



CLOTHING AND ECO LABELS, AND THE DIGITAL PRODUCT PASSPORT: INSIGHTS INTO CONSUMER BEHAVIOUR

Scientific paper
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ABSTRACT: The fashion and textile industry faces significant environmental challenges. In the transition toward a circular economy, clothing labels and eco-labels play an important role in communicating sustainability information to consumers. To further enhance transparency, the European Union is introducing Digital Product Passports (DPPs), which provide detailed information on product life cycles.

This study examines Slovenian consumers' perceptions of clothing labels, eco-certifications, and DPPs, as well as their influence on purchasing decisions. A quantitative online survey explored shopping habits, attention to clothing label information, awareness of eco-certifications, and attitudes toward the adoption and use of DPPs. The results show that consumers check clothing labels and express interest in sustainability-related information. Awareness of eco-certifications and DPPs is present but varies across respondents, while attitudes toward digital product information are generally positive, although often neutral. The findings suggest that the DPP has potential to improve transparency and access to product information, depending on consumer awareness and the clarity of information provided.

Keywords: Clothing labels, Eco labels, Consumer behaviour, Sustainable consumption, Purchasing behaviour, Digital Product Passport (DPP).

OZNAKE NA ODEĆI, EKOLOŠKE OZNAKE I DIGITALNI PASOŠ PROIZVODA: PERCEPCIJE I PONAŠANJE POTROŠAČA

APSTRAKT: Modna i tekstilna industrija suočavaju se sa značajnim ekološkim izazovima. U tranziciji ka cirkularnoj ekonomiji, oznake na odeći i ekološke oznake imaju važnu ulogu u prenošenju informacija o održivosti potrošačima. Kako bi se dodatno unapredila transparentnost, Evropska unija uvodi digitalne pasoše proizvoda (Digital Product Passports – DPPs), koji pružaju detaljne informacije o životnom ciklusu proizvoda.

Ova studija ispituje percepcije slovenskih potrošača o oznakama na odeći, ekološkim sertifikatima i DPP-u, kao i njihov uticaj na odluke o kupovini. Kvantitativno online istraživanje obuhvatilo je navike kupovine, obraćanje pažnje na informacije na oznakama odeće, svest o poznavanju ekoloških sertifikata i stavove prema usvajanju i korišćenju DPP-a. Rezultati pokazuju da potrošači proveravaju oznake na odeći i izražavaju



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interesovanje za informacije povezane sa održivošću. Svest o eko-certifikatima i DPP-u je prisutna, ali varira među ispitanicima, dok su stavovi prema digitalnim informacijama o proizvodima uglavnom pozitivni, iako često neutralni. Nalazi ukazuju na to da DPP ima potencijal da poboljša transparentnost i pristup informacijama o proizvodima, u zavisnosti od svesti potrošača i jasnoće ponuđenih informacija.

Ključne reči: Oznake na odeći, ekološke etikete, ponašanje potrošača, održiva potrošnja, kupovno ponašanje, digitalni pasoš proizvoda (DPP).

1. INTRODUCTION

The fashion and textile industry represents a significant global sector with considerable economic, environmental, and social impacts. Production and consumption in this industry involve intensive use of natural resources, high energy demand, water pollution, and substantial textile waste. The rise of fast fashion has further accelerated clothing turnover and shortened product lifespans, increasing the overall environmental footprint [1–3]. In response, increasing attention has been directed toward more sustainable production and consumption practices, including improved durability, recyclability, and enhanced supply chain visibility [2, 3].

Clothing labels serve as an important communication tool between producers and consumers, providing key product information such as size, material composition, care instructions, and origin [4]. Beyond their traditional role, clothing labels increasingly incorporate sustainability-related information, such as eco-labels and environmental certifications, as well as information related to environmental and ethical aspects of production and supply chains. However, the effectiveness of such information depends on consumer understanding, trust, and willingness to integrate it into purchase decisions [5–7]. Recent research on Slovenian consumers indicates a generally positive attitude toward eco-friendly textile products, with labels such as “product with certificate” identified as important factors influencing purchase decisions [8]. However, empirical evidence suggests that although eco-labels are recognized, they are not consistently the primary determinant of purchasing decisions, which are often driven by price, quality, and design [5, 9]. Similarly, international studies report that consumer understanding and trust in eco-labels remain limited due to label proliferation, lack of standardisation, and difficulties in interpretation [6, 7, 10]. Consequently, while eco-labels have the potential to encourage sustainable purchasing behaviour, their actual impact is often constrained without clear communication, standardisation, and consumer education [6, 10].

To address these challenges, the European Commission has introduced the EU Strategy for Sustainable and Circular Textiles (COM(2022) 141 final), which includes the implementation of Digital Product Passports (DPPs) [2]. According to the European Parliamentary Research Service, DPPs are expected to enhance traceability, product-level information access, and circularity in the textile value chain by providing digital access to data such as materials, production processes, and lifecycle information [11]. Digital



Product Passports have recently gained increasing attention in EU policy, academic research, and industry practice. Emerging empirical evidence suggests that DPPs may improve consumer confidence and support more sustainable purchasing decisions, although research remains in an early stage [12-14]. Industry perspectives further highlight that DPPs can provide consumers with detailed sustainability-related information, including material origin and environmental impact data, thereby strengthening product-level information accessibility across the product lifecycle [15].

Nevertheless, empirical research on consumer awareness, acceptance, and willingness to use DPPs in the textile sector remains limited. Building on this gap, this study investigates Slovenian consumers' perceptions of clothing labels, eco-certifications, and Digital Product Passports, as well as their influence on purchasing decisions.

2. RESEARCH DESIGN AND METHODOLOGY

This study employed a quantitative research design using a structured online questionnaire to examine Slovenian consumers' perceptions of clothing labels, eco-certifications, and Digital Product Passports (DPPs). The study investigated shopping habits, attention to clothing labels, awareness of eco-labels, and willingness to use DPPs.

Table 1: Demographic characteristics of respondents

Variable	Category	Frequency	Percent (%)
Gender	Male	12	9.3
	Female	113	87.5
	Other / Prefer not to say	4	3.2
Age	18–25	35	27.1
	26–35	16	12.4
	36–50	43	33.3
	51–65	31	24.0
	65+	4	3.1
Education	Primary / Secondary	0	0
	Vocational / Technical	40	31.0
	University / Higher Education	56	43.4
	Master's / PhD	29	22.5

A convenience sample of Slovenian consumers was recruited through online platforms and social media. No personally identifiable data were collected, and respondents provided informed consent prior to participation. The sample included respondents of different ages, genders, education levels, employment statuses, and regions of residence. A total of 129

respondents participated in the survey. Table 1 presents the demographic characteristics of the respondents.

The questionnaire consisted of four sections: demographics; shopping behaviour (purchase frequency, preferences for sustainable materials, shopping channels, and key purchase factors); clothing labels and eco-information (awareness, understanding, importance, and attitudes towards sustainability-related information measured using a 5-point Likert scale); and Digital Product Passports (awareness, attitudes, and willingness to use). Data were collected over a five-week period (20 March–24 April 2026) through an online survey. After the completion of the survey, the collected data were analysed using descriptive statistical methods, including frequency analyses and cross-tabulations.

3. RESULTS AND DISCUSSION

The sample characteristics are presented in Table 1. The sample consisted of 87.5% female and 9.3% male respondents, with the remaining percentage comprising other or non-disclosed categories. The largest age group was 36–50 years (33.3%), followed by respondents aged 18–25 years (27.1%). In terms of education, most respondents had completed university or higher education (43.4%).

The first part of the analysis examined respondents' clothing purchasing habits, including shopping channels, purchase frequency, use of online and second-hand markets, purchases of organic or sustainable clothing, and key purchase decision factors. Figure 1a presents the frequency of clothing purchases among respondents. Most respondents purchased clothing several times per year (51.2%), followed by monthly purchases (19.4%) and seasonal purchases (16.3%). Infrequent purchasing was reported by 12.4% of respondents, while only 0.8% reported purchasing clothing weekly. Overall, the results indicate that clothing purchases are generally occasional rather than frequent.

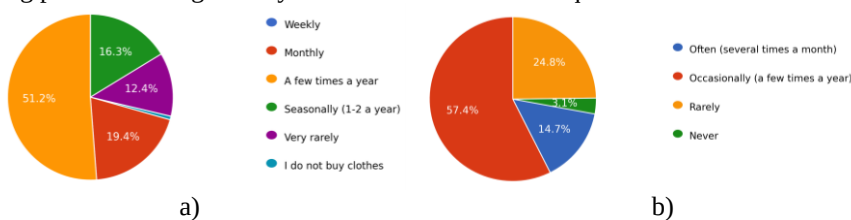


Figure 1: Frequency of clothing purchases:

(a) General clothing purchases and

(b) Purchases of clothing made from organic or other ecological or sustainable materials

Purchases of clothing made from organic or other ecological or sustainable materials

Figure 1b presents the frequency of purchasing clothing made from organic, ecological, or other sustainable materials. Most respondents reported purchasing such garments several times per year (57.4%), followed by rare purchases (24.8%) and frequent purchases, defined as several times per month (14.7%). Only 3.1% reported never purchasing such items. These findings suggest that sustainable clothing is already part of respondents'

purchasing behaviour; however, for most respondents, such purchases remain occasional rather than regular.

Figure 2 presents respondents' clothing purchasing channels (multiple responses allowed). The most frequently used channel is stores selling new clothing (69.8%), followed by online shopping (62.0%). Outlet stores are used by 19.4% of respondents, while 3.1% shop in luxury fashion stores. Second-hand consumption is also present, including physical second-hand stores (41.1%), online second-hand platforms (22.5%), and clothing swap events (9.3%). A small number of respondents reported making or exchanging clothing themselves.

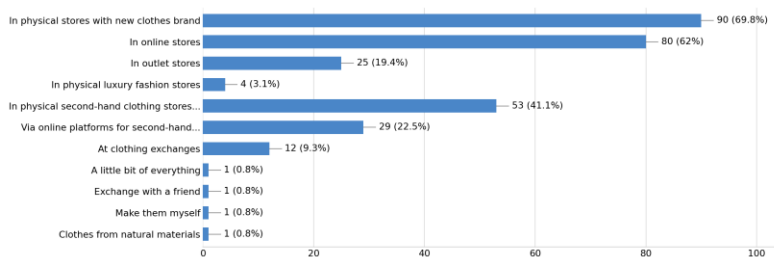


Figure 2: Clothing purchasing channels

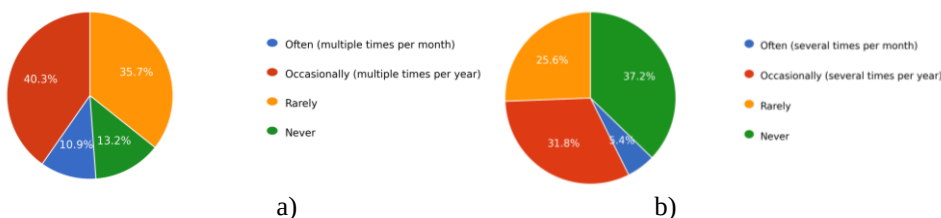


Figure 3: Frequency of clothing purchases by channel: (a) Online stores and (b) Second-hand stores or online second-hand platforms

Figure 3a shows the frequency of online clothing purchases among respondents. Most respondents purchase clothing online occasionally, defined as several times per year (40.3%), followed by rare purchases (35.7%) and no online purchases (13.2%). Frequent online shopping, defined as several times per month, was reported by 10.9% of respondents. Figure 3b presents the frequency of purchasing second-hand clothing through physical or online platforms. A total of 37.2% of respondents do not engage in second-hand shopping, while 31.8% purchase second-hand clothing occasionally (several times per year), 25.6% do so rarely, and 5.4% purchase second-hand clothing frequently (several times per month). Overall, online clothing shopping is more widespread, while second-hand purchasing is less frequent and includes many non-users.

Figure 4 presents the factors respondents consider most important when purchasing clothing. Material quality and quality of workmanship are the most important factors for 44.2% of respondents, followed by comfort and fit (23.3%). Design, cut, and colour are

prioritised by 18.6%, while price is the key factor for 7.0% of respondents. Sustainability and ecological materials are identified as the primary consideration by 3.9% of respondents. Overall, the results indicate that functional and quality-related aspects are prioritised over price and sustainability in clothing purchase decisions.

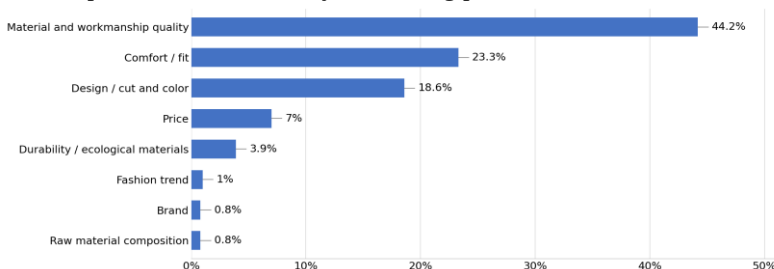


Figure 4: Key factors in clothing purchase decisions

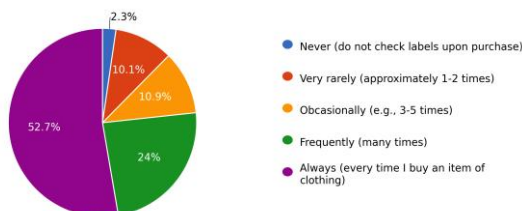


Figure 5: Frequency of checking clothing labels during purchase

The second part of the analysis examines clothing and eco/sustainability labels, including attention to label information, key and missing information, and familiarity with and trust in certifications. Figure 5 presents how often respondents check clothing label information when purchasing garments. Most respondents reported always checking labels (52.7%) or doing so frequently (24.0%), followed by occasional checking (10.9%). Very rare checking was reported by 10.1%, while only 2.3% never check labels. Overall, the results indicate that clothing labels are an important source of information in the purchasing process.

Figure 6a shows the types of information respondents usually read on clothing labels (multiple responses allowed). Fibre composition is the most frequently consulted information (89.9%), followed by size (72.9%) and care instructions (69.8%). Manufacturer and country of production are considered by 44.2% of respondents, while 36.4% pay attention to sustainability information or certifications. Warnings and recommendations (28.7%), additional material information (20.9%), and brand name (17.8%) are selected less frequently. Figure 6b presents the information on clothing labels considered most important in purchase decisions (multiple responses allowed). Material composition is by far the most important factor (93.8%), followed by care instructions (45.0%). Sustainability labels and certifications influence 27.1% of respondents, while 24.0% consider origin and ethical production. Brand name (11.6%) and size (0.8%) are least important.

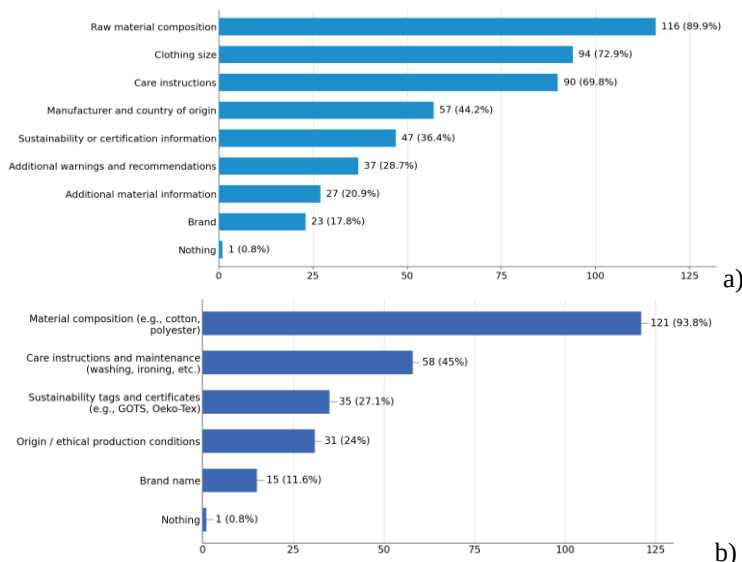


Figure 6: Clothing label information: (a) Information read and (b) Information considered most important

The analysis also examined missing information on clothing labels and label-related discomfort. Most respondents reported a lack of information on ethical production (67.4%), followed by sustainability-related details such as recycled or organic materials and certifications (45.7%), and more detailed material properties, such as wrinkle resistance, water repellence, etc. (39.5%). Additionally, 27.9% indicated that clothing labels should provide more specific care instructions, such as washing garments inside out and air-drying only, etc. Overall, respondents expect more transparent and detailed information regarding sustainability, production practices, material characteristics, and garment care. In addition, 96.9% (125 of 129 respondents) reported removing clothing labels due to discomfort, mainly because of itching (92.9%) and thickness or bulkiness (42.1%). Open-ended responses further highlighted issues such as oversized or poorly placed labels, excessive translations, visibility through lighter fabrics, and too many labels attached to a single garment.

Respondents were asked how often they check whether clothing materials are sustainable, organic, or certified with eco/sustainability labels. As shown in Figure 7a, 34.1% sometimes check this information, 30.2% always do, 28.7% rarely do, and 7.0% never do. Responses indicate a varied level of attention to sustainability-related information in purchasing decisions. Figure 7b presents respondents' familiarity with ecological and sustainability labels. Most respondents (65.1%) report partial familiarity, while 17.1% report good familiarity and 17.8% are not familiar at all.

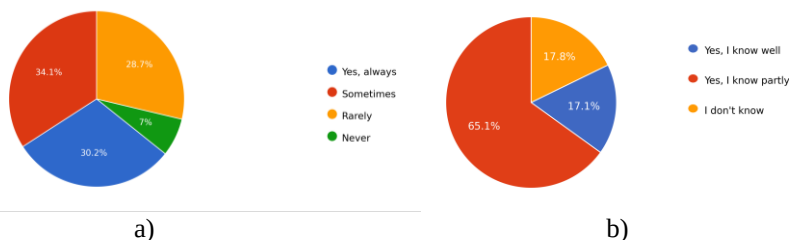
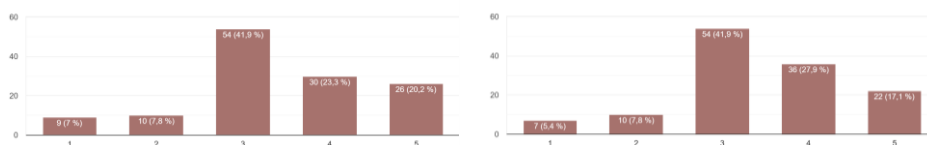


Figure 7: Sustainability information on clothing: (a) Checking information and (b) Familiarity with eco labels

The survey also examined respondents' familiarity with ecological, sustainability, and other clothing-related labels (multiple responses allowed). The most recognized label was OEKO-TEX Standard 100 (68.2%), followed by the EU Ecolabel (58.1%), OEKO-TEX Made in Green (45.7%), and the Global Organic Textile Standard (GOTS) (43.3%). Lower recognition was observed for the Blue Angel (23.3%) and Better Cotton (20.9%), while 10.1% reported no familiarity with any ecological labels. Familiarity with additional sustainability certifications was also assessed. Fair Trade/Fair Wear Foundation was recognized by 57.4% of respondents, followed by the Global Recycled Standard (30.2%), Cradle to Cradle Certified™ (20.9%), and Bluesign® (11.6%). A total of 26.4% were not familiar with any of these certifications.

Respondents were also asked about their level of trust in sustainability labels and ecological certifications on clothing (1 = no trust, 5 = complete trust). Most respondents reported moderate trust (47.3%), followed by high trust (29.5%) and complete trust (10.9%). Lower levels of trust were reported by 8.5%, while 3.9% reported no trust. Overall, trust in sustainability labels is generally positive but cautious. In addition, respondents were asked whether clearer sustainability information and eco-labels would influence their decision to purchase sustainable clothing. The majority indicated that they would probably be influenced (43.4%), followed by those who were unsure (24.8%). A further 22.5% stated that they would be influenced, while 8.5% reported that they would probably not be influenced. Overall, improved clarity and visibility of sustainability information could positively influence consumers' purchasing decisions, although a considerable share of respondents remains uncertain. The study also revealed that consumers express a notable willingness to pay more for garments made from sustainable materials with eco-labels. Specifically, a substantial majority are willing to pay extra for verified eco-friendly products: 39.5% would pay 10–20% more, 18.6% up to 10% more, and 16.3% between 20–30% more. Furthermore, 8.5% indicated they would not pay anything extra, while another 8.5% would be willing to pay 30–50% more, and 5.4% would pay over 50% more. The next section focused on the Digital Product Passport (DPP) for clothing. Slightly more than half of respondents (55.8%) reported that they were not familiar with the concept, while 44.2% indicated that they had previously heard of the DPP. Respondents most frequently reported having heard about the DPP at events, workshops, or conferences (18.6%) and in the workplace (17.8%). This was followed by websites or news portals

(11.6%) and social media (9.3%). Fewer respondents reported having encountered the concept through education (8.5%), clothing brands (5.4%), or friends and family (3.9%). Furthermore, 34.1% of respondents reported having encountered a QR code on clothing providing product-related information, while 65.9% had not. Despite this limited experience, interest in QR-based digital information is relatively high, as 73.6% indicated that they would scan a QR code if it replaced traditional labels and provided all relevant product information, whereas 26.4% would not. Respondents were also asked about their likelihood of scanning a DPP when purchasing clothing. Most reported that they would be very likely (34.9%) or likely (27.9%) to do so, while 20.2% indicated that they might scan it. A smaller proportion reported that they would be unlikely (11.6%) or very unlikely/not willing (5.4%) to engage with it.



a)

b)

Figure 8: Attitudes toward the Digital Product Passport (DPP):
(a) Sustainable purchase decisions and (b) Trust in eco-certifications

Figure 8a presents respondents' attitudes toward the DPP in supporting more sustainable clothing purchase decisions (1 = strongly disagree, 5 = strongly agree). Responses were distributed with a neutral majority (41.9%), followed by agreement (23.3%) and strong agreement (20.2%), while 7.8% disagreed and 7.0% strongly disagreed. Figure 8b presents respondents' perceptions of whether a DPP would increase their trust in eco-certifications and labels on clothing. Responses were similarly distributed, with a neutral majority (41.9%), followed by agreement (27.9%) and strong agreement (17.1%), while 7.8% disagreed and 5.4% strongly disagreed. Respondents were also asked to what extent they agree that information on a DPP would be useful in making purchase decisions (1 = strongly disagree, 5 = strongly agree). Responses showed a neutral majority (34.9%), followed by agreement (34.1%) and strong agreement (20.2%), while 6.2% disagreed and 4.7% strongly disagreed. Overall, across all three statements, responses indicate a general tendency toward agreement, although a substantial proportion of respondents remained neutral.

Respondents were asked which types of information they would like to access digitally via a Digital Product Passport (multiple responses allowed). The most desired information was fibre composition (74.4%), followed by raw material origin (72.1%). A high level of interest was also expressed in care and maintenance information and other material-related data (65.1%), as well as information on production processes and working conditions (62.8%). More than half of respondents indicated interest in material certifications (56.6%), recycling information (53.5%), and full product traceability (52.7%). Lower but still



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notable interest was observed for repairability information (45.7%) and the product's carbon footprint (38.8%).

The results indicate substantial interest in several types of digital product information, particularly fibre composition, raw material origin, care and maintenance instructions, and production-related aspects, as these were selected by a large share of respondents. Interest in environmental impact information, such as carbon footprint, was lower in comparison, although still present among a considerable proportion of respondents. In addition, most respondents indicated that DPP information would be useful in their purchasing decisions, and over 60% reported a positive likelihood of using such digital information when available. Overall, the Digital Product Passport is perceived as a potentially useful tool for providing product-related information across multiple dimensions. Its potential influence on consumer decision-making will depend on increasing awareness and ensuring that the information provided is clear, accessible, and relevant to purchasing contexts.

4. CONCLUSION

This study examined Slovenian consumers' clothing purchasing behaviour, attention to clothing labels, awareness of eco-certifications, and perceptions of the Digital Product Passport (DPP). Results show that clothing is purchased at a relatively moderate frequency, primarily several times per year, followed by monthly and seasonal purchases. Purchases are mainly made through physical stores and online platforms, while second-hand clothing purchasing is also present but less frequent. A similar pattern is observed for sustainable clothing, which is mostly purchased occasionally rather than regularly, indicating that sustainability is still not a dominant driver of clothing consumption.

Consumers demonstrate a relatively high level of engagement with clothing labels, most commonly by checking key product information such as fibre composition and care instructions. However, label-related discomfort is highly prevalent, as nearly all respondents reported having removed clothing labels due to irritation (itching), thickness, or bulkiness. This highlights a trade-off between the informational value of labels and their physical usability, as the material form of labels can negatively affect user experience despite their role in providing product-related information.

Awareness of ecological and sustainability labels is present, with most respondents reporting partial familiarity, while a smaller share indicated good familiarity. The highest recognition is observed for certifications such as OEKO-TEX, the EU Ecolabel, and the Global Organic Textile Standard (GOTS). Respondents also report varying levels of attention to sustainability-related information in clothing materials, with most indicating that they occasionally check whether materials are sustainable, organic, or certified, suggesting that such considerations are present but not consistently integrated into purchasing decisions. Trust in sustainability labels is generally positive but cautious, reflecting acceptance without strong confidence. At the same time, respondents express expectations for more comprehensive information, particularly regarding sustainability, material properties, and detailed garment care instructions. Overall, awareness of



sustainability labels and material-related sustainability information is present, while their use in decision-making remains inconsistent.

Regarding digital product information, awareness of the Digital Product Passport (DPP) remains limited, although a considerable share of respondents has encountered the concept, mainly through professional and formal information channels. Only a minority of respondents reported having scanned QR codes on clothing providing product-related information, indicating that the current implementation of digital product information in the clothing sector remains limited. Despite this, consumers show generally positive attitudes toward digital product information and express willingness to engage with it when available.

The findings indicate substantial interest in detailed digital product information, particularly regarding material composition, raw material origin, care and maintenance instructions, production processes, and working conditions. Sustainability-related information, including certifications, recycling information, and product traceability, is also valued. Although interest in carbon footprint and reparability information is somewhat lower, these aspects are still relevant for a considerable share of respondents. Respondents also perceive DPP information as useful in their purchasing decisions, supporting its relevance in consumer decision-making. Taken together, the results suggest that although sustainability is not yet the primary driver of clothing purchases, there is a clear demand for improved information availability and greater transparency. The Digital Product Passport represents a relevant development in this direction, but its impact will depend on effective implementation and integration into everyday consumer decision-making.

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