Consumer Preferences for Sustainability Transparency in Digital Product Passports

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The research behind the paper

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Introduction

Digital Product Passports (DPPs) are a promising technology to enhance transparency regarding the sustainability of products. They provide consumers with deeper insights into environmental impacts, material composition, recyclability, and ethical practices. The European Union has recently decided that, from 2026 onwards, an increasing number of products sold within the EU must include a DPP. The aim is to promote sustainable decision-making by improving transparency and traceability along the supply chain through standardized product data accessible to all stakeholders.

Beyond meeting regulatory requirements, DPPs offer companies the opportunity to differentiate themselves in the market – provided that consumers recognize and value the information made available. However, the implementation of DPPs is associated with substantial challenges, particularly with regard to data collection, management, and seamless data provision. This requires deep integration into supply chain data ecosystems and close cooperation among stakeholders.

To date, it remains unclear which specific types of information consumers actually value in a DPP. We therefore examined consumer preferences for information transparency in DPPs based on a survey of 230 German consumers.

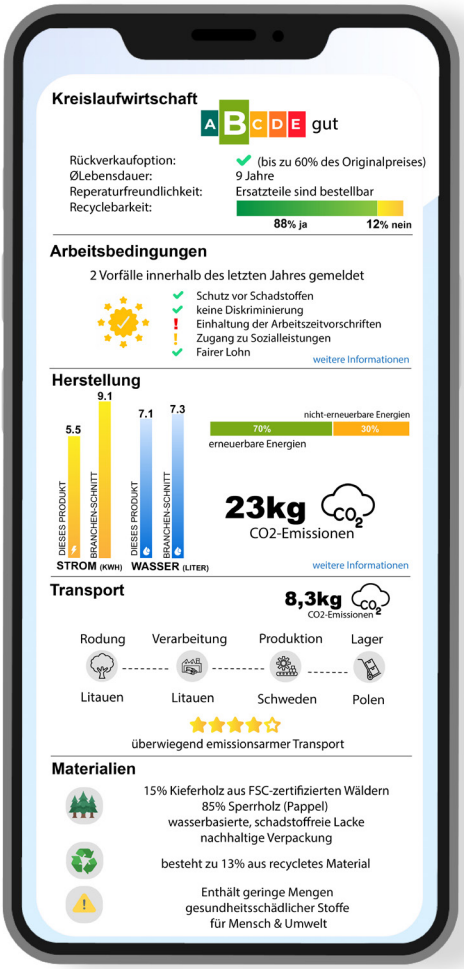
Concept of Digital Product Passports

The DPP is an electronic tool that captures, processes, and shares product-related information across supply chain actors and consumers. It aggregates data from different stages of the supply chain and the product life cycle in order to improve sustainability performance. This includes data on emissions, materials, and chemical substances, as well as information on repairability, working conditions, and sustainable disposal instructions. Users can easily access this information, typically via QR codes on product packaging.

Organizations have long disclosed sustainabili-

ty-related product information through various means, including product labels, sustainability reports, and corporate websites. However, these traditional disclosure methods often suffer from fragmentation, limited accessibility, and a lack of real-time updates. DPPs represent a significant advancement in sustainability communication by addressing these shortcomings. Unlike conventional approaches, which often focus on isolated aspects such as carbon footprint or ingredient transparency, DPPs consolidate and standardize sustainability data across the entire product life cycle.

Moreover, existing sustainability disclosures are vulnerable to greenwashing due to inconsistent data verification, whereas DPPs rely on standardized and immutable records, thereby enhancing credibility. With their emphasis on repair, reuse, and recycling guidance, DPPs go beyond static certifications and provide a dynamic, life-cycle-oriented transparency tool.



Methodology and Findings of the Study

To examine consumer preferences for information transparency in DPPs, we conducted a conjoint analysis. This method allows us to quantify consumer preferences for different product attributes and their respective levels. In our study, participants evaluated various DPP designs that differed in the amount of information provided on sustainability performance:

1. Circular economy: Information on recyclability, repairability, and the average product lifetime.

2. Working conditions: Information on fair wages and compliance with working-time regulations across the supply chain.

3. Production: Details on manufacturing processes and resource consumption.

4. Transport: Information on transport routes and associated CO2-emissions.

5. Materials: Information on the use of recycled materials, the origin of raw materials, and the presence of harmful substances.

The levels of information varied in terms of the degree of detail provided on sustainability performance (no information, basic information (e.g., labels), and detailed information (e.g., specific numerical data)).

Our results show that the utility consumers derive from sustainability-related product information depends significantly on the level of detail provided. The absence of information consistently results in negative utility, underscoring the importance consumers place on transparency and their demand for clear and accessible sustainability data.

Furthermore, our findings indicate that providing detailed information consistently yields the highest utility across all attributes, particularly for the circular economy. This supports our hypothesis that greater information transparency generates higher consumer utility.

However, across all attributes, the increase in utility from no information to basic information is larger than the increase from basic to detailed information. This pattern is especially evident for attributes such as working conditions and transport, where the difference between basic and detailed information is marginal, suggesting that consumers may perceive detailed information in these areas as less relevant.
The analysis of attribute importance supports these findings, with information on the circular economy, materials, and production rated as the most important. This suggests that consumers are particularly interested in the end-of-life sustainability of products.

Differences in Preferences Across Consumer Groups

Our consumer segmentation analysis based on self-perceived environmental responsibility shows that not all consumers value detailed information on working conditions and transport. This is particularly true for consumers with low environmental awareness. While detailed information on the circular economy and materials also increases utility for this group, the benefit of detailed information diminishes for attributes such as working conditions and transport.

Overall, the segmentation analysis reveals that consumers with low environmental awareness exhibit different attribute priorities compared to those with high environmental awareness. Consumers with lower environmental awareness prioritize information on the circular economy while assigning less importance to working conditions. In contrast, consumers with higher environmental awareness display more balanced preferences, with working conditions also holding relatively significant value for this group.

These findings suggest that some consumers are satisfied with “good enough” information rather than seeking maximum transparency, particularly when dealing with complex or personally less relevant information. This behavior may reflect a trade-off between the cognitive effort required to process extensive details and the perceived value of additional information.

Practical Implications for the Design of DPPs

From a managerial perspective, our findings provide valuable insights for organizations, DPP providers, and policymakers regarding consumer preferences and information needs related to product sustainability, while also informing design principles for DPPs:

1. Preference for detailed information: Consumers generally prefer detailed information over simple labels. DPPs

should therefore be designed to include detailed and transparent data, as this substantially enhances consumer preferences.

2. Risks of missing information: The absence of information leads to significant negative utility across all information types, particularly for materials and production. This highlights the risks associated with withholding sustainability-related data, as consumers clearly prefer at least basic information over a lack of transparency. Companies should therefore consider basic disclosures as a minimum standard to maintain trust and perceived value.

3. Prioritization of information types: Not all detailed information is valued equally. Attributes related to production (e.g., industry benchmarks) and the circular economy (e.g., resale options) are strongly prioritized, whereas details on working conditions are less valued. This could be reflected in the information hierarchy within the DPP—for example, by displaying circular economy information first, followed by materials, while aspects such as working conditions appear further down.

4. Flexible design: Consumers with higher perceived environmental responsibility preferred more detailed data, whereas less environmentally conscious consumers opted for fewer details. This points to the need for a flexible DPP design that accommodates different user preferences. A layered approach that provides an overview of key sustainability attributes with the option to access more detailed information could serve both consumers seeking a quick overview and those desiring in-depth insights.

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