Protokol

Digital Product Passport (DPP): The Complete Guide

Exploring the opportunities and implications of Digital Product Passports (DPP) for organisations, consumers and policy makers.

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1. Introduction

Digital Product Passports (DPP) are a tool for collecting and sharing product data throughout its entire lifecycle used to illustrate a product's sustainability, environmental and recyclability attributes. Recorded product data from across the supply chain including raw material sourcing and manufacturing process is captured on the DPP and shared amongst a number of stakeholders and participants – unlocking benefits, use-cases and value across entire ecosystems.

Although the concept of 'cradle-to-grave' product tracking isn't new – utilising blockchain technology to record and cryptographically secure product data through a Digital Product Passport is an emerging solution that is growing rapidly in business uptake. This solution is also one that places more emphasis on end-user accessibility than others – with consumer benefits and value derived equalling that of businesses, which isn't always the case with alternative mechanisms.

The broader Digital Product Passport concept will evolve over time in terms of utility, but in its current form, they are largely being scoped and utilised within sustainability, recyclability and environmental initiatives – all of which fall under the 'circular economy' umbrella.

It should be noted that although Digital Product Passports have a seemingly fixed purpose at this stage, the underlying concept and technology is still relatively nascent and developing. This guide will surface additional use-cases that sit outside of the current key scope, signalling numerous opportunities that businesses can unlock for their organisation and customer base.

Circular Economy and Sustainability

At the heart of the current Digital Product Passport discussions are the concepts of circular economy and sustainability. The circular economy initiative looks to transform the way that we produce, consume and utilise products and resources – aiming to cut waste to a minimum and extend both resource and product longevity.

This is part of a broader pledge to enable the world and its population to become more sustainable – enabling all stakeholders to optimise the use and reuse of valuable resources and materials. Under the circular economy framework, nothing of value is wasted through new approaches to sharing, repairing, reusing and recycling.

Under numerous EU legislative acts and initiatives, many industries have been prioritised as the first wave to adopt DPPs that includes batteries & vehicles, textiles, electronics & ICT, furniture, plastics, construction and chemicals. Although the final timeline is still being defined, 2026/7 signals initiation for the first industry to adopt DPPs (batteries) and the others are all expected to follow suit by 2030.

2. Paving The EU Roadmap

It's not just innovative thinking that's providing the catalyst for business adoption of Digital Product Passports. In Europe, a whole host of policies and regulations (either in the proposal or implementation stage) have been drawn up by the European Union largely under the European Green Deal (EGD) which carries the long-term goal of enabling the continent (Europe) to reach net zero emissions by 2050.

Under the EGD, there is the Circular Economy Action Plan (CEAP) which came into force in March 2020 and is more directly related to the topic of Digital Product Passports and their proposed usage from a governmental (European Union) level. The CEAP details the European circular economy strategy and contains multiple key goals related to ensuring product sustainability, producing less waste and empowering consumers to make more informed decisions on product purchases. Further to this, under the CEAP and supplementary initiatives, several industries will be targeted as the first batch to face industry-wide regulations related to helping the European Union (and by extension the continent as a whole) achieve its sustainability goals.

To better illustrate the policies currently in place or being proposed at the European Union level related to product sustainability and Digital Product Passports. The below lists several relevant items that largely all fall under the broader Circular Economy Action Plan (CEAP).

- **Ecodesign for Sustainable Products Regulation (ESPR):** The ESPR came into force on 18th July 2024. This regulation is focussed on improving the overall circularity and both energy and environmental sustainability performance of products. This framework sets guidelines and benchmarks on multiple components including product durability, reusability, resource efficiency and carbon footprints. The key mechanism for capturing and sharing this data is a Digital Product Passport solution that will provide multiple stakeholders with a detailed breakdown of the products' sustainability credentials.
- **EU Strategy for Sustainable and Circular Textiles:** This is in the implementation stage as of March 2022 and is another key area of the CEAP. This regulation is focussed on improving the overall circularity of textiles found in clothing, buildings and vehicles among others. The key goal is to essentially improve the longevity and durability of textiles and to increase the ease of repair and recycling. There is a heavy consumer/end-user aspect embedded into this legislation that enables them to verify the 'green claims' of the companies they are purchasing textile products from. As per the official regulation, Digital Product Passports will be utilised as the key solution for enabling this mechanism and goal achievement.
- **Construction Products Regulation (CPR):** This is in the implementation stage as of March 2022 and is another key area of the CEAP. This regulation is focussed on ensuring that construction products across Europe abide by safety and environmental criteria. The framework being built lends a hand to the usage of Digital Product Passports.
- **(New) EU Battery Regulation:** This is currently in the proposal stage that was published in December 2020 and is another key area of the CEAP. This regulation is focussed on ensuring that batteries within the EU area are sustainable and safe that carry high levels of recyclability. This is due to be implemented over the coming years, with 2026/7 proposed for it to take effect in the industrial and EV car battery markets. Again, a Digital Product Passport (or Battery Passport as noted) will be the key solution powering this regulation.

- **Corporate Sustainability Reporting Directive (CSRD):** This initiated in January 2024 and obligates listed companies (except micro-companies) and large companies (those meeting 2 out of 3 of the defined criteria that consists: 250+ employees, €40m+ turnover & €20m+ total assets) to report on sustainability and ESG issues. This detailed reporting helps support the move towards a more 'green' and sustainable economy.
- **EU Green Claims Directive:** Adopted on 12th March 2024, the EU Green Claims Directive is a legislative proposal aimed at combating greenwashing by establishing clear, reliable, and verifiable criteria for environmental claims made by companies about their products or services. The verifiable sustainability information contained within DPPs will help organisations comply with this directive, giving customers unfettered access to this data so they can make informed purchase decisions.
- **Toy Safety Regulation:** This regulation introduces stricter rules on chemical substances, improves conformity assessment procedures, and mandates new requirements for Digital Product Passports within the EU Toy industry, aiming to provide the highest levels of child protection and reduce the presence of unsafe toys on the market. DPPs will be mandatory for all toys and will include comprehensive compliance information, helping ensure transparency and traceability.
- **EU Detergents Regulation:** The EU Detergents Regulation governs the market placement, composition, labelling, and biodegradability of detergents and surfactants in the EU. The regulation aims to protect the environment and human health by ensuring that detergents are safe and effective. The revised regulation is expected to be implemented by the end of 2024, with full compliance required by 2025. This allows a transition period for manufacturers to adapt to the new requirements.

As per the CEAP's guidelines, prioritised industries have been selected based on their currently high wastage attributes, current climate impact and high potential for fitting within broader EU circularity strategies.

Digital Product Passports will be applied to these prioritised industries that include batteries & vehicles, textiles, electronics & ICT, furniture, plastics, construction and chemicals. All of which are expected to be fully utilising DPP's by the end of the decade.

Companies Registered Outside of the EU

Despite Digital Product Passports being steered by the European Union under numerous legislation – its not just European-based companies that will have to utilise DPPs.

Any product that enters the EU market must comply with the related legislation, meaning that they will have to carry an associated DPP – even if the company is registered in non-EU territories.

Aware that resulting complexity could disrupt global supply chains and business ecosystems, the EU will extend support to partner countries and engage in open dialogue with international nations to ensure joint collaboration with DPP regulations and infrastructure.

3. A Digital Product Passport Solution

A Digital Product Passport essentially creates a digital twin of a physical product and securely records event, transactional and sustainability-based data from across the product's lifecycle. The digital twin is commonly associated to the physical product via a QR code, barcode or other technology such as NFC tagging – with the Digital Product Passport being accessible via a smart device application or similar.

For example, a consumer could scan a QR code embedded onto the label of a clothing item and be immediately redirected to the associated Digital Product Passport to view data on the product's sustainability credentials, ownership history and even details on how to recycle.

Although the current legislation and scope of Digital Product Passports is firmly focused on collecting full product lifecycle data to provide a full view into its sustainability, recyclability and circularity – by diversifying the type of data collected, the use-cases and opportunities expand.

This means that the digital twin concept and Digital Product Passport technology is not limited solely to those markets such as textiles and batteries who are being directly targeted on a European Union level. This technology is open to all businesses, regardless of industry to experiment and utilise for long-term business and customer value.

In fact, many industries are already jumping ahead of the curve and utilising Digital Product Passport technology to unlock additional use-cases related to transparency, traceability and tradability.

Data Collection & Requirements

When taking a more holistic view of Digital Product Passports in terms of their current and potential utility – there are multiple different data categories that can be collected and subsequently shared across entire ecosystems and value-chains.

- **General:** This refers to general product information and data that is used to identify the product provenance including product ID & batch numbers, reference numbers, weight/volume, manufacturing facility location and dates and manufacturer operator ID among others. This is particularly useful when for example, a consumer wants to verify the authenticity of the product and avoid purchasing a counterfeit or forgery.
- **Source:** Referring to the type and origin of raw materials and components utilised within the manufacturing and development of the product. Information related to the chemicals, plastics, ingredients and substances used are included along with what materials have been previously recycled and recovered. Further to this, details regarding the sustainability of the actual manufacturing process itself, and whether ethical practices were abided by could also be recorded and accessed. An example here would be a consumer being able to validate whether the green claims of a company they are purchasing from are legitimate.

- **Footprint:** Data relating to the carbon footprint, expected waste generation and environmental impact of the product throughout the manufacturing process, lifecycle and actual usage of the product. This can reinterpret data held within categories above, such as providing details on the energy utilised or emissions to water or air that were emitted within the manufacturing process and what raw materials or components of the product are made from recyclable materials. Essentially, the DPP will illustrate resource consumption and environmental impact of associated products.
- **Maintenance:** Details related to the repairability attributes of a product, and the actual repair 'events' that have occurred throughout a product's life. This could include a deep dive into the location/outlet that carried out the repair, details of the actual repair and cost, along with any supplementary notes to build context of why repair was required in the first instance. And example here would be a luxury watch owner who initiates a repair to their item after accidental repair – with all details recorded on the associated digital passport.
- **Ownership:** This incudes details related to past and current owners of a particular product including detailed breakdowns of ownership duration and a specific event audit trail. The level of ownership detail could of course be configured based on unique use-cases, but an example here would be clothing and luxury good resale whereby ownership could also be transferred through the digital passport application.
- **Instructions:** The DPP will store instructions and protocols for numerous operations such as disassembly and recycling, end-of-life and disposal, along with procedures on how to repair, refurbish, upgrade or reuse the product. Combined, this data will inform relevant stakeholders on the steps to take in order to effectively transition the product into the remanufacturing process to aid circularity.
- **Documentation:** Digital versions of warranty, service, insurance and guarantee documentation that can be immutably stored within a digital passport and accessed by all relevant parties. This would also contain expiry, and any repurchase data that an end-user could use to validate their claims and coverage. An example here would a vehicle owner who elects to utilise a free service package that they have previously purchased. Via the digital passport associated to the vehicle, the vehicle brand's service department would be able to verify the owners claim without the need for standard administrative processes.

As previously mentioned, Digital Product Passports as a technology is still early and use-cases continue to grow – directly tied to the type of data being collected. Ultimately, Digital Product Passports provide multiple parties including manufacturers, consumers, re-sellers and recycling entities with a full audit-trail of events and transactions that have occurred through a product's life.

For now, the key focus is on the sustainability, repairability and recyclability of a product that all ties into the broader circularity of the actual product. But as more businesses dive into the technology and understand its potential, Digital Product Passport use-cases and opportunities will continue to scale.

EU Digital Product Passport Requirements According to the ESPR

While Digital Product Passport solutions can be adapted to a number of different use cases and can include various features and functionality, the Ecodesign for Sustainable Products Regulation (ESPR) outlines a number of key Digital Product Passport requirements for compliance.

Currently, these requirements can be categorised into three key categories, which include general requirements, access requirements and data requirements.

General Digital Product Passport Requirements

- Passport should exist and be in compliance with essential requirements
- A DPP should be uniquely linked to a product
- A back up copy must be made available via third party product passport service provider
- The passport must remain available for at least expected lifetime of product
- A DPP must be fully interoperable with other digital product passports

Digital Product Passport Access Requirements

- Access should be given through a unique product identifier embedded in a data carrier
- A copy of the data carrier and unique product identifier should be made available to dealers and online marketplaces
- There should be differentiated access to data with data broken down into public and restricted data

Digital Product Passport Data Requirements

- DPP should include all mandatory information listed in the product group-specific delegated act
- The information contained in the DPP should be authentic, reliable and verified
- The unique product identifier should be created and issued in accordance with standards
- There should be a link to the EU digital product passport registry of all unique identifiers
- A copy should be uploaded to the EU web portal

While this gives a basic overview of current requirements, it is important to note that more detailed information on the requirements of DPPs is expected to be released by the EU under delegated acts in the coming months.

Data Carrier

Data carriers refer to the mechanism that enables end-users to access the Digital Product Passport tied to a particular product. At present, EU guidelines suggest that organisations will have the freedom to decide what data carriers they utilise for any single, batch or type of product. Data carrier types suitable for DPPs include:

- **QR Code:** Already commonly utilised across several different industries and verticals for a multitude of purposes – the QR code could be considered the current go-to data carrier. Also famed for its durability and flexibility, QR codes are also widely accessible due to their easy connectivity with a smart device.
- **Barcode:** A similar option to the QR code carrier type, but offering less flexibility in terms of data held and utility due to its general purpose being to store product based data and not for example, act as a conduit between a user and a webpage (that could contain the associated DPP).
- **NFC:** Already used for contactless payments, NFC are similar to QR codes in that they are accessible by the majority of modern day smart devices, although they do carry additional cost as they are essentially standalone hardware devices (stickers with embedded antenna and microchip). A large advantage NFT tags have over QR & barcodes is their ability to be installed ‘inside’ a product and not necessarily on the ‘outside’ that offers further security benefits.

Data Sharing

Given the broad number of stakeholders and entities that participate in any given value chain, along with the varied demands and usage of data – a DPP solution will require a flexible approach to data sharing and accessibility.

Under the Ecodesign for Sustainable Products Regulation (ESPR), key stakeholders who should have access to a DPP (based on varying permissions and access rights) include:

- **Customers**
- **Manufacturers**
- **Importers**
- **Distributors**
- **Repairers**
- **Remanufacturers**
- **Recyclers**
- **Market surveillance authorities**
- **Customs authorities**
- **Civil society organisations**
- **Trade unions**
- **European Commission**

Current proposals will categorise data stored within the DPP between private or public – whilst permissions to access, modify or update data will be defined by the European Commission. Although specific delegated acts to formalise DPPs for each target industry are still under development, the Commission has ensured that data security and privacy is at the heart of DPP design.

Why Blockchain?

Blockchain technology acts as the perfect foundation on which to build a Digital Product Passport solution for several reasons.

- **Data Security:** A consensus approach to validating data, underpinned by the most robust encryption system virtually eliminates data tampering and fraud. Decentralized technology also removes single points of failure securing data like never before.
- **Immutability:** As an immutable digital ledger, blockchains offer an extremely high level of trust in the data they contain. Consensus-based data validation guarantees that the information held is accurate and hasn't been changed or tampered with by malicious parties.
- **Transparency:** All blockchain transactions are provable, traceable and searchable on-chain, providing complete transparency for all ecosystem stakeholders in relation to the data stored within Digital Product Passports.
- **Efficiency:** Data is processed, exchanged and validated quickly with blockchain. The execution of smart contracts enables processes to be streamlined. This also cuts out the overreliance on intermediaries and 3rd parties – driving efficiency and data proficiency.
- **Decentralization:** Blockchains are decentralized, censorship-resistant, and less vulnerable than legacy technologies that rely on centralised servers.

Customer Experience Layer

Digital Product Passports offer the opportunity for businesses to leverage an additional channel, one that provides a direct link to their customers. Marketing, sales and customer success teams can all utilise the digital passport application as a means of offering new services or features that are otherwise unavailable.

An example of this is Breitling, who via their blockchain-powered digital passport enable customers of their luxury timepieces to claim ownership of their watch and access exclusive services.

This is an early example of how digital passports provide additional value outside of their core purpose and how the concept will continue to evolve and open up new opportunities for both brands and customers.

4. The Value of Digital Product Passports

As Digital Product Passports impact and involve multiple stakeholders from across value-chains and sectors – the benefits and value are far reaching. From organisations, to consumers, to policy makers and recyclers – digital passports provide benefits for all.

Benefits to Businesses and Organisations

- **New Business Models:** The push towards a circular economy with more focus on product longevity provides a plethora of new business opportunities (such as product-as-a-service) that can be utilised to unlock additional revenue streams and growth drivers for companies. Circularity may for example enable an entirely new repair and service function for businesses that further provides the opportunity to forge stronger relationships with customers. Digital passports can be seen as an additional channel that marketing, sales and business operations can tap to provide new services and an enriched customer experience.
- **Increase Consumer Trust:** By recording events across the full lifecycle of products from manufacturing all the way to recyclability or disposal – businesses can offer consumers a fully transparent view into the authenticity and state of the product they are purchasing. This is backed up by the finding that 46% of consumers want clarity on product sourcing. This effectively increases buyer confidence and can maximise retention and loyalty.
- **Validate Green Claims:** Greenwashing is becoming a serious issue that is tainting the reputation of companies who are making legitimate claims. Through a digital passport, the sustainability attributes and claims are fully validated and secured on an immutable blockchain network – which is crucial as 53% of consumers can't identify greenwashing claims. This also enables businesses to optimise their circular strategy and become a sustainability leader in face of increasing demand from their customer bases to do so.
- **Consumer Protection:** By ensuring that the raw materials and manufacturing processes abide by pre-set standards, businesses can protect their customers from illegitimate, dangerous and sub-par raw materials and end-products. By extension, this protects the brand from negative PR issues such as product recalls and incidents caused by product defects.
- **Ensure Compliance:** Supply chains can become incredibly complex and difficult to track, meaning that organisations may legitimately lack the required data to monitor their compliance and sustainability performance. Through digital passports as a single and shared source of truth – this data can be more easily tracked and accessed, leading to businesses being able to track their compliance with initiatives in real-time.

Benefits to Consumers and End-Users

- **Buyer Confidence:** Digital passports enable consumers to make more informed purchase choices related to the sustainability performance of the brands they buy from. As consumers are beginning to increasingly favour brands that back-up their green-claims, digital passports are a perfect tool. This is reinforced by the finding that 33% of consumers have stopped purchasing from a brand over sustainability concerns. Further to this, there has never been a time where consumers haven't cared about the state, authenticity and history of the products they purchase, so by having an accurate depiction of the products' lifecycle at hand, buyer confidence will continue to grow.

- **Maximised Product Value:** Similar to the above, consumers can rest assured that their products are legitimate – enabling them to avoid faulty or forged goods. This contains added benefits when the consumer chooses to enter the burgeoning resale market to resell their products. Being able to prove that their product is legitimate protects product value.
- **Identify Greenwashing:** As previously noted, digital passports are a perfect tool to enable consumers to identify greenwashing and validate a company's claim in relation to their green initiatives. Though the immutability and transparency provided by blockchain, consumers can identify whether they are being purposely misled. A case to outline this is the fashion brand H&M who is being sued for their claims of environmentally friendly clothing – when in fact this turned out to be misleading. Through a digital passport, consumers will be able to detect any false claims immediately and independently.
- **Recognise Carbon Footprint:** Many consumers who are seeking more sustainable responsibility from their chosen brands are looking to improve their own performance and reduce their carbon footprint. Depending on the type of product, accurate data on energy consumption and environmental impact can be gathered from an associated digital passport, which could also include additional blockchain-enabled services. For example, through tokenisation, a clothing retailer could incentivize consumers to recycle their end-of-life clothes (at official recycling partners or in-store) and be rewarded with a 'sustainability token' that could eventually be traded for loyalty rewards or other perks. Blockchain and digital passports opens new doors for encouraging positive action from consumers in joining the pledge to champion circularity.

Benefits to Policy Makers and Governing Bodies

- **Verify Compliance:** By utilising a DPP framework, policy makers such as the European Union and member states will be able to locate, analyse and evaluate business compliance with sustainability initiatives. In essence, DPP's provide a unified basis for tracking the sustainability performance of business entities and organisations, providing a mechanism for policy makers to benchmark KPI's and take necessary action if required.
- **Drive Sustainability:** By creating an immutable platform for recording sustainability data and enforcing policies – businesses and organisations will be forced to follow guidelines, particularly when their 'green performance' is fully open and transparent. Under a digital passport system, greenwashing and false claims are significantly reduced, giving policy makers the best chance of meeting their key sustainability, resource optimisation and circularity goals.

5. DPP Use-Cases

This guide has introduced the key drivers behind Digital Product Passports and their unique components. Although the current focus is on proving sustainability and enabling the circular economy initiatives, there are multiple other use-cases and opportunities that can be unlocked once the scope of digital passports is expanded.

- **Provable Sustainability:** Digital passports enable organisations to capture key upstream data points, information and events from across the manufacturing and product creation process. Data points related to resources utilised and emissions released during the manufacturing process fully details the environmental impact of the product. This enables organisations and brands to prove their sustainability claims to consumers whilst validating compliance to regulators and authorities.
- **Lifecycle Tracking:** Digital passports are continuously updated with downstream events throughout the entire lifecycle of a product. From repairs, to maintenance, to upgrades – DPPs become a repository for storing all noteworthy events. Importantly, information on disposal, end-of-life and product recycling are also captured in a DPP, providing a foundation for product circularity and remanufacturing.
- **Enable Circularity:** Linked to the points above, by capturing a range of upstream and downstream data points – DPPs become a tool for powering product and supply chain circularity. Through full visibility into the raw materials and components used within a product along with details into which parts of the product can be recycled & re-used – circularity can be achieved.
- **Data Transparency:** Digital passports provide a foundation for increased transparency and data accuracy throughout the entire supply chain – increasing efficiency and strengthening relationships among suppliers and ecosystem participants. Processes and information exchange throughout the value chain are improved as DPPs enable real-time audit trails of asset and data flows.
- **Trace Provenance:** Digital passports improve traceability throughout the supply chain – enabling consumers to track the origin, source and provenance of the raw materials and resources used within their products. This proof-of-source builds trust between organisations and their customers whilst providing all parties oversight into the resources and raw materials used within the manufacturing process.
- **Ownership Verification:** Digital passports powered by decentralised blockchain infrastructure enable consumers to claim immutable ownership of their product. Historical owners and exchanges between buyers and sellers can be visualised that boosts trust in resale markets – whilst ownership can be easily transferred between parties to improve resale efficiency. Fast and easy verification of second-hand goods generates real opportunities for brands themselves to unlock new revenue streams in profitable resale markets.
- **Combat Counterfeits:** Digital passports enable consumers and brands to verify the authenticity of a product. For brands in industries where counterfeiting is a huge challenge, product passports quickly and easily determine not only whether a product is authentic but can even verify ownership (while protecting the owner's personal details). The ability to present the digital passport alongside the linked physical product will enable brands and consumers alike to effectively combat the counterfeit market.
- **Customer Experience:** Digital passports can act as an additional communications and engagement channel that directly interfaces organisations with their customer. Extra services, perks and experiences could be offered exclusively through this channel, that also acts as a perfect gateway for educating customer on sustainability initiatives. Brands could go a step further and utilise tokenisation to gamify and incentivize sustainable behaviour from customers – leading to increased loyalty and retention.

6. Applicable Industries

While the delegated acts containing each industry's specific DPP requirements have yet to be published, the following industries have been identified as high priority for sustainability and circularity measures:

- **Batteries:** DPPs enable organisations to satisfy the regulatory requirements imposed by the Battery Regulation, which mandates the implementation of battery passports by 18th February 2027 for batteries in light means of transport (LMT), industrial batteries and EVs. From sustainable sourcing provenance to increased circularity and advanced safety, DPPs can help transform the batteries industry.
- **Chemicals:** The EU chemicals industry produced approximately 7.9 Million metric tonnes of waste in 2020. DPPs can help the chemical industry to increase circularity for chemical products by enabling supply chain traceability, swift verification of their safety credentials, and improving upstream visibility. They contain end-of-life instructions, improving their recyclability and capacity for safe disposal. DPP requirements for chemical products will be delivered via a delegated act under the ESPR between 2026 – 2030.
- **Construction:** Regulations such as the ESPR and CPR mandate DPPs for the construction industry to help reduce the industry's environmental impact. DPPs can provide a platform for sharing product sustainability information with construction stakeholders to enable environmentally conscious supply decisions, leading to more sustainable construction projects and mitigating negative reputational impact. DPPs under the CPR are expected to come into effect from 2027.
- **Electronics:** Presently, only 20% of all e-waste is recycled. DPPs can reduce waste and improve circularity in consumer electronics by containing recyclability information and detailed disposal instructions specific to each item which can help to reduce the amount of e-waste sent to landfills. Each product's verifiable raw material composition is displayed for stakeholders to scrutinise, assisting with retrieving rare earth materials from e-waste. DPP requirements for electronics products will be delivered via a delegated act under the ESPR between 2026 – 2030.
- **Furniture:** 12.2 Million tonnes of furniture waste is generated globally on a yearly basis, with over 80% of that ending up in landfills. DPPs can help the furniture industry increase its overall recycling rate (currently 0.3%) by providing accessible recycling and remanufacturing instructions. The verifiable sustainability data included within DPPs can also help furniture firms prove that their green claims are genuine, tackling greenwashing and empowering customers to make environmentally conscious purchases. DPP requirements for furniture products will be delivered via a delegated act under the ESPR between 2026 – 2030.
- **Luxury Goods:** As well as providing sustainability information and raw material provenance for luxury goods, DPPs enable enhanced supply chain traceability to help customers identify counterfeit goods and allow brands to remove unscrupulous suppliers from their network. When combined with blockchain, DPPs can contain tamper-proof ownership records, enabling more secure trading on second-hand marketplaces. DPP requirements for luxury goods will be delivered via a delegated act under the ESPR between 2026 – 2030.
- **Plastics:** 400.3 Million metric tonnes of plastic was produced across the globe in 2022, with plastic production generating some of the highest CO2 emissions of any industry. DPPs can provide a granular on the carbon emissions produced during plastic manufacture for each of a company's products, giving them a holistic view of their emissions profile. identify and monitor high-emission processes and take action to make them greener. DPP requirements for plastics products will be delivered via a delegated act under the ESPR between 2026 – 2030.

- **Textiles:** 92 Million tonnes of textile waste is produced each year and is expected to grow to 134 million tonnes by 2030. The ESPR has given textiles a specific mandate to help curb this waste by introducing DPPs by the year 2030. The information contained within DPPs will help boost the circularity of textile products by providing recyclability and disposal instructions and tackle greenwashing in the industry by giving key stakeholders easy access to sustainability, manufacturing, and raw material data for individual products.
- **Toys:** Discarded toys contribute environmental hazards such as microplastics and greenhouse gas emissions – 90% of toys are made of plastic, with 80% of those toys ending up in landfill, incinerators, or the ocean. DPPs are mandated by the Toy Safety Regulation to help improve circularity in the industry by providing access to recyclability information. They also provide verifiable safety information that can be accessed by customers, customs officers, and regulators, helping to reduce the number of unsafe toys on the market.

The Way Forward

It's clear that sustainability and circularity are no longer 'nice to haves' but are instead quickly becoming a key strategic priority for organisations, brands and even consumers. On the policy-making level such as the European Union, legislation is in development that paves the future for Digital Product Passports as a key enabler for the circular economy.

For stakeholders within the textiles, electronics, battery and construction industries among others – the mandatory adoption of Digital Product Passports is fast becoming a reality. Now is the best time to begin exploring and experimenting with the technology, both to gain first-mover advantage and to ensure you have enough time to effectively bring your value chain and stakeholder ecosystem inline with your solution prior to legislation taking effect.

How Protokol Can Help

At Protokol, we are experts in Web3 and blockchain technology. Through our consulting and development services we can help you build and deliver your Digital Product Passport solution to support your broader sustainability and circular strategy.

Contact us to discover more and book a call with our experts: **protokol.com/contact**

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