

Digital Product Passport Cues and Circular Fashion Purchase Intention: The Roles of Repairability Signal Diagnosticity, Greenwashing Skepticism, Data-Privacy Concern and Re-commerce Platform Trust

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ABSTRACT

The transition to circularity in the fashion industry is driven by a growing demand for more specific sustainability information at the level of the product, surpassing general green claims, from both regulators, brands, and consumers. Digital Product Passports can convey information regarding traceability, material composition, repairability, and end-of-life information, but consumer marketing research has only recently started to consider how consumers interpret these information cues in their purchasing decisions. In this study, a marketing framework is developed to connect the cue clarity and diagnosticity of repairability signals with perceived traceability assurance, trust in the re-commerce platform and the intention to buy circular fashion, as well as circular fashion purchase behaviors. Greenwashing skepticism and data-privacy concern are incorporated as boundary conditions that may influence consumer response to digital product passport information. A quantitative, explanatory, cross sectional survey was conducted among 411 fashion consumers and analysis using a PLS-SEM procedure, which involves evaluating the reliability and validity of the measurement, as well as the explanatory power and hypothesis relationships among online fashion consumers. The findings indicate that the digital product passport cue clarity and repairability signal diagnosticity positively influence perceived traceability assurance, which subsequently increased re-commerce platform trust and circular fashion purchase intention. The result also shows the greenwashing skepticism negatively affect purchase intention, while the data privacy concern weakens the positive effect of Digital product passport cue clarity on perceived traceability assurance. The Study contributes to sustainable marketing literature by demonstrating how transparent Digital Product passport information can enhance consumer credence and promote circular fashion consumption.

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1. Introduction

The global fashion industry is often regarded as one of the most resource-intensive industries, as it is characterized by high material flow, short product life cycles, and consumption that is mostly based on disposing of products (Niinimäki et al., 2020; Todeschini et al., 2017). In response to this pressure, Bocken et al. (2016), Ellen MacArthur Foundation (2017), and Tukker (2015) urge a change in fashion where durability, repair, resale, reuse, recycling and product-service alternatives are encouraged in preference to a one-way product-service life cycle. Marketing research has thus moved beyond the basic models of eco-attitude to examining consumer response to sustainable marketing cues considered credible, product life-extension value and circular service trust in the purchasing process (McNeill & Moore, 2015; Vehmas et al., 2018; White et al., 2019).

The Digital Product Passport (DPP) is emerging as a key circularity tool—thanks to its ability to link a physical product to digital information on where the product comes from, its materials, usage, reparability, reusability, and end-of-life processing and treatment (Adisorn et al., 2021; European Parliament, 2024; European Union, 2024). The European Union Eco-design for Sustainable Products Regulation governs the legal foundation for the eco-design requirements and information about products in the product-passport (European Union, 2024). However, there is also a perspective on the effectiveness of applying DPs to textile products, where it is suggested that if information is standardized, secure and user-relevant, DPs can help to increase traceability, transparency and circularity in textile value chains (European Parliament, 2024). Recent studies identify Digital Product Passports as a critical innovation for advancing circular economy practices by improving product transparency across the product lifecycle (Becchi et al., 2026; Dietrich, 2025).

While Digital Product Passports are typically considered as compliance infrastructure, this consumer-facing aspect is also a marketing concern as the cue must be noticeable, interpretable and trusted by consumers in order to be effective (Connelly et al., 2011; Wells et al., 2011). According to signaling theory, observable signals will lessen the information asymmetry when the product

quality is unobservable, such as sustainability impact or repairability (Kirmani & Rao, 2000; Spence, 1973). For example, the quality of a website, information richness and trust cues can impact product quality perception and purchase intention in digital commerce, meaning product-passport clarity could function as a sustainability signal in fashion retail websites (Gefen et al., 2003; Pavlou, 2003; Wells et al., 2011).

The lack of research is significant because although previous sustainable fashion studies have investigated attitudes, environmental concerns, ethical orientation and price barriers, a smaller number of studies has investigated Digital Product Passport cue clarity, repairability signal diagnosticity and re-commerce trust as marketing-related concepts that are connected (Gleim et al., 2013; McNeill & Moore, 2015; Zhao & Liu, 2025). Although authentication and product-history information provided via DPs could mitigate the uncertainty in re-commerce markets (Slaton, 2025), the use of DPs in secondary luxury and resale contexts is still largely underdeveloped. It also mentions how research on Digital Product Passports has focused on the regulatory aspects more than on circular value creation, providing a space for consumer-behaviors studies to test the impact of digital transparency on purchase decisions (Dietrich, 2025).

Circular fashion is chosen as the context for this article, as apparel products are visible, identity linked and frequently resold, whilst green claims in the sector are often challenged by consumers and regulators (Adamkiewicz et al., 2022; Belk, 1988; Wiederhold & Martinez, 2018). Consumer doubts about greenwashing may undermine intentions to buy a sustainable product when they feel that the company is misrepresenting its environmental performance or statements are ambiguous (Nyilasy et al., 2014; Mohr et al., 1998; Chen & Chang, 2013). In addition, data-privacy concern can contribute to consumer resistance to the use of digital systems as shoppers may not want to scan or use a passport when they do not understand how their information is being utilized (Aguirre et al., 2015; Malhotra et al., 2004; Martin & Murphy, 2017).

Engagement needs to have transparency in product information, trust in the sustainability of such products, and trust in digital platforms. However, the fear

of greenwashing and security in the data can impact the trust of the consumers in the circular fashion products, limiting their readiness to purchase such products using Digital Product Passports (White et al., 2019; Park & Lin, 2020; Adamkiewicz et al., 2022; Martin & Murphy, 2017; Becchi et al., 2026; Zhao & Liu, 2025). Lopes et al. (2024) found that most DPP studies focus on technological architecture, data requirements, and supply-chain implementation, while consumer-focused research remains limited. Similarly, Voulgaridis et al. (2024) emphasized that DPPs can support circularity by providing lifecycle, repair, and maintenance information. Zhao and Liu (2025) showed that technological awareness, perceived usefulness, and sustainability values influence consumers' acceptance of DPPs. Jeganathan et al. (2025) further suggested that integrating DPP information into retail experiences may help reduce the sustainable fashion attitude–behaviors gap. More recently, Becchi et al. (2026) found that consumers value DPP-enabled transparency and may be willing to pay more for digitally labelled fashion products. This study addresses these gaps by testing an integrated consumer-behaviors model linking DPP cues, traceability assurance, platform trust, purchase intention, and circular purchase behaviors.

Lack of proper communication concerning the Digital Product Passport has repercussions that transcend the buying decision made by the consumer. Poor implementation of the passports will result in loss of consumer trust, loss of effectiveness of circular economy initiatives, high costs of implementing the initiative, and hampering sustainable initiatives. However, knowing the signals that consumers value is useful for companies to fully leverage the effects of the implementation of the Digital Product Passport.

2. Statement of the problem

It has become more necessary than ever before for fashion firms to implement Digital Product Passports (DPPs) because of regulations such as the European Union's Eco-design for Sustainable Products Regulation that have been implemented recently. Despite the fact that the implementation of DPPs will contribute to an increase in transparency, traceability, and circularity in the

fashion industry, many companies find it challenging to simplify the complex sustainability data in order to make it easier for consumers to understand.

Present initiatives relating to the Digital Product Passport appear to be more concerned with its technicalities than consumer perceptions. Firms have not empirically established which DPP signals build consumer trust, increase consumer traceability, and lead to circular consumption behaviors. This implies that firms may end up implementing Digital Product Passports that meet all the regulatory requirements yet do not influence consumers in any way. The attitude-behaviors gap experienced by fashion consumers when it comes to sustainable fashion can be attributed to the competition between ethical concern and price, style, convenience, brand image and habit (Diddi et al., 2019; McNeill & Moore, 2015; Wiederhold & Martinez, 2018). The important question for practical marketing is thus not: do Digital Product Passports exist? but: are the cues clearly defined so that they make traceability assurance and platform trust (Connelly et al., 2011; Wells et al., 2011) possible?

Information about repairability is particularly underutilized as a cue for consumers as many fashion messages focus on recycled content or overall sustainability instead of maintenance, spare parts and repair services and post-purchase life extension (Ellen MacArthur Foundation, 2017; Mugge et al., 2017; Van Weelden et al., 2016). This problem is relevant because it is only when customers believe that such a product can be useful throughout its entire life cycle, maintain resale value and that it can be traded in the re-commerce market without a lot of uncertainty, that they can generate value from it (Guiot & Roux, 2010; Roux & Guiot, 2008; Sheth et al., 1991). The diagnosticity of repairability signals could therefore further enhance the perceived assurance of traceability of circular claims (Kirmani & Rao, 2000; Sweeney & Soutar, 2001).

There are two resistance mechanisms that exacerbate the issue. First, greenwashing skepticism can lead to consumers' discounting of sustainability cues even when firms make more information available (Chen & Chang, 2013; Delmas & Burbano, 2011; Lyon & Montgomery, 2015). Second, data-privacy concern can lead to decreased interaction with product-passport technology, as

scanning, personalization and product-history technology might be seen as data-extractive (Aguirre et al., 2015; Martin et al., 2017; Smith et al., 1996). Credibility, repairability, trust and privacy have not been tested in a circular way in the field of marketing, which gives rise to the present framework (Slaton, 2025; Zhao & Liu, 2025).

Despite past researchers conducting investigations into issues like transparency, traceability, and sustainable consumption, there has been little effort directed towards studying the impact that digital product passport signals, combined with repairability, may have on consumers' perceptions regarding traceability assurance, trust on the re-commerce platform, intentions to make purchases, and circular shopping behavior, considering their fears of greenwashing and privacy. Recent studies have recognized Digital Product Passports (DPPs) as an important mechanism for improving product transparency, traceability, and circular economy implementation (Adisorn et al., 2021; Becchi et al., 2026; Voulgaridis et al., 2024).

However, most of the literature deals exclusively with aspects such as design, regulatory issues, and logistics of implementing DPPs; there is very little research conducted on consumers' understanding of DPPs in their buying behavior (Lopes & Barata, 2024; Zhao & Liu, 2025). Furthermore, although transparency and trust have been widely acknowledged as important determinants of sustainable consumption, the mechanisms through which DPP cue clarity and repairability information influence perceived traceability assurance, re-commerce platform trust, and circular fashion purchase behaviors remain underexplored. Existing studies have also provided limited evidence regarding the roles of greenwashing skepticism and data-privacy concern as factors influencing consumers' responses to DPP-enabled sustainability information. Addressing these gaps leads to the following research questions:

- 1) How do digital Product Passport cue clarity and repairability signal diagnosticity influence consumer's circular fashion purchase behaviors?

- 2) How do trust mechanisms and consumer resistance factors influence the relationship between Digital Product Passport cue and circular fashion purchase behaviors?

The objectives of the studies are as follows:

- 1) To examine the effects of Digital Product Passport cue clarity and repairability signal diagnosticity on perceived traceability assurance.
- 2) To investigate the role of perceived traceability assurance in building trust in re-commerce platforms and promoting circular fashion purchase intention.
- 3) To examine the influence of greenwashing skepticism and data privacy concern on consumer's response to Digital Product Passport cues.
- 4) To evaluate the effect of circular fashion purchase intention on actual fashion purchase behaviors.

3. Literature Review and Conceptual Framework

A. Signaling Theory and the Stimulus-Organism-Response Logic

According to signaling theory, information asymmetry exists in markets because buyers cannot directly observe all of the quality attributes prior to purchasing (Spence, 1973; Kirmani & Rao, 2000). Both the environmental performance and the production process and end-of-life offerings are often hard to check for the average consumer at the point of sale, making sustainability claims particularly prone to asymmetric information (Delmas & Burbano, 2011; Chen & Chang, 2013). A Digital Product Passport has the capacity to serve as a signal to provide transparency on information that is not easily available about the product, and to make the information structured and credible (Adisorn et al., 2021; European Parliament, 2024).

The stimulus-organism-response approach accounts for internal appraisal of the external store stimuli and subsequently, behavior (Bagozzi, 1986; Wells et al., 2011). In this article, "cue clarity" and "repairability" are considered as stimuli, "perceived traceability assurance" and "re-commerce trust" are considered as organismic evaluations, and "purchase intention" and "circular behaviors" are considered as responses (Connelly et al., 2011; Pavlou, 2003). This makes sense

in line with models of sustainable consumer behaviors related to cues, trust, perceived value and behaviors (Hartmann & Apaolaza-Ibáñez, 2012; White et al., 2019).

B. Circular Fashion Purchase behavior

Circular fashion purchase behaviors involve purchasing durable, second-hand, refurbished, repaired, recycled, rented or resale clothing in addition to only new fast fashion apparel (Bocken et al., 2016; Ellen MacArthur Foundation, 2017; Todeschini et al., 2017). Environmental concern is not the only factor that influences sustainable clothing consumption, as other aspects of clothing consumption such as identity, aesthetics, price, availability and social meaning (Belk, 1988; McNeill & Moore, 2015; Wiederhold & Martinez, 2018) also play a role in shaping clothing consumption. When consumers see the functional, emotional, social and conditional value in the circular option, it becomes more likely that they'll adopt circular behavior (Guiot & Roux, 2010; Sheth et al., 1991; Sweeney & Soutar, 2001).

Studies of second-hand and collaborative consumption reveal that trust, platform reliability, perceived economic value and assurance of product-condition are key factors for consumer uptake (Hamari et al., 2016; Lamberton & Rose, 2012; Roux & Guiot, 2008). Likewise, as revealed in refurbished-product research, consumers consider quality risk and uncertainty prior to accepting refurbished products and those with longer use history (Hazen et al., 2017; Mugge et al., 2017; Van Weelden et al., 2016). Digital Product Passports have the potential to mitigate these uncertainties, by connecting product identity to verifiable circular information (European Parliament, 2024; Slaton, 2025).

C. Digital Product Passport Cue Clarity

Digital Product Passport cue clarity is defined as the degree of understanding, accessibility, comparability and decision-relevance of the information in the passport for consumers (European Parliament, 2024; Zhao & Liu, 2025). Consumer expertise research indicates that the provision of information is beneficial if consumers have sufficient knowledge to process product attributes (Alba & Hutchinson, 1987). Clear cues on the interface and credible information

on the product can enhance trust and purchase intention in the ecommerce context, where consumers lack the ability to physically inspect the product (Gefen et al., 2003; Pavlou, 2003; Wells et al., 2011).

Transparency of Digital Product Passport is especially relevant in emerging markets as sustainability information may be unknown and/or technical and/or considered as a premium brand practice (Biswas & Roy 2015; Gleim et al. 2013). Passport cues can convey traceability assurance to consumers if they contain information about the origin of the product as well as the materials used and how the product can be repaired or recycled (Adisorn et al., 2021; European Parliament, 2024). So, the following hypothesis is formulated:

H1: Digital Product Passport cue clarity has a positive effect on perceived traceability assurance.

D. Repairability Signal Diagnosticity

Repairability signal diagnosticity will be defined as the perceived usefulness of repair-related information concerning the durability of the product, maintenance effort and continued value of the product (Mugge et al., 2017; Van Weelden et al., 2016). Diagnostic cues can be particularly effective when they provide consumers with an inference of unobserved quality characteristics when they are unable to assess the product directly (Kirmani & Rao, 2000; Wells et al., 2011). Repairability signals can involve care guidance, accessibility of spare parts and information on repair services, durability indicators and expected use-life information (European Parliament, 2024; Ellen MacArthur Foundation, 2017).

Circular fashion is all about consumer appreciation of the products after their first-life, information about repair and resale can make the circular benefits more tangible to the consumer (Bocken et al., 2016; Guiot & Roux, 2010). With clear signalling of repairability, consumers might feel a greater sense of transparency in product history and a decreased trust in brand's hidden weaknesses, as indicated by the extensive use of green terms and adjectives (Adamkiewicz et al., 2022; Parguel et al., 2011). So, Formulated hypothesis would be:-

H2: Repairability signal diagnosticity has a positive effect on perceived traceability assurance.

E. Perceived Traceability Assurance

Traceability assurance is the consumer perception of the possibility to follow and verify the origin of a product, its materials, the ownership of these materials and circularity claims. (Adisorn et al., 2021; European Parliament, 2024). When it comes to trust, traceability assurance is related to reducing risk in situations in which the seller is unfamiliar (Kim et al., 2008; Pavlou, 2003), or they wish to make claims with respect to sustainability, or their previous purchasing of a product (Gefen et al., 2003). Traceability assurance can help alleviate doubts about authenticity and condition/hidden defects in re-commerce (Cervellon et al., 2012; Slaton, 2025).

Trust in online platforms has been identified as a significant determinant of the intention to transact online because consumers lack the confidence in the quality of the products, the use of their information and the reliability of the sellers (Kim et al., 2008, McKnight et al., 2002, Pavlou, 2003). A product passport can then help to build trust in a re-commerce platform, verifying materials, source, and repair history and potential for resale (European Parliament, 2024; Slaton, 2025). Based on the insights, the hypothesis which is developed

H3: Perceived traceability assurance has a positive effect on re-commerce platform trust.

F. Re-commerce Platform Trust

The concept of re-commerce platform trusts denoted consumer confidence in the re-commerce platform to offer product information, fair transaction process and reliable after-sales services (Gefen et al., 2003; Kim et al., 2008). Trust is an important part of collaborative consumption as users share access or ownership of products and histories of products in an uncertain environment (Hamari et al., 2016 and Lamberton & Rose, 2012). Second-hand trust can help alleviate concerns about authenticity, hygiene, and condition and value retention (Cervellon et al., 2012; Guiot & Roux, 2010).

Trust can also transform sustainability motivation to intention as consumers are more likely to translate moral preference into purchase when the marketplace is believed (Chen, 2010; Chen & Chang, 2013). Trust in platform matters may be

particularly salient when Digital Product Passport information is accessed via a retailer, marketplace or brand app as opposed to a neutral public interface (Martin & Murphy, 2017; Pavlou, 2003). So, the hypothesis below is formulated:

H4: *Re-commerce platform trust has a positive effect on circular fashion purchase intention.*

G. Greenwashing Skepticism

Greenwashing skepticism is a lack of trust on the part of the consumer about the completeness, truthfulness and/or intent of a firm's sustainability communication (Mohr et al., 1998; Nyilasy et al., 2014). Greenwashing is when companies try to project an image of environmental friendliness through disingenuous or misleading statements made by selective, vague or exaggerated claims (Delmas & Burbano, 2011; Lyon & Montgomery, 2015). Fashion is a sensitive context, as circularity, recycled content and eco-friendly language can be symbolically leveraged without a genuine impact on the environment (Adamkiewicz et al., 2022; Niinimäki et al., 2020).

Information provided in the DPP could be dismissed by skeptical consumers if it is perceived that the brand is controlling the information, or that negative information is not disclosed or that DPP is another marketing claim (Chen & Chang, 2013; Parguel et al., 2011). As suggested by previous studies, greenwashing perception can lead to negative attitude, trust and purchase intention towards green products (Nyilasy et al., 2014; Schmuck et al., 2018). Based on the insights, the hypothesis which is developed:-

H5: *Greenwashing skepticism has a negative effect on circular fashion purchase intention.*

H. Data-Privacy Concern

Data-privacy concern is the concern of consumers regarding the collection, use, storage and sharing of their personal data in digital interactions (Malhotra et al., 2004; Smith et al., 1996). According to privacy calculus theory, consumers consider benefits before they give up information or engage in data-enabled services and also consider the perceived privacy risks (Culnan & Armstrong, 1999; Dinev & Hart, 2006). Data privacy in marketing has implications on

customer trust, effectiveness of personalization and performance of the firm as customers can react negatively to data practices that they perceive as unclear or invasive (Aguirre et al., 2015; Martin et al., 2017).

Where the primary application is sustainability transparency (European Parliament, 2024; Martin & Murphy, 2017), Digital Product Passports might involve scanning QR codes, using apps, or entering the ownership of a product, raising privacy concerns. When consumers fear tracking or have ambiguous data uses, the effect of cue clarity on perceived traceability assurance may be reduced due to consumers' attention focusing on personal risk (Aguirre et al., 2015; Malhotra et al., 2004). Thus, the following hypothesis is developed:

H6: Data-privacy concern negatively moderates the relationship between Digital Product Passport cue clarity and perceived traceability assurance.

I. Purchase Intention and Circular Purchase behaviors

Purchase intention is an individual's intention to purchase a product, and in the Fishbein and Ajzen (1975) and Ajzen (1991) reasoned-action and planned-behaviors models, it is considered an immediate predictor of behaviors. Meta-analytic evidence indicates that intentions predict behaviors, although that relationship can become weaker due to control barriers/situational constraints (Armitage & Conner, 2001; Ajzen, 2020). However, in a sustainable context, purchase intention does not always translate into action, and examples of this have been found when the price of the sustainable option is too high, when the product is not easily accessible, when the product does not fit with the style or when there is a lack of trust in the product (Diddi et al., 2019; Gleim et al., 2013; McNeill & Moore, 2015).

The implementation of Digital Product Passport in the fashion industry can help to decrease the intention-behaviors gap, as information about quality and origin, as well as the care and resale of the products, will be more easily assessed at the point of sale (European Parliament, 2024; Zhao & Liu, 2025). But intention is still a required mechanism as consumers need to be willing to scan, compare, purchase, repair or resell products first (White et al., 2019; Ajzen, 1991). Based on this, the following hypothesis is formed:

H7: Circular fashion purchase intention has a positive effect on circular purchase behaviors.

Conceptual Framework

The conceptual framework draws from signaling theory, the stimulus-organism-response logic, and the circular consumption values, to suggest how Digital Product Passport cues can affect outcomes of circular fashion purchases (Connelly et al., 2011; Sheth et al., 1991; Wells et al., 2011). The cue clarity and repairability of the DPP signal the diagnosticity that provides a greater transparency stimulus and increases the perceived traceability assurance (Adisorn et al., 2021; European Parliament, 2024). Perceived traceability assurance contributes to the build of trust in the re-commerce platforms, which in turn leads to circular fashion purchase intention and circular purchase behaviors (Kim et al., 2008; Pavlou, 2003; Slaton, 2025). First, “greenwashing skepticism” is identified as a negative predictor of the intention, and “data-privacy concern” is identified as a negative moderator between “passport clarity” and “traceability assurance” (Chen & Chang, 2013; Malhotra et al., 2004).

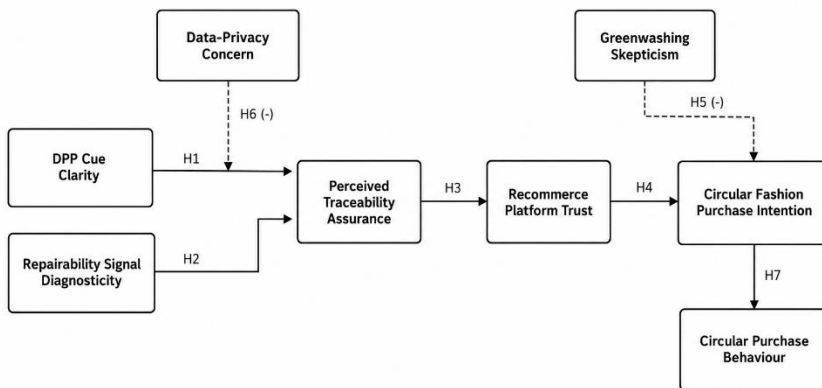


Figure 1. Conceptual Framework.

4. Methodology

A quantitative approach was adopted to empirically test the pre-proposed relationships among the constructs using statistical analysis. An explanatory design was appropriate because the study aimed to explain the relationships among theoretically established constructs based on exploring an unknown phenomenon. Although the proposed model has predictive capability, the primary objective was theory testing and explanation. A cross-sectional survey conducted because data were gained from respondents one time to test the affiliations among the respective variables. Therefore, the findings should be seen as relationships and not as direct cause-and-effect connections (Hair et al., 2019; Kline, 2016).

The target population includes the fashion consumers of Bangladesh, which are individuals aged at least 18 and fashion consumers in the context of online shopping and have purchased apparel products via online or offline retail channels within six months before being interviewed. In this study, the consumers buying fashion apparel like sustainable fashion clothes, second-hand clothing, or refurbished clothing were selected since it is expected that those consumers would have sufficient information about the sustainability of the products.

A purposive sampling strategy was applied since some requirements for eligibility had to be fulfilled by the interviewees. The minimum number of respondents was determined using the criteria related to PLS-SEM and statistical power (Hair et al., 2022). 411 valid questionnaires were retained for further analysis.

The data were collected by a questionnaire which was structured and included two parts – demographic variables and measurement variables. All variables were measured through validated scales that were adapted from the relevant literature and measured using a five-point Likert scale where 1 was “strongly disagree” and 5 was “strongly agree.” The questionnaire was first reviewed and pilot tested by experts before the main data collection process began.

Data were collected online between April 2026 and May 2026 through informed consent of the respondents. The respondents share their response voluntarily and confidentiality is maintained carefully.

The proposed model was analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) because it is appropriate for analyzing complex models containing multiple latent constructs, mediation, and

moderation effects while simultaneously assessing the measurement and structural models (Hair et al., 2022). Reliability and validity were evaluated using indicator loadings, Cronbach's alpha, composite reliability, average variance extracted (AVE), and the heterotrait–monotrait (HTMT) ratio. The structural model was assessed using bootstrapping, path coefficients, t-values, p-values, effect sizes (f^2), coefficients of determination (R^2), predictive relevance (Q^2), and variance inflation factors (VIF) to evaluate the proposed hypotheses.

4. Result

4.1. Profile of the Respondents

Total 411 valid responses were retained for analysis. The respondents comprised fashion consumers who had experienced apparel products after purchasing within the previous six months. The sample consisted of 52.1% male, 43.6% female, and 4.3% other-gender respondents. Regarding geographic distribution, most respondents were from Dhaka (43%), followed by Chattogram (11.2%), Khulna (6.1%), Sylhet (5.8%), and Rajshahi (5.4%), indicating that the survey covered respondents from multiple cities. The demographic profile is presented in the below **Table 1**.

Characteristic	Category	Frequency (n)	Percentage (%)
Country	Bangladesh	411	100
Gender	Male	214	52.1
	Female	179	43.6
	Other	18	4.3
Cities	Dhaka	177	43
	Chattogram	46	11.2
	Khulna	25	6.1
	Sylhet	24	5.8
	Rajshahi	22	5.4
	Cumilla	21	5.1
	Narayanganj	16	3.9
	Gazipur	15	3.6
	Rangpur	11	2.7
	Other cities	64	15.6

Table 1. Respondent Profile (N = 411)

4.2. Measurement Model Assessment

As reflected in Table 2, the loadings of all the indicators exceeded the required value of 0.70, which means that the values range between 0.736 and 0.852,

implying that the indicators' reliability is good. Additionally, Cronbach's alpha was between 0.723 and 0.845 while composite reliability was between 0.845 and 0.906. This shows that internal consistency is good. This reflects adequate convergent validity. All the factor loadings were above 0.70, Cronbach's alpha and composite reliability were above 0.70, and the AVE was above 0.50. All this indicates adequacy of reliability and convergent validity. Overall, the measurement model has been proved to be reliable and valid. Therefore, it is suitable to have the structural model. Findings about the measurement model have been presented in Table 1.

Construct	Item	Measurement statement	Loading Range	Cronbach's Alpha	Composite Reliability	AVE
DPP Cue Clarity	DPP1	The passport explains sustainability information in clear language.	0.812	0.820	0.893	0.735
	DPP2	The passport makes origin and material information easy to compare.	0.779			
	DPP3	The QR or NFC access point is easy to notice and use.	0.801			
Repairability Signal Diagnosticity	RSD1	Repairing information helps me judge how long the product can last.	0.824	0.807	0.885	0.719
	RSD2	Spare-part or repair-service information increases my confidence.	0.791			
	RSD3	Care and repair instructions are useful for purchase evaluation.	0.804			
Perceived Traceability Assurance	PTA1	The passport makes the product's origin verifiable.	0.846	0.845	0.906	0.762
	PTA2	The passport shows enough evidence about the supply chain.	0.821			
	PTA3	The passport helps confirm sustainability claims.	0.829			
Greenwashing Skepticism	GWS1	I am skeptical of fashion brands' sustainability claims.	0.818	0.808	0.886	0.721
	GWS2	I suspect many green fashion claims overstate real benefits.	0.785			
	GWS3	I look for independent proof before trusting green claims.	0.792			
Data-Privacy Concern	DPC1	I worry that passport scans may collect personal data.	0.807	0.790	0.877	0.704
	DPC2	I avoid scanning when data-use information is unclear.	0.772			
	DPC3	I prefer product information without personal tracking.	0.789			
Re-commerce Platform Trust	RPT1	I trust the platform to verify product history.	0.852	0.842	0.905	0.760
	RPT2	I trust the platform provides fair product-conditioning details.	0.836			
	RPT3	I trust the platform handles circular-fashion transactions fairly.	0.812			
Circular Fashion Purchase Intention	CFPI1	I intend to buy fashion products with transparent circular information.	0.844	0.824	0.895	0.739
	CFPI2	I would pay a modest premium for a verified circular fashion product.	0.823			
	CFPI3	I would recommend passport-enabled circular fashion to others.	0.801			
Circular Purchase Behaviour	CFPB1	I buy second-hand, repaired, refurbished or resale fashion products.	0.778	0.723	0.845	0.645
	CFPB2	I check product information before making fashion purchases.	0.747			
	CFPB3	I repair, resell or donate usable clothing instead of discarding it.	0.736			

Table 2. Factor Loading and Reliability Table

Figure:2 Structural Equation Modeling (SEM) Path for circular Fashion Purchase drivers.

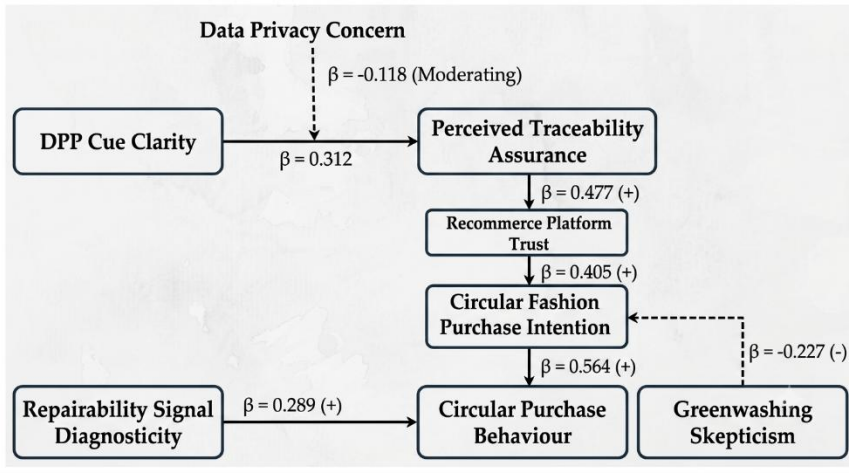


Figure 2, shows the results of the structural model assessment. Cue clarity of digital product passport (DPP) had a positive impact on traceability assurance ($\beta = 0.312$). In simpler terms, high cue clarity of the digital product passport contributes to higher traceability assurance perception. Similarly, diagnosticity of the repairability signal had a positive effect on traceability assurance ($\beta = 0.289$). Increased traceability assurance in turn contributed to trust in the re-commerce platform ($\beta = 0.477$), which in turn had a positive impact on purchase intention of circular fashion products ($\beta = 0.405$). Greenwashing skepticism had a negative impact on purchase intention ($\beta = -0.227$), indicating that greenwashing skepticism negatively impacts consumers' purchase intention of circular fashion products. Furthermore, data privacy concern had a negative moderating impact on the relationship between DPP cue clarity and traceability assurance ($\beta = -0.118$). Finally, purchase intention of circular fashion had the highest positive impact on circular purchase behavior ($\beta = 0.564$).

5. Discussion

The results of this study empirically validate the impact of DPP cues on consumer trust and purchasing behaviors in the circular fashion industry market. All the seven formulated hypotheses were empirically validated, confirming that

transparent product information, repairability, trust and perception are important things which articulate the circular fashion purchasing behavior of consumers.

From the results, DPP cue clarity was found to have a significant positive influence on traceability assurance ($\beta = 0.312$, $p < 0.001$), hence validating hypothesis one. The above result means that consumers are assured of the traceability and authenticity of the circular fashion products through DPP information cues that are clearly presented. With clear information about product origin, composition, and sustainable attributes, there is less information asymmetry and consequently better-informed decisions by consumers in their purchases. This finding confirms the Signaling theory which states that credible and observable signals minimize uncertainties in information asymmetry markets (Spence, 1973; Connelly et al., 2011). It is also in line with other studies that show that transparent digital information cues increase consumer trust and confidence in sustainable consumption (Gefen et al., 2003; Wells et al., 2011; Becchi et al., 2026; Zhao & Liu, 2025).

Furthermore, it is found that repairability signal diagnosticity positively impacts traceability assurance perception ($\beta = 0.289$, $p < 0.001$), thus validating hypothesis H2. It seems like consumers perceive repair manuals, spares, and maintenance data as trustworthy signals concerning the quality and durability of a product. In contrast to generic sustainable claims, repairability information gives tangible proof of high-quality circular product. This result is consistent with earlier studies which show that repairability is one of the factors determining consumer attitude towards circular products (Mugge et al., 2017; Van Weelden et al., 2016). Furthermore, this result supports findings of recent Digital Product Passport researches proving that consumers are more interested in informative claims rather than symbolic environmental claims (Dietrich, 2025; Becchi et al., 2026).

Among all antecedents, the traceability assurance was found to have a significant positive impact on re-commerce platform trust ($\beta = 0.477$, $p < 0.001$), thus proving Hypothesis 3. This implies that the trust in product information is transferred by the consumers to the podium itself. Differently said, if the

customers find the information credible and verifiable, they will trust the digital platform. This result is in line with the extant literature on digital trust where the concept of trust is seen as developing based on credibility of information (McKnight et al., 2002; Kim et al., 2008; Pavlou, 2003).

The results further demonstrate that re-commerce platform trust positively and significantly predicts circular fashion purchase intention ($\beta = 0.405$, $p < 0.001$), which supports H4. This implies that trust remains an essential requirement for consumers when they think about buying second-hand and circular fashion products. Trust enables consumers to be more willing to purchase because they have confidence in the verification process of the products offered in the platform, the descriptions of those products, and the transaction process itself. These findings align with other studies that have shown how trust minimizes perceived risks and encourages consumers to make sustainable purchase decisions (Gefen et al., 2003; Kim et al., 2008). In addition, the insights donate to the contemporary literature related to Digital Product Passport by sharing corroboration that transparent information about the product can build trust and result in increased purchase intentions for circular fashion products. As expected, greenwashing skepticism decreases circular fashion purchase intention ($\beta = -0.227$, $p < 0.001$), which supports H5. This finding supports previous greenwashing research showing that exaggerated or misleading environmental claims reduce consumer trust and increase perceived risk (Chen & Chang, 2013; Nyilasy et al., 2014; Adamkiewicz et al., 2022). The result suggests that Digital Product Passports alone are insufficient unless the information they provide is perceived as credible and independently verifiable.

This moderation effect suggests that data privacy concern negatively impacts the strength of the positive association between Digital Product Passport cue clarity and perceived traceability assurance ($\beta = -0.118$, $p = 0.008$). Thus, the research hypothesis (H6) is supported. Even though this result shows the weakest effect among all of the associations presented in the structural model, it proves that data privacy concerns can be considered one of the barriers for consumer usage of digital transparency technologies. The consumers will most likely avoid any

interaction with QR codes or Digital Product Passports, which they do not understand in terms of the collection or use of their data. This conclusion supports Privacy Calculus Theory (PCT) and findings of other researchers, who have shown that data privacy concerns limit consumers' usage of digital technology (Dinev & Hart, 2006; Martin & Murphy, 2017).

Ultimately, circular fashion purchase intention was found to be the best predictor of circular fashion purchase behavior ($\beta = 0.564$, $p < 0.001$), proving H7. This means that consumers' behavioral intention is effectively converted into actions through the development of positive attitudes and trust. The findings are in line with the Theory of Planned Behaviors (Ajzen, 1991, 2020), where behavioral intention is seen as the most immediate predictor of behavior. Also, previous research on sustainable consumption has suggested that higher levels of purchase intention lead to increased engagement in circular consumption (Park & Lin, 2020; White et al., 2019).

Overall, the findings reveal a sequential trust-building mechanism within the proposed framework. Digital Product Passport cue clarity and repairability information enhance perceived traceability assurance, which strengthens trust in re-commerce platforms and subsequently increases consumers' intention to purchase circular fashion products. This intention ultimately translates into actual circular purchase behaviors. At the same time, greenwashing skepticism and data privacy concern weaken consumers' responses to transparency initiatives, indicating that information quality alone is insufficient without credibility and privacy protection. These findings contribute to the emerging Digital Product Passport literature by providing empirical evidence that transparent, credible, and privacy-conscious digital information systems can effectively promote consumer participation in the circular fashion economy.

6. Implications of the study

This paper contributes to the body of knowledge about DPPs and circular fashion by indicating that DPP cue clarity and repairability serve as vital elements of digital transparency which contribute to consumers' perception of traceability

assurance, increase their trust toward re-commerce platforms, and motivate circular fashion purchasing intentions and behavior. Also, the findings reveal that greenwashing skepticism and data privacy concerns negatively affect the impact of digital transparency, emphasizing the significance of incorporating the notions of trust and privacy into consumer decision-making frameworks.

The findings have important implications for fashion brands and re-commerce platforms. First of all, companies should create Digital Product Passports providing sufficient information about the sustainability aspects of their products, including repair guidance and history of ownership. Re-commerce platforms should incorporate the information from DPPs into authenticity verification, condition reports, and return policies encouraging circular purchases. Secondly, brands should avoid greenwashing by providing credible sustainability information and communicating their data privacy policies to consumers.

The findings also have policy implications. Policymakers should promote standardized and consumer-friendly Digital Product Passport systems that improve transparency, comparability, and credibility across the fashion industry. Regulations should support independent verification of sustainability information and incorporate robust data privacy safeguards to strengthen consumer trust and facilitate the broader adoption of circular fashion practices.

7. Conclusion

The current research presents an analysis of the marketing concept constructed based on the impact of cues for Digital Product Passport on purchase intention of products by means of the circular fashion and real purchase actions. It has been found out that cues for the passport and reparability of the product improve traceability and, therefore, increase consumer trust in the re-commerce platform. The result also suggests that skepticism about greenwashing and privacy concerns can undermine the response to digital sustainable marketing systems; this means credibility and privacy are key components of sustainable marketing strategy.

These findings support the arguments that transparent, credible and easy interpretable product details take a crucial role in minimizing the details asymmetry and building consumer trust in circular fashion markets. The study extends signaling theory by demonstrating that Digital Product Passport functions as credible market signals that improve consumer confidence and encourage sustainable purchasing decisions. It also highlights that transparency alone is insufficient unless supported by trustworthy sustainability claims and effective privacy protection.

In this study, we investigated the effect of DPP cues on circular fashion purchase intention and behavior. Our research showed that cue salience and repairability information have significant positive effects on traceability assurance perception, which further results in building trust in re-commerce and purchase intention of circular fashion products. Purchase intention then proved to be the most important determinant of circular purchase behavior. Additionally, it was found that greenwashing skepticism and privacy concerns reduce consumers' response to digital transparency.

Overall, this study provides empirical evidence that Digital Product Passports can serve as both regulatory and marketing tools for promoting circular fashion adoption. By integrating transparency, trust, and consumer resistance factors into a single framework, the study contributes to the growing literature on sustainable consumer behaviors and offers valuable insights for researchers, practitioners, and policymakers. Future research may validate the proposed model using longitudinal data, different cultural contexts, and additional consumer or technology-related factors to further strengthen the generalizability of the findings.

8. Limitations and Future Research Directions

Across-sectional survey design is a limitation in this study as this design cannot prove a long-term change in behaviors or repeated participation in a circular fashion over time. Future studies will require using longitudinal designs, field experiments and platform transaction data to examine whether DPPs had an

impact on the actual behaviors of scanning, repairing, reselling and buying. Comparative analyses across countries, product types and age groups would also clarify whether ample discrepancies in the impact of passport clarity across markets with different digital literacy levels, and across markets with different levels of regulation or sustainable fashion awareness.

Future studies should also examine other moderators like price sensitivity, fashion involvement, environmental identity, technology readiness, and perceived authenticity as the factors that influence buying circular fashion products are related to functional, emotional, social and ethical values. Experimental studies might be able to tease out some combinations of cues that lower greenwashing skepticism and boost consumer trust, such as the independent verification seals and the complexity of privacy notices and product-passport interface. Mixed-method studies might also be able to identify consumers' interpretation of the information on their passport when they are actually shopping, particularly when sustainability objectives are competing with price, style and convenience.

Statements Regarding Generative AI and AI-Enhanced Software for Text Creation: The authors used Grammarly to check the language and ChatGPT (by OpenAI) to improve text clarity. All the AI recommendations have been thoroughly reviewed and edited by the authors. The authors are responsible for the resulting text of the manuscript.

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