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The Evolution of Sustainable Haute Couture in the Fashion Industry: A Literature Review on Eco-friendly Materials, Design, and Production

Khusnul Syam Syakirah AR.
Universitas Negeri Makassar, Makassar, Indonesia
Email Corresponding Author: khusnul01072005@gmail.com

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ABSTRACT
The fashion industry's dependence on resource-intensive materials, linear production systems, and rapidly changing trends has intensified environmental degradation and textile waste. Within this context, haute couture offers a distinctive sustainability pathway through limited production, craftsmanship, personalisation, durability, and high symbolic value. This study aims to critically examine the development of sustainable haute couture by integrating three principal dimensions: environmentally responsible materials, sustainable design, and cleaner production. A systematic literature review was conducted following the PRISMA 2020 framework. Peer-reviewed articles published between January 2016 and September 2026 were identified through Scopus, Web of Science, ScienceDirect, and Google Scholar. From 312 initial records, 74 duplicates were removed, 238 titles and abstracts were screened, and 58 full-text articles were assessed. Twelve articles, consisting of five empirical studies and seven conceptual or review-based studies, satisfied the eligibility criteria and were analysed through thematic content analysis. The results showed that nine articles addressed material sustainability, ten examined design strategies, and eight discussed production practices; however, only five substantially integrated all three dimensions. Environmentally responsible materials included recycled, bio-based, biodegradable, regenerated, and waste-derived textiles. Dominant design strategies comprised longevity, personalisation, repairability, modularity, upcycling, and zero-waste construction, while cleaner production involved made-to-order systems, craftsmanship, digital prototyping, precision cutting, and waste recovery. The study concludes that sustainable haute couture has considerable transformative potential, but its credibility depends on life-cycle verification, transparent sourcing, ethical craftsmanship, and integrated circular practices extending from material selection to post-use recovery.

Keywords : Circular Design; Cleaner Production; Environmentally Responsible Materials; Sustainable Fashion; Sustainable Haute Couture

INTRODUCTION

The global fashion industry faces increasing pressure to reconcile aesthetic innovation and commercial growth with environmental responsibility. Conventional fashion systems remain dependent on resource-intensive fibres, chemical processing, geographically fragmented supply chains, and linear "take–make–dispose" production models. These practices contribute to greenhouse-gas emissions, water consumption, chemical pollution, microfibre release, and escalating volumes of textile waste (Bick et al., 2018; Niinimäki et al., 2020). Approximately 92 million tonnes of textile waste are generated annually, demonstrating that improvements limited to individual products cannot adequately address the systemic environmental consequences of fashion production (Niinimäki et al., 2020). Sustainable transformation must therefore

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encompass material selection, design decisions, manufacturing processes, product longevity, and end-of-life management.

Within this context, haute couture occupies a distinctive position. Unlike mass-produced fashion, haute couture is characterised by exclusivity, artistic experimentation, exceptional craftsmanship, made-to-measure construction, and substantial symbolic value. These characteristics potentially support sustainability because artisanal production, emotional durability, repairability, and extended garment use are fundamentally opposed to the disposability associated with fast fashion. Nevertheless, haute couture may also involve rare animal-derived materials, elaborate embellishment, energy-intensive processes, complex material combinations, and international sourcing, all of which can increase environmental impacts and hinder recycling. Sustainable haute couture should consequently not be understood merely as the use of "green" fabrics; rather, it constitutes an integrated design philosophy through which ecological integrity, cultural value, craftsmanship, and technological innovation are negotiated throughout a garment's life cycle.

Sustainable-fashion theory conceptualises sustainability as the simultaneous integration of environmental, social, economic, and cultural value into fashion systems (Henninger et al., 2016). Circular-economy theory further requires products and materials to remain at their highest value through durability, reuse, repair, remanufacturing, and recycling (Brydges, 2021). In haute couture, these principles may be operationalised through regenerative and recycled fibres, zero-waste pattern cutting, modular construction, non-toxic finishing, local craftsmanship, digital prototyping, and production on demand. However, the environmental advantages of these interventions cannot simply be presumed. Textile reuse generally provides greater benefits than recycling because it avoids part of the impact associated with new production, but its actual performance depends on product displacement, transportation, processing, and garment lifetime (Sandin & Peters, 2018). Accordingly, sustainable haute couture requires evidence-based evaluation rather than symbolic environmental claims.

During the last decade, sustainable-fashion scholarship has developed from definitional debates into material innovation, circular design, supply-chain management, business-model transformation, and consumer behaviour. Henninger et al. (2016) demonstrated that sustainable fashion remains a multidimensional and contested concept, while Todeschini et al. (2017) identified circularity, collaborative consumption, and technological innovation as important drivers of sustainable fashion business models. Mukendi et al. (2020) subsequently mapped sustainable-fashion research into pragmatic change, radical transformation, consumption practices, and institutional responses, confirming that sustainability involves an entire socio-technical system rather than isolated eco-products.

Material-oriented studies emphasise organic, recycled, bio-based, biodegradable, and waste-derived textiles. Textile biomaterials can reduce dependence on fossil resources, but their suitability must be assessed through functional properties, processing requirements, durability, and end-of-life scenarios (Ferreira et al., 2023). Similarly, textile recycling produces environmental benefits only when recycled outputs replace virgin production and when collection, sorting, and processing burdens do not outweigh the avoided impacts (Sandin & Peters, 2018). Dahlbo et al. (2017) found significant recovery potential in post-consumer textiles while also revealing limitations related to material quality, collection systems, and market demand.

Design research has introduced strategies including design for longevity, emotional durability, modularity, disassembly, repair, personalisation, upcycling, and zero-waste cutting. Maldini et al. (2019) empirically showed that product personalisation may enhance attachment and use, although it does not automatically reduce purchasing volumes. Designers are therefore decisive actors because early design decisions determine material composition, production efficiency, repairability, and recyclability (Wang & Zakaria, 2023). Eco-colour–material–finish approaches similarly connect aesthetic decisions with product-life extension and environmental assessment (Lee et al., 2023).

At the production level, cleaner dyeing, waterless finishing, digital printing, laser processing, three-dimensional design, additive manufacturing, and made-to-order systems offer opportunities to reduce waste and resource consumption (Daukantienė, 2023). A systematic analysis of 138 publications nevertheless found that green practices remain unevenly distributed across procurement, cutting, sewing, washing, finishing, and packaging, particularly in developing-country production contexts (Jain & Kalapurackal, 2023). Brydges (2021) likewise found that circular strategies often concentrate on post-consumer waste rather than being integrated across sourcing, design, production, use, and recovery.

Luxury-fashion research indicates that durability, rarity, craftsmanship, heritage, and superior quality can support sustainability, yet luxury also depends on novelty, exclusivity, and conspicuous consumption.

Athwal et al. (2019) describe this relationship as conceptually promising but empirically underdeveloped. Sustainable luxury consumption is influenced by personal values, social expectations, culture, and perceived economic value (Jain, 2019), while sustainable fashion can diffuse as a luxury-associated trend through interactions among designers, institutions, and younger consumers (Khan et al., 2022). Recent evidence further associates circular luxury with artistic creation, traditional craftsmanship, repair, recycling, and personalised experiences (Abdelmeguid et al., 2024).

Despite this progress, four limitations remain. First, most studies examine fast fashion, ready-to-wear products, general luxury, or consumer intention; haute couture is rarely treated as a separate system of material experimentation, artisanal design, and bespoke production. Second, material, design, and manufacturing innovations are commonly investigated independently, although their environmental outcomes are interdependent. A biodegradable material, for example, may provide limited benefits when combined with non-separable embellishments or toxic finishes. Third, existing research frequently describes strategies without comparing their measurable environmental effects. Life-cycle evidence remains inconsistent regarding production scale, functional units, garment longevity, replacement rates, and end-of-life assumptions (Sandin & Peters, 2018). Fourth, research is geographically concentrated in developed economies, whereas material sourcing, textile processing, artisanal knowledge, and garment manufacturing frequently occur in developing regions (Jain & Kalapurackal, 2023). This imbalance restricts understanding of how sustainable haute couture may protect traditional craftsmanship while ensuring traceability, fair production, and ecological accountability. The literature therefore lacks an integrated synthesis explaining how environmentally preferable materials, circular design strategies, and cleaner production technologies collectively shape the development of sustainable haute couture.

This literature review aims to critically examine the development of sustainable haute couture through three interconnected dimensions: environmentally responsible materials, sustainable and circular design, and cleaner production. Specifically, it seeks to identify dominant theoretical perspectives, synthesise empirical findings, compare the environmental opportunities and limitations of existing innovations, and formulate future research directions applicable to high-value fashion systems. The study's novelty lies in positioning haute couture as a potential experimental laboratory for sustainable fashion rather than merely a subcategory of luxury consumption. It proposes an integrative Material–Design–Production–Value perspective: materials are assessed through sourcing and life-cycle performance; design through longevity, disassembly, adaptability, and aesthetic durability; production through waste, energy, water, chemicals, digital technology, and craftsmanship; and value through cultural preservation, exclusivity, traceability, and extended use. This perspective connects circular-economy principles with the distinctive artistic and artisanal attributes of couture, enabling sustainability to be evaluated as systemic performance rather than as material substitution or promotional discourse.

Sustainable haute couture represents both a contradiction and a strategic opportunity. Its resource-intensive aesthetics may create environmental burdens, yet its made-to-order production, craftsmanship, durability, and emotional value offer structural advantages over volume-driven fashion. The decisive issue is whether these advantages are supported by verified material choices, circular design, transparent supply chains, and cleaner production. By consolidating fragmented evidence into an integrated analytical framework, this review establishes a foundation for evaluating how haute couture can contribute to a fashion system that is environmentally regenerative, culturally meaningful, technologically innovative, and economically viable.

METHODS

This study employed a systematic literature review to examine the development of sustainable haute couture through three interrelated dimensions: environmentally responsible materials, sustainable design, and production practices. A systematic review was selected because it enables transparent, reproducible, and theoretically structured knowledge synthesis while reducing the subjectivity associated with conventional narrative reviews (Snyder, 2019). The identification, screening, eligibility assessment, and inclusion procedures followed the PRISMA 2020 framework developed by Page et al. (2021).

Literature searches were conducted across Scopus, Web of Science, ScienceDirect, and Google Scholar for peer-reviewed journal articles published between January 2016 and September 2026. The search strategy combined Boolean operators with the terms: ("sustainable haute couture" OR "sustainable luxury fashion" OR "eco-fashion") AND ("sustainable material" OR "biomaterial" OR "recycled textile") AND

("circular design" OR "zero-waste design" OR "production" OR "craftsmanship"). These terms reflected the multidimensional definition of sustainable fashion advanced by Henninger et al. (2016) and the material–design–production configuration identified in contemporary fashion scholarship (Daukantienė, 2023; Ferreira et al., 2023).

The initial search generated 312 records: 138 from Scopus, 104 from Web of Science, 48 from ScienceDirect, and 22 from Google Scholar. After removing 74 duplicates, 238 records were screened by title and abstract. This process excluded 171 records that did not directly address sustainability within fashion, textiles, luxury, or couture-related contexts. Of the 67 reports sought for retrieval, nine could not be accessed, leaving 58 full-text articles for eligibility assessment. Forty-six articles were subsequently excluded because they did not focus on haute couture or luxury fashion (n = 19), did not examine materials, design, or production (n = 13), offered insufficient conceptual or empirical evidence (n = 8), or failed to satisfy the publication-period and language criteria (n = 6). Consequently, 12 articles constituted the final objects of qualitative synthesis.

Eligible studies had to be English-language peer-reviewed journal articles, fall within the specified ten-year period, and offer empirical or conceptually rigorous evidence concerning at least one of the three analytical dimensions. Publications such as editorials, books, conference abstracts, commercial reports, and articles without methodological transparency were excluded. Journal reputation, methodological clarity, theoretical relevance, and the correspondence between evidence and conclusions informed the quality appraisal.

A structured extraction matrix recorded authorship, publication year, geographical context, research design, theoretical framework, material innovation, design strategy, production technology, environmental contribution, and reported limitations. Thematic content analysis was then applied through deductive categories—materials, design, and production—and inductive subthemes emerging from the evidence. Material analysis considered recycled, bio-based, biodegradable, and waste-derived textiles, acknowledging that environmental benefits depend on substitution effects and life-cycle conditions (Sandin & Peters, 2018). Design analysis addressed longevity, personalisation, repairability, modularity, and circularity, while production analysis covered craftsmanship, cleaner processing, digital technologies, and waste minimisation. Cross-study comparison was used to distinguish conceptual propositions from empirically demonstrated outcomes. This synthesis responds to persistent fragmentation in sustainable-fashion research (Mukendi et al., 2020) and evaluates whether circular strategies are integrated throughout couture value chains rather than confined to end-of-life management (Brydges, 2021; Niinimäki et al., 2020; Todeschini et al., 2017).

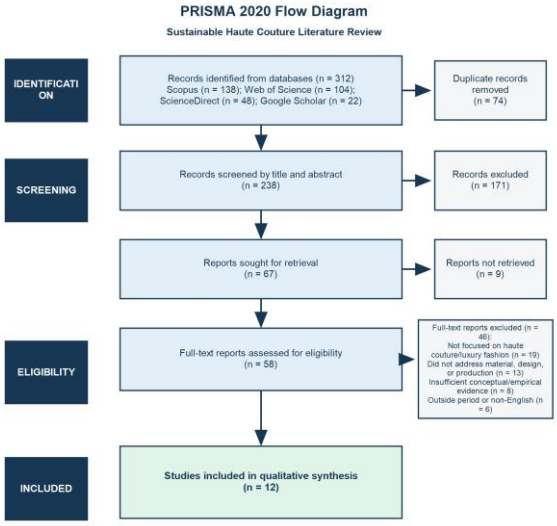

Figure 1. PRISMA 2020 Study-Selection Flow Diagram

RESULTS AND DISCUSSION

Result

The qualitative synthesis of 12 selected articles revealed that the development of sustainable haute couture is structured around three interdependent dimensions: environmentally responsible materials, sustainable design, and cleaner production. Of the 12 articles, five presented empirical evidence through case studies, interviews, product evaluation, or digital-data analysis, whereas seven developed conceptual

evidence through systematic reviews, life-cycle literature, or theoretical synthesis. Based on the coding performed in this review, material sustainability appeared in nine articles, sustainable design in ten articles, and production sustainability in eight articles. Only five studies substantially integrated all three dimensions. This distribution indicates that sustainable-fashion knowledge remains fragmented, particularly when translated into the specific context of haute couture.

Table 1. Conceptual and Empirical Synthesis of the 12 Reviewed Articles

Study	Scope and method	Evidence type	Material-related findings	Design and production findings	Relevance to sustainable haute couture
Henninger et al. (2016)	Qualitative investigation of sustainable-fashion definitions	Empirical–conceptual	Sustainable materials require traceability, ethical sourcing, and reduced environmental impacts	Sustainability must cover design, labour, transparency, and product longevity	Couture sustainability cannot be defined only by premium or natural materials
Todeschini et al. (2017)	Review and classification of innovative fashion business models	Conceptual	Recycled and alternative materials support value innovation	Circular design, on-demand production, and collaborative models reduce linear resource use	Couture can combine exclusivity with circular value creation
Cimatti et al. (2017)	Italian luxury-accessories case study and life-cycle assessment	Empirical	Leather and textile scraps can be recovered as inputs for new luxury products	Eco-design and recycling reduce waste while maintaining product differentiation	Provides direct evidence that luxury waste can become high-value design material
Sandin and Peters (2018)	Review of 41 life-cycle studies on textile reuse and recycling	Conceptual–empirical synthesis	Reuse generally generates greater environmental benefits than recycling	Benefits depend on displacement of virgin production, product quality, and logistics	Durable, repairable couture potentially creates greater value than premature recycling
Maldini et al. (2019)	Empirical assessment of personalised clothing	Empirical	Material reduction is not automatic when personalisation is applied	Personalisation may strengthen attachment and use, but does not necessarily reduce purchase volume	Bespoke production supports emotional durability but requires controlled consumption
Niinimäki et al. (2020)	Review of environmental impacts across the fashion value chain	Conceptual–empirical synthesis	Fibre production generates impacts involving water, energy, chemicals, and emissions	Longer lifetimes and slower production are necessary alongside material innovation	Couture's slow, made-to-order model offers structural sustainability advantages
Mukendi et al. (2020)	Systematic synthesis of sustainable-fashion research	Conceptual	Eco-material adoption represents only one component of systemic transformation	Sustainable fashion requires changes in design, production, consumption, and governance	Supports evaluating couture as a socio-technical system rather than an eco-product
Brydges (2021)	Interviews with founders, executives, and sustainability managers from 19 Swedish fashion brands	Empirical	Brands increasingly use recycled or lower-impact inputs	Circular initiatives are often concentrated at the waste stage instead of integrated across supply chains	Couture houses need coordinated sourcing, design, production, repair, and recovery
Daukantienė (2023)	Literature review of sustainability in fashion	Conceptual	Sustainable fibres require assessment of performance and processing impacts	Digital design, additive manufacturing, laser processing, and efficient finishing may reduce waste	Digital–artisanal integration can improve couture precision and material efficiency
Ferreira et al. (2023)	Review and decision framework for textile biomaterials	Conceptual	Biomaterials differ in durability, biodegradability, source, processing, and	Material selection should incorporate circular design and functional requirements	Couture designers require multicriteria selection rather than "natural material" assumptions

			end-of-life performance		
Wang and Zakaria (2023)	Systematic review of designers' role in circular fashion	Conceptual	Material choice at the design stage determines subsequent circularity	Designers strongly influence durability, disassembly, waste, and production processes	Couture designers can act as primary agents of system-level environmental innovation
Abdelmeguid et al. (2024)	Topic modelling of LinkedIn data from 1,115 UK textile and fashion companies	Empirical	Recycling and material recirculation emerged as developing luxury strategies	Five drivers included artistic creation, craftsmanship, style, retail excellence, and personalisation; only approximately 20% of companies explicitly emphasised sustainability	Empirically connects craftsmanship and personalisation with circular luxury, but reveals limited adoption

Environmentally Responsible Materials

The material dimension demonstrates a transition from conventional virgin fibres toward recycled textiles, production scraps, biomaterials, regenerated fibres, and biodegradable alternatives. However, the evidence does not support the assumption that every natural or recycled material is inherently sustainable. Ferreira et al. (2023) show that biomaterial performance depends on raw-material origin, manufacturing requirements, functional durability, and end-of-life conditions. A material that biodegrades under industrial conditions, for instance, may offer little advantage when combined with synthetic linings, adhesives, metallic embellishments, or finishes that prevent separation. Sandin and Peters (2018) similarly establish that reuse and recycling deliver environmental benefits primarily when they displace virgin-material production. Reuse generally performs better because it retains the energy, labour, craftsmanship, and economic value already embedded in the garment. For haute couture, this finding favours archive reuse, restoration, redesign, deadstock utilisation, and component recovery over fibre-level recycling. The luxury case examined by Cimatti et al. (2017) empirically demonstrates that fabric and leather waste can be transformed into differentiated products without eliminating luxury value. Consequently, waste materials should not be treated as aesthetically inferior inputs. Through artisanal treatment and design intervention, they can acquire scarcity, narrative value, and uniqueness the attributes on which haute couture traditionally relies.

Sustainable Design

Design emerged as the most frequently discussed dimension. The reviewed evidence identifies longevity, timeless aesthetics, personalisation, emotional durability, repairability, modular construction, zero-waste pattern development, and design for disassembly as the principal strategies. These approaches correspond closely with couture practices because couture garments are customised, labour-intensive, and designed to embody exceptional symbolic value. Nevertheless, personalisation does not automatically produce environmental improvement. Maldini et al. (2019) found that customised products may strengthen user attachment and garment use, but they do not necessarily reduce the total number of garments purchased. Thus, emotional durability must be accompanied by physical durability, repair services, adaptable sizing, and responsible consumption. Wang and Zakaria (2023) position designers as critical decision-makers because choices made during product development determine material compatibility, cutting waste, construction methods, repair potential, and recyclability. In haute couture, this responsibility is especially significant: elaborate embroidery, coatings, adhesives, mixed fibres, and inseparable decorations may increase aesthetic value while preventing recovery. Sustainable couture design therefore requires an intentional balance between visual complexity and material separability.

Sustainable Production

The production findings indicate a convergence between craftsmanship and advanced technology. Couture's made-to-order system reduces unsold inventory, while manual construction permits repair, adaptation, and precise material control. Niinimäki et al. (2020) support slower production and longer garment use as essential responses to the environmental burden of volume-driven fashion.

Digital prototyping, three-dimensional design, body scanning, laser cutting, additive manufacturing, and digital printing may complement artisanal expertise by reducing physical samples, improving cutting precision, and limiting production errors (Daukantienė, 2023). Nevertheless, technological innovation cannot be classified as sustainable without examining electricity use, equipment, production scale, and rebound effects.

Brydges (2021) found that many fashion companies apply circular principles mainly after products become waste. This downstream orientation is insufficient. In sustainable haute couture, cleaner production must begin with traceable procurement and continue through efficient pattern development, non-toxic colouring, low-waste assembly, local craftsmanship, quality control, repair, take-back, and material recovery.

Integrated Finding

The central result is that sustainable haute couture cannot be achieved through a single intervention. Environmentally responsible material without durable design may still become premature waste; circular design without cleaner production may merely relocate environmental burdens; and efficient production without responsible sourcing may preserve extractive material systems. The evidence therefore supports an integrated **Material–Design–Production–Value framework**:

Dimension	Core criteria	Expected sustainability outcome
Material	Traceability, recycled or regenerative content, non-toxicity, durability, separability	Lower virgin-resource dependence and improved material recovery
Design	Longevity, emotional attachment, repairability, modularity, zero-waste construction	Extended garment life and reduced obsolescence
Production	Made-to-order systems, craftsmanship, digital precision, cleaner processing, waste control	Reduced inventory, emissions, water consumption, and production waste
Value	Heritage, artistic originality, cultural craftsmanship, transparency, exclusivity	Preservation of cultural value and legitimisation of sustainable luxury

Overall, sustainable haute couture has considerable transformative potential because its traditional attributes craftsmanship, limited production, personalisation, durability, and high value are compatible with slow and circular fashion. However, empirical adoption remains limited. Abdelmeguid et al. (2024) found that only approximately 20% of the 1,115 fashion and textile companies examined explicitly emphasised sustainability. Moreover, few studies directly measure the life-cycle performance of complete couture garments. The reviewed literature therefore indicates that sustainable haute couture is conceptually advanced but empirically under-evaluated. Future research should test integrated couture products using life-cycle assessment, material-flow analysis, production-waste measurement, durability indicators, and social assessments of artisanal labour.

Discussion

The findings demonstrate that sustainable haute couture is evolving from a material-oriented environmental response into an integrated system involving material selection, design intelligence, production technology, craftsmanship, and value preservation. Although nine of the 12 reviewed studies addressed materials, ten examined design, and eight discussed production, only five substantially connected all three dimensions. This imbalance confirms that sustainability is still frequently implemented through isolated interventions rather than through life-cycle transformation. Consistent with Henninger et al. (2016), sustainable fashion should therefore be interpreted as a multidimensional concept involving environmental integrity, ethical production, transparency, longevity, and economic viability. For haute couture, this interpretation is especially relevant because ecological performance must coexist with artistic excellence, exclusivity, cultural meaning, and superior craftsmanship.

The material findings indicate a transition from virgin and fossil-based inputs toward recycled fibres, deadstock textiles, production remnants, regenerated cellulose, biomaterials, and biodegradable alternatives. However, material classification alone cannot determine sustainability. Ferreira et al. (2023) argue that biomaterials must be evaluated according to feedstock origin, processing intensity, technical performance, durability, and end-of-life conditions. Similarly, Daukantienė (2023) demonstrates that environmental performance is influenced not only by fibre type but also by dyeing, finishing, garment maintenance, and waste treatment. Consequently, the designation of a fabric as “natural,” “recycled,” or “biodegradable” should not become a substitute for life-cycle verification. In couture production, this is critical because fabrics are frequently combined with embroidery, sequins, metallic components, adhesives, coatings, and synthetic linings that may obstruct disassembly or biodegradation.

The reviewed evidence further establishes a hierarchy of material-value retention. Sandin and Peters (2018), based on 41 life-cycle studies, found that textile reuse commonly provides greater environmental benefits than fibre recycling because reuse preserves the energy, labour, and material value already embedded

in a product. In haute couture, this principle supports restoration, redesign, archive circulation, deadstock utilisation, and the transfer of embroidery or decorative components between garments. Cimatti et al. (2017) empirically showed that leather and textile remnants from luxury manufacturing could become inputs for new high-value products. Indonesian evidence provides a comparable interpretation: Putro (2022) demonstrated that garment-industry waste can be converted into commercially valuable products through design experimentation and community craftsmanship. Material waste can therefore be reconceptualised as a design resource rather than a residual production problem.

Nevertheless, the transformation of waste into luxury products depends on design quality. Listiani et al. (2024), in a SINTA-accredited design journal, found that upcycled garments could satisfy aesthetic principles while extending product utility. This evidence challenges the perception that recycled materials necessarily produce visually inferior outcomes. In haute couture, the irregularity, scarcity, and historical traces of recovered materials can instead reinforce uniqueness and narrative value. Yet upcycling should not merely conceal waste beneath decorative complexity. It must maintain structural quality, wearability, repairability, and material traceability to prevent the production of aesthetically attractive but short-lived garments.

Design emerged as the strongest integrative mechanism in the review. Wang and Zakaria (2023) position designers as upstream decision-makers whose choices influence cutting efficiency, component compatibility, durability, repair, disassembly, and recycling. Sustainable couture design must consequently move beyond surface aesthetics toward life-cycle-oriented construction. Zero-waste pattern cutting, modular components, reversible assembly, adaptable sizing, mono-material construction, and removable embellishments can preserve couture complexity while facilitating maintenance and recovery. Todeschini et al. (2017) similarly identify circular design and on-demand production as central elements of sustainable fashion business-model innovation.

Personalisation represents another important but conditional advantage. Haute couture garments are produced according to individual measurements and preferences, potentially strengthening emotional attachment and reducing premature disposal. Nevertheless, Maldini et al. (2019) found that personalisation may increase product attachment without necessarily reducing the total volume of clothing purchased. Bespoke design should therefore be combined with timeless aesthetics, physical durability, alteration services, repair guarantees, and intergenerational transfer. The sustainability of couture arises not simply because a garment is unique, but because uniqueness encourages prolonged and intensive use.

Production findings reveal productive compatibility between traditional craftsmanship and digital technology. Made-to-order production can minimise unsold inventory, while artisanal construction permits precise quality control, repair, and component replacement. At the same time, three-dimensional prototyping, body scanning, digital pattern development, laser cutting, and additive manufacturing may reduce sampling and cutting waste (Daukantienė, 2023). Sedjati and Yantari (2021) further demonstrate the creative potential of plant-based colourants and ecoprint processes for textile development. However, natural dyeing should still be assessed for mordant toxicity, water consumption, colourfastness, and scalability. Technology or traditional practice should not be presumed sustainable without measurable production evidence.

The empirical results also expose a persistent implementation gap. Brydges (2021), through interviews involving 19 Swedish fashion brands, found that circular initiatives were frequently concentrated at the waste stage instead of being integrated across sourcing, design, manufacturing, use, and recovery. Abdelmeguid et al. (2024) similarly reported that only approximately 20% of 1,115 UK fashion and textile companies explicitly emphasised sustainability. Thus, although luxury's craftsmanship, durability, and personalisation correspond with slow-fashion principles, these attributes do not automatically constitute circular practice. Niinimäki et al. (2020) emphasise that systemic environmental improvement requires slower production, extended garment lifetimes, and changes across the value chain.

Conceptually, the results support a Material–Design–Production–Value framework. Environmentally responsible materials provide the physical basis; circular design determines longevity and recoverability; cleaner production controls resource consumption and waste; and cultural–symbolic value motivates preservation. Mukendi et al. (2020) reinforce this systemic interpretation by framing sustainable fashion as an interaction among technological, commercial, institutional, and behavioural transformations. The principal competitive implication is that sustainability should not weaken couture identity. Traceable materials, artisanal knowledge, repair services, and material narratives can strengthen authenticity and differentiation.

Overall, sustainable haute couture is conceptually promising but empirically under-measured. Future studies should compare complete couture garments through life-cycle assessment, material-flow analysis,

durability testing, production-waste measurement, and social evaluation of artisan labour. Without such evidence, sustainability risks remaining a branding discourse. With integrated verification, however, haute couture can function as an experimental platform from which high-quality environmental innovations diffuse into the broader fashion industry.

CONCLUSION

This literature review concludes that sustainable haute couture is developing through the interdependence of environmentally responsible materials, circular design, cleaner production, and cultural value preservation. The synthesis of 12 articles comprising five empirical studies and seven conceptual or review-based studies showed that nine articles addressed material sustainability, ten examined design strategies, and eight discussed production practices. However, only five studies substantially integrated these dimensions, indicating that sustainability initiatives remain fragmented across the fashion value chain.

Conceptually, sustainable haute couture cannot be reduced to using natural, recycled, or biodegradable textiles. Material performance must be evaluated through traceability, processing impacts, durability, separability, and end-of-life potential. Circular design strategies, including zero-waste cutting, modular construction, repairability, personalisation, and emotional durability, can extend garment lifetimes while preserving exclusivity. Cleaner production can be strengthened through made-to-order systems, artisanal craftsmanship, digital prototyping, precision cutting, non-toxic processing, and production-waste recovery.

Empirically, reuse and life extension generally preserve greater environmental value than fibre recycling, while upcycling can transform production remnants into aesthetically and commercially valuable products. Nevertheless, limited corporate adoption and insufficient life-cycle measurement reveal a persistent implementation gap. Sustainable haute couture therefore has strong transformative potential, but its credibility requires measurable environmental performance, transparent supply chains, ethical craftsmanship, and integrated circular practices from material sourcing to post-use recovery.

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