Environment and Social Psychology (2025) Volume 10 Issue 10 ISSN: 2424-8975 (O)
doi: 10.59429/esp.v10i10.4161 2424-7979 (P)

RESEARCH ARTICLE

Cognitive and Emotional Determinants of Sustainable Engagement with Digital Clothing

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ABSTRACT

Fast fashion, textile waste, and overproduction create serious sustainability issues for the fashion industry. Digital clothing, also known as virtual fashion, incorporates augmented reality, social media, and the metaverse. This form of virtual fashion has the potential to reduce the harmful impact on the environment caused by fast fashion. This research involves a systematic literature review with thematic analysis (based on the model suggested by Braun and Clarke) to explore the cognitive and emotional variables involved in digital clothing sustainability. The study focuses on 28 peer-reviewed articles published between 2014 and 2025, focusing on digital clothing. The key cognitive determinants are perceived usefulness, digital literacy, and sustainability awareness that constitute the rational basis of adoption decisions. Emotional determinants, including expression of identity, hedonic joy, and social belonging, were necessary to long-term engagement. Several barriers exist, including the intangible nature of digital garments and doubts over their authenticity and sustainability. Results indicate that there is a need for an approach that combines both emotional and rational factors of customer motivation. This helps to understand how consumers make decisions and stay engaged over time with digital clothing. Consequently, the digital clothing businesses need to deliver a trustworthy, engaging, customized, and sustainable way to attract customers. At the same time, educating customers on digital literacy is essential in the long term. Moreover, policymakers should develop inclusive policies that ensure sustainability and digital equity in the digital fashion industry. Collectively, the measures can help form a supportive environment for sustainable and digital engagement in the fashion industry.

Keywords: Digital clothing; sustainable fashion; consumer psychology; cognitive engagement; emotional motivation; systematic literature review; thematic analysis; virtual fashion

1. Introduction

The fashion industry is experiencing increased criticism because of fast fashion's contribution to the sustainability crisis, with fast fashion, excess production, and textile waste being key contributors to environmental pollution [1]. New types of innovation are reacting to this by changing the way consumers interact with clothing. Digital clothing, also known as virtual fashion, is one of such innovations that only live in digital space, namely in a game, in augmented reality (AR) filters, in the metaverse, and on social

ARTICLE INFO
Received: 12 September 2025 | Accepted: 14 October 2025 | Available online: 28 October 2025

CITATION
Zhu XJ, Kim SJ. Cognitive and Emotional Determinants of Sustainable Engagement with Digital Clothing. *Environment and Social Psychology* 2025; 10(10): 4161 doi:10.59429/esp.v10i10.4161

media [2]. Digital clothing provides a possible avenue to lessen the environmental footprint of conventional apparel manufacturing through the transfer of consumption into the digital realm [3]. Simultaneously, such innovations relating to the aforementioned one, such as smart clothing, which involves embedding sensors in clothes and smart textiles, have appeared [4]. Nevertheless, although both concepts represent the overlap of fashion and technology, they are quite different in terms of use and the experience of the consumers. Attempting to deal with both in one study is conceptually vague. That is why the current paper does not aim to be comprehensive but rather aims at examining a narrower area of study, digital clothing, to be able to discuss its psychological aspect and sustainability-enhancing effects.

Digital clothing is a concept where clothing is created and worn in a virtual environment, including augmented reality (AR), social media platforms, the metaverse, and video games [58]. Unlike traditional clothing, digital clothing has no physical presence and solely depends on online reach. These digital garments are designed online using 3D software and are worn by avatars in virtual settings. There is no real manufacturing, shipping, or physical involvement in the real world [59]. Digital clothing is only a digital asset that is owned and worn by people in a digital space [60]. As digital clothing rejects products, transportation, and distribution, it largely reduces environmental degradation. However, the energy consumption for running heavy servers and excessive use of electricity does remain a serious concern for the environment [61]. Overall, digital clothing reduces the overproduction in fast fashion, offering a sustainable alternative in the fashion industry [62].

Recent studies have identified digital clothes as one possible remedy to overproduction and over-waste that continues to be a scourge of the fast fashion industry [63]. Research has argued that through the replacement of even a small percentage of physical clothes with the implementation of the digital version, trillions of liters of water and a large portion of carbon could be saved, and therefore, digital fashion is one of the most efficient sustainability aspects [64]. Digital garments use approximately 97% less CO2 compared to the equivalent physical garments, eliminating the need to use harmful chemicals and microplastic pollution that accompanies the manufacturing of traditional textiles [65]. Despite the significant positive environmental impact, other academics remind that the energy demands of digital fashion, primarily data centers and rendering technologies, must be controlled in a way that would promote the net sustainability impacts to the fullest. The consumer acceptance research shows that the intention to wear digital clothes in the manifestation of online self and content creation is growing, and more than 60% are willing to wear garments online, a fact that testifies that the consumption pattern can be altered [66]. However, the literature also reveals issues such as the problem of digital divide, a risk of virtual fast fashion, and the need to implement transparent schemes to establish a new direction between psychology and sustainability. These observations underscore the need to have systematic reviews that would integrate cognitive and emotional variables that influence consumer interaction with online clothing, which this paper would provide.

The current research on the psychological processes and obstacles peculiar to digital clothing sustainability is scarcely addressed. This study will therefore answer the following questions: (1) Which cognitive and emotional drivers are used to encourage consumers to adopt digital clothing sustainability? (2) What are the effects of these factors on the adoption and continued use of digital apparel? (3) What are the obstacles to complete sustainability in the adoption of digital fashion?

To explain how consumers can respond to digital clothing, it is necessary to consider cognitive and emotional aspects [5]. Rational decision making, including perceptions of usefulness, authenticity, and sustainability benefits, and affective engagement, including identity expression, novelty, and social belonging, are all influenced by cognition and affect, respectively [6]. Although there is greater interest in

digital clothing, the current research is fragmented and largely focuses on it as a design or sample instrument, rather than a complete virtual product. This renders it difficult to comprehend digital clothing as an entity. The combination of consumer thoughts and affective reactions to making a choice to interact with digital clothing in a sustainable manner is also a low-researched area [67]. In addition to this, issues such as why not everyone acts on their good intentions and why some individuals do not have access to digital technology are not well researched, and thus, businesses and researchers cannot apply this information.

Though there is an increasing body of research on these dynamics, current research is still piecemeal and usually conceptual and has not been synthesized in a systematic way. This creates a gap in the knowledge about the psychological aspects of sustainable communication with digital clothes. To address this gap, the present research is a thematic analysis-based systematic literature review (SLR) that synthesized the existing evidence. The study objective is to establish the cognitive and emotional motivation of consumer interest in the sustainability of digital clothing. By doing so, the study is value-added to the gaps existing between the work of fashion innovation, consumer psychology, and sustainability that can be implemented in the academic study and in the practice in the fashion industry. This paper presents an integrative approach to comprehend the psychological and sustainability aspects of digital clothing adoption by expressing the academic domains of fashion innovation and consumer psychology alongside environmental sustainability. This is a thorough synthesis that is key in informing forthcoming studies and practice in the digital fashion industry that is in flux.

2. Materials and methods

To understand the cognitive and emotional implications of sustainable engagement with digital clothing, this paper has used a qualitative Systematic Literature Review (SLR) and thematic analysis. The rationale behind the selection of the SLR was its clear, replicative, and systematic approach to gathering, shortlisting, and synthesizing literature on a narrow subject [7,11]. In contrast with narrative reviews, SLR reduces the likelihood of bias because all the steps of the search and selection process are guided by documented and already established criteria, which increases the reliability and validity [8,12]. The application of the PRISMA 2020 statement fits the best practices in systematic reviewing by providing methodological transparency and reproducibility, directing the search of the database, screening, inclusion, and exclusion of studies in a systematic way (see PRISMA flowchart below) [9,10]. Their incorporation of thematic analysis gives the investigation an interpretive richness that allows it to go beyond describing what consumers are doing, to gaining insight into the complexity of consumer psychology behind digital clothing sustainability.

The systematic literature review was performed in three major steps based on the PRISMA 2020 recommendations. In the Identification stage, 203 records were identified in four databases: Scopus, Web of Science, ScienceDirect, and Google Scholar. 39 records were excluded in duplicate removal. During the Screening stage, 164 records, with titles and abstracts, were screened, and 87 records were eliminated because they were not about digital clothing or consumer engagement. In the inclusion stage, 77 full-text articles have been reviewed, with 49 of them being filtered out due to the reason that they were about smart textiles or irrelevant to psychological/sustainability. Lastly, 28 studies were eligible to serve the thematic analysis during the Inclusion stage.

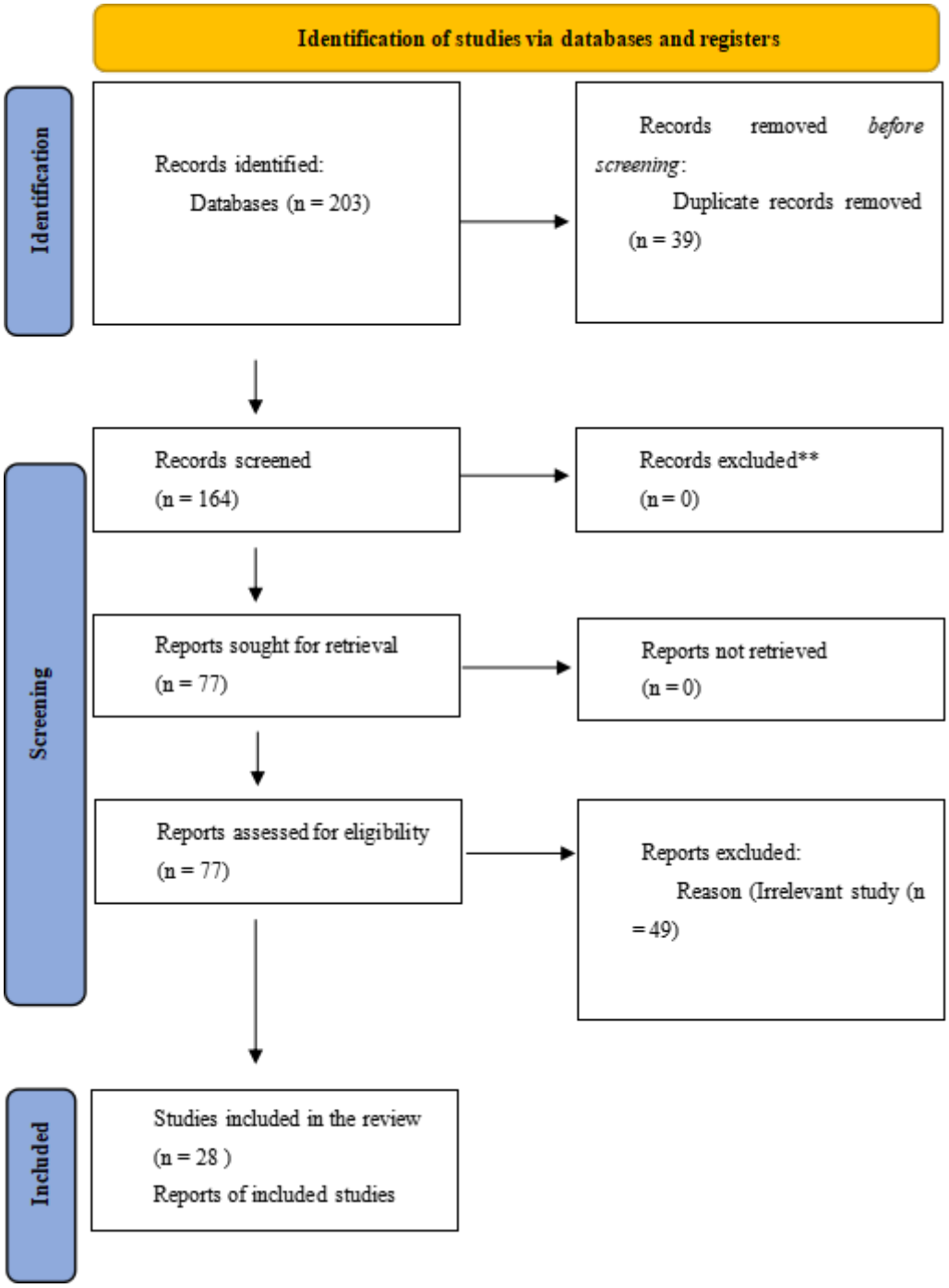

Figure 1. PRISMA

Four well-known databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar, were used as search tools. Boolean operators used were a combination of terms that were associated with digital fashion, consumer psychology, and sustainability to make the most of the sensitivity.

Table 1. Keywords search

Keywords/Boolean Operators	Purpose
"Digital fashion" OR "virtual clothing" OR "digital clothing"	Focus on the digital fashion sector
AND "consumer psychology" OR "consumer engagement" OR "adoption"	Psychological and behavioral facets
AND "sustainability" OR "sustainable fashion"	Sustainability focus

Pre-established inclusion and exclusion criteria were used to screen the literature. They are indicative of the emphasis of the study on the topic of digital clothing as a new fashion innovation standing at the junction of consumer psychology and sustainability.

Table 2. Inclusion Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles, conference papers, book chapters	Non-peer-reviewed literature, such as blogs, opinion pieces, newspapers, and magazines
English language publications only	Non-English studies
Publications from 2014 to 2025	Studies published outside this date range
Studies expressly focused on digital clothing, digital fashion, or virtual fashion.	Studies focusing solely on smart textiles, smart clothing, or non-fashion wearables
Research analyzing consumer psychology, engagement, acceptance, interaction, or retention	Studies unrelated to consumer behavior or sustainability
Conceptual, empirical, or mixed-method articles	Purely technological or engineering studies without a consumer/sustainability focus

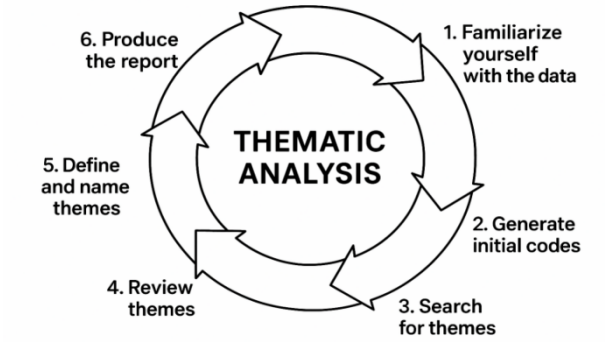

Figure 2. Stages in thematic analysis

Thematic analysis offers an organized but adaptable manner in which to shift beyond description to interpretation [14,15]. A well-developed six-step framework of thematic analysis by Braun and Clarke was used. By being both systematic and versatile, in analyzing qualitative data, this approach can be ideal in bringing together various results in a wide range of fields like marketing, psychology, cultural studies, and sustainability [16]. First, the researcher was intimately acquainted with the data, reading, and rereading all of the chosen works, developing a profound sense of the depth and complexity of insights that were associated with cognitive, emotional, and sustainability dimensions of engagement with digital clothes. Then, appropriate excerpts that were relevant to consumer perceptions, emotions, and sustainability motivations were systematically coded. These codes were then lumped into preliminary themes, which represented bigger concepts. Themes were screened and narrowed down to make sure they had internal consistency and were not similar to other themes. Finally, the themes were properly defined and named to describe the psychological factors that play the central role in the attraction to online clothing as a sustainable innovation. The last thing was to synthesize these themes into a single story that ties the cognitive and emotional aspects of the sustainability context. It was able to do so by this process, enabling the study to move beyond the

descriptive summaries to a more profound interpretation of the psychological processes that influence consumer behavior.

Table 3. Steps in Thematic Analysis

Step Number	Step Name	Description
1	Familiarization	Reading and re-reading the data to gain a deep understanding of the content and context
2	Generating Initial Codes	Systematically coding meaningful data segments related to research questions.
3	Searching for Themes	Grouping related codes into broader potential themes based on patterns and meanings
4	Reviewing Themes	Refining and validating the themes by checking coherence within and distinction between themes
5	Defining and Naming Themes	Clearly describing each theme's core idea and finalizing its name to reflect the content.
6	Producing the Report	Integrating the themes into a coherent narrative explaining insights aligned with research objectives [17].

In order to provide transparency, an audit trail was used to document every decision made during the search, screening, and coding process, and this gave a clear way of replicating and being accountable. The reliability was also ensured by the cross-coding of a subsample of materials with a second independent investigator, and any differences were discussed in group discussion and solved. Despite the fact that this practice lowers subjectivity, there are still restrictions. The digital clothing literature is quite new and rather scarce, and this limits the extent to which results can be generalized. Limiting to English-language publications might have missed the significant research in major areas that are fast-moving digitally. Although thematic analysis will provide in-depth qualitative data, there will be no quantitative effect sizes, and therefore, it will be necessary to supplement empirical research with complementary studies in the future to generalize. Finally, the dynamism of technology in the digital fashion environment means that this literature review will have to keep undergoing changes to ensure its relevance.

To maintain transparency, all the decisions made in the search, screening, and coding processes were well documented to leave a clear trail to be followed by others to repeat the study. A second researcher independently coded part of the material to increase reliability, and in case of any difference, the difference was discussed and resolved collectively. One can say that, despite these steps, bias is minimized, but still, there are certain limitations. Digital clothing research is a relatively new field, and the quantity of studies offered is limited; thus, the results cannot be generalized at the moment. In addition, only English-language publications were added, and this could have left out valuable research conducted in other languages and other regions. Thematic analysis offers deep and in-depth information, but does not give quantitative data. Thus, quantitative studies will be necessary in the future to prove these results. Lastly, since digital fashion is dynamic as technology keeps changing, this review will have to be revised on a regular basis to keep up to date.

3. Results and discussion

The thematic analysis retrieved 28 out of the 200 records using PRISMA published between 2014 and 2025. The studies included are wide-ranging, and there are contributions by sustainability science, marketing, fashion studies, information systems, wearable technology, and design practice. The aim was to expose the cognitive and emotional determinants on which sustainable engagement with digital and smart clothing is based, and to establish the processes by which digital fashion practices can produce sustainability outcomes.

Extraction of data through thematic analysis led to four broad themes, which include: (1) cognitive determinants of digital clothing involvement, (2) emotional factors and affective involvement, (3) sustainability-increasing mechanisms of digital fashion, and (4) a synthesis of cognition, emotion, and sustainability. The results are discussed below and are organised into four thematic sections with subthemes that are furthered with numbered citations [17,45]. The subthemes are syntheses of evidence in a variety of studies and point out patterns, consistencies, and gaps.

3.1. Cognitive determinants of digital clothing engagement

Cognitive determinants refer to the rational, knowledge-based, and evaluative processes that consumers apply when evaluating the adoption of digital clothing. Most of the literature reviewed contains three interrelated cognitive subthemes, namely: perceived usefulness and functionality, ease of use, compatibility, trust, and knowledge, awareness, and environmental concern.

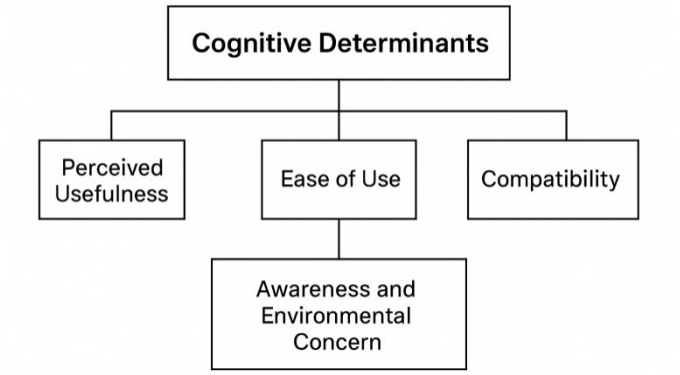

Figure 3. Cognitive determinants of digital clothing engagement

The perceived usefulness emerged as the most consistent cognitive predictor of adoption in varied digital-fashion environments [21]. Results of the studied empirical evidence and conceptual treatments indicated that to consumers, the instrumental benefits of technologies (be they direct personal utilities like better fit, lower return risk, novel functionalities such as solar energy harvesting in smart garments, or industry-wide efficiencies like reduced sampling and prototyping waste) are prioritized [24]. Empirical studies of immersive retail contexts have demonstrated that value-added properties (e.g., 3D visualisations and virtual try-ons) can increase purchase intentions by allowing consumers to better judge fit and appearance - a purely cognitive advantage to reduce uncertainty and increase perceived value [28,11]. The analyses related to Industry 4.0 and digital twins review level focus on the perception of functionality, which is converted into beliefs in the quality of the products and corresponds to the expectations of a consumer aligned with resource-saving production processes [27].

The utility of digital fashion is becoming more and more accepted as a multidimensional phenomenon in modern studies [37]. Other than the functional advantages, usefulness is perceived in a wider context by consumers, particularly where sustainability is at the macro level [35]. Considering the ecological usefulness, an example of such usage is virtual sampling, which minimizes the use of material and minimizes the environmental cost of the conventional prototyping process. Meanwhile, usefulness may be an experience as well. Personalised virtual garments enable consumers to indulge in identity, creativity, and self-expression without any physical production and thereby provide a personal sense of fulfilment and uniqueness. Service utility is yet another tier of value and is observed in rental or subscription-based retailing, which provides consumers with access to items they want without necessarily owning them [26]. Such services are beneficial in addition to the convenience, as they correspond to the dynamics of changing the attitude towards sustainable consumption and shareable use [18]. Research papers about the virtual wardrobe and customised

digital platform ensure that all these dimensions are included in the decision-making calculus used by consumers when embracing digital products and services [25]. Overall, the usefulness of digital clothing may be explained on both personal and systemic scales: it brings personal gains, including creativity, access, and convenience, and also the sustainability results at the level of the fashion system.

When platforms and interfaces are seen as easy to use, barriers to adoption dissolve; when virtual garments can be incorporated with the current consumer behaviours and digital activities, compatibility reinforces the cognitive signal to adopt [19]. Empirical research indicates that AR/VR interfaces with an intuitive user experience lead to lower cognitive load and perceived control, which makes them more widely accepted by both innovative and less-innovative consumers [34]. On the other hand, low usability or low complexity increases perceived risk and deters use. Compatibility cannot simply be the fit of technical aspects: compatibility can also be compatibility with the personal style, as well as social norms and cultural values [22]. It has been demonstrated that consumers are more inclined to use digital or rented garments to the extent that the service aligns with their identity, dress codes, or cultural requirements, and when they feel that the technology will fit into their wardrobe-management practices [23]. Trust can also be affected by compatibility with privacy expectations and data-handling practices; research studies that examined the acceptance of wearables in non-fashion settings highlight that data transparency and explicit privacy safeguards can raise cognitive trust, which can be transferred to other areas and thus is applicable to digital fashion platforms that access personal data [45].

Perceived functionality and behavioural intention are mediated by trust. Customers feel trust when platforms are perceived to be credible (with clear provenance, with reliable fit algorithms, with correct sizing) and uncertainty is reduced, and cognitive adoption pathways are reinforced [16]. Knowledge and environmental consciousness are dual cognitive functions: as input into rational cost-benefit calculations, and as normative anchors that rationalise high-cost or new decisions [24]. The survey-based designs were consistent in their conclusion that sustainable knowledge and environmental concern have a positive relationship with the intentions to use digital-fashion practices that are perceived as being environmentally friendly (e.g., renting and buying, using virtual clothes, engaging in the circular programme) [17]. The more informed consumers are regarding the negative effects of fast fashion on the environment and the possibility of using digital solutions to minimise waste, the more they are inclined to use these solutions in their decisions [27]. One line of work has linked knowledge to perceived responsibility: greater sustainable-fashion literacy triggers cognitive responsibility, which mediates between purchase intention and post-purchasing behaviours [34]. Likewise, consumer value dimension studies indicated that authenticity and perceived utility could be strengthened when consumers possess baseline information of sustainable design practices and digital customization processes [26].

Perceived efficacy also limits cognitive awareness. Locus-of-control measures and self-efficacy constructs were predictive of whether knowledge would be translated into intention - people who think their decisions do make a difference are more apt to use knowledge to action [19]. Thus, informational campaigns can be ineffective alone without parallel measures that enhance the sense of agency and instrumentality. Overall, the cognitive determinants provide the rational scaffolding for adoption. Perceived utility and usefulness are worth looking into; perceived ease of use, compatibility, and trust lessen barriers; knowledge and environmental concern provide normative rationales of adoption. The works reviewed indicate that these drivers of cognition are active in conjunction and not in isolation, and are particularly strong at the early stages of adoption, where consumers consider new technologies and services. But cognition is hardly enough to explain a sustained engagement - a position that is occupied by affective factors, explained next.

3.2. Emotional motivations and affective engagement

The experiential and identity-based aspect of interaction with digital and smart clothes is determined by emotional factors. In the literature, emotion operates in three main directions: aesthetic appeal, hedonic pleasure and distinctiveness; identity, expressing oneself and social conventions; and emotional awareness as a force of sustainability practice. These affective drivers are supplementary and, in most instances, override cognitive determinants in cases where continued use and behavioural persistence are the aim.

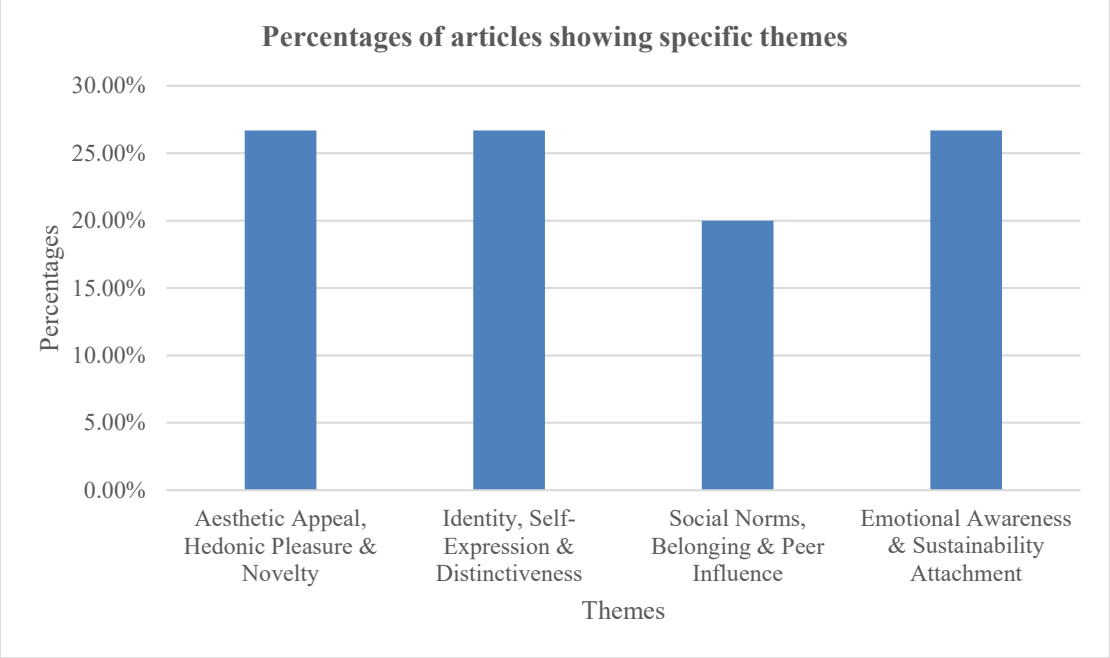

Figure 4. Emotional motivations and affective engagement subthemes with percentages

Aesthetics is a fundamental driving force in the world of fashion and seems to be the same in digital fashion. Empirical evidence indicates that the perceived beauty, realism, and richness of the virtual clothes have a significant positive effect on emotional engagement and intention to adopt [28]. The focal point is hedonic pleasure: if virtual experiences are enjoyable, aesthetically pleasing, playful, and new-fangled, users claim to experience more attachment and tend to include digital clothes in their virtual personalities more often. Experiments of virtual try-on show that hedonic value may mediate purchase or adoption intention, especially in the case of browsers who are in the process of deliberating, instead of targeting a particular product [28]. Emotional value is also delivered by uniqueness and novelty. Access-based and luxury rental models also capitalise on the emotional value of exclusivity and novelty in addition to sustainability assertions, thus encouraging consumers to use rental instead of ownership due to both aesthetic and affective motives [23]. These digital customization platforms, which deliver output that is differentiated, identity-specific (e.g., personalised avatars, unique digital skins), satisfy the consumers' desire to be unique and, therefore, strengthen the emotional connections to the digital product [18].

Notably, in some cases, emotional appeal may supersede cognitive hesitations: consumers can switch to the use of digital solutions even when cognitive appraisals (e.g., perceived usefulness) are mixed or ambiguous, in case emotional benefits are high enough. This is especially true of younger generations (e.g., Generation Z) who value symbolic consumption and self-expression via the Internet [35]. Clothing presents identity; digital clothing carries this role into virtual and in-between social spaces. Research in the literature demonstrates that self-expression and identity signalling are motivating factors in interactions with virtual

wardrobes, digital customization, and social-media-oriented fashion consumption [20]. Emotional satisfaction is attained in the process of being able to present oneself coherently within the various online platforms and through the levels of social responses that the presentations cause.

Emotional drivers are accentuated by social norms and peer pressure. In the case of an online community where sustainable practices are encouraged or where digital style innovation is being celebrated, social reinforcement enhances the chances of individuals adopting and maintaining the use of digital solutions [22]. The findings of the community-based modest-fashion SMEs show that social belonging and perceived community efficacy lead to emotional engagement and, consequently, value co-creation behaviours [22]. Normative cues (ratings, peer reviews, influencer endorsements) act as emotional stimuli in consumer-to-consumer settings (rental platforms) that help to justify the decision to rent or to wear non-owned clothing [23]. Emotional motivation to belong to social groups and be acknowledged also combines with the cognitive factors: social endorsement tends to enhance perceived trust and decrease perceived risk, which results in a cumulative cognitive-affective enhancement of adoption.

Another emotional transference is that of emotional awareness and attachment in sustainability practices. The literature demonstrates that interventions aimed at mobilising affective attachment to materials (visible mending, participatory recycling and re-design processes, user-centred creative recycling) elevate affective commitment and practice-based results such as repair behaviour and recycling success [34]. Pride, care, and stewardship, which are feelings that make sustainable practices personally valuable, are achieved through the use of experiential activities that engage hands-on use of the waste in the textile industry or in the process of textile repair. Additionally, certain studies emphasise the role of spiritual or reflective capabilities (wider affective realms) in mediating between knowledge and responsible practice: responsibility becomes more internalised and maintained when knowledge is construed in an affective/spiritual sense [17]. Emotional drivers are thus not only motivators in the short run (pleasure, identity), but also binding systems, which transform discrete behaviours into long-lasting habits.

Sustainable engagement centres on emotional determinants. The intangible rewards supporting continuity and pro-environmental practices are aesthetic enjoyment, identity expression, social validation, and affective attachment. Where cognitive drivers open the door to trial, affective drivers retain consumers within, making a one-off adoption into a continuing relationship. Such mechanisms work especially well in situations in which digital fashion can provide new expressive possibilities (e.g., avatars, digital skins) or in which sustainability is incorporated into social life through community and participatory practices.

3.3. Mechanisms of digital fashion to sustainability

Smart and digital clothing can also help with sustainability in a variety of ways. The main directions found in the review include circular and collaborative consumption models, physical production replaced by digital, repair, recycle, and emotional durability. Both of the pathways connect psychological determinants (cognitive and emotional) to visible sustainability consequences.

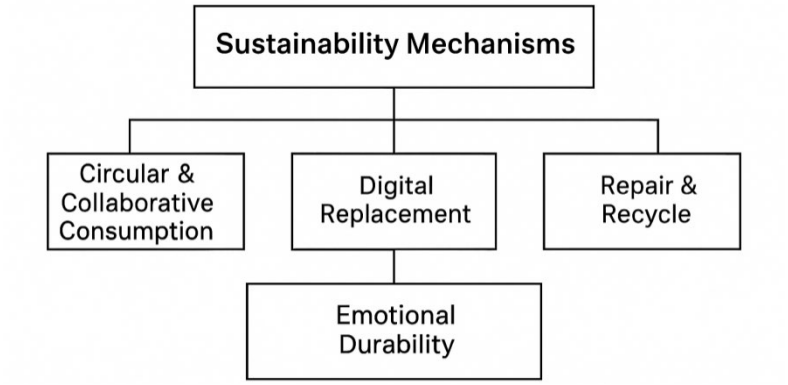

Figure 5. Mechanisms of digital fashion to sustainability

Such a sustainability mechanism is recurrent, called collaborative consumption (renting, sharing, peer-to-peer platforms). A number of studies within the corpus report that the model of rental decreases material throughput by favouring access over ownership, which correlates with the idea of the circular economy [23]. The incentive to rent tends to involve both cognitive and affective processes (economic benefit, perceived relative benefit, and hedonic novelty, social signalling), a dual route that enhances readiness to engage in circular modes [25]. Results show that environmental consciousness augments the likelihood to engage in cooperative models, yet social regulations and confidence in the platform need to be widely adopted [26]. The pre-emptive sustainability discourse and social effectiveness of the platforms marketed and designed in their own way will play a role in making the idea of rental systems more cognitively and affectively appealing. Notably, the literature cites heterogeneity: luxury rental is made to attract status-oriented consumers who appreciate temporary access to special objects, whereas mainstream rental is increasing its presence in value or sustainability-oriented markets. The two segments are capable of providing a reduction in physical production with scale.

Digital substitution means the substitution of physical objects with digital objects or utilising digital tools in the most drastic way to minimise the use of physical sampling and prototyping. Research into 3D models, digital twins, and AR/VR has shown that virtual sampling and try-ons decrease sample production, shipping, and returns - physical tools of decreasing waste and emissions [27]. Virtual fashion products (non-physical clothes worn in games and social media or in virtual events) are a direct alternative: the consumers can express fashion identity without physical consumption, which may possibly reduce the environmental impact of symbolic consumption [35]. The cognitive acceptance (usefulness, trust in virtual representation) and emotional resonance (is the digital garment as rewarding to experience as the physical one) are crucial in this sustainability pathway [28]. Study results have shown that where virtual garments are realistic enough and can convey identity well, consumers believe that they can be used as valid alternatives to physical garments, and therefore, the cognitive confidence coupled with emotional fulfillment can bring about sustainability benefits.

Micro-level sustainability practices used in repairing and recycling have been pushed to the side of the debate on digitalization. Repair practices that include hands-on repairs, the teaching of visible mending, and user-based recycling programmes have shown that emotional (attachment, pride in craft) and cognitive (repair competence, knowledge of material systems) skills serve to add life to garments and reduce waste. Together, these processes, collaborative consumption, digital replacement, and the creation of emotional permanence through repair/recycling, demonstrate that digital fashion can physically diminish waste and alter consumption behaviour under the conditions of psychological satisfaction. There is a set of cognitive

drivers (perceived usefulness, trust, knowledge) or emotional motivations (aesthetic satisfaction, identity, attachment) that will interact to decide whether these mechanisms are adopted and scaled. According to the literature, trials with platforms that develop both rational utility and emotional involvement hold the most promising effects, turning them into lasting and sustainable behaviour.

3.4. Cognition, emotion, and sustainability

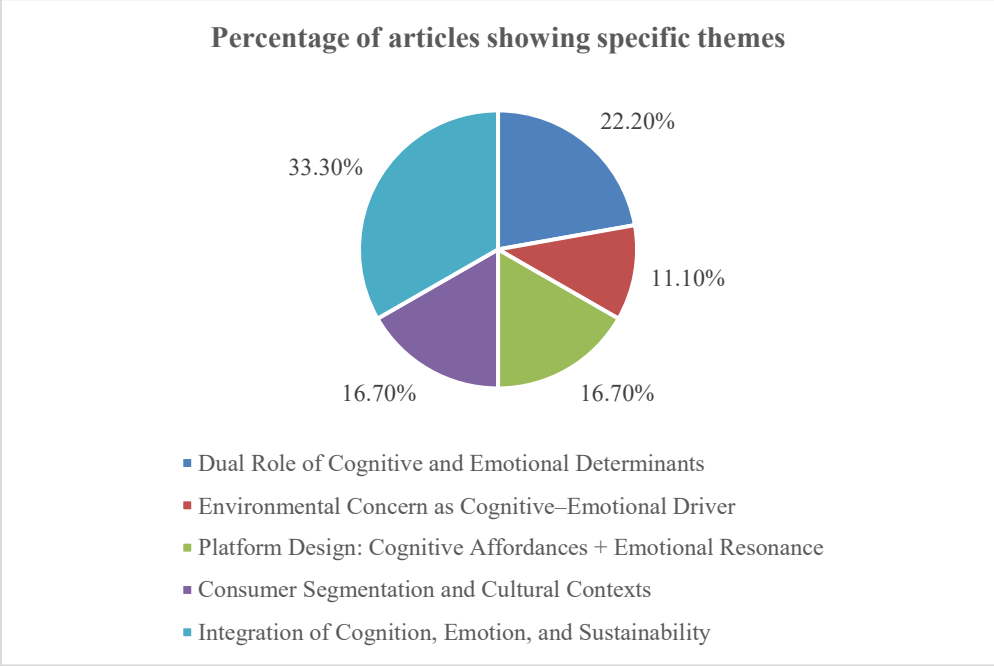

Figure 6. Emotional motivations and affective engagement subthemes with percentages

Several empirical reports indicate that usefulness (cognitive factor) and enjoyment or aesthetics (emotional factors) worked together to predict behavioural intentions and real engagement. Practically, a platform or a product that is only useful but has no emotional insight performs poorly; on the other hand, emotionally appealing but functionally deficient products also experience low levels of long-term uptake [28]. The environmental concern is a cognitive and emotional one. It has been shown that more sustainable consumers are driven by the moral and affective salience of environmental concerns; this moral resonance enhances the chances of adopting digital or rental solutions that reduce impact [26]. Successful digital-fashion platforms are those that have transparent cognitive affordances (accurate sizing, reliable imagery, provenance information) and are emotionally charged (personalization, community features, storytelling). In locations where these factors are combined, adoption and sustainable behaviour are more likely to be sustained [33].

Interventions that combine emotionally expressive practices (e.g., visible mending) with digital tools (e.g., tutorials, digital twinning) generate feedback loops that reinforce knowledge and attachment. With time, the loops transform episodic action into habitual action, leading to quantifiable sustainability results. The strength of cognitive-affective integration is context and consumer segment-specific. Younger consumers can be more emotionally oriented (identity, novelty), and other groups can be more susceptible to cognitive drivers (functionality, cost savings) in comparison to normative drivers (community influence). It is important to note that compatibility and trust are regulated by cultural contexts (e.g., modest fashion community or region-specific norms), so localised strategies are important [30]. Despite the cross-sectional and experimental evidence of integration, there is little longitudinal research to follow the temporal changes

in cognitive and emotional determinants to promote and maintain long-term behaviour. This is a weakness that restricts the capacity of modelling causal pathways and estimating long-term ecological impacts.

The theme of integration helps to emphasise that sustainable interaction with digital apparel is an ambivalent phenomenon that needs both a rational and an affective appeal. The most effective way of promoting sustainability is when the cognitive and emotional determinants are worked in harmony through platform designs and policy interventions that facilitate both the provision of correct information and personally meaningful experiences. Digital clothing thereby functions as an intersectional privilege, a technological, psychological, and cultural piece of art that can drive the fashion system into sustainability, provided that both mind and feeling are considered in the adoption strategies.

Answering cognitive determinants (perceived usefulness, ease of use, compatibility, knowledge) initiates the conditions of initiating adoption by means of offering rational arguments and perceived risk reduction [33]. In the decision calculus, consumers consider personal utilities (e.g., better fit, convenience) and systemic utilities (e.g., waste reduction, supply-chain efficiency). Adoption is being maintained by emotional motivations (aesthetics, hedonic enjoyment, identity, emotional attachment) and transformed into repeated behaviour[23]. The significance of emotional drivers is especially strong in those situations that allow expressing oneself and being recognised within society. Mechanisms of sustainability (collaborative consumption, digital substitution, repair/recycling) can offer pathways in the scope of which digital garments contribute to reduced material throughput and longer item life [27]. The benefit of these mechanisms realised is based on both emotional adoption and cognitive acceptance. Cognition, emotion, and sustainability should be integrated in order to achieve long-term, system-level impact. It is the hybrid interventions, the combination of reliable, practical technologies with emotionally enticing experiences and physically observable sustainability benefits, that have the best results. Nonetheless, there is little longitudinal data and direct indicators of these psychological processes with environmental measures.

This systematic review gives a comprehensive description of the cognitive and emotional antecedents of consumer engagement with digital clothing and associated sustainable practices, based on 28 articles. When these results are put into the context of the existing literature and the wider theoretical discussions, it becomes possible to critically evaluate the way in which consumers process and respond to innovation in digital and sustainable fashion, and how cognition and emotion co-evolve to determine the adoption support, intention to use, and ultimately, long-term behavioral change. The discussion combines the results with known models of technology use, consumer psychology, and sustainability scholarship, as well as outlines limitations in the current body of evidence and future research directions.

The first important finding pertains to the influence of such cognitive determinants as the perceived usefulness, functionality, ease of use, compatibility, knowledge, and environmental concern. Some of the studies analyzed in the context of the current review have shown that these aspects continue to be key influencing factors in the rational decision-making process of consumers in relation to digital and sustainable clothing. The research studies on smart clothes application indicated that compatibility and comfort were supportive of providing the impression of utility, with environmental concern being predictive of responses [21]. What this means is that the consumer remains very dependent upon the application of utilitarian judgment in their decision-making towards the fashion innovations, even with the digitized mediations of a product rather than a tangible product.

Previously, studies within the consumer behavior domain revealed a general trend of the Technology Acceptance Model (TAM) that perceived usefulness and ease of use were at the core of the adoption process, irrespective of the domain- e-commerce or wearable health devices [61]. It is primarily the fact that TAM is

extrapolated into the sphere of digital clothing that ensures its explanatory power, not to mention that the rational assessment of the consumers is more than mixed with the aesthetic and affective factors that apply to fashion in particular. Moreover, there is also a homogenous emphasis on knowledge and awareness as the antecedents of sustainable buying [17]. Findings are in line with the results of sustainable consumption studies, where the literacy of consumers about the effects on the environment tends to be all the more translated into a desire to behave more sustainably [46]. Eco-labeling and green certification studies also report that informational clarity can change consumer purchasing behavior to favor environmentally friendly items, but these effects are often dampened by trust in the source of the information [47].

However, cognitive evaluations are also found to be unsuccessful in maintaining engagement, as revealed by the evidence. The studies have always found that the cognitive trust of the utility or functionality of the digital fashion has to be supplemented with the affective engagement in order to bridge the intention-behavior gap. As an example, although surveys showed that environmental knowledge and locus of control may predict sustainable apparel consumption was high [18], the same surveys also indicated that self-expressiveness and social influence, which are affinity variables, mediated brand trust and purchase intention. This implies that the affective and rational lines do not separate but are interrelated and need additional theoretical unification [48].

Parallel to this, emotional motivations were proven to be as essential as sustainable involvement in digital clothes. The aesthetics of virtual clothing, hedonic satisfaction due to the relation to AR/VR technologies, and the uniqueness of the luxury rentals were exposed to establish emotional attachments that boosted adoption [18]. These affective aspects usually act as the mediator between the cognitive appraisals and end purchase intentions. One such example is that consumers reported greater fun and positive affect with recycling-oriented design studies, which in turn positively influenced satisfaction and sustainability outcomes[26]. Similarly, virtual wardrobes and collaborative consumption services demonstrated that the innovativeness and emotional excitement were useful predictors of adoption, and they complemented cognitive characteristics, such as social responsibility [29].

This is attributable to other decision-making theories that are more psychologically based, which assert that affect normally precedes the process of decision-making or even dominates rational decision-making. Neuroscience theories of consumer behaviour focus on the reality that responses to aesthetics, novelty, or social resonance are processed by reward circuits, and therefore bias subsequent rational judgements [50]. These interests in the given case, specifically in fashion, where identity and social performance are inseparable, are more emotional rather than functional [49]. In this respect, the findings are in line with the literature that exists, in which sustainable digital fashion has to be developed not only with rational efficiency but also hedonic pleasure and the capacity to express oneself [51].

The results also suggest that emotional awareness can be a significant contributor towards the advocacy of sustainable strategies to encompass mending, recycling, and repair. The visible mending teacher interviews revealed that the emotional connection to clothes as a result of the pedagogical approach extended the life of the latter [24]. Similarly, there is evidence that participatory recycling experiments showed that user satisfaction and positive emotional involvement had a direct positive effect on the recycling rates [35]. These findings suggest that incorporating the emotional response in the sustainability interventions is useful in closing the much-publicized attitude-behavior gap sustainably. Emotional appeals (guilt, pride, or nostalgia), according to the environmental psychology literature, are more likely to be effective in behavior change than information campaigns, particularly in behavioral areas that are self-identity related and

lifestyle-related [52]. Thus, digital fashion projects exploiting the emotional design features can possibly achieve the goal of harmonizing consumer behavior with sustainability objectives [53].

The third important thematic area is related to the sustainability-enhancing mechanisms of digital fashion. The findings of the collaborative and circular models of consumption proved that online renting, sharing, and luxury fashion rental services are being promoted more and more as economically and environmentally beneficial [25]. The practices exploit mental evaluations of worth and effectiveness at the same time, eliciting affective satisfaction based on uniqueness and hedonic gains. In addition, the digital replacement of physical production also has great sustainability potential, as demonstrated in virtual clothing studies and digital transformation technologies [27]. Digital prototyping, virtual try-ons, and 3D/AR/VR applications reduce material waste and shorten production cycles, and are aligned with industrial supply chain dematerialization. This is consistent with the sustainability literature that claims that one of the avenues that reduces the ecological footprints of the industries, which have disproportionate production and waste (dressing included), is dematerialization by overproduction [54].

The success of digital fashion adoption depends on a balance between cognitive drivers such as perceived usefulness, trust, and knowledge, and emotional drivers such as enjoyment, self-expression, and attachment [57]. The fashion industry, therefore, needs to design digital clothing experiences incorporating both functional use and the emotional content, stories, and interactive social capabilities. The above research has supported this argument, with an example being the fact that the previous research also indicates that VR fashion stores are not only offering efficient shopping interfaces, but also an entertaining and fun experience to stimulate the desire to see them again [58]. On a policy level, the interventions that enhance the concept of sustainable consumption of digital fashion can be mandated to balance out the informational campaigns (to form cognitive awareness) with the emotionally charged narratives (to form affective connections).

However, the shortage of evidence-based research should be acknowledged. The extreme use of cross-sectional surveys and experimental studies limits the possibility of projecting long-term behavioral outcomes. There were very few studies that used longitudinal designs and ethnography or field experiments that had the capability of capturing the time-based changes in cognitive and emotional determinants. In addition, a large part of the evidence is based on younger, technologically savvy groups (e.g., college students, Gen Z), which casts doubt on the extrapolability of findings to non-technical demographics and across different cultures. Earlier discussions of digital consumption studies warn that conclusions drawn on a small group of early adopters are unlikely to apply to the general population with less digital literacy [59]. Future studies should hence be able to diversify their samples and also use mixed methods to triangulate information. The other restriction is associated with the fact that negative feelings were rather sparsely explored, including anxiety, distrust, or overcoming, which can also influence the adoption of digital clothes. Although positive affective engagement was often mentioned [23]. The possibility of the restraining forces of the information overload, frustration with the technology, or the privacy issues was not properly examined. Studies on digital commerce have proposed that perceived risk and cognitive load can be a severe adoption barrier despite high utility [60]. The answers to such gaps, perhaps, can be used to represent the picture of emotional processes at play in online fashion consumption in an even-handed way.

The other avenues of research will be longitudinal observation of consumer participation in digital clothing, cross-cultural comparative studies, and an ethnography of the lived experience of the user of digital clothing. Causal mechanisms may also be tested with experimental interventions, which may be as manipulative of both cognitive (e.g., informational framing, eco-labels) and emotional (e.g., storytelling, gamification) determinants as needed. Last but not least, the systemic sustainability outcomes are to be

considered more attentively: although the positive character of the tendency of substitution by digital means may be evident, the consecutive consequences of further digital consumption and energy consumption should be critically evaluated.

To sum up, the results of this review can be summarized as follows: the idea of sustainable involvement in digital clothing can be defined by a rather complex set of cognitive and emotional variables, and sustainability is the rationale of it and the emotion that inspires it. These mechanisms that result in adoption are elicitation of cognitive appraisals of utility and compatibility with knowledge, and continuation by emotional determinants of enjoyment, self-expression, and attachment. There are such sustainable systems as a system of circles, digital substitution, and an emotional system of sustainability, which make it possible to mitigate the effects on the environment.

Digital clothing helps to alleviate the strain of fast fashion by making the virtual consumption of clothes able to reduce materials production, waste, and carbon emissions, and thus enable fashion to be circular despite the necessity of physical clothes. It makes fashion more of a democratic right, shattering exclusivity, yet in the developing economy, cost is central to sustainable appropriation. To manufacturers, digital fashion is a way to save money and increase interaction with the consumer through the integration of useful functionality with emotion. Nevertheless, there are other social and emotional challenges, such as possible digital gaps and privacy concerns. Combination interventions with emotional expressiveness and digital tools are effective in creating habits for sustainability, which emphasizes the role of cognitive and emotional motivation in the adoption approaches. This culturally context-specific, consumer-specific approach is essential in creating long-term, system-level environmental impact.

Together, these considerations indicate the necessity of considering integrative theoretical frameworks and practical solutions that put cognition, emotion, and sustainability digitally into focus simultaneously. The other weaknesses in methodologies of the studies must be addressed in future research, and the demographic coverage of the studies must be widened, and the industry and policy stakeholders must concentrate on the designs and interventions that would utilise both affective and rational leverages to enhance sustainable consumer engagement.

4. Conclusion

The study found rational anchors of consumer engagement in the shape of fundamental cognitive determinants of perceived usefulness, level of digital literacy, trust in technology, and cognisance of sustainability through a systematic review of 28 studies. Besides them, other affective motivations such as identity expression, novelty, and belonging were identified as powerful motivations of interest that make interest alive. The main barriers were also defined, including the fact that the approach is not physical, and thus, consumers do not think that it is real and sustainable, as well as the digital divide that remains and limits access. The primary value that the study brings is that it is the initial systematic review to explicitly relate consumer psychology to the sustainability in the digital adoption of clothes. It demonstrates the collision of mental and emotional motivation with the processes of sustainability in order to generate a model of multidimensional engagement through the incorporation of the fragmented evidence. The integration develops theory in the area of research on consumer behavior, fashion innovation, and sustainability, and provides practical knowledge. Findings reveal the topicality of consumer education as an effective tool to build trust and literacy, sustainable branding strategies creating a balance between rational transparency and emotional engagement, as well as all-inclusive policies to prevent the digital divide.

The paper also affirms that a rational basis of adoption (cognitive, i.e., perceived usefulness, ease of use, compatibility, knowledge, and environmental concern) and an affective resonance must exist to sustain the further engagement of the motivation of emotions (i.e., aesthetic appeal, hedonic enjoyment, self-expression, and emotional attachment). Sustainability is a complex process, and this will attract the rational and emotional conscientiousness, which will solidify the dedication to digital clothing practices. Since it is built on such findings, a number of recommendations can be offered to academia, the industry, and policymakers. The study has indicated that the researchers need to cease to think and operate within rationalist frames, such as TAM or SDT, and develop integrative models combining cognitive and affective determinants. The longitudinal and ethnographic research is also needed in addition to cross-sectional questionnaires to narrate the changing attitudes. The results suggest to the industry participants that they should create digital garment experiences that are very rational and emotive. The products and platforms are to be dependable, practical, and clear on sustainability, but to access the consumer through being immersive, aesthetic, personal, and expressive about oneself. Emotional consciousness can be extended to such programs as repair, recycling, and user-friendly co-creation to prolong the product life cycle. The multi-dimensional intervention ought to be embraced by the policy makers to the level of integrating informational campaigns to increase cognitive awareness and emotional storytelling to personalize sustainability, and should lead to the realization of the sustainability route.

The side effects are much wider than fashion in the future. Since digital clothing is evolving with the AR, VR, AI, and digital twins, it is one of such examples of the overall socio-technical change where sustainability, consumer psychology, and digital innovation collide. The process of adoption can be triggered by drivers, but there is also an element of emotional engagement at the cost of long-lasting and sustainable attached practice. It is a conclusion that cuts across the digital consumption fields, including smart homes and digital health. It is obligatory to consider potential recovery, such as platform energy requirements, which should also be addressed in future studies, to make the net sustainability gains with digital substitution. The study fulfilled the aim of research and provided a powerful framework of comprehending the psychological contextual backgrounds of sustainable digital involvement in fashion, and provided both didactic and theoretical responses to how innovation can be aligned with the global sustainability parameters.

Conflict of interest

The authors declare no conflict of interest

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