

# Circ Thread

## Policy Brief

### Success Factors For The Digital Product Passport System

dss<sup>+</sup>

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# POLICY BRIEF #1: DIGITAL PRODUCT PASSPORTS

## 1.1 Contents Overview

This policy brief builds on the results of the CircThread project on how to develop the Digital Product Passport (DPP). After a short overview of the current context, the brief dives into CircThread's analysis of use cases for the DPP, namely which data is needed by which actor, and develops a vision for an ideal DPP. This vision is compared to the current proposal for a DPP presented by the European Commission in its proposal for an Eco-design for Sustainable Products Regulation. Finally, recommendations are made to bridge the gap between the vision and what is currently feasible, and what should be kept in mind to assess the DPP's success in the future.

## 1.2 Digital Product Passports: current state of play

### 1.2.1 Providing missing data for sustainable production and consumption

When the European Court of Auditors published its audit of the EU Circular Economy Action Plan, it concluded that only minimal progress was made to improve the EU circularity rate. Both the European Commission and Member States had failed to put forward the necessary instruments to reach their policy goal<sup>1</sup>. The EU's 2021 circularity rate is at only 11.8%<sup>2</sup> and in 2020 its material footprint was 13.7 tonnes per capita<sup>3</sup>. There is an urgent need to reduce resource consumption, notably by closing material loops, extending the lifecycle of products and materials brought to the market, and reducing the demand for new products made out of primary materials.

This requires both improvement at the product design level, but also in overall stock management (e.g. product in circulation), through the implementation of circular business models and enforcement of product legislation (including due diligence on the conditions in which the products we consume are manufactured). To do so, economic operators across the life of a product, but also public authorities, consumers, and civil society, need detailed information on products: including components, chemical substances, availability of spare parts, and usage data. However, most of this information is unavailable to those who need it. Our value chains are extremely complex, spanning multiple jurisdictions. Information flows are halted by confidentiality agreements from one supplier to another, the lack of standardised data transmission, or a pure break in information flow after the product arrives in the hands of consumers.

A key solution presented to improve information flows across all product life cycle actors in a circular economy is the introduction of digital product passports (DPPs).

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1 European Court of Auditors (2023) Special report 17/2023: Circular Economy – Slow transition by member states despite EU action <https://www.eca.europa.eu/en/publications/SR-2023-17>

2 Circle Economy (2023) The Circularity Gap Report 2023 [https://assets.website-files.com/5e185aa4d27bcf348400ed82/63ecb3ad94e12d3e5599cf54\\_CGR%202023%20-%20Report.pdf](https://assets.website-files.com/5e185aa4d27bcf348400ed82/63ecb3ad94e12d3e5599cf54_CGR%202023%20-%20Report.pdf)

3 Eurostat's Material flow accounts statistics – material footprints, accessed October 2023 [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Material\\_flow\\_accounts\\_statistics\\_-\\_material\\_footprints](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Material_flow_accounts_statistics_-_material_footprints)

## 1.2.2 The existing DPP landscape

A recent mapping counted about 76 private initiatives to develop DPPs<sup>4</sup>. In addition, public authorities are funding projects, such as the European CircThread, CE-RISE and CIRPASS, the German-funded Battery pass, and (although not necessarily digital) the Luxembourg initiative for a Product Circularity Data Sheet. Most private initiatives focus on the needs of individual companies, such as marketing and green claims, but also to some extent, supply chain management and circular services, and there is a lack of interoperability between these systems. The objective of making overall value chains more circular is unlikely to result from these initiatives, most of which are now looking towards the upcoming EU regulation to scale up.



In March 2022, the European Commission published its proposal to reform the Eco-design directive and turn it into a new Eco-design for Sustainable Products Regulation (ESPR). One of the headline novelties is the introduction of mandatory digital product passports for over 20 to 30 specific product groups (before that, DPPs had only been foreseen for electric vehicle batteries in the Batteries regulation<sup>5</sup>). The DPPs are expected to host the mandatory information requirements, such as environmental parameters, user manuals, and conformity certificates<sup>6</sup>. A key research effort in this context is the CIRPASS project, which by mid-2024 is expected to provide a proof-of-concept DPP for batteries, textiles, and electronics.

Based on the EU legislative intent, DPPs are set to be rolled out from 2026 onwards in sequential fashion for the intended product groups. The European Commission sees these DPPs not only as a reporting instrument for Eco-design product requirements, but also as to set common principles to ensure the flow of data between actors. They should be designed to promote sustainability and circularity and facilitate customs and market surveillance.

The current legislative text and discussions on how to implement it still leave a lot of space for discussion. Several issues are already arising. First of all, the EU DPP will apply within the EU's jurisdiction, and market operators placing products on the EU market will be the ones obligated to create DPPs. However, the information needed is generated and sits mostly beyond

4 M. Jansen, B. Gerstenberger, J. Bitter-Krahe, H. Berg, J. Sebestyén, J. Schneider (2022) Current approaches to the digital product passport for a circular economy : an overview of projects and initiatives. Wuppertal Institut für Klima, Umwelt, Energie. <https://doi.org/10.48506/opus-8042>

5 European Union (2023) REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC. 2020/0353, PE-CONS 2/23 <https://data.consilium.europa.eu/doc/document/PE-2-2023-INIT/en/pdf>

6 See ESPR Annex [https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation\\_en](https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation_en)



the EU across global supply chains. Legislators and companies will need to find ways to ensure that data is retrieved from their suppliers. A logical consequence of this is that there will be a lot more tracking across these value chains that interact with the EU Single Market. There might be different solutions to this, beyond the legislative DPP system that is emerging. This raises several questions including while the EU DPP will be used for legal compliance, will other private tools be developed? Will they be able to branch on the EU DPP? And, if so, how will these solutions with a more global scope relate and interact with the DPP?

Beyond technical questions on how the DPP will actually work, there is a need to keep the attention on why DPPs are needed from a societal perspective, and why they need to be developed as part of a regulatory context. Early versions of DPPs are already being implemented from a business perspective in early mover sectors like textiles, but the need to include them in the law stems from the fact that without legal obligation, information that is essential for the environmental transition is not being shared. Nor is the information standardised to create a level playing field with equal burdens and benefits for companies. The development of the DPP should be fully integrated into the wider policy context, from the other parts of ESPR to other legislations including the DPP (Batteries regulation, Construction Products Directive) to related instruments like the Green Claims Directive to wider strategies such as the Sustainable Textiles strategy.

Private DPPs focus on consumer satisfaction, branding, marketing (and stock management, supplier relations, etc.). Many are not primarily about sustainability or only operate at a company level. For example, machine washable RFID-based DPPs for clothing are developed to support the improvement of an existing product's impact, but it does not address the staggering volumes of clothing produced and wasted by the sector. While existing systems may be used to reduce the cost of a mandatory DPP, we should remain aware that they were not designed to address sustainability from a systemic perspective. To maximise the potential of the EU DPP, we need ideas beyond the existing world of DPPs. A DPP can also provide information to EU statistics and policymakers to help them design better and targeted policies. For example, the DPP can support the EU survey on ICT usage in households and by individuals.

## 1.3 A vision for an ideal DPP

### 1.3.1 CircThread learnings: use cases and data needs across a product lifecycle

An ideal DPP should serve the needs of all actors involved in the life of products to reduce their impact on the environment. A key learning of the CircThread project is that there is a myriad of actors, all with specific information needs but also hosting data usually for internal purposes. Looking at only three pilots and seven use cases, the project defined no less than 199 user stories for information usage, typically requiring sharing between two or more actors across product life cycle stage<sup>7</sup>.

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<sup>7</sup> CARTIF (2022) CircThread Deliverable 2.2: Use Case information requirements evaluation <https://circthread.com/download/deliverable-2-2-use-case-information-requirements-evaluation/>



A key topic is whether the full bill of materials and substances should be included in the DPP, including for purposes of calculating environmental impacts using Life Cycle Analysis, and to support insights for recycling technology implementation. Consultations with stakeholders reveal that different actors will need a different format of information, with different levels of granularity<sup>8</sup>. Our user stories show how manual workers in disassembly lines in recyclers' or repairers' environments can use better information to avoid being exposed to hazardous materials. A DPP could help to provide the right information on disassembly and also give an indication to anticipate risks in case of uncommon or unlabelled products. In this type of context, qualitative information on substance handling may be more valuable for decision making purposes<sup>9</sup>. In addition, a direct link between the product and the related data could improve the use of data on substances compared to the current SCIP database<sup>10</sup>. Other users, on the contrary, might prefer access to the exact substance list. For example, researchers and public authorities still lack a detailed overview of substances present in products to be able to evaluate risks of human substance exposure to develop appropriate mitigation and governance strategies.<sup>11</sup>

8 J. Schenten, R. Niebler, M. Führ (2023) Traceability of Chemicals in Products for a Non-Toxic, Resource-Preserving and Climate Neutral Circular Economy: Policy Workshop for a Theory of Change. [https://www.askreach.eu/wp-content/uploads/2023/01/AskREACH\\_Traceability-WS\\_report\\_2023-01.pdf](https://www.askreach.eu/wp-content/uploads/2023/01/AskREACH_Traceability-WS_report_2023-01.pdf)

9 It should be noted that manual disassembly is not used in many recycling facilities across Europe, and for cost-efficiency reasons process the e-waste in bulk and use automatised depollution technologies. Treatment of big appliances and refurbishers, however, can benefit greatly from the DPP in the short term.

10 Sofia, EEB, Client Earth (2023) SCIP Database: Does it enhance transparency on Substances of Concern in a Circular Economy? <https://rethinkplasticalliance.eu/wp-content/uploads/2023/10/SCIP-report.pdf>

11 Sofia, EEB, Client Earth (2023) SCIP Database: Does it enhance transparency on Substances of Concern in a Circular Economy? <https://rethinkplasticalliance.eu/wp-content/uploads/2023/10/SCIP-report.pdf>

The EU DPP legislation opens the possibility for unit/item level DPPs which can be useful for consumers, repairers, manufacturers, and end-of-life processors that can sort and treat WEEE (waste from electrical and electronic equipment) on a unit basis. Whilst not a standard practice, such operators can include refurbishers, recyclers of big and industrial equipment and, in the long-term ordinary recyclers that if there is a sufficient benefit will adapt their processes to sort individual items. However, the viability of feeding the DPP with individual product data has raised many question marks during the interviews held with various actors, and solutions needs to be found to really tap into the DPP's potential.

Indeed, our case studies demonstrate how important information from the use phase can be to improve circularity. However, information from actual users today tends to be missing. For product designers, knowing the actual use of the products would allow them to optimise both the components used and their operation (e.g. software). For example, boilers are designed to work in specific conditions but then the reality is usually different (e.g. room conditions, time between servicing). This would also support the work of service technicians, as they often do not receive the right information on boiler problems. Instead, sensations (e.g. personal experiences) or partial information is usually received. Information on the rate of faulty items was also mentioned as useful for purchasing departments of the original company, to know which products are worth buying back to put on the reuse market, or for service parts purchasers to know available stocks and the price of recovered parts. Another use could be for manufacturers to know which aspects need to be re-designed, or which faulty component should be replaced. From a customer perspective, the DPP could also be helpful for the recall of defective products.

The key learning is that a transition to more circular products and processes requires access to extensive data from all the stages in the product life cycle transparently and collaboratively. Information needs to flow both ways, from producers to end-of-life and vice versa. Consumers' input remains an untapped source of information to improve product design and use phase services related to e.g. repair and reuse (see separate chapter briefs on eco-design and on repair and reuse in the context of the DPP for further developments).

### 1.3.2 CircThread learnings: key IT barriers and solution

To be able to share this information, several technical issues first need to be solved. In its deliverable **D2.3 Barriers and Solutions for Information Exchange and Decision Performance**<sup>12</sup>, the CircThread team focused on IT solutions from technical algorithms, architecture design, and process perspectives. They identified 15 barriers and matched them with 56 solutions.



<sup>12</sup> CARTIF (2022) CircThread Deliverable 2.3: Barriers and Solutions for Information Exchange and Decision Performance <https://circthread.com/download/deliverable-2-3-barriers-and-solutions-for-information-exchange-and-decision-performance/>

Firstly, we need to build standardised formats and architecture to be able to share verified and verifiable information in a simple way. Then we need to address issues of security and trust, with built-in solutions and systems so that actors are willing to share information. Clear rules on how to introduce or modify information will be needed, alongside verification systems and secured access rights.

And finally, there is the question of uptake. The IT infrastructure must contribute to the utilisation of the data stored in the system. Solutions identified include data-driven storytelling for both policy and business decisions. While not a topic for legal requirements, developing IT tools that help extract the data publicly available in DPPs could support policy research and provide insights for new regulations or policy programmes aimed at supporting sustainable production and consumption.

## Barriers

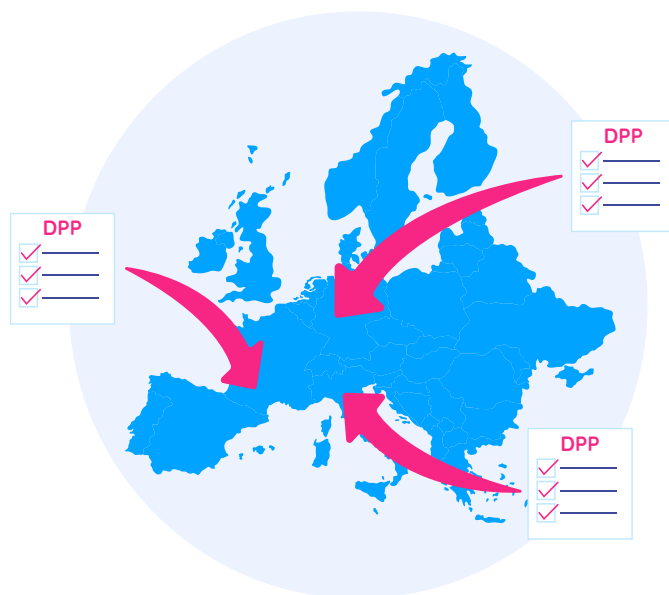
- 1 Lack of standardized information sharing using modern IT architecture with using common definitions and decision-making frameworks.
- 2 Lack of a standardised format to communicate the information.
- 3 Lack of trust or absence of information security in the context of information exchanges.
- 4 Inability to share information because of risk of information leakage to competitors.
- 5 Lack of visibility or lack of insights about the information that is needed to enable CE strategy deployment (e.g., value creation in remanufacturing).
- 6 Lack of incentives for sharing the data by the owners such as an economic incentive or regulatory incentive or a procurement incentive.
- 7 Limitations to share data due to privacy regulations.
- 8 Lack of organizational and digital mechanisms for setting up information sharing approaches or platforms.
- 9 Information is defined at too high level of complexity by experts for a decision maker.
- 10 Absence of organizational networks and lack of incentives to set up such networks for information sharing.
- 11 Lack of in-house expertise or ability to improve expertise for CE strategy deployment.
- 12 Lack of attractiveness over new circular product lifecycle management approach over traditional linear models.
- 13 Lack of prioritisation of CE strategy deployment within/between organisations.
- 14 Too high costs for digital integration with information exchange and sharing systems.
- 15 Lack of trust in or absence of information integrity/quality checks in the context of information exchanges.



### 1.3.3 How does the EC proposal for a DPP relate to this ideal vision?

Existing DPP initiatives have been developing and implementing solutions for the needs and barriers described above. The main difference for the EU DPP is that it will have to do so at a scale and scope that is unprecedented. As it is part of a legal instrument, it will also have to work within the scope that is given to the ESPR. While much still remains to be defined, we already know that its scope will limit what it can achieve.

While EU policies may influence economic actors in other regional markets, The ESPR will not have the legal authority to compel suppliers working outside of the EU. The key question remains by what mechanism such suppliers will provide the information needed by the economic operators who need to create a DPP to access the EU market. At this stage, depending on the market power of the operator, and their capacity to influence their suppliers, they may or may not be able to get this information from suppliers. It is unknown how this will affect their capacity to enter the EU market, and what system will be put in place by authorities to support them. One thing to keep in mind is that requirements for information for a broad set of products are likely to trigger more adaptation from foreign markets than requirements for a limited set of products.



Besides this, mandatory information requirements are unlikely to include a full tracing of materials and substances, as they are not part of the initial proposal from the Commission. Similarly, as item level DPPs will not necessarily be implemented for all products, use phase information collection systems may not be collected for them. While DPP users and providers often mention this as a necessity for DPPs to be successful, data gaps will most likely remain.

The requirements will also apply to new products only. Legacy products, that might stay in use for decades, will not be obligated to have a DPP. It would nonetheless be useful to give the possibility to create a DPP for these products, at the item level, associated and implemented at reuse, repair, refurbishing, remanufacturing, and recycling steps of a product. This would make the most sense for existing products for which already sufficient information is available within existing economic operator databases to create item level DPPs. However, the ESPR at present excludes any provisions for enabling existing on-market product DPPs.

Finally, the ESPR will not immediately apply to all products on the market, and some products may never be regulated under the ESPR (e.g. medical devices). The ESPR will progressively develop rules for specific product categories. Some products will be regulated under other laws (e.g. batteries or potentially construction products) and still be included in the DPP, but nonetheless, it will take a long time – from a business perspective – before a majority of products on the EU market to have an active DPP. The first products to benefit from a DPP are not expected before 2026 at the earliest, and it will take at least until 2030 for the 20-30 product categories to have been legislated to have Eco-design performance and information requirements mandating a DPP.

## 1.4 Policy recommendations: Bridging the gap between the ideal DPP and what is feasible

### 1.4.1 Recommendations to bridge the gap and make the most of the policy opportunity with efficient use of time and resources

#### Information shared



- Align data in the DPP with data needs of the actors along the value chain
- Truly consider going to the item level, especially when the use phase is very relevant to a product's environmental impact.
- Ensure that at least all substances of concern<sup>13</sup> are traced if it is not possible to add all substances. With the right access rights, taking into account the context in which data will be used, including all materials and substances should not present a business risk.
- Develop solutions to link the DPP system to other legal databases (e.g. Digital Building Logbooks, EPREL, SCIP, etc.)

<sup>13</sup> The legal definition of substances of concern will be tackled in Article 2(28) of the ESPR, under negotiations at the time of writing this paper. The Commission's proposal includes a number of already regulated substances under REACH and CLP regulations, due to their high toxicity and persistence in the environment, as well as those substances that negatively affects the re-use and recycling of materials in the product in which it is present.

### *DPP system*



- Develop systems for data verification to avoid misuse of the DPP. The verification of data accuracy is a key point to avoid unfair competition through the use of fake data to lure consumers to buy products.
- Develop technologies accessible for all actors in the value chain. For example, a QR code type of DPP may be useful for a consumer, but not for a recycler scanning through entire containers.
- Adopt a strong focus on interoperability, the possibility for service providers to develop accessible options for all companies including those outside of Europe to encourage data sharing when there is no legal obligation and bring costs down.

### *Uptake of DPP data*



- Develop policy and business use cases to maximise the use of the data collected. Ensure that it informs policy decisions beyond product regulation, for example when setting targets for resource consumption or circularity, developing sectoral legislations (e.g. Textile), or informing overarching regulations like REACH.
- Strengthen the value and potential of the DPP by identifying and serving additional legislations where the DPP can be a useful instrument (e.g. enforcement, customs control, extended producer responsibility, CRM Act etc.).

### 1.4.2 How to assess the DPP's success

A balance should be struck between information needs and excessive or unnecessary collection and storage of data. The European Commission should monitor the environmental cost of the DPPs, and the results should be used to improve the infrastructure over time, making recommendations (or obligations) to service providers.

As an intermediate step, metrics and qualitative assessment should track the data's accuracy and how it is used in the real world. For example:

- What is the level of legal compliance, and how much mandatory data is missing?
- How often data inaccuracy is reported, and is it often addressed and in what manner?
- How engaged are actors that do not have a legal obligation to provide information?
- Are actors in need of data reporting that they find the DPP useful and actively use it?

Finally, the success of the DPP should be measured by its capacity to support eco-design and sustainable production. Metrics should be developed to monitor:

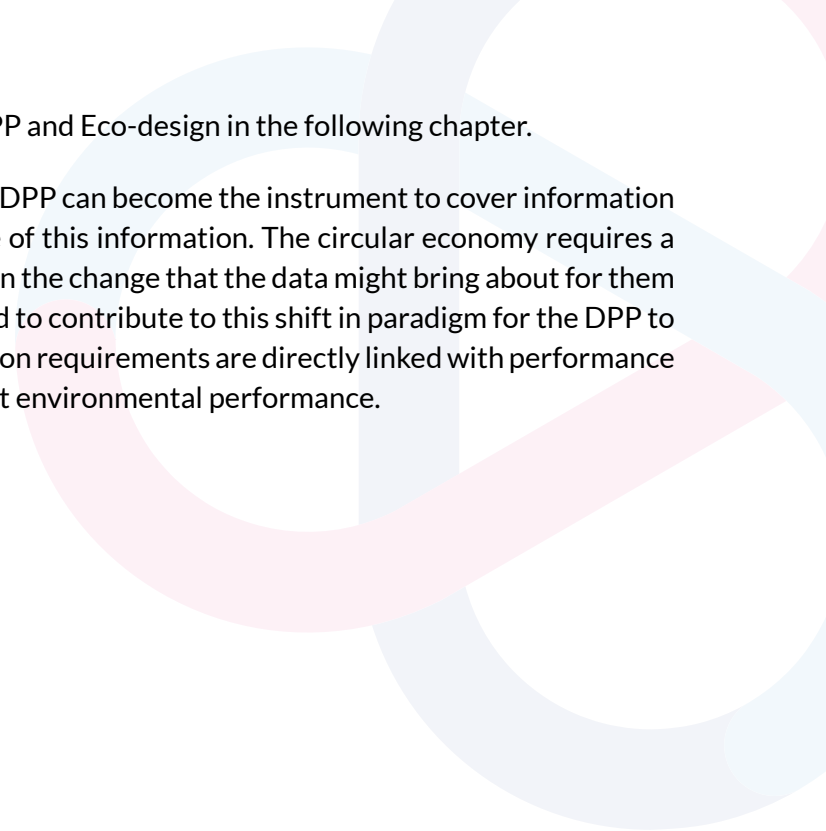






Metrics are further developed in our brief on DPP and Eco-design in the following chapter.

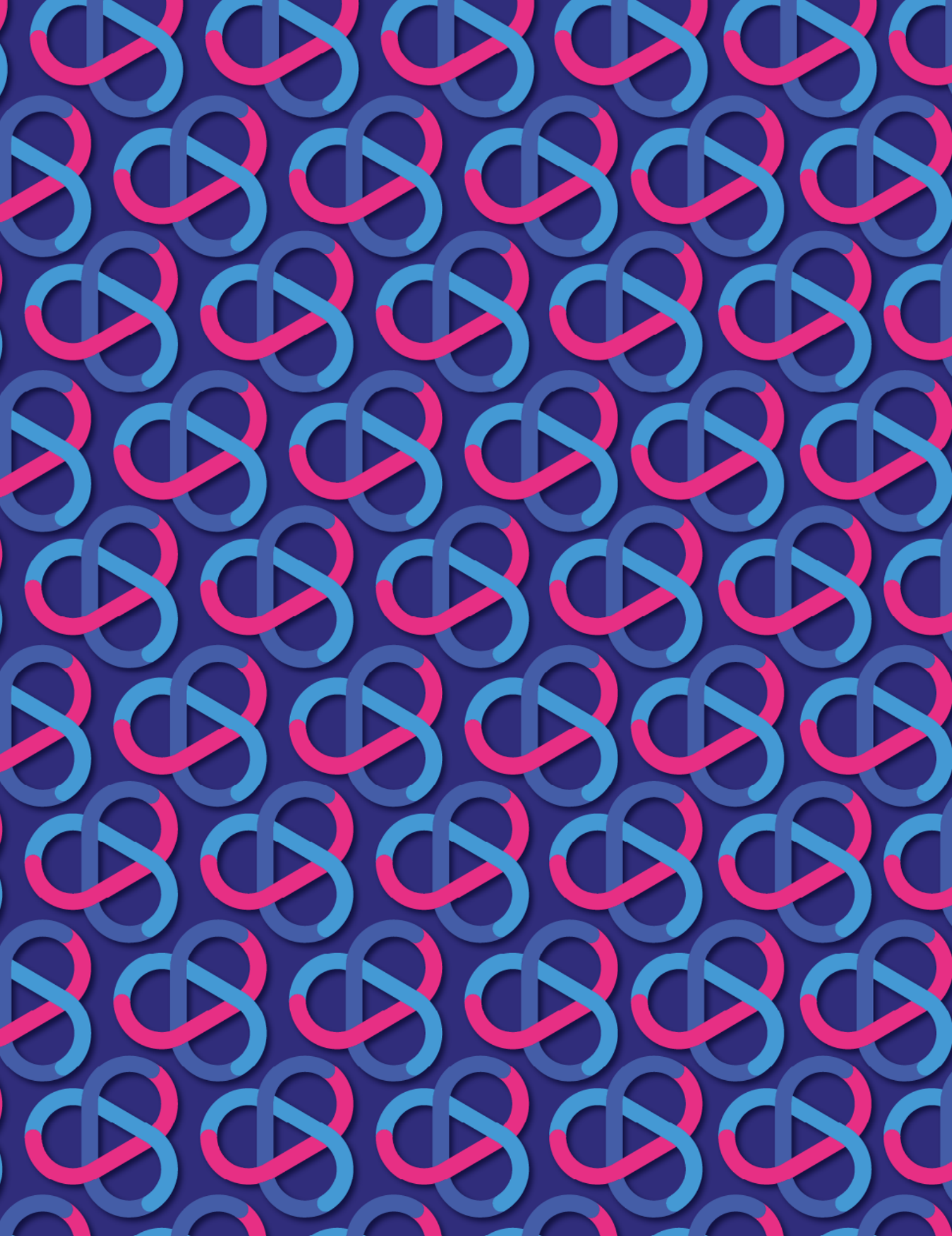
As a final note, it should be noted that whilst the DPP can become the instrument to cover information flows, it is in the hands of the users to make use of this information. The circular economy requires a change in mindset: actors need to be interested in the change that the data might bring about for them to use the DPP. The ESPR and other policies need to contribute to this shift in paradigm for the DPP to be successful. In the ESPR for example, information requirements are directly linked with performance requirements, setting minimum rules for product environmental performance.



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