

DPP x Sorting data Gap analysis

White paper

tExtended T4.1



tExtended

Executive Summary

Introduction

The overall objective of the tExtended project is to develop a knowledge-based Blueprint for a sustainable textile ecosystem, where textile flows are optimized to retain the value of products and materials in a safe and sustainable way. The data model and Digital Product Passport (DPP) data help enable the Blueprint by improving the availability and interoperability of information across the textile ecosystem. Building on the findings of tExtended Deliverable 4.1, which established the foundation for a data-sharing framework and data model that form a key foundation of the Textendifier (Conceptual Framework)¹, and drawing on insights from project partners through surveys and validation workshops, this white paper explores how the forthcoming DPP can create tangible value for textile sorting operations. It identifies key gaps and opportunities across the value chain and highlights potential solutions to enable more effective sorting for reuse and high-quality recycling, supporting greater circularity within the textile sector.

Background

The EU Digital Product Passport (DPP), developed under the Ecodesign for Sustainable Products Regulation (ESPR), aims to make product information digitally accessible throughout a product's lifecycle. For textile sorting, this could help address longstanding challenges related to missing fibre composition data, unreliable care labels, inconsistent classifications, and the lack of product identifiers at end-of-life.

These data gaps currently limit traceability and make it difficult for sorters to optimize decisions for reuse and recycling. By enabling access to standardized product information through persistent digital identifiers, DPPs could improve sorting accuracy, support higher-

¹ Mäkelä, S. M., Vuorinen, J., & Heikkilä, P. (2025). Textendifier-Textile waste optimization tool. In ECOSYSTEX Conference 2025: New Technologies & Business Models for Textile Circularity.

quality recycling, and strengthen the role of sorting facilities in a more circular textile value chain.

A knowledge base is taking shape

CIRPASS-2 is one of several important initiatives contributing to the knowledge base needed for the implementation of Digital Product Passports (DPPs). For textiles, this work is particularly important because the value of DPPs will not only depend on data availability, but on whether that data can be used in practice to improve reuse, sorting, and recycling. By exploring questions such as product level granularity and digital identifiers, CIRPASS-2 helps ensure that future DPP requirements can support a more circular textile system.

The [CIRPASS-2 report “DPP Granularity Level Options for Textiles/Apparel” \(2025\)](#) explores the benefits and challenges of model-, batch-, and item level identifiers within the Digital Product Passport framework. The report concludes that item level identifiers offer the greatest potential for improving traceability and supporting circular activities such as sorting, reuse, and recycling. It therefore recommends that item level identification be strongly encouraged, considered for future regulatory requirements, and incentivized where not mandatory. The report also calls for clearer rules on batch level information and better evidence on the costs and benefits of serialized identifiers.

The results and work from CIRPASS-2 is highlighting similar areas around the gaps that have been summarized and identified from the tExtended survey and workshop. The recommendations and insights from CIRPASS connect well with the added insights mapped out in this white paper.

Read and follow

[Cirpass 2](#)

[Trace4Value / SwePass](#)

[ECOSYSTEMX](#) TG5 - Circular Textile Data

Scope

Scope

This white paper explores how the forthcoming Digital Product Passport (DPP) can support textile sorting for reuse and recycling, with a particular focus on data needs, interoperability challenges, and opportunities across the value chain.

The paper aims to:

- Explore how the Digital Product Passport (DPP) can support increased value for sorting to reuse and recycling.
- Analyse data related challenges identified by partners through tExtended deliverables and activities.
- Compare these challenges with existing and emerging standards CEN/CLC/JTC 24 for the Digital Product Passport².
- Identify data gaps that may hinder interoperability across the value chain.
- Highlight key insights and opportunities for improving data exchange and interoperability between stakeholders across the value chain

² [CENELEC - CEN/CLC/JTC 24](#)

Approach

This white paper builds on previous work carried out within the tExtended project and combines findings from earlier deliverables with stakeholder input gathered through surveys and workshop discussions. The approach aims to validate existing findings and identify key challenges and opportunities related to the implementation of the Digital Product Passport (DPP).

Deliverable D4.1

This work builds on findings from the tExtended project, particularly Deliverable D4.1, which identifies material composition, traceability, interoperability, data governance, and secure data sharing as key enablers for circular textile value chains. The report also highlights challenges related to data quality, confidentiality, trust, and the practical implementation of Digital Product Passports (DPP). Furthermore, it identifies textile sorting as a promising application for DPP-enabled data exchange and highlights the potential role of AI in supporting interoperability and data utilisation. To further explore and validate these findings, a survey and stakeholder validation workshop were conducted. Together, these activities provided additional insights into current practices, perceived barriers, data needs, and stakeholder expectations regarding DPP implementation.

Survey

To better understand current practices and challenges across the textile value chain, a stakeholder survey was conducted. The survey explored data practices, interoperability challenges, and Digital Product Passport (DPP) readiness among actors from different parts of the value chain.

Responses were collected from manufacturers, brands, textile sorters, recyclers, waste management organisations, research institutes, and technology providers.

The survey focused on:

- Current use of digital identifiers and traceability systems
- Existing data collection and management practices
- Readiness for upcoming DPP requirements
- Data needs for textile reuse, sorting, and recycling
- Barriers to data sharing and interoperability
- Risks associated with confidentiality, compliance, and implementation costs
- Missing infrastructure and standardisation needs

The objective was to understand both the maturity of current data systems and stakeholders' expectations regarding the role of DPP in enabling circular textile value chains.

Validation Workshop

Following the survey, a validation workshop was organised to discuss the findings and gain a deeper understanding of the identified challenges and opportunities. The workshop provided an opportunity to validate survey results and gather additional perspectives from across the value chain.

The workshop aimed to:

- Validate and contextualise survey findings
- Identify critical gaps and implementation barriers
- Explore potential support mechanisms and solutions
- Discuss trust, governance and confidentiality
- Understand how DPP data can best support sorting, reuse, and recycling
- Explore future technologies and enablers, including AI

While the survey identified what stakeholders perceive as the main challenges, the workshop discussions provided additional insight into why these challenges exist and how they may be addressed.

Opportunities and Key Gaps Identified

Opportunities Identified

Better sorting and higher-quality material flows

Across both the survey and workshop, stakeholders consistently emphasised that the primary value of DPP lies in improving the quality of material flows within the circular textile system.

Reliable product information can improve:

- Sorting accuracy
- Material identification
- Recycling efficiency
- Feedstock quality
- Availability of secondary raw materials

As one participant noted:

“The optimal use of data is to get better material quality out of the system.”

The findings indicate that the greatest value of DPP may be realised at the sorting stage, where information can directly influence decisions on reuse, repair and recycling.

Increased transparency and reduced greenwashing

Participants widely viewed DPP as a tool for increasing transparency throughout textile value chains.

Expected benefits include:

- Improved traceability
- Better verification of sustainability claims

- Greater transparency towards consumers
- Reduced risk of greenwashing
- Increased trust between business partners

Several respondents viewed transparency as one of the strongest drivers for DPP implementation.

AI as a potential enabler

The workshop introduced a strong interest in the potential role of artificial intelligence.

Participants suggested AI could support:

- Data harmonisation
- Translation between terminology and systems
- Interoperability
- Data validation
- Lower implementation costs

As one participant described it:

“AI will be the software partner that lowers costs.”

Key Gaps Identified

Gap 1: Limited availability of relevant data for DPP

Although some organisations have already begun collecting DPP related information, many respondents reported that significant parts of the required data are either unavailable or difficult to access.

This was particularly evident for actors further downstream in the value chain, such as sorters and recyclers, who often lack visibility into product composition and production data.

Several stakeholders also described difficulties obtaining information from suppliers and value-chain partners.

Gap 2: Insufficient interoperability

One of the clearest findings from both the survey and workshop was the lack of interoperability between organisations.

- Stakeholders highlighted:
- Fragmented business systems
- Limited digital data exchange
- Lack of common data structures
- Different interpretations of data fields

Many respondents noted that the challenge is often not the absence of data but the inability to exchange and utilise data efficiently.

The need for standardised APIs, common identifiers and harmonised data models was repeatedly emphasised.

Gap 3: Data quality and reliability

Several respondents expressed concerns regarding the quality and reliability of currently available information.

One sorting stakeholder reported that only approximately 65% of information on care labels can be considered accurate.

Participants also identified challenges related to:

- Incorrect composition information
- Missing supplier data
- Unknown chemical content
- Inconsistent sustainability claims

Without improvements in data quality, stakeholders questioned whether DPP can deliver meaningful value.

Gap 4: Missing verification mechanisms

A major concern emerging from both the survey and workshop relates to the lack of robust verification systems.

Stakeholders highlighted uncertainty around:

- Verification of recycled content
- Environmental claims
- Life Cycle Assessments (LCA)
- Product Environmental Footprint (PEF) data

As one participant noted:

“The verification system is not there today.”

Another commented:

“It is difficult to trust something that is difficult to understand.”

The findings suggest that verification may become a critical bottleneck for large-scale DPP implementation.

Gap 5: Confidentiality and data governance

The strongest concern raised by respondents relates to confidentiality and protection of commercially sensitive information.

Stakeholders expressed concerns regarding the sharing of:

- Supplier relationships
- Production processes
- Formulations
- Business-sensitive sourcing information

One respondent stated:

“We are very afraid that confidential data will get public.”

This issue was consistently raised across both the survey and workshop and appears to be one of the most significant barriers to industry acceptance.

Gap 6: Cost and resource requirements

Stakeholders highlighted significant concerns regarding the costs associated with collecting, maintaining and verifying DPP-related information.

Particular concerns were related to:

- LCA generation
- PEF calculations
- Third-party certification
- Site audits
- Supply-chain data collection

As one workshop participant remarked:

“The cost of generating DPP data for LCA and PEF could be astronomical.”

This challenge was seen as particularly significant for SMEs and companies with limited resources.

Gap 7: Lack of harmonised definitions and standards

Many stakeholders argued that the sector still lacks a common understanding of key concepts related to sustainability and circularity.

Participants called for harmonisation of:

- Circularity terminology
- Environmental definitions
- Product identifiers
- Data structures
- Data exchange standards

As one participant summarised:

“We need a common language about data.”

The results suggest that standardisation efforts remain a prerequisite for large-scale interoperability.

Gap 8: Global supply-chain participation

The workshop highlighted uncertainty regarding how actors outside Europe will engage with future DPP requirements.

Participants questioned:

- Why suppliers should provide additional information
- Whether companies outside the EU will see value in participating
- How concerns about sensitive information will be managed

As one participant asked:

“What is in it for them?”

This highlights a potential gap between regulatory ambitions and incentives for global supply-chain participation.

Gap 9: Long-term accessibility of product information

Several participants highlighted practical concerns regarding the durability of product-linked information.

Questions arose around what happens when:

- Labels are removed
- Products are reused multiple times
- Information carriers are damaged

Possible solutions discussed included RFID tags, durable printing and embedded identifiers.

Review of existing & emerging standards

Below is a structured mapping showing how the **CEN/CENELEC JTC 24 Digital Product Passport (DPP)** standards (CENELEC - CEN/CLC/JTC 24) can help address the key gaps identified in the study. The standards primarily address the **technical and governance foundations** needed for DPP implementation, although some gaps (such as verification costs and global supplier incentives) require additional regulatory, market, or organisational measures beyond standardisation.

Table 1: Mapping of CEN/CLC/JTC 24 Digital Product Passport - Framework and System against Key Gaps

Key Gap	Relevant CEN/CLC/JTC 24 Standard(s)	How the Standard Supports the Gap
Gap 1: Limited availability of DPP-relevant data	EN 18216 (Data Exchange Protocols), EN 18222 (APIs), EN 18219 (Unique Identifiers)	Establishes mechanisms for structured data sharing across the value chain. Unique identifiers enable linking information from different actors, while APIs and data exchange protocols facilitate access to product information by downstream actors such as sorters, repairers and recyclers.
Gap 2: Insufficient interoperability	EN 18223 (System Interoperability), EN 18222 (APIs), EN 18216 (Data Exchange Protocols), EN 18219 (Unique Identifiers)	Directly addresses interoperability challenges by defining common interfaces, communication methods, identifier schemes and interoperability requirements. Reduces fragmentation between business systems and supports seamless data exchange.

Gap 3: Data quality and reliability	EN 18216, EN 18222, EN 18221 (Data Storage, Archiving and Persistence)	While these standards do not verify data correctness, they help improve consistency, traceability, version control and data integrity. Persistent storage and standardised exchange formats make it easier to identify data sources and maintain reliable records over time.
Gap 4: Missing verification mechanisms	EN 18221, EN 18219, EN 18222	Supports traceability, auditability and data provenance, which are prerequisites for verification systems. Unique identifiers and lifecycle management APIs can enable links to certification systems, audit records, LCA documentation and verification bodies. However, verification methodologies themselves will need to come from other standards or regulatory frameworks.
Gap 5: Confidentiality and data governance	EN 18222, EN 18223, EN 18221	Can support controlled access mechanisms, data management architectures and authorised information exchange. Interoperability and API standards can

		help define who can access what information, supporting different visibility levels for regulators, consumers and supply-chain actors.
Gap 6: Cost and resource requirements	EN 18216, EN 18222, EN 18223	Standardisation reduces duplication and integration costs by enabling reuse of data across systems. Automated data exchange and common interfaces can lower the administrative burden associated with DPP implementation, particularly for SMEs. Nevertheless, costs related to LCA, PEF and third-party verification will remain significant.
Gap 7: Lack of harmonised definitions and standards	All JTC 24 standards, especially EN 18219, 18216, 18223	This is the gap most directly addressed by JTC 24. The standards provide common approaches for identifiers, data exchange, interoperability and passport architecture, effectively creating the “common language about data” requested by stakeholders.

Gap 8: Global supply-chain participation	FprEN 18216, 18219, 18223	Internationally applicable and technology-neutral standards can reduce barriers to participation for suppliers outside Europe. Common identifier and interoperability frameworks make it easier for global actors to connect with DPP systems. However, incentives for participation remain largely a policy and business issue rather than a technical standardisation issue.
Gap 9: Long-term accessibility of product information	FprEN 18220 (Data Carriers), FprEN 18221 (Storage, Archiving and Persistence), FprEN 18219 (Unique Identifiers)	Directly addresses durability and accessibility concerns. Data carrier standards can support robust solutions such as QR codes, RFID or future technologies, while storage and persistence requirements ensure information remains available throughout a product's lifecycle even if physical labels are damaged.

Key Insights

Material composition data is the foundation of circular textile value chains

Key takeaway

Material composition emerged as the most critical data category for enabling effective sorting, reuse and recycling. Across stakeholder groups, fibre composition, material blends, recycled content and information affecting recyclability were consistently identified as essential for making informed end-of-life decisions.

Recommendation

Future DPP implementation should prioritise access to reliable material composition data throughout the textile lifecycle, particularly at the sorting stage where decisions on reuse and recycling are made.

The challenge is not collecting data, but making it usable

Key takeaway

The findings suggest that the main challenge is not the absence of data, but the inability to exchange and use data across organisations and systems. Valuable information often exists but remains fragmented and inaccessible to downstream actors.

Recommendation

Efforts should focus on improving interoperability between existing systems and ensuring that relevant information can be accessed and understood across the value chain.

Textile sorting is a tangible DPP use case

Key takeaway

Among the potential applications discussed by stakeholders, textile sorting emerged as the area where DPP data could generate the most immediate and tangible value. Access to product information at this stage can directly influence reuse, repair and recycling outcomes.

Recommendation

Sorting should be considered a priority use case when testing and implementing DPP-enabled data exchange solutions.

Trust and confidentiality will determine industry adoption

Key takeaway

Concerns regarding confidentiality and commercially sensitive information were among the most frequently raised barriers to DPP implementation. Stakeholders emphasised the need for confidence in how information is shared and managed.

Recommendation

Future DPP frameworks should address data governance and confidentiality alongside technical interoperability requirements.

AI may become a key enabler of interoperability

Key takeaway

Workshop participants identified AI as a potential tool for addressing practical challenges related to interoperability, data harmonisation and information management across fragmented systems.

Recommendation

Further exploration and pilot testing should be encouraged to better understand where AI can add value within DPP-enabled textile value chains.

Standards provide a foundation for interoperability

Key takeaway

The emerging DPP standards address several of the challenges identified by stakeholders, particularly those related to identifiers, data exchange, interoperability and information accessibility.

Recommendation

Industry actors should actively engage with emerging standards and assess how they can support more consistent and interoperable data exchange across textile value chains.

Appendix

- Survey summary: [Extended T4,1 survey SUMMARY.xlsx](#)
- Workshop notes: [Notes from workshop 21 may.docx](#)