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The Sustainable Fashion Revolution considering Circular Economy and targeting Generation Z by reusing garments with Acrylan and Terlenka

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Abstract. The fashion industry is undergoing a paradigm shift towards sustainability, embracing Circular Economy principles. This revolution displaces the traditional linear model, focusing on reusing garments made from materials like Acrylan and Terlenka. The study examines their environmental impact and durability, while exploring innovative recycling technologies to extend their lifespan. Generation Z plays a crucial role in driving this change. Their environmental consciousness and commitment to ethical consumerism shape industry norms through social media and sustainable fashion choices. The paper also analyzes successful case studies of fashion companies integrating Circular Economy practices, highlighting benefits for both businesses and consumers. This Sustainable Fashion Revolution, with its focus on circularity, material innovation, and Gen Z's influence, envisions a future where fashion becomes a symbol of environmental responsibility, paving the way for a more ethical and conscientious industry.

Keywords: Sustainable Fashion Revolution; Circular Economy Integration; Environmental Footprint Evaluation; Acrylan and Terlenka Sustainability; Generation Z Influence; Circular Economy Practices; Fashion Industry Transformation

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1 Introduction

The contemporary fashion industry witnesses a crucial paradigm shift, with sustainability assuming a position of paramount importance. This burgeoning focus on environmental consciousness aligns seamlessly with the values championed by Generation Z, a demographic renowned for its social and environmental activism. However, a seemingly paradoxical situation emerges. Despite their pronounced commitment to ecological well-being, Gen Z appears to be entangled in a cycle of unrestrained fashion consumption. This essay aims to elucidate the complexities of this phenomenon, particularly how limited financial literacy within Gen Z might be contributing to extravagant spending on short-lived apparel, specifically focusing on garments constructed from materials like Acrylan and Terlenka.

Irresponsible Consumption and Generation Z, born between the mid-1990s and early 2010s, has emerged as a force for change in various societal aspects (Alt, 2018). Despite their activism, this generation grapples with impulsive fashion consumption fueled by a constant desire for novelty influenced by the fleeting trends of social media. While generalizations about Generation Z's disinterest in collecting items may not be entirely accurate, certain trends, influenced by digitization, minimalism, environmental awareness, a mobile lifestyle, and a preference for access over ownership, contribute to their evolving behaviors (Twenge, 2017), such as:

1. **Digitization and Minimalism:** Growing up in a digital environment, Generation Z leans towards a more minimalist approach to physical possessions, as many experiences are digitized.
2. **Environmental Awareness:** A heightened environmental consciousness influences attitudes toward material possessions, with excessive consumerism perceived as harmful to the environment.
3. **Mobility and Active Lifestyle:** The mobile and active lifestyle of many in Generation Z makes owning extensive collections impractical, especially for those who move frequently.

4. **Access over Ownership:** Adopting the "access rather than ownership" model, Generation Z prioritizes access to services and experiences over owning physical objects.
5. **Changing Interests:** Cultural interests and trends evolve rapidly in the digital age, influencing Generation Z's willingness to invest in long-term collections.

Emerging research suggests an intrinsic connection between insufficient financial literacy and rampant clothing purchases. Limited financial knowledge can lead to poor money management, where frequent clothing acquisitions function as a response to fleeting desires. Further exacerbating this unsustainable cycle are readily available, affordable fashion options and societal pressures to conform to the latest trends. Beyond financial considerations, the materials used in clothing also contribute to ephemeral consumption. Fabrics like Acrylan and Terlenka, while versatile and budget-friendly, are prone to rapid wear and tear. This lack of durability necessitates frequent replacements, intensifying the purchase-disposal cycle and its negative environmental impact. Considering these findings, the paper argues for the urgent integration of financial education and environmental awareness in Generation Z's development. Current educational shortcomings in long-term financial planning and the environmental consequences of consumption habits necessitate significant intervention. Implementing educational programs that address both financial responsibility and sustainable fashion choices appears to be a pressing need.

A detailed analysis of the relationship between financial literacy and ephemeral fashion consumption in Generation Z would be a valuable contribution to the field. This research could inform the development of educational programs aimed at promoting responsible financial practices and sustainable fashion choices within this demographic. Integrating financial literacy into the education system while simultaneously promoting sustainable fashion practices could prove to be crucial solutions in addressing this issue (Harris & Rea, 2011).

As Generation Z becomes empowered with sound financial literacy and a deeper understanding of sustainability, it paves the way for a positive shift toward conscious and responsible consumption in the fashion world. The Future of Fashion, Dematerialization, and the Service Economy is looking toward the 2050-time horizon, the seventh idea envisions a radical transformation of the fashion industry toward dematerialization and the adoption of a Service Economy (Hethorn, & Ulasewicz, 2008). Dematerialization represents a paradigm shift where ownership of physical garments gives way to experiences and access (Black, 2008). Future consumers may opt for subscription services, fashion rentals, and sharing platforms instead of accumulating vast clothing collections, fostering a constant rotation of garments without the need for continuous new production. This transition to a Service Economy fosters collaboration between consumers and the fashion industry. Brands may concentrate on creating timeless and durable designs, providing maintenance and upgrade services to extend the life of existing garments (Joy et al., 2012). Innovations in recycling and upcycling technologies become pivotal for reusing and transforming existing fashion garments, minimizing dependence on new resources. This future, with limited resources for mass clothing production, not only redefines society's relationship with fashion but also stimulates a cultural shift toward valuing creativity, durability, and authenticity over the accumulation of ephemeral possessions. Adapting to this service-based economic model not only offers a sustainable solution to resource scarcity but also opens the door to a new era where fashion becomes a dynamic and conscious expression of personal and collective identity.

2 Circular Economy and its Relevance to Fashion: A Transformative Approach to Sustainability

The Essence of the Circular Economy in Fashion represents a profound shift in how we conceive, produce, and dispose of products, challenging the traditional linear economic paradigms. Its significance in the fashion industry serves as a guiding principle towards more sustainable practices, instigating a comprehensive transformation across the entire textile industry value chain. At the heart of Circular Economy principles in fashion lies the redefinition of garment creation. The emphasis shifts from mass production and disposability to conscious design, the selection of sustainable materials, and meticulous consideration of garment durability and versatility. Designers, in this context, become architects of sustainability, exploring new forms of artistic expression that respect the planet's limits (Mont & Plepys, 2008). Holistic Waste Management in the Circular Economy addresses the issue of waste in fashion comprehensively (Pookulangara & Shephard, 2013).

From choosing materials that minimize environmental footprints to implementing efficient manufacturing processes, every stage of a garment's life cycle is optimized to reduce waste generation. Additionally, business models such as upcycling and recycling promote the extension of the useful life of garments, mitigating the rapid obsolescence of conventional fashion. In this context, reuse and recycling emerge as pivotal components of the Circular Economy in fashion. Reuse propels the creation of a vibrant second-hand market, where garments find new owners and extend their usefulness. Conversely, innovative recycling stands as a creative response to textile waste challenges, transforming pre-existing materials into new creations, thereby concluding the garment's life cycle sustainably. Consumer Mindset Shift in the Circular Economy in fashion not only transforms production processes but necessitates a fundamental shift in consumer mindset. Education and awareness become indispensable tools to empower consumers, urging them to make informed decisions about their purchases and appreciate quality over quantity. Supply chain transparency and sustainability labels become standards guiding purchasing choices. Embracing the Circular Economy in fashion is not merely about meeting ethical standards; it also fuels innovation.

From creating new sustainable materials to experimenting with disruptive business models, the Circular Economy catalyzes a creative and progressive environment in the fashion industry. However, the path to the Circular Economy in fashion is not without its challenges. Changing ingrained habits, seeking truly sustainable materials, and reconfiguring industrial infrastructures are just a few obstacles. Nevertheless, each challenge presents an opportunity for innovation and collaboration as the industry moves towards a future where fashion is measured not only by aesthetics but also by its positive impact on the planet and future generations (Prendergast & Tsang, 2009).

Building a Collaborative Ecosystem in the Circular Economy in fashion transcends mere adjustments to production processes; it is about constructing an ecosystem of collaboration and collectivity that embraces the interconnectedness of all actors in the value chain. This section underscores the importance of collaboration between designers, manufacturers, retailers, consumers, and regulatory bodies to achieve a truly circular and sustainable system. Integration of Actors in the Supply Chain considers that the Circular Economy demands seamless integration of all actors in the fashion supply chain. From designers conceiving sustainable garments to manufacturers implementing eco-efficient practices, each link plays a crucial role. Effective collaboration enhances transparency and traceability, enabling consumers to make informed decisions about the provenance and sustainability of the garments they choose.

Collaborative Platforms and Open Innovation evaluate the creation and sharing platforms as an essential component of the Circular Economy. These platforms facilitate the reuse and exchange of garments among consumers, encouraging the extension of the fashion life cycle. They also serve as spaces for collectivity, where users share knowledge about sustainable styles, ethical brands, and responsible practices. Open innovation and co-creation become key drivers for advancing the Circular Economy in fashion. Collaboration between companies, research centers, independent designers, and local communities propels the creation of innovative solutions. Openness to diverse ideas and co-creation allows overcoming obstacles more effectively and accelerating the adoption of sustainable practices. Establishing shared standards and regulations strengthens collectivity. The fashion industry collaboratively establishes ethical and sustainable standards to guide the production, labeling, and marketing of garments (Shaw & O'Brien, 2016). Implementing common regulations enhances consumer confidence and establishes a framework for shared responsibility in the transition to sustainability. Extended Product Responsibility permits correct collaboration and extends product responsibility. Manufacturers, designers, and retailers commit to managing the full life cycle of garments, from production to eventual recycling. This shared responsibility encourages more transparent and ethical practices, ensuring that each garment contributes positively to the circular ecosystem (Black, Eckert & Isakson, 2009). Empowering Consumers for Collective Action ensures that collaboration extends to the consumer, empowering them to be an active part of the change. Consumer education and participation in sustainable fashion initiatives strengthen the collective. Informed consumers play a crucial role in demanding sustainable practices and supporting brands committed to the Circular Economy, thus driving conscious demand that transforms the fashion industry from the ground up. Fostering a Culture of Collaboration and Collectivity in short, building a circular ecosystem in fashion involves not only changing processes but fostering a culture of collaboration and collectivity. It is through this interconnectedness that fashion embraces its potential to be an agent of positive change in building a sustainable future.

3 Acrylan and Terlenka: Materials of the New Sustainable Age

The analysis of Acrylan and Terlenka as prominent fabrics in contemporary fashion unveils a captivating narrative within the sustainability discourse. These materials, extensively utilized in garment manufacturing, are currently under closer examination to comprehend and enhance their environmental impact. Evaluating their environmental footprint involves

a meticulous examination of each phase of their life cycle, from raw material extraction to disposal. The initial and critical stage in the life cycle of Acrylan and Terlenka is raw material extraction. As synthetic materials derived from petroleum, inherent sustainability challenges arise. This section explores the implications of reliance on non-renewable resources, investigating innovative alternatives to alleviate pressure on petroleum supplies and reduce the environmental footprint from the outset. The manufacturing process of Acrylan and Terlenka significantly influences their sustainability. From polymerization to fiber creation, each step has environmental implications.

Here, we delve into how advanced manufacturing technologies can enhance efficiency and reduce energy consumption. Additionally, the feasibility of alternative materials that offer a more sustainable approach is considered. Assessing the sustainability of Acrylan and Terlenka involves a crucial examination of their performance in apparel. This section scrutinizes the durability and versatility of these materials in comparison to more sustainable alternatives. Emphasis is placed on garment longevity to minimize environmental impact. Design strategies that maximize useful life and reduce the need for constant replacement are explored. Examining the environmental impact during the use of garments made with Acrylan and Terlenka is essential. Every characteristic, from faded resistance to ease of care, has environmental consequences. Sustainable care practices, such as cold washing and aeration, are discussed to mitigate negative impacts during the wear phase and extend garment life. The end-of-life and disposal phase of Acrylan and Terlenka presents specific challenges in waste management. This section explores advanced recycling methods, such as controlled chemical decomposition, and advocates for collection and recycling systems to reduce material waste in landfills and mitigate negative impacts on ecosystems. Despite challenges, innovations and sustainable alternatives for Acrylan and Terlenka are emerging. Technologies like bioplastics and synthetic fibers from renewable sources are examined to pave the way for a future where fashion materials are sustainable from conception (Brezet & van Hemel, 1997). Transparency in Acrylan and Terlenka's supply chain is a cornerstone for improving sustainability. Traceability from raw material to final product enables an accurate assessment of the environmental footprint. This section underscores the need for companies to disclose detailed information on production practices and environmental measures, empowering consumers to make informed decisions and driving the industry towards higher standards of environmental responsibility.

4 Innovations in Textile Recycling: Transforming Textile Waste Management

Textile waste management is undergoing a revolution, thanks to technological innovations that are reshaping the approach to fiber recycling, particularly in the case of Acrylan and Terlenka. This section delves into the innovations in textile recycling, examining the impact on sustainability, from the fiber recovery process to environmental implications. At the forefront of textile recycling, advanced technologies like controlled decomposition and chemical processes specific to Acrylan and Terlenka are implemented. This section explores how these innovations efficiently recover fibers, reducing dependence on new raw materials and minimizing the environmental impact associated with their production (Brown & McDonagh, 2016). Understanding the closed loop in textile recycling is crucial for efficiently reintegrating Acrylan and Terlenka fibers into the production chain. This section explores closed recycling systems, which recover and reincorporate fibers without significant loss of quality, redefining textile sustainability. Challenges and opportunities related to the widespread implementation of these systems are also analyzed. The practical application of the circular economy in textile recycling is seen through innovative business models. This section examines how companies adopt circular approaches to manage textile waste, from collection to transforming it into new garments. Success stories are highlighted, and possibilities for replicating these models in the fashion industry on a large scale are explored (Ellen MacArthur Foundation, 2017). Despite advances, textile recycling faces challenges such as fiber contamination and the need for specialized infrastructure. This section discusses solutions, including ongoing research into more efficient methods and collaboration between industry and governments to establish policies encouraging widespread adoption of textile recycling practices (Seemiller & Grace, 2017). Consumer education is crucial for the success of textile recycling. This section explores how awareness initiatives drive active consumer participation in textile waste management. The importance of transparency in disclosing information on recycling processes is examined, empowering consumers to make informed and sustainable decisions (Stillman & Stillman, 2010). Cross-sector collaboration, especially between the textile industry, technology, and research, proves to be a key catalyst for driving innovation in textile recycling. Successful collaboration cases are highlighted, showcasing how joint efforts can accelerate the development of effective and sustainable solutions (Fletcher & Tham, 2019). This section concludes by exploring prospects for textile recycling and its transformative potential in global textile waste management. Ongoing research anticipated technological advances, and the continued need to invest in efficient and sustainable textile recycling practices are discussed, paving the way towards a truly circular and environmentally conscious fashion industry.

5 Z Generation: Pioneers of Sustainability

Z Generation, with its deep-rooted sense of social and environmental responsibility, emerges as a key driving force in promoting sustainable fashion. This section explores in depth the pivotal role this generation plays in the transformation of the fashion industry, from their social media actions to their purchasing decisions, generating a tangible impact on the sustainability and social responsibility of brands. Z Generation is characterized by its innate commitment to social and environmental responsibility (Smith, Fischer & Yongjian, 2012). It examines the core values that define this generation, highlighting their awareness of environmental and social issues (Seemiller & Grace, 2019). In addition, the motivations that drive Z Generation to prioritize sustainability in their fashion choices are explored, underlining their role as agents of change. Social media activism is presented as a powerful tool used by Z Generation to advocate for sustainable fashion. Emblematic campaigns led by this generation are analyzed, from the use of hashtags to the viralization of environmental awareness messages (Cook & Pettigrew, 2014).

People in the Z Generation are not only limited to expressing their opinions online but also take concrete actions, such as boycotting unsustainable brands. It examines how purchasing decisions and boycott campaigns have directly impacted the strategies of fashion companies, urging them to reevaluate their practices and align with the sustainable expectations of this generation for this reason Z Generation's shopping preferences become a critical driver for the demand for sustainable fashion (Elmore & Fargo, 2017). The factors that influence their purchasing choices are analyzed, from transparency in the supply chain to the preference for brands with environmental and social commitments. In addition, emerging trends that suggest a shift towards more conscious and sustainable consumption are explored. Based on the demand for transparency in the supply chain, Z Generation stands out as a hallmark. It explores how this generation demands detailed information about production practices, the materials used, and the environmental impacts of the garments they purchase. This demand for transparency drives brands to adopt more ethical and sustainable practices. Education and ongoing awareness are critical elements in understanding how the Z Generation continues to cultivate their commitment to sustainable fashion. It analyzes how educational programs, events, and online platforms contribute to the formation of more informed and active consumers. In addition, the importance of maintaining educational momentum to consolidate and expand sustainable practices in the future is highlighted.

Considering Z Generation is not only looking for sustainable brands but is also actively collaborating with companies committed to sustainability, it is important to explore how partnerships between this generation and ethical brands generate positive synergies, stimulating innovation and the adoption of more sustainable practices in the fashion industry. This collaboration demonstrates the power of Z Generation as a driving force for tangible change in the fashion landscape (Cook & Pettigrew, 2014). An important consideration of Generation Z is how they perceive sustainability, in the case of electric vehicles there is previous research associated with the feature selection of the variables associated with this proposed paradigm shift, as shown at Figure 1.

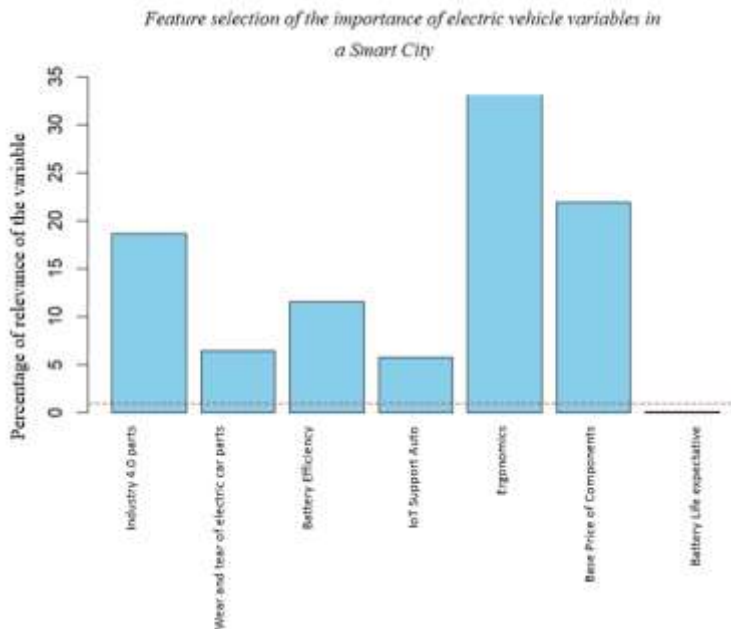


Fig. 1. Feature Selection of the variables associated with the use of electric vehicles by the Generation Z. As we can see in Figure 1, the estimation of the battery life expectancy associated with the electric vehicle is what they are least interested in knowing, as the speed of the car is no longer a priority, now it is the ergonomics that they are most interested in enjoying, the rate of enjoyment of having an electric car.

6 Case Studies in Sustainable Fashion: An Analysis with a Focus on Business Intelligence

Leading companies in sustainable fashion have implemented effective strategies in the choice of materials, focusing on Acrylan and Terlenka. Using Business Intelligence tools, data on durability, environmental impact, and consumer preferences are analyzed to evaluate the effectiveness of these strategies. Equations that measure consumer acceptance and the ecological footprint of materials are incorporated to provide a quantitative perspective. The sustainable fashion case analysis, specifically focused on garments made with Acrylan and Terlenka, offers a detailed view of how various companies have implemented strategies based on the Circular Economy (Ellen MacArthur Foundation, 2017). This approach, supported by Business Intelligence (BI), allows for a deeper and more quantifiable understanding of the practices adopted. Case studies that reveal effective approaches, from material choices to implementing innovative recycling processes, are then examined, demonstrating that sustainable fashion can be both ethical and profitable. Case studies reveal the implementation of innovative recycling processes in sustainable fashion companies. Through Business Intelligence, data related to operational efficiency and the costs associated with these processes are examined. Profitability and effectiveness equations are presented to measure the financial and environmental impact of these practices, highlighting how innovation in recycling can be not only sustainable but also profitable.

Business Intelligence analysis is applied to evaluate success metrics in sustainable fashion companies. Sustainability-related key performance indicators (KPIs) such as waste reduction and customer satisfaction are explored. Sustainable yield equations are used to quantify the results, allowing an accurate assessment of the impact of the strategies adopted. The sustainable fashion case analysis, specifically focused on garments made with Acrylan and Terlenka, offers a detailed view of how various companies have implemented strategies based on the Circular Economy [8]. This approach, supported by Business Intelligence (BI), allows for a deeper and more quantifiable understanding of the practices adopted. Case studies that reveal effective approaches, from material choices to implementing innovative recycling processes, are then examined, demonstrating that sustainable fashion can be both ethical and profitable. The effective integration of Business Intelligence into business decision-making stands out as a crucial element in the successful implementation of sustainable practices. Cases where analytical data have directly influenced the formulation of business strategies and policies are explored. Equations are presented that demonstrate how data-informed decision-making can improve operational efficiency and financial sustainability. Analyzing sustainable fashion cases through Business Intelligence provides valuable lessons on the replicability and scalability of the strategies adopted. It examines data

indicating the effectiveness of scaling up sustainable practices on a large scale. Replicability and scalability equations offer quantitative tools to evaluate the feasibility of implementing similar strategies in other companies in the sector. The Sustainable Fashion Formula based on Business Intelligence is used to examine the balance between ethics and profitability in sustainable fashion companies. Data on the additional costs associated with ethical practices and how these decisions affect consumer perception and brand loyalty are analyzed. Equations that weigh ethics against profitability offer a quantitative assessment of the overall success of the sustainable fashion strategy. The social and environmental impact of sustainable fashion strategies is quantitatively measured using Business Intelligence. Data on the reduction of the ecological footprint and improvements in working conditions are analyzed. Social and environmental impact equations allow for a detailed assessment of these companies' success in achieving sustainable and ethical goals.

6.1 Design of Experiments and Circular Economy: Optimizing Textile Sustainability

The circular economy has become a crucial paradigm for addressing the environmental challenges linked to the textile industry. In this context, the utilization of design of experiments (DOE) stands out as an invaluable tool for analyzing and optimizing sustainable practices, specifically those related to 1000 Acrylan and Terlenka garments. Design of Experiments Fundamentals is a statistical methodology that systematically explores the impact of multiple variables in a process or system. In the context of the circular economy, where the interdependence of factors is crucial, DOE offers a significant advantage. It allows the evaluation of not only the individual performance of each variable but also their joint influence and possible interactions. An orthogonal array, in this context, is an arrangement of experiments that ensures each variable has an independent and measurable effect without significant interference from other variables. For our 1000 garments, this approach becomes essential to understand how different variables, such as material composition, production methods, and ethical practices, collectively affect the profitability of sustainable practices (SPR). In a Practical Application scenario, imagine an experiment where each garment represents a unique combination of variables. Using an orthogonal arrangement ensures that all possible combinations are equally represented, considering different proportions of Acrylan and Terlenka, diverse recycling strategies, and varied ethical approaches to production. By collecting profit, cost, and RPS data for each garment, advanced statistical techniques can be employed to identify patterns and trends. DOE allows us to understand each variable's individual contribution to RPS and to discover how these variables interact. This in-depth knowledge is essential to optimize sustainable practices and maximize profitability within the framework of the circular economy. Applying DOE to the 1000 garments analysis provides a more holistic understanding of how design and production decisions affect sustainability. By identifying the most effective combinations, we can drive the adoption of more sustainable practices in the textile industry. This approach benefits companies by improving their RPS and contributes to the broader goal of a more sustainable and circular textile system. In conclusion, the design of experiments proves to be a strategic ally in the implementation of the circular economy in the textile industry. Through orthogonal arrays and statistical analysis, we can unravel the complexity of interactions between variables and make informed decisions for a more sustainable textile production. This approach is not only an investment in the profitability of Acrylan and Terlenka garments but also in the sustainable future of the entire industry. All things considered, we decided to implement seven different equations associated with a sample of one thousand garments—half of them made of Acrylan and Terlenka (Ellen MacArthur Foundation, 2017).

For this study, there are seven equations proposed: 1. Ecological Footprint of Materials (HEM), 2. Textile Sustainability Index (TSI), 3. Sustainable Practices Profitability (SPR), 4. Customer Satisfaction Index (CSI), 5. Operational Efficiency in Recycling (OER), 6. Consumer acceptance (CA), and 7. Financial Impact of Ethical Decisions (FIED).

Ecological Footprint of Materials (HEM) is represented by

$$HEM = \frac{CO_2\text{emission} + \text{water consumption} + \text{waste generated}}{\text{amount of raw material used}}$$

This equation measures the ecological footprint of a specific material, considering CO₂ emissions, water consumption and waste generated in relation to the amount of raw material used. Figure 2 shows the results of HEM.

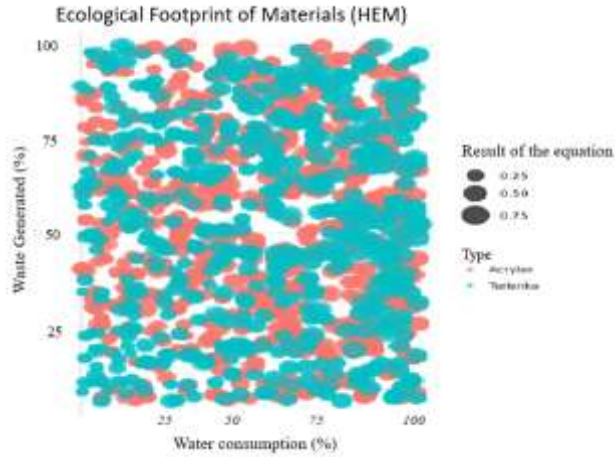


Fig. 2. Ecological Footprint of Material (HEM).

The Textile Sustainability Index (TSI) quantifies the sustainability of a textile material, incorporating factors such as durability, recyclability and environmental impact of the production process. The equation is:

$$IST = \frac{\text{Material durability} + \text{material recyclability}}{\text{environmental impact of production process}}$$

and Figure 3 shows the results of this index.

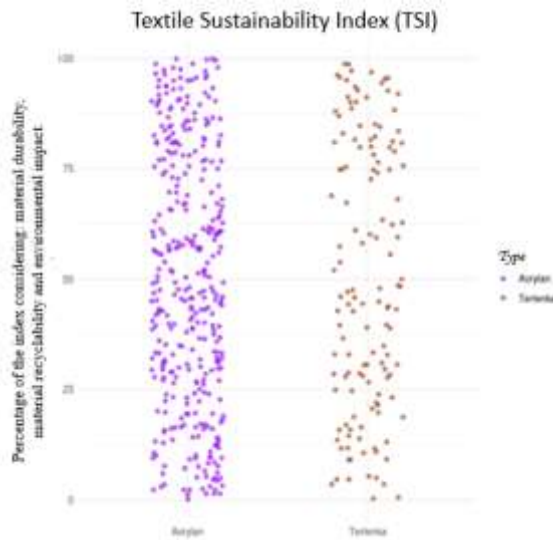


Fig. 3. Representation of Textile Sustainability Index (TSI)

The next equations is Sustainable Practices Profitability (SPR)

$$SPR = \frac{\text{profits generated by sustainable practices}}{\text{additonal cost associated with ethical practices}}$$

The SPR evaluates the profitability of implementing sustainable practices, considering the profits generated against the additional costs associated with ethical decisions, as shown in Figure 4.



Fig. 4. Sustainable Practices Profitability (SPR)

The Customer Satisfaction Index (CSI), calculated by:

$$CSI = \frac{\text{satisfied customers} \times \text{recycling process (acrylan and terlenka garments)}}{\text{total clients}}$$

quantifies customer satisfaction in the context of sustainable fashion, expressed as a percentage of total customers. Explanation: This equation calculates the efficiency of the recycling process for acrylan and terlenka garments. It compares the amount of recycled material to the total amount produced, expressed as a percentage. Index is shown at Figure 5.

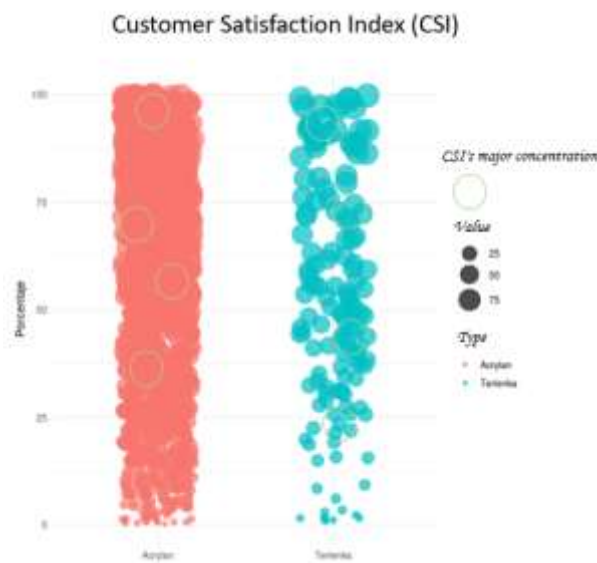


Fig. 5. Customer Satisfaction Index (CSI) representation.

Operational Efficiency in Recycling (OER) measures the operational efficiency in recycling processes, considering the amount of recycled material in relation to the associated operating costs. Its equation is

$$OER = \frac{\text{recycled material}}{\text{operating cost of recycling process}}$$

and the results are shown in Figure 6.

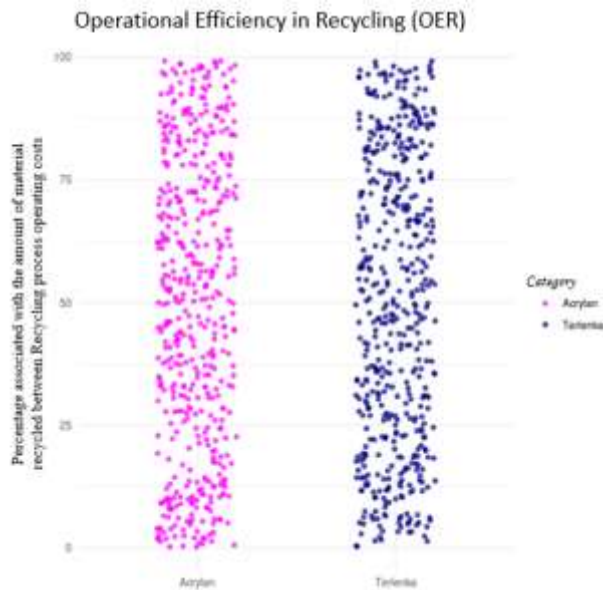


Fig. 6. Operational Efficiency in Recycling (CER)

Also, Consumer Acceptance (CA) evaluates consumer acceptance of sustainable products, expressed as a percentage of total products purchased. the equation is

$$CA = \frac{\text{number of sustainable products purchased}}{\text{total number of products purchased}}$$

and the results are depicted in Figure 7.

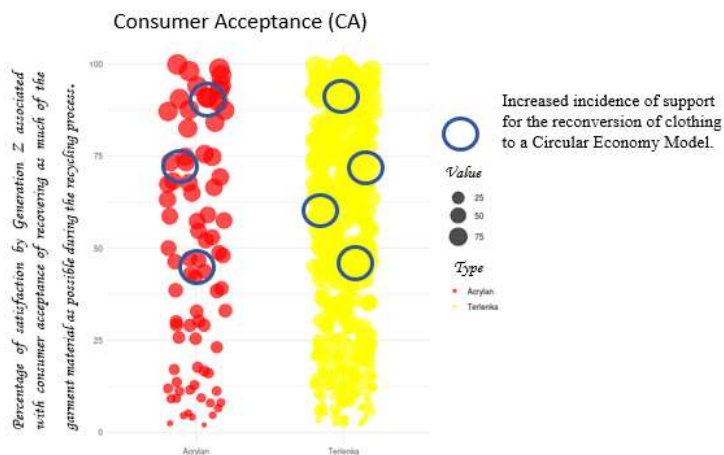


Fig. 7. Consumer acceptance associated with Economy Circular (CA).

Finally, Financial Impact of Ethical Decisions (FIED) is defined by

$$FIED = \frac{\text{increased income due to brand image}}{\text{additional costs for ethical decisions}}$$

FIED measures the financial impact of ethical decisions, considering the increased revenue associated with a positive brand image versus the additional costs of adopting ethical practices, as shown in Figure 8.



Fig. 8. Financial Impact of Ethical Decisions (FIED).

Now, we have shown a final Conceptual Diagram of each component of our Representation of Circular Economy including each proposed equation, in Figure 9.



Fig. 9. Model representation of each component of our proposal Fashion Circular Economy including each proposal equation to understand the values in different outfits including Acrylan and Terlenka.

7 Conclusions and Future Perspectives: Sustainable Transformation in Fashion

As the fashion industry undergoes a paradigm shift towards sustainability, the integration of sustainable practices stands as an inescapable imperative. Derived conclusions from the implementation of Circular Economy-based strategies underscore the urgent need for companies to incorporate practices that not only reduce the environmental footprint but also actively promote sustainability within their business models (Ellen MacArthur Foundation, 2017). Technological innovations serve as catalysts for a sustainable future in fashion. Findings related to advanced recycling processes and the application of Business Intelligence underscore how technology becomes a crucial ally in informed decision-making and the continual improvement of sustainable practices (Pookulangara & Shephard, 2013). The transformative influence of Generation Z on sustainable fashion further redefines the industry narrative. Findings emphasize that this generation not only shapes changes in buying preferences but also demands transparency and accountability from brands. The duality of transformation in fashion, encompassing both ethical and profitable dimensions, is a highlighted reality. Examining data reveals that companies embracing sustainable practices not only enhance their brand image and contribute positively to the environment but also secure long-term profitability. Sustainability emerges not merely as an ethical duty but as a strategically smart business approach. Generation Z emerges as a pivotal catalyst in steering the fashion industry towards a more ethical and value-driven trajectory (Brown & McDonagh, 2016).

Addressing the challenges and opportunities encountered during the transition to sustainable fashion is crucial. Cross-sector collaboration emerges as a successful model for the sustainable fashion industry. Insights highlight how cooperation between companies, governments, and non-governmental organizations accelerates the adoption of sustainable practices by establishing a framework for knowledge and resource sharing. Conclusions drawn from aspects like supply chain management and consumer education provide valuable lessons and insights into overcoming persistent challenges. This exploration offers a detailed roadmap for the industry to navigate the road to sustainability successfully (Joy et al., 2012). Prospects are explored, envisioning a globalized sustainable fashion industry. This section delves into emerging trends, shifts in consumer perception, and government initiatives that could shape a truly ethical and conscious fashion industry in the decades to come. The convergence of these elements sets the stage for a sustainable transformation that goes beyond aesthetics, paving the way for a fashion industry deeply rooted in environmental consciousness and ethical responsibility.

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