inter facing

a cream fabric of one meter was used as lining

Figure 41 The researcher cutting the preferred material according to the interfacing

Source; Author

Figure 42 The straps of the baby carrier after being lined

Source; Author

Figure 43 Where the baby will be sitting

Source; Author

Figure 44 The front part of the baby carrier

Source; Author

Figure 45 The back part of the carrier

Source; Author

4.5.5.3 Leaf Flow baby carrier

Description

The front panel of this carrier has decorative pin tuck stitching that gives the impression of ripples. The fabric is subtly reinforced by the fine, repeated tucks, which also add surface texture. The organic features of the banana leaf inspired the design of the carrier's front panel's rhythmic, uniformly spaced pin tucks. These stitched ridges represent continuity, care, and organic movement since them visually and texturally mimic the flowing lines of a banana leaf's veins.

More than just surface ornamentation, the pin tucks give the repurposed fabric modest structure and additional texture, which helps it drape and fit the baby's body more organically. By elevating the aesthetic appeal of plain or faded textile waste, this surface design turns commonplace materials into something elegant and culturally significant. The baby's comfort is gradually improved by the ripple-like patterning, which also helps with breathability and light cushioning.

The leaf flow Carrier's use of blue fabric represents the most readily available repurposed materials from local tailors and homes, even though the green banana leaf serves as structural

inspiration. The design allows natural motifs to emerge through stitching and texture rather than hue, emphasizing sustainability and form expression over literal color depiction.

By imitating the structural elegance of banana leaf veins, the leaf flow Carrier's pin tuck patterning draws inspiration from nature and creates visual appeal. The carrier has a handcrafted, culturally relevant appearance that strikes a balance between sustainability and aesthetic refinement thanks to the interaction of texture, form, and repurposed materials.

The ergonomic design of the leaf flow Carrier guarantees the comfort of both the infant and the caregiver. The front panel keeps the infant in a comfortable sitting position, and the adjustable, padded straps distribute weight evenly throughout the body. A contoured, breathable fit is also facilitated by the pin tuck design, which was inspired by the structure of banana leaves. The leaf flow Carrier is safe, comfortable, and functional for prolonged use due to these ergonomic characteristics.

Compared to current commercial infant carriers, the Leaf Flow Carrier is quite marketable, especially because of its distinctive fusion of cost, and sustainability. The Leaf Flow Carrier is manufactured from locally obtained, repurposed home textiles, making it both economical and environmentally beneficial. This is in contrast to mass-produced carriers like those from Baby Bjorn or Ergo baby, which are frequently pricey, made from synthetic fabrics, and visually homogeneous. It stands out in artisan and low-income marketplaces thanks to its characteristic pin tuck surface ornamentation, which was inspired by the structure of banana leaves. It satisfies practical demands while providing a handcrafted, emotionally impactful appearance. It is ergonomically built to support the infant in a healthy seating position and has padded, adjustable straps for caregiver comfort.

Figure 46 One of the mothers has two of these pinafores that were still in good condition.

Source; Author

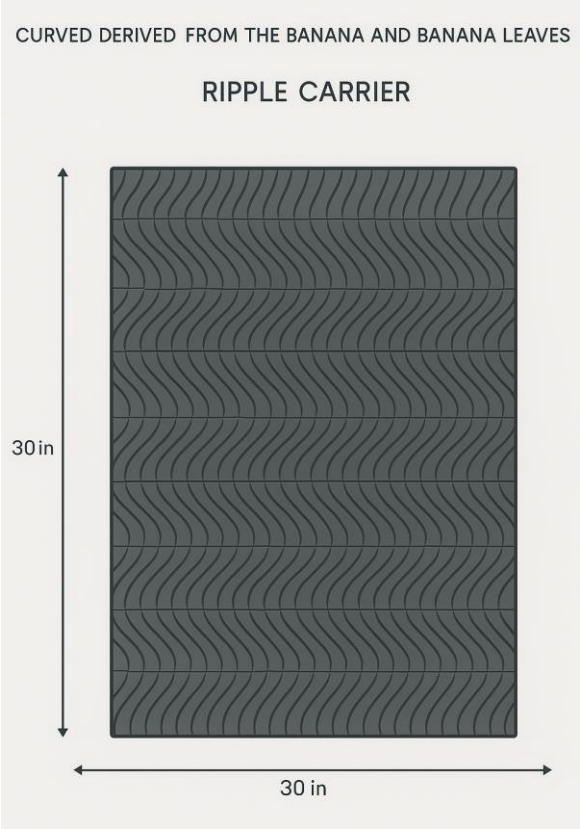

Figure 47 A computer aided draft drawing of the carrier

Source; Author

Figure 48 The researcher is undoing the pinafores to get flat surfaces to work with

Source; Author

Materials used.

After the pinafores were unraveled, the lower part was used; its width was 2.5 meters

One meter of cotton lining was used in lining the inner part of the carrier each meter at 10,000ugx.

One meter of wadding was used as interfacing for the carrier.

Figure 49 The researcher ironing the pin tucks after sewing so that they can be flat

Source; Author

Figure 50 The pin Turks after sewing

Source; Author

Figure 51 Drafts of the baby carrier.

Source; Author

Figure 52 A pocket to be attached to the baby carrier

Source; Author

Figure 53 The pocket attached to the pouch of the baby carrier where the baby carrier sits is also for the mothers security purposes as its close to her body it won't make the baby uncomfortable due to the padding

Source; Author

Figure 54 The front part of the Leaf Flow baby carrier

Source; Author

Figure 55 The part of the baby carrier where the baby would sit.

Source; Author

Figure 56 The back part of the Leaf Flow baby carrier

Source; Author

4.5.5.4 Duo Nest carrier

Description

The Duo Nest Carrier is a well-made baby carrier made especially for mothers of twins or other caregivers who are in charge of two babies of the same age. The carrier's layered, curved design is a reflection of biomimicry, taking both structure and inspiration from the organic shape of banana leaves. The banana leaf inspires it, which is renowned for its flexible and protective wrapping. It consists of two symmetrical, softly padded pouches that may be placed front-and-back or side-by-side, providing ergonomic flexibility according to user desire. While the carrier as a whole maintains balance and posture with a broad waistline and adjustable shoulder straps, each pouch is independently made with reinforced seams and sponge padding to ensure each child's safety and comfort.

The leaf-smocking surface design, a hand-stitched method that produces a textured, organic pattern across the fabric panels, improves the Duo Nest Carrier's aesthetic appeal. This smocking's design grid was meticulously arranged to resemble the veining of banana leaves, producing a surface that is both ornamental and significant. Beyond its aesthetic value, this smocking technique subtly improves the fabric's strength and breathability, creating a surface that adheres to contemporary upcycling guidelines. The carrier has cultural and environmental significance since the polyester base fabric, which was chosen for its toughness and low weight, echoes the natural color scheme of bananas and banana leaves.

In terms of ergonomics, the Duo Nest Carrier is a breakthrough in baby mobility. Even weight distribution despite the doubled load is ensured by the adjustable straps' contouring to follow the caregiver's body. The carrier is supportive for extended usage because it is designed to prevent pressure points and is heavily cushioned with 1.5 meters of sponge interfacing. The base of the carrier resembles the rounded taper of a banana tip, keeping the kids in an upright, healthy position while cradling them in a soothing seat.

The final design of the carrier, which was influenced by both computer-aided and hand-drawn drawings, strikes a balance between wearing comfort and sculpture. Similar to how banana trees develop in clusters and round their fruit with their leaves for protection, it embodies the idea of nurturing, care, and twofold protection.

More than just a twin baby holder, the Duo Nest Carrier is a practical and aesthetic representation of sustainability, community cooperation, and design inspired by nature. It reimagines what maternity care may feel and look like in resource-constrained settings by transforming waste textiles into a product that is both structurally sound and culturally rich.

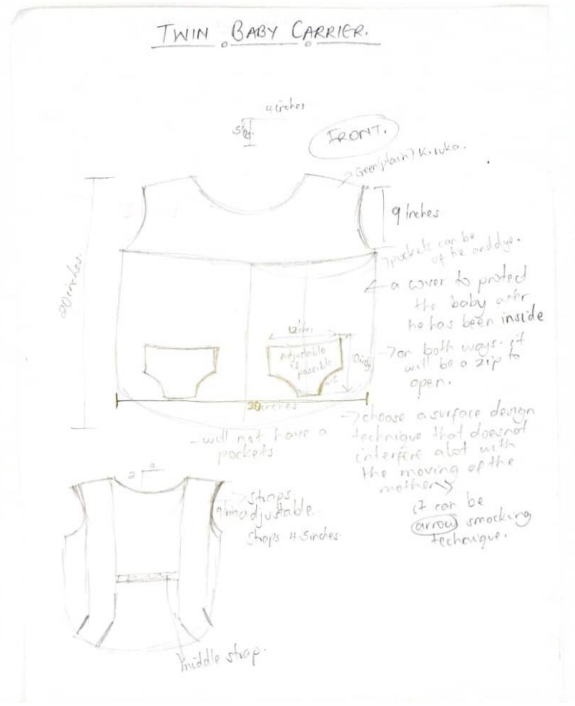

Figure 57 A draft pattern sketch for the baby carrier designed to carry twins.

Source; Author.

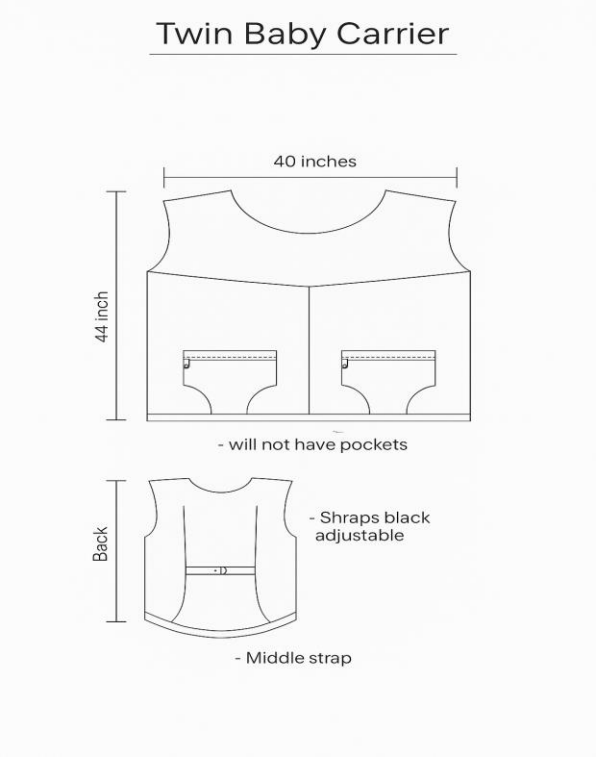

Figure 58 A computer aided draft of the dual nest carrier

Source; Author

Figure 59 The researcher started by getting different materials with colors derived from the source of inspiration and she sewed them together.

Source; Author

Figure 60 The researcher drawing the grids for the smoking technique

Source; Author

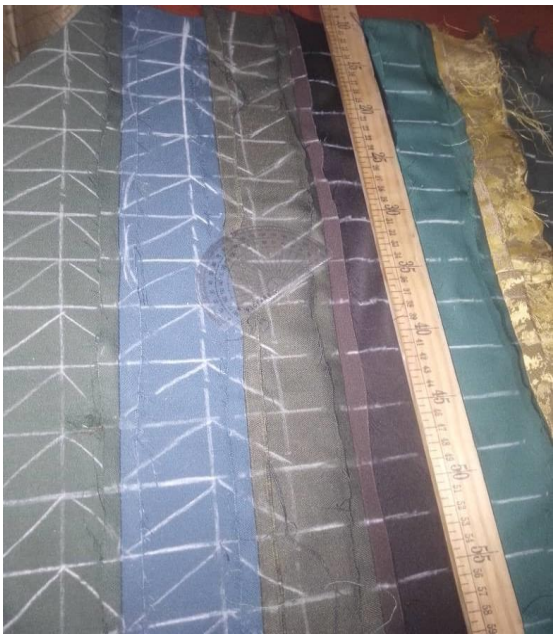

Figure 61 The grid that the researcher used as a sewing guide in order to achieve the leaf smoking technique.

Source; Author

Figure 62 The researcher using hand stitching in order to achieve the leaf smoking technique.

Source; Author

Figure 63 The leaf smoking technique.

Source; Author

Materials used.

3 meters of polyester fabric were used for the body of this twin baby carrier.

1 and a half meters of sponge as this baby carrier needed to be sturdy enough to carry the weight of two babies.

Figure 64 The different parts of the twin baby carrier cut and ready to be sewn together.

Source; Author

Figure 65 The front part of the baby carrier after being sewn the two pouches are areas where babies can be put.

Source; Author

Figure 66 The back part of the baby carrier.

Source; Author

Figure 67 How the baby carrier appears on the human body.

Source; Author

Figure 68 The back part of the duo nest baby carrier

Source; Author

4.5.5.5 Sling Baby carrier

Description

The Sling Baby Carrier's straightforward, one-shouldered design is modeled after the organic shape and protective qualities of a banana leaf. The gentle drape and enveloping shape of this carrier replicate the ancient uses of banana leaves for carrying, wrapping, and shade. Inspired by the ripening stages and color variations of a banana and its foliage, it is made from repurposed tie-dye fabric that was chosen for its warm, earthy tones of yellow, brown, and gentle blue.

The quilted banana leaf designs sewn directly into the fabric's surface are a unique element of the Sling Baby Carrier. In addition to making the carrier more aesthetically pleasing and kid-friendly, these quilted designs also support the carrier's thematic link to nature while discreetly adding more padding and structure. An otherwise simple structure gains symbolic and aesthetic importance from the quilted stitching, which imitates the veins and natural curvature of banana leaves. Because the carrier is customizable, caregivers can fasten the sling to the baby's body size and comfort level, guaranteeing a snug fit and good posture. Because of its lightweight cotton fabric's breathability and softness, which complement Uganda's warm environment and daily baby wearing needs, it is especially well suited for short-term infant carrying.

Compared to commercial alternatives, the Sling Baby Carrier is much more marketable because of its distinctive blend of affordability and sustainability. It provides a visually appealing and narratively rich substitute for mass-produced carriers, drawing inspiration from organic shapes such as banana leaves. It is affordable and eco-friendly, making it accessible to low- to middle-income families and ecologically conscious parents. It is made from repurposed textile waste. For warmer climes, its airy and lightweight form is perfect, providing a more straightforward and adaptable alternative to heavy, structured carriers.

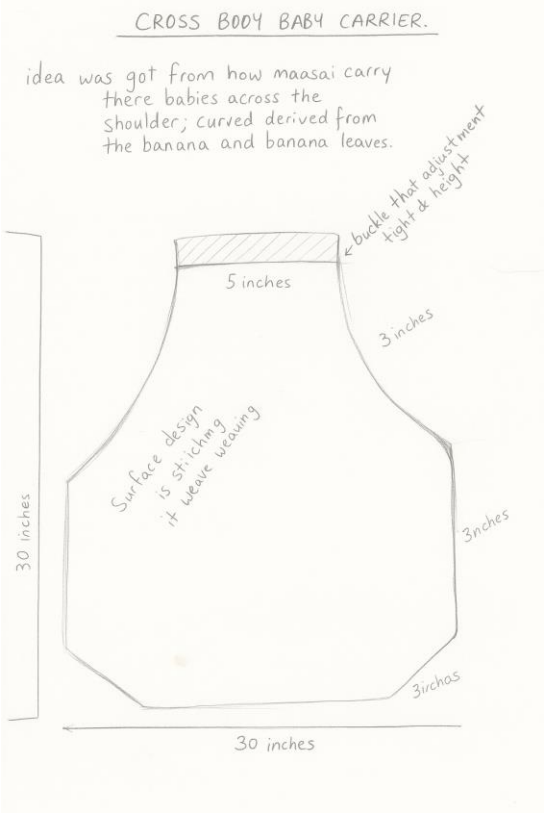

Figure 69 The sketch of the sling baby carrier

Source; Author

Figure 70 The shape of the banana leaf being quilted into the surface of the baby carrier

Source; Author

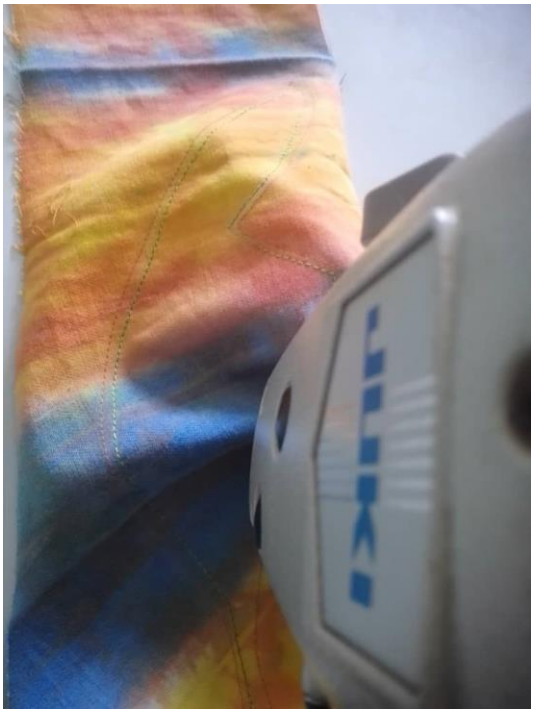

Figure 71 The quilting process of the baby carrier

Source; Author

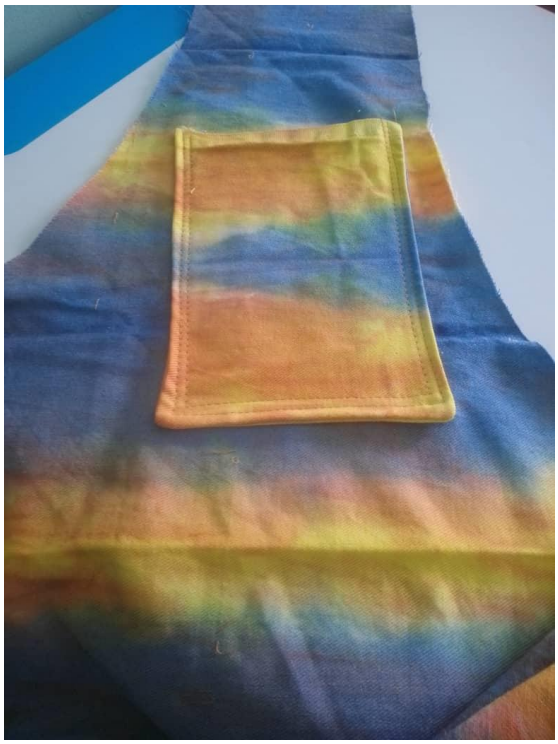

Figure 72 A pocket where a mother can place her phone and essentials sewn into the sling.

Source; Author

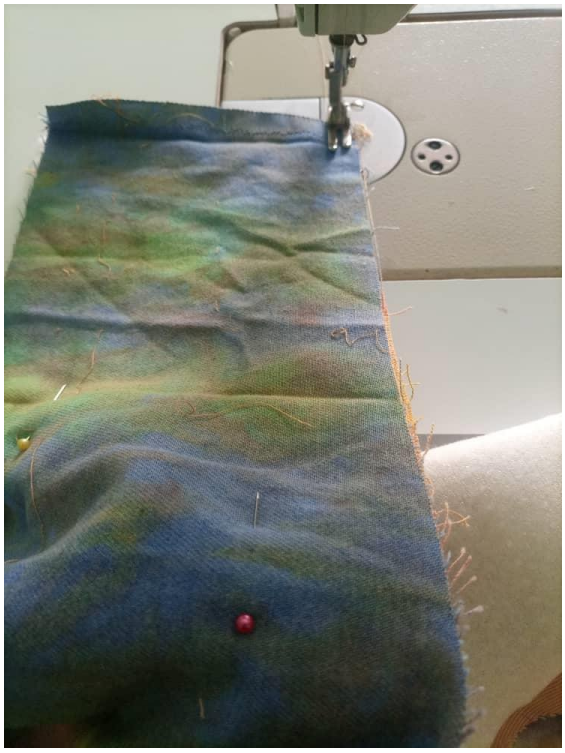

Figure 73 The author joining the baby carrier together

Source; Author

Figure 74 The front part of the baby carrier

Source; Author

Figure 75 The interior of the baby carrier where the baby sits

Source; Author

Figure 76 The baby faces the mother in the sling baby carrier

Source; Author

Figure 77 The back part of the baby carrier, showing that the mother can adjust it to the length that she prefers.

Source; Author

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of Findings

This study examined how household textile waste can be upcycled into multifunctional, sustainable baby carriers suitable for young mothers in Makindye Division, Kampala District. The research was guided by three objectives:

1. To analyze the potential of household textile waste as a sustainable material for creating baby carriers within the circular economy.
2. To explore suitable surface decoration techniques that enhance the visual and cultural appeal of baby carriers made from textile waste for Makindye Kampala Division
3. To design and produce multifunctional, affordable, and visually appealing baby carrier prototypes through participatory studio practice for mothers in Makindye, Kampala Division.

Data were gathered through observations, interviews, and studio experiments using an exploratory qualitative methodology and an action research design. Young mothers, tailors, and households were among the participants. The results of observations and interviews showed that textile waste, such as old bed linens, T-shirts, and cotton fabric, is widely available in urban households. However, concerns about fabric weakness, durability, and inconsistency were constantly raised by tailors.

The safety of baby carriers may be impacted by structural limitations, as one tailor noted that "used fabric is weaker, and it's hard to ensure uniform quality." All tailors concurred that, with the right selection, cleaning, and reinforcement, household textile waste could be used despite these obstacles. Mothers also said they would be open to using inexpensive, environmentally friendly baby carriers as long as they were well-made, cozy, and safe. The main conclusions showed that, despite issues with fabric strength, consistency, and hygiene, household textile waste can still be used to make reasonably priced and ecologically friendly baby carriers. Although they had reservations regarding the durability of the materials, tailors were amenable to utilizing waste fabrics under certain design and reinforcement guidelines.

Participants valued surface embellishment techniques like patchwork, applique, leaf smoking, and pin tucking because they were both aesthetically pleasing and functional. These methods were employed to strengthen the fabric's weak spots in addition to improving its aesthetic appeal.
The organic shape of the banana leaf served as inspiration for the design process, which included ergonomic elements like compartment pockets, curved shapes, and adjustable straps. The final prototypes showed that, with user and tailor input, repurposed textile waste can be turned into useful, reasonably priced, and aesthetically pleasing baby carriers.

5.2 Conclusion

According to the study's findings, upcycling waste textiles from homes into baby carriers was a practical and significant way to promote maternal health and environmental sustainability. Although quality control is still an issue because post-consumer fabric condition varies, the first goal was achieved by verifying the availability and suitability of textile waste for carrier production. This illustrates how circular economy concepts can be implemented at the household level through material recovery and reuse.

Finding surface decoration methods that contributed to structural reinforcement, in addition to enhancing aesthetic value, enabled the accomplishment of the second goal. The successful creation of prototypes utilizing practice-based design influenced by field insights ultimately achieved the third goal. These prototypes maintained affordability and cultural relevance while meeting functional needs like comfort, support, and storage. The study's action research methodology was validated by the studio's iterative and participatory process, which made sure the finished designs were based on local reality.

The results also support the significance of including end users in the design process, including tailors and young mothers. Their input was crucial in creating working prototypes that are also sensitive to practical requirements. Although material inconsistency is still a problem, it can be controlled with careful surface treatments, structural reinforcement, and material selection. The study supports Sustainable Development Goal 12: Responsible Consumption and Production and fosters local design innovation.

5.3 Recommendations

Based on the study's findings, a number of suggestions are made to help academic institutions, designers, and policymakers promote the sustainable production of baby carriers out of waste textiles from homes.

5.3.1 In Relation to Objective 1: Textile Waste as Sustainable Material

In order to effectively utilize textile waste in the production of baby carriers, it is essential to implement comprehensive community-level initiatives focused on sorting, cleaning, and categorizing various fabric types before they can be repurposed. These initiatives should aim to create an organized workflow that simplifies the recycling process and maximizes the potential of reclaimed materials.

Community workshops can be organized to educate households on the importance of textile recycling. Residents should be informed about effective storage techniques for reusable textiles, emphasizing that items should be kept clean and dry until they can be donated. Flyers, social media campaigns, and local events can serve as platforms for outreach, highlighting the environmental benefits of donating rather than discarding textiles.

Moreover, it’s crucial to provide local tailors and designers with access to training programs that focus on evaluating fabric integrity. These programs can include hands-on workshops where participants learn to assess the quality of different fabrics, such as identifying suitable materials for linings (e.g., using cotton for its breathability and softness). Education on sustainable sourcing and the environmental impact of textile waste can further motivate professionals to engage with these initiatives as this can be a source of income for them.

Implementing standardized material testing protocols in studios or workshops can significantly enhance the quality of recycled textiles used in baby carrier production. Techniques such as checking for fraying, performing color fastness tests, and assessing tear strength should be part of routine fabric evaluation. Workshops could include demonstrations on these testing methods, allowing participants to gain practical experience in identifying materials that meet safety and performance standards.

Furthermore, collaboration between community organizations, local governments, and fashion industry stakeholders can amplify these efforts. Establishing a network for sharing resources, tools, and knowledge can facilitate the scaling of sustainable practices. By fostering a culture of recycling and

education around textile waste, the community can play a vital role in producing safe, high-quality baby carriers while also reducing the environmental footprint associated with textile disposal.

5.3.2 In Relation to Objective 2: Surface Decoration and Aesthetic Appeal

Designers and tailors should receive comprehensive training that covers not only the technical aspects of garment construction but also the innovative and artistic realms of creative surface embellishment techniques. This holistic approach would enable them to create garments that are not only functional but also visually captivating.

Techniques like pin tucking and smoking can be used to enhance the aesthetic appeal of garments and improve their durability, along with traditional methods such as patchwork and applique. By incorporating these techniques into everyday fashion, designers can create pieces that last and tell a story.

Furthermore, local community fashion events or exhibitions should be organized to promote the value and artistry of culturally inspired, upcycled baby carriers. Such events could serve as a platform to showcase the creativity and skill involved in transforming secondhand materials into beautiful, functional products. This can help to educate the public about the benefits of upcycling and the artistry that can emerge from using materials that might otherwise be discarded.

By spotlighting these practices in community settings, we can help to reshape perceptions about secondhand materials. Rather than viewing them through a lens of stigma, the narrative can shift to emphasize their uniqueness, craftsmanship, and expressiveness. Highlighting stories of artisans who skillfully reinterpret these materials can further enhance their appeal, making them desirable choices for consumers who value sustainability and originality in fashion. In essence, fostering an appreciation for these techniques and materials not only supports the livelihoods of designers and tailors but also cultivates a more sustainable and conscious fashion culture that resonates with a broader audience.

5.3.3 In Relation to Objective 3: Production of Functional, Sustainable Prototypes

In order to effectively scale the production of high-quality, upcycled baby carriers, a strategic approach that includes partnerships among tailors, local designers, and health centers is crucial. This collaboration can harness the unique strengths of each stakeholder to develop a sustainable production model. Tailors should be designated as the primary producers, taking the lead in crafting simplified versions of the prototypes. By adopting cooperative models, tailors can share resources, which may include tools, sewing machines, and design templates. This collective approach can lower production costs and increase efficiency, allowing for a more significant output.

In order to ensure that each carrier maintains the ergonomic standards integral to its design, features such as adjustable straps, strong seams, and integrated compartments must be standardized. Creating detailed documentation in the form of instructional guides will be crucial. These guides should not only outline the specific measurements and materials to be used but also include step-by-step sewing instructions and quality control checkpoints. This documentation will aid tailors in replicating the designs accurately and consistently across various production batches.

Institutions like Kyambogo University or local vocational training schools can play a pivotal role in this initiative. By offering design programs tailored to the production of baby carriers, these institutions can provide essential training for both tailors and aspiring designers. This training can cover topics such as advanced sewing techniques, fabric selection, sustainable practices, and market trends.

Furthermore, educational institutions can facilitate technical supervision by deploying skilled instructors to oversee production, ensuring adherence to quality standards. They can also organize workshops that focus on design innovation and the importance of ergonomics in baby carriers, enhancing the skillset of local producers.

In order to maximize the impact of these partnerships, health centers can help by promoting the upcycled baby carriers among their clientele. They can distribute information about the carriers during prenatal and postnatal care sessions, ensuring that new parents are aware of the availability and benefits of these products.

Additionally, connecting local artisans with online platforms and marketplaces can broaden their reach, enabling them to sell directly to consumers. This creates not only sustainable income opportunities

for tailors and designers but also fosters a sense of community ownership in the production of these essential items.

Ultimately, this collaborative framework aims to create a vibrant ecosystem that supports the continuous production of high-quality, upcycled baby carriers. By combining the strengths of tailors, designers, and educational institutions, the initiative can foster economic empowerment, contribute to environmental sustainability, and ensure that parents have access to ergonomic and safe baby-wearing options. Through this model, we can achieve significant social impact while enhancing the livelihoods of the communities involved.

5.4: Areas for further Research

In order to create uniform standards for regional manufacturing and commercialization, more study should concentrate on assessing the sturdiness, and functionality of upcycled baby carriers. Future research might also examine the viability and scalability of community-based upcycling businesses in order to evaluate their potential for generating jobs and lowering urban waste across the country. Examining consumer attitudes, cultural acceptability, and the marketability of upcycled infant carriers would also yield important information for further adoption. The precision, productivity, and aesthetics of sustainable production could be further improved by using technology breakthroughs like automated sewing systems and digital design tools. Comparative studies between various East African or Ugandan regions may show differences in user preferences and textile waste management. Finally, in order to support long-term sustainability and innovation in the textile industry, future research should look at how upcycling and circular design ideas may be included into national waste management policy, vocational training, and industrial design education.

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APPENDIX 1: INFORMED CONSENT FORM

KYAMBOGO UNIVERSITY

Informed Consent for Participation in the Study

Upcycling household textile waste into multifunctional baby carriers to support young mothers in Kampala. (Makindiye division)

Date: …….

Researcher: Ainembabazi Martha Tel.: +256 704023222

Study Area: Kisugu Health Center and the surrounding suburbs of Namuwongo and Bukasa in the Makindye division

Dear Participant, my name is Ainembabazi Martha and I am conducting a study titled as above.

I am asking you to volunteer for the above-mentioned study. I will first explain why I am doing this study, the good and the bad about it, and what will be asked of you if you agree to participate in the study.

If you choose to participate in the research study, I will ask you to sign this consent form and then continue to ask you the questions I have for the study. A copy of this consent form will be given to you.

Purpose of the study

The purpose of this study is to explore the potential of household textile waste as a sustainable and affordable alternative material for creating baby carriers tailored to the needs of young mothers in Uganda.

Voluntary Participation

Before you learn about the study procedures, it is good that you know these things;

- It is entirely voluntary to take part in this study
- You don't have to participate in this study if you consider it not necessary and that decision doesn't affect your health or life in any way.
- You may choose to stop being interviewed at any time.

- If you choose not to take part in the study, you can still join another research study later, if one is available and you qualify.

Study Procedures

If you decide to take part in the study, you will be required to answer questions that I will be asking you, which will include questions that inform about the Upcycling household textile waste into multifunctional baby carriers to support young mothers in Kampala. These questions will also consist of some socio-demographic characteristics.

Possible risks of participation in the study

I expect this study to have no risk at all.

Benefits of participation in the study

You may not receive any direct benefit from taking part in the study. The information obtained may be used to guide the upcycling of household textiles into multifunctional baby carriers.

Costs to you

No monetary costs apart from your time.

Reimbursement

Since I am to meet you at your convenient place in Kisugu Health Center and the surrounding suburbs of Namuwongo and Bukasa in the Makindye division no transport fund will be made.

Confidentiality

Efforts will be made to keep your personal information confidential. Any study information about you will be identified only by code. Any publication of this study will not make use of your name or identify you personally.

Questions

This study has been approved by the Directorate of Research and Graduate Training of Kyambogo University and will be carried out in accordance with the Uganda Guidelines for Research involving

Human Participants. In the event of any problems/ concerns/questions about the study, please contact the director of Research and Graduate Training.

Participant's declaration

By signing below, I ……agree to participate in the study titled **Upcycling household textile waste into multifunctional baby carriers to support young mothers in Kampala. (Makindiye division)**

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that participating in this study is voluntary and I have not been pressurized in any way.
- I may decide to leave the study at any time and I will not be penalized or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signature and/or fingerprint ……...

Interviewer's Name ……

Interviewer's signature……

Date ……

APPENDIX 2: INTERVIEW GUIDE

Interview Guide for Young Mothers, Households, and Tailors

Introduction:

This interview seeks to gather insights from young mothers, households, and tailors regarding the use of household textile waste for creating multifunctional, sustainable baby carriers. Your input will play a key role in shaping the design and development of this product. Thank you for your participation.

For Young Mothers

1. Do you currently use a baby carrier? If yes, what type of carrier do you use (e.g., wrap, sling, structured carrier)?
2. How often do you use your baby carrier, and for what activities or locations?
3. What do you like most about your current baby carrier? Are there any features you wish it had or any changes you would make?
4. Does your baby carrier have enough storage for essentials (e.g., phone, bottles, diapers), or do you usually carry an additional bag?
5. Would you prefer a baby carrier with extra storage for your items while keeping the carrier lightweight?
6. Are you familiar with the concept of upcycling? What are your thoughts on using upcycled materials (like old clothes) to make new products such as a baby carrier?
7. How important is it to you to use sustainable products in your daily life? Do you think using upcycled textile products like a baby carrier could reduce waste?
8. Would you be interested in a baby carrier made from upcycled household materials? What aspects (e.g., durability, comfort, appearance, and storage) would influence your decision to use it?
9. Would an upcycled baby carrier with extra storage and durable materials make it easier for you to manage your baby and belongings in public spaces like markets or taxi parks? How important is it for you to have a hands-free carrier that allows you to carry baby essentials in one item?

For households

1. How do you usually dispose of these unused textiles? Do you ever repurpose them for other uses (e.g., cleaning rags, DIY projects)?
2. Are you familiar with the concept of upcycling? Would you be interested in repurposing old textiles for creating functional products like baby carriers?
3. What would encourage you to participate in repurposing household textiles (e.g., ease, sustainability, saving money)?
4. Would you be open to donating or selling your unused textiles for a sustainable project like this?
5. Do you face any challenges or limitations when trying to reuse or recycle household textile waste? If so, what are they?
6. How can the process of upcycling be made easier or more accessible to you?
7. How important is it to you to reduce waste and contribute to sustainability by upcycling or recycling household textiles?

For Tailors

1. Have you ever worked with recycled or upcycled materials? If yes, could you share an example?
2. Are there any challenges or considerations when working with textile waste compared to traditional fabrics?
3. What challenges do you foresee in transforming household textile waste into baby carriers? Are there any technical or design challenges that need to be addressed?
4. What types of modifications or adjustments would be necessary to ensure that upcycled materials are durable and functional for a baby carrier?
5. How do you view the role of tailoring in promoting sustainability, especially through the reuse of materials?
6. Is there anything else you would like to add that could help us design a functional and sustainable baby carrier?
7. Would you be interested in contributing further to this project, such as testing designs or providing feedback on prototypes?

APPENDIX 3; INTRODUCTORY LETTER

KYAMBOGO UNIVERSITY

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Tel: 041 - 4286792 Fax: 256-41-220464
Website:www.kyu.ac.ug Email: drgt@kyu.ac.ug

Directorate of Research and Graduate Training

Office of the Director

APPENDIX 8: INTRODUCTORY LETTER

Date: February 12th 2025

The Medical Officer – In - Charge
Kisugu Health Center III
Park Rise Road
Kampala - Uganda

RE: AINEMBABAZI MARTHA

Dear Sir/Madam

This is to introduce to you the above-named student Reg: No **23/U/GMAID/0405/PE** pursuing Master of Art and Industrial Design, Department of Industrial and Commercial Art, Kyambogo University.

She intends to carry out research on ***"Upcycling Textile Waste into Baby Carriers for Young Mothers in Makindye, Kampala"*** in partial fulfillment of the requirements for the award of Master of Art and Industrial Design, Department of Industrial and Commercial Art of Kyambogo University.

The purpose of this letter therefore is to request you to grant her permission to carry out her study.

Any assistance rendered to her will be highly appreciated.

Yours sincerely

Prof. Bosco Bua
AG. DIRECTOR

KYAMBOGO UNIVERSITY
★ 12 FEB 2025 ★
DIRECTOR
DIRECTORATE OF RESEARCH AND GRADUATE TRAINING

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Directorate of Research and Graduate Training

Office of the Director

APPENDIX 8: INTRODUCTORY LETTER

Date: February 12th 2025

The Medical Officer – In - Charge
Kisugu Health Center III
Park Rise Road
Kampala - Uganda

KAMPALA CAPITAL CITY AUTHORITY
KISUGU HEALTH CENTER III
KCCA
17 FEB 2025
IN CHARGE OFFICE
P.O. Box 7010, Kampala - Uganda

APPROVED

RE: AINEMBABAZI MARTHA

Dear Sir/Madam

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12 FEB 2025
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