UNLOCKING DPP

The Why, What and How of Digital Product Passports

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It’s hard to get excited about regulations: the complicated language, the rules, the financial burden of implementation, the requirement to change; but strangely enough, the Ecodesign for Sustainable Product Regulation (ESPR) (and within it, the Digital Product Passport requirement) is exactly what the fashion industry has been asking for for years, it just didn’t know it.

The EU Ecodesign regulation and its digital product passport component are set up to provide the level playing field, with standard ways of measuring and communicating sustainability efforts and impact, that the industry has long been needing. This book explains why and how the regulation sets about doing this, why it’s pivotal to create a circular economy, what the ESPR and DPP entail, and what this means for all brands - irrespective of size or revenue - that are selling textile products in Europe.

Sharing learnings from a first of its kind ‘live DPP textile pilot’ in partnership with brands Marimekko and Kappahl, this book also offers concrete guidance on the data and digital system integration brands will need to be ready for DPP. ESPR was adopted by the European Parliament in April 2024. The DPP will follow next, and this book sets brands up with guidance and tangible examples of how to start preparing today.

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About TrusTrace
Founded in 2016, TrusTrace offers a market-leading platform for supply chain traceability and compliance, enabling brands and suppliers around the world to standardize how supply chain and material traceability data is captured, digitized and shared. Through providing access to validated supply chain data, TrusTrace empowers brands to identify, understand and improve the impact of their supply chain. The data can be used for risk management, compliance, product claims and footprint calculations, offering the ability to share data confidently and easily about product origin, impact, and much more.

TrusTrace is leading global-scale traceability programs for many of the world's largest brands. The company is headquartered in Stockholm, Sweden, with additional offices in India, France and the US.

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INTRODUCTION

DATA, TEXTILES AND NET-ZERO DEADLINES

'I got into fashion because I LOVE numbers and data …' said nobody, ever, (except perhaps a bespoke tailor or two); nevertheless, the European Commission has mandated that every textile product sold in European Union (EU) is 'Ecodesigned' and has a digital product passport (DPP), to be implemented between 2026-2030.

It's time for fashion to see data as a friend, not foe, especially since these new data imperatives are linked to the EU's legally-binding commitment to slash its greenhouse gas emissions to net-zero by 2050:

"Making Europe the first climate-neutral continent in the world is a binding commitment under the EU Climate Law."[1]

For brands and retailers, this marks a new era of data requirements and supply chain traceability and transparency, and for some, it's a welcome shift:

> *Digital Product Passports and the legislation to comply are coming for the industry— that's something we should all be pleased about.*

> *We see it as an opportunity to heighten the level of information and transparency we offer consumers about products, but also as an opportunity to manage product data more efficiently, with the product afterlife in mind. It's easy to see the hurdles and uncertainties, but we should all be excited about the data shift that will happen in the coming years.*
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> "

Nicolaj Reffstrup
Co-Founder
GANNI

But despite the willingness and leadership shown by some of the brands like GANNI, Marimekko and Kappahl (both of whom took part in a DPP pilot study outlined in this book), the operational components and requirements of DPP are poorly understood, hence this book, which explains why DPP is necessary, what it is, and how it will work. But first, let's look at what DPP is *not*.

MYTH BUSTER: #1
DPP is NOT simply a QR code attached to a garment and an app; it comprises digital information, physical product identification and a comprehensive digital system able to handle large volumes of data and facilitate multi-stakeholder data access and entry.

Far from being 'all worked out' and ready for implementation with the help of some QR codes and user interfaces, the DPP is established in 'why' and 'what' terms, but the 'how' is still being decided as the EU's research and pilot studies to determine this are ongoing.

The final data requirements and data standards, as well as the IT systems architecture and interoperability, are expected to be decided by 2026; however solid guidance to get brands and retailers started on DPP preparation is already in place within the Ecodesign for Sustainable Product Regulation (ESPR) which was officially adopted by the European Parliament on 23rd April, 2024 - a major milestone that paves the way for the new era referenced above by Nicolaj Reffstrup of GANNI.

Within the ESPR there is guidance on DPP data and DPP system that enabled the first end-to-end textile DPP pilot for textile products, led by TrusTrace in partnership with Trace4Value and a number of other fashion and technology stakeholders.

As the industry shifts from minimal regulation to a significant surge in both the volume and intricacy of global laws, the potential for it to become overwhelming is palpable. The DPP is no exception as its extensive data demands on a per-product basis will necessitate gathering and validating data that has historically been hard to access.

Nevertheless, true visionaries can look beyond the immediate disruptions and challenges and recognize the potential this data holds. The possession of detailed supply chain data empowers brands to adopt a proactive stance, enabling them to maintain control rather than being caught off guard by the inevitable disruptions.

DPPs serve as a critical element in constructing the data, insights, and infrastructure necessary to drive a truly circular economy, as well as unlocking novel business opportunities, but how to effectively create and implement them is not clear today. This is what we are aiming to clarify in this book.

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Shameek Ghosh
Co-Founder & CEO
TrusTrace

This book explains the 'Why' and 'What' of DPP, and for the first time, presents fashion brands and retailers with a textile-specific end-to-end case study for the 'How.'

As the 'responsible economic operators' for complying with DPP, brands and retailers can, and should, begin preparing for DPP now, and this book is their essential guide.

THE ‘WHY’

This chapter answers the questions:

Why is the DPP being introduced and what will it achieve?

How does the DPP fit into the wider legislation and regulations changes in Europe, and those related to the textile and fashion industry?

What is the impact of textile products, and how will DPPs help address this?

LEGISLATION AND REGULATIONS

DPP is one requirement within a much bigger set of plans that the European Union (EU) has put in place to realign industry with climate targets. Under the European Climate Law, the EU committed to reduce its net greenhouse gas emissions by at least 55% by 2030, and it needs plans and strategies to help achieve this target. Furthermore, the EU aims to be 'emissions-neutral' by 2050.

In 2020, the European Commission introduced the European Green Deal: a set of proposals for climate, energy, transport and taxation policies aimed at reducing net greenhouse gas emissions by at least 55% by 2030[2].

The European Green Deal aims to ensure[3]:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind

THE EU GREEN DEAL AND CIRCULAR ECONOMY ACTION PLAN (CEAP)

The European Green Deal sets in stone the EU's green transition ambitions and climate targets. Under the Green Deal umbrella, the Circular Economy Action Plan 2020 (CEAP) seeks to enhance the Deal by providing businesses with a trigger to scale up the circular economy.

The four core themes of the Circular Economy Action Plan 2020 are:

1. Make sustainable products the norm in the EU
2. Empower consumers
3. Focus on the lifetime of products through a sectoral lens
4. Ensure less waste.

The CEAP 2020 is a call to action to create sustainable products, with specific chapters focused on enabling sustainable product policy actions and product value chain actions; it also encourages less waste and more customer-centric actions. To emphasize action and accountability, the CEAP 2020 outlines pivotal legislation and provides target implementation dates[4].

The CEAP addresses two key legislative actions for textiles:

1. High levels of separate collection of textile waste by 2025 (for EU member countries)[5]
2. EU Strategy for Textiles 2021

The EU Strategy for Textiles includes the laws, regulations and guidance specific to the textiles sector and textile products; including the Ecodesign for Sustainable Products Regulation (ESPR) and within it, the requirement for each product to have a Digital Product Passport (DPP).

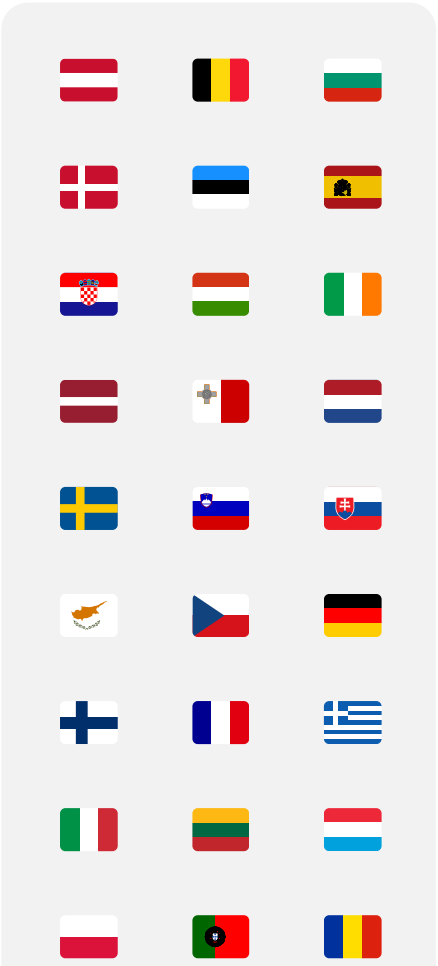
THE EU DATA STRATEGY AND DPP

In 2020 the European Commission introduced the EU Data Strategy with the purpose of developing ‘common European data spaces’ in strategic economic sectors and domains of public interest. The DPP and the DPP system are being devised in

OVERVIEW

The EU Green Deal, CEAP and Sustainable Textile Strategy

The European Union consists of **27 Member states:**



The EU Green Deal

CEAP Circular Economy Action Plan

Sustainable Textile Strategy

- EU Product Compliance Network
- Taxonomy Regulation Delegated Act
- Eco-design for Sustainable Products Regulation (ESPR)
- Empowering Consumers for the Green Transition
- Corporate Sustainability Due Diligence Directive (CS3D)
- EU Forced Labor Regulation
- Green Claims Directive
- PEF Methodology for Apparel and Footwear
- Waste Framework Directive Extended to Textiles
- Revision of Regulation on Waste Shipments
- Revision of the Industrial Emission Directive
- Revision of EU Ecolabel Criteria
- Revision of the Textile Labelling Regulation
- EU Toolbox Against Counterfeiting

The Green Deal has many strategies and regulations targeting all sectors, that we do not cover here

Every 5th year there is a new election in the EU, with a set of new politicans steering the EU forward

In 2019 the elected politicians defined **The Green Deal**; Including the **Circular Economy Action Plan** with the **Sustainable Textile Strategy**, where many laws and regulations addressing the apparel and textile industry were shaped.

Many of the regulations apply to **all global companies selling in the EU**, not just for EU companies.

accordance with this Data Strategy (also part of the EU Green Deal) which means they will be built to incorporate data infrastructures and governance frameworks critical to delivering the EU Green Deal.

One of these requirements is that the DPP data will be accessible and interoperable (explained in the upcoming '*What*' section) to facilitate the circular economy. In the case of textiles, DPP will provide data to enable product-level care, repair, and recycling for circular economy value creation.

The EU Data Strategy (and CEAP) contains legislation and regulations that support the EU's quest for economic growth decoupled from resource use in the textile sector (and other consumer product sectors).

THE IMPORTANCE AND ROLE OF DPP

DPPs are one facet of many regulations intended to help deliver the EU Green Deal's aim of 'green growth[6]' and net zero emissions. DPPs will help unlock the circular economy potential of textile products.

With the aim of DPPs clear, what are the impacts of textile products and how will regulations like ESPR and the DPP help deliver green growth?

MYTH BUSTER #2

The DPP is not merely a mechanism for collecting product-specific data to enable repair, recycling and consumer engagement; it is a key facet of the entire EU bloc's environmental and economic plan for achieving economic growth with reduced environmental impacts. The textile sector in Europe has been in decline for some time, and the EU Textile Strategy aims to revive it, extracting greater economic value and higher employment for the sector.

EUROPEAN UNION DEFINITIONS

What is the European Union and who are its members?

- The European Union (EU) is a political and economic union of 27 member states located primarily in Europe.
- EU members include countries like Germany, France, Italy, Spain, the Netherlands, Poland, and others. Two examples of non-members of the EU are Norway and the UK.

What is the European Commission (EC) and what does it do?

- The EC is the executive branch of the EU responsible for proposing legislation, implementing decisions, and upholding the EU treaties.
- It also represents the EU in international affairs and manages the day-to-day business of the EU.
- The EC is steered by 27 commissioners, one representing each member state of the EU, together making decisions on the ECs strategic and political direction.

What is the difference between laws, regulations, directives and texts?

- A law is a binding legislative act that must be obeyed by those to whom it is addressed.
- A regulation is a binding legislative act that applies directly and uniformly across all EU member states without the need for national legislation. An example of a regulation is the ESPR, where the details are mapped out by the EU through the legal text and the delegated acts for textiles, and all member states have to comply with the regulation as it is.
- A directive is a legislative act that sets out the goal that the EU must achieve. Then it is mandatory for the 27 member countries to transpose the directive to national laws. One example is the Corporate Sustainability Due Diligence Directive, that will now transpose into 27 national laws.
- A 'text' usually refers to legal documents, such as treaties, agreements, or directives, which may not be legally binding on their own but provide guidance or principles for action.

How do/will EU member countries adopt the European Commission's Green Deal Strategies including CEAP?

- The Green Deal was approved in 2020, by the newly voted parliament (2019), with the aim of a more sustainable and climate-neutral European Union.
- EU member countries adopted the European Commission's Green Deal Strategies, including the Circular Economy Action Plan (CEAP), through various mechanisms such as incorporating them into regulations, national legislation, policies, and strategies.
- This adoption process involved consultations, negotiations, and adjustments to ensure alignment with each country's specific circumstances and priorities.
- EU elections are every 5th year, marking June 2024 a new parliament will form in the EU. The Green Deal remains but it will be up to the newly elected members of parliament on how the continuous enforcement of the now-adopted regulations under the Green Deal and CEAP will shape our industry.

EU TEXTILES TRADE AND IMPACTS

According to the European Environmental Agency (EEA), on average, textile consumption[7] in Europe has the fourth highest impact on the environment and climate change from a global lifecycle perspective; the third highest impact on water and land use, and the fifth highest in terms of raw material use and greenhouse gas emissions[8]. These figures are based on estimated consumption of textile goods (calculated as the difference between textile imports and exports) in the EU's 27 member states[9]. However, estimated textile consumption figures are known to be a poor indicator of the actual volume and type of textiles available for circular waste streams.

Recent research by the New Cotton Project[10] noted that an absence of reliable textile waste data was “slowing down the development of system level solutions and economic incentives for textile circularity”[11]. It also revealed that the data is “at least two years old, and often incomplete and inconsistent due to varying methodologies and data years.” The project's research found a 20% difference between ‘put on market’ textile figures and measured quantities of post-consumer textiles collected separately and present in mixed residual waste[12]; it also concluded that there is almost no reliable information about fibre composition in the post-consumer textile stream either.

The New Cotton Project consortium has since urged EU policy makers to focus on “standardizing reporting requirements across Europe from post-consumer textile collection” and “incentivize digitization so that reporting can be automated, and high-quality textile data becomes available in near real-time.”

TEXTILE DATA GAPS AND ‘GUESSTIMATES’

The EEA data limitations and the findings of the New Cotton Project illustrate that data on textile waste volumes and types in Europe is of poor quality, old and gap-laden, restricting the advancement of textile circularity infrastructure in Europe (since investment in such infrastructure depends on data demonstrating the volumes and types of textile waste to be processed).

Furthermore, without product-specific data available to value chain stakeholders, maximum utility and economic value cannot be extracted from these products, undermining EU circular economy goals. To date, textile sector trade data has been value-driven, not volume driven, and so a significant and historical textile product data gap exists in Europe.

REGULATIONS TO PLUG DATA GAPS

Textile product data gaps will be addressed through the industrial and data strategies in Europe, and through the Circular Economy Action Plan (CEAP) and its EU

Sustainable Textile Strategy. For example, the introduction of digital product passports (DPPs) for textile products will enable information sharing related to sustainability, circularity and value retention for reuse, remanufacturing and recycling[13]. The DPP will provide product information to consumers to inform purchasing decisions and extend the life and utility of products. DPP data will also be available to textile waste collectors, sorters and recyclers to facilitate the circular textiles economy in Europe.

Separately, Extended Producer Responsibility (EPR) schemes[14] (already in place in some EU countries) charge brands and retailers a fee according to the weight or number of textile products they put on the market. EPR schemes are intended to fund circular infrastructure to in turn establish the industrial capacity to drive the circular economy.

WHY EPR, ESPR AND DPP?

EPR is a ‘tax’ on textile products put on the market, where the brand or retailer is essentially ‘paying forward’ the cost of managing that product once it is disposed of by the consumer and becomes waste; somewhat of a ‘band-aid’ for today’s linear textile economy.

In practice, EPR funds can’t be used wisely today to fund future circularity solutions unless textile products are categorized (by type, volume and composition). Therefore, efforts today centre on establishing the appropriate collection and sorting infrastructure to categorize discarded textile products and waste, driven by the recently adopted EU textile waste separation law. The new law stipulates that all EU countries must have the means of separately collecting textile waste from mixed waste streams in place by 2025; this collection step is the first rung on the ladder to establishing a circular textiles economy in the EU.

In contrast to EPR, ESPR and DPP stipulate ecodesign criteria and product data requirements to increase the lifespan and utility of the product, and explain how to eventually recycle it; not a band-aid, but an enabler of the new economy where economic value will be separated from resource use.

These complementary regulations could be thought of as ESPR and DPP filling the data gaps standing in the way of maximizing the use of EPR funds; with ESPR and DPP being circular economy enablers and EPR helping to fund the switch from linear

to circular economic infrastructure in waste management terms.

ESPR aims to shift what is today under-valued and mismanaged textile products into products that have been designed and manufactured according to minimum thresholds for sustainability and durability, and with known circularity potential – all of which will be contained in the DPP.

These two regulatory strategies: EPR and ESPR (encompassing DPP) are the key to EU bloc countries unlocking what they hope will reignite the shrinking EU textile industry and deliver ‘green growth.'

EU REGULATIONS SUMMARIZED

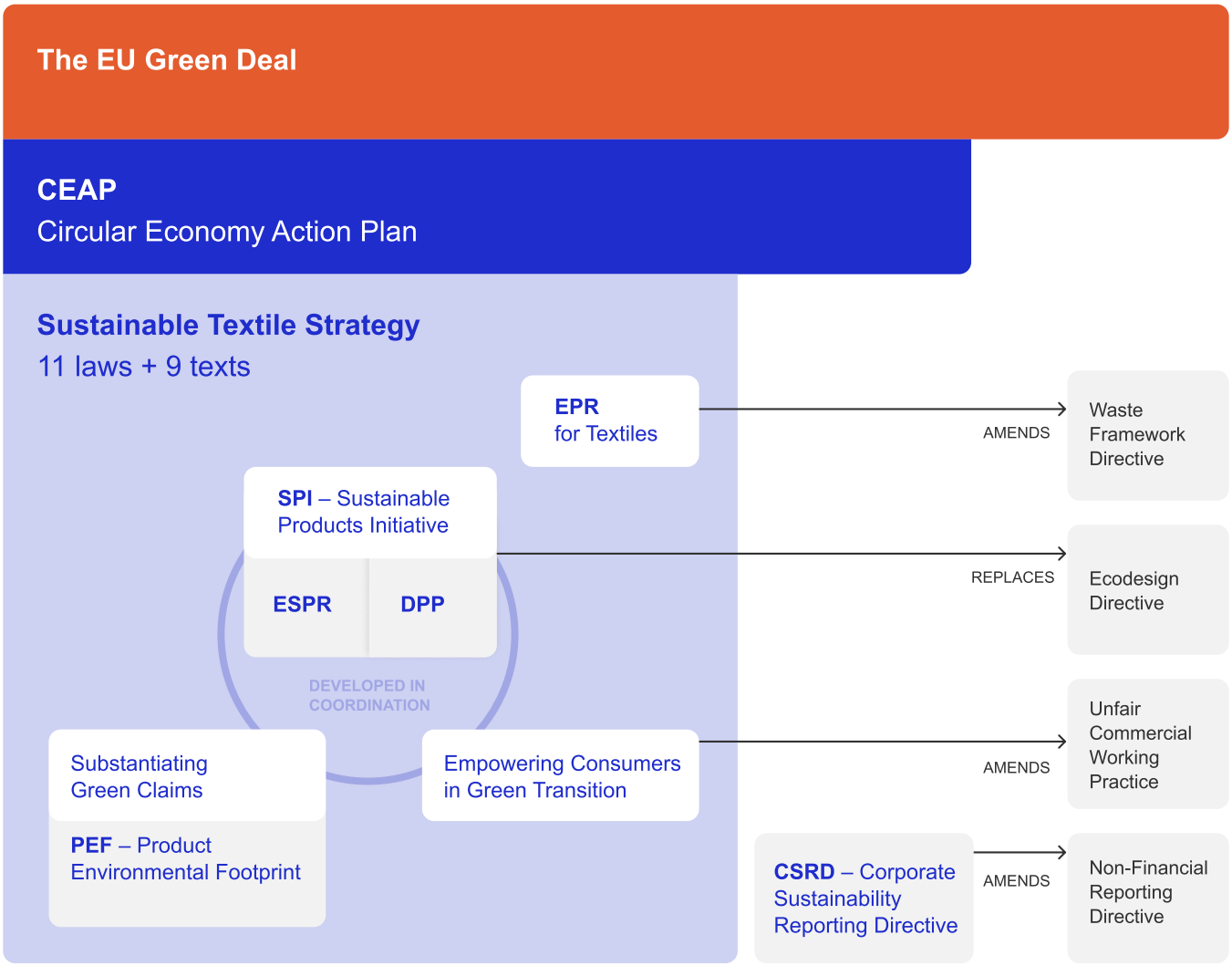
The EU’s quest for a more sustainable, circular data-driven economy begins with the EU Green Deal. The Green Deal encompasses strategies and a range of legislation and regulations for the textile industry. Within the deal is the Circular Economy Action Plan (CEAP) and a range of other plans and strategies to guide legislation and regulation to shape how industries should operate to fulfill EU economic and environmental targets.

The EU’s targets rely on decoupling resource use from economic growth (circularity) and data-driven industry transformation. Therefore, a host of new regulations are needed to fill data gaps, introduce digital systems and support circular infrastructure (strategically and financially). The result is a group of textile-specific laws, regulations and requirements solidified within The EU Sustainable Textile Strategy (the “EU Textile Strategy”).

The EU Textile Strategy includes Extended Producer Responsibility (EPR) and the Ecodesign for Sustainable Product Regulation (ESPR), which includes the requirement for Digital Product Passports (DPPs).

THE EU TEXTILE STRATEGY IN FOCUS

The EU’s overarching Textile Strategy has been devised by the European Commission’s Environment department[15]. The strategy’s 11 laws and 9 ‘texts’ (written guidance) have resulted from consultation with value chain stakeholders in Europe (despite almost all of the EU’s textile products being manufactured in, and imported from, Asia–but that’s another story).



[16] [17]

The Textile Strategy is calling on EU member states to implement the following actions[18]:

- Mandatory Ecodesign requirements;
- Stopping the destruction of unsold or returned textiles;
- Tackling microplastics pollution;
- Introducing information requirements and a **Digital Product Passport**;
- Green claims for truly sustainable textiles;
- Extended producer responsibility and boosting reuse and recycling of textile waste

SUSTAINABLE PRODUCTS INITIATIVE (SPI)

SPI contains both ESPR and DPP and encompasses the effort to produce and trade only ‘sustainable’ and ‘circular’ products in the European market.

MYTH BUSTER #3

DPP is not only for textile products, nor does it specifically target 'fast fashion.' Textile products are one of 12 end-use products the EU will require DPPs for, and all clothing, homeware and footwear products comprising majority textile materials will be 'in scope'; the European Commission places textile products as having the highest circularity value potential of those in scope for DPP, demonstrating the economic potential hoped to be unlocked.

ESPR

Under the ESPR, Ecodesign requirements will be set for specific product categories to improve their circularity, energy performance, resource efficiency, and other environmental sustainability attributes. Textiles are one of 19 product groups (and 12 end-products)[19] currently listed for ecodesign requirements under ESPR. The Joint Research Centre (JRC) has drafted a report recommending 'potential measures' for Textiles and Footwear, on behalf of the European Commission's Environment Department[20]. The JRC lists textiles and footwear as the most impactful of the 12 end-use products across 10 environmental and human health metrics[21].

IN SCOPE PRODUCTS FOR ESPR AND DPP

The textile product group (Textiles and Footwear) has been defined by the European Commission as follows:

*"**Apparel and home/interior textiles** consumed by households, and similar products consumed by government and business and **footwear and technical textiles** usually or also meant for consumers or specifically meant for industry. Excluded are: products for which textiles (including leather) are not the dominant component."*[22]

The definition of 'dominant component' and how it will be determined has not yet been stipulated.

In addition to proposing the 'in scope' products for ESPR, the JRC authored a preceding research paper examining the impacts of European Union production and consumption of goods against planetary boundaries[23]; they concluded that products must be produced and consumed according to regulations (for example ESPR) that limit these impacts.

The new ESPR law builds on the existing Ecodesign Directive that has guided the improved energy efficiency of products in the EU for almost 20 years[24]. It will set performance and information requirements for key products placed on the EU market (identified on the basis of analysis and criteria related to the EU's climate,

environment and energy efficiency objectives and guided by the JRC). The European Commission has said that 'priority will be given to highly impactful products, including textiles (especially garments and footwear), furniture (including mattresses), iron and steel, aluminium, tyres, paints, lubricants and chemicals, as well as energy related products, ICT products and other electronics.'

The new **Ecodesign requirements** will go beyond the previous Directive's energy efficiency requirements and aims to increase circularity, covering, among others:

- product **durability, reusability, upgradability, and repairability**
- presence of **chemical substances** that inhibit reuse and recycling of materials
- **energy and resource efficiency**
- **recycled content**
- **carbon and environmental footprints**
- available **product information**, in particular a digital product passport (DPP).

DPP

DPP is the cornerstone of connecting textile product impacts to products themselves. According to the European Commission, DPP specifically aims to[25]:

1. enhance sustainable production;
2. extend product lifetimes, optimising product use, and providing new business opportunities to economic actors through circular value retention and extraction;
3. support consumers in making sustainable choices;
4. enable the transition to the circular economy by boosting materials and energy efficiency; and
5. support authorities to verify compliance.

The requirements for the DPP system are fully aligned with the goals of the European Data Strategy which aims to make the EU a leader in a data-driven society and create a single market for data to enable innovative processes, products and services[26].

In accordance with the European Data Strategy, DPP data will be available for use in the economy and society, while keeping those who generate the data in control and ensuring that European rules (including privacy and

data protection), as well as competition law, are fully respected.

DPP, therefore, is the critical component for unlocking the product-related circular economy in Europe (including for textiles).

Overall, DPP exists to facilitate product creation, use and management in accordance with the EU's economic and environmental ambitions; and to identify those responsible operators that do not comply.

Once again, for those mistakenly thinking that DPP had already been devised and implemented on products that carry a QR code connected to an app or website, you are mistaken.

Having traveled through the textile regulation funnel and arrived at the foundational digital product passport, it's time to unpack, in detail, what the digital product passport is (and isn't), how it will work, and what brands and retailers need to know, and do, next.

THE ‘WHAT’

This chapter answers the questions:

What is the DPP and what is required to comply with it?

Who and what is ‘in scope’ for DPP?

What data and systems are needed now, and in the future?

What don’t we know about DPP yet?

DPP
WHAT IS IT?

DPP is a critical enabler for ensuring that the most relevant product data for circular value creation across value chains is readily available.

DPP relies on common data spaces, where data infrastructures and governance frameworks allow pooling and sharing of data, improving its accessibility and interoperability (the ability of computer systems or software to exchange and make use of information).

Practically speaking, **a digital product passport (DPP)** has **three primary components**:

1. DPP **data**: data about the product, which must fit the scope, definitions and **standards** set for DPP
2. A **unique identifier** for each product (its digital fingerprint) that can be **accessed** via a **data carrier**
3. Built **IT systems** with architecture to facilitate **data interoperability**

DATA

The **DPP Data** is the digital information about the product.

DPPs will be the 'digital fingerprint' of each product, including the brand that made the product, where and how the product was made, the materials in the product, how it should be cared for, and its circularity potential– from repair and reuse, to disassembly for eventual recycling. Also included in the DPP will be environmental footprint and chemical compliance data.

The ESPR Article 7 (Information Requirements) and Annex III stipulate the mandatory information requirements of the DPP. Specific information requirements will be detailed for each product category in the Delegated Acts (see the 'When' section). However, the general information requirements have already been described in the current ESPR proposal documents[27], which specify that this information shall or may include[28]:

- the unique product identifier at the level indicated in the applicable delegated act
- the Global Trade Identification Number as provided for in standard ISO/IEC 15459-6 or equivalent of products or their parts;
- relevant commodity codes, such as a TARIC code;

- compliance documentation, such as the declaration of conformity, technical documentation or conformity certificates;
- requirements related to substances of concern;
- user manuals, instructions, warnings or safety information;
- information related to the manufacturer;
- unique operator identifiers other than that of the manufacturer, in particular those responsible for product certification tasks;
- unique facility identifiers;
- information related to the importer;
- voluntary EU Ecolabels;
- information on the performance of the product in relation to the product parameters;
- information for consumers and other end-users on how to install, use, maintain and repair the product in order to minimize its impact on the environment and to ensure optimum durability, as well as on how to return or dispose of the product at end-of-life;
- information for treatment facilities on disassembly, recycling, or disposal at end-of-life;
- other information that may influence the way the product is handled by parties other than the manufacturer;

It is important to note that some of this information is already collected and shared on garment labels today; DPP will simply require this information to be provided within the passport data as well.

According to ESPR guidelines[29], DPP data come in two forms: static and dynamic. Static datapoints are fixed, unalterable information that remains consistent over time, such as the product's country of origin or intended season of sale. Conversely, dynamic datapoints are subject to updates and revisions, allowing for modifications throughout the product's lifecycle to reflect changes in its status or related information. For instance, a repair that alters the material composition of a garment would necessitate updates to dynamic datapoints. Additionally, DPP information points may vary in terms of accessibility, with some being publicly available while others are subject to restricted access conditions.

UNIQUE IDENTIFIER AND DATA CARRIER

According to ESPR[31] guidelines, each product must possess a distinct identifier known as a persistent unique product identifier[32].

This identifier serves as a permanent hallmark throughout the product's lifecycle and is typically a serialized Global Trade Identification Number (GTIN) in accordance with the GS1 Standard, and ensuring comprehensive

DPP STAKEHOLDER DEFINITIONS

Responsible Economic Operator (REO): the actor responsible for placing the product on the market and thus responsible for implementing the DPP. In the textile industry, the REO could be the brand or the retailer, including retail stores and online eCommerce sites[30].

Circular Economy Operators (CEOPs): The CEOPs cover all actors involved in the circular value chain and could for example include sorter, recycler, remanufacturer and repairer. These actors will need to access DPP information as well as add data to the DPP throughout the product lifecycle.

Consumers: product purchasers who will scan the data carrier to access product information

Public authorities: regulators, customs and market surveillance authorities)

DEFINITIONS OF DATA CARRIERS

RFID Tag: Radio Frequency Identification (RFID) tags are smart labels within a tracking system that uses radio frequency to search, identify, track, and communicate information stored in the tag.

QR Code: Quick response (QR) codes are barcodes that are readable by digital devices containing a code reader, like smartphones, for example. When the code is scanned, the device accesses the information connected to that code, usually via a URL, SMS or a similar means of linking to digital information.

NFC Tag: Near-field communication technology (NFT) allows two devices to communicate wirelessly. The technology can be embedded in a small tag to facilitate data transfer between nearby electronic devices, such as smartphones and laptops.

Watermark: Watermarking is the process of hiding digital information in a carrier signal, whereby it cannot be easily noticed. Covert watermarks can be integrated into printed artworks such as on labels or packaging, which when scanned by those aware of their presence, reveal the product information.

traceability. To access DPP data the ESPR requires a machine-readable data carrier[33]. This involves attaching a QR code, RFID tag, NFC tag, or watermark to the product, providing seamless data retrieval by automated systems. Each data carrier has pros and cons. RFID tags are efficient, but can raise data privacy concerns. QR codes are cost-effective, but limited in their data capacity. NFC tags are convenient and secure, but they have a limited transmission range and a higher cost. Watermarks are invisible and secure, but may pose readability challenges.

The specific DPP use case and priorities will determine the most suitable data carrier. For now, QR codes are preferred due to consumer accessibility, whereas RFID technology is preferred for bulk scanning in recycling operations, for example, due to its efficiency.

SUMMARY OF DATA CARRIER PROS AND CONS

DATA CARRIER	PROS	CONS
RFID Tags	Efficient, durable, bulk scanning, flexibility (store various types of data), security	Relative higher cost, compatibility issues with existing infrastructure, privacy concerns
QR Codes	Cost-effective, consumer ease, flexibility (store various types of data), interactivity and consumer engagement	Limited data capacity, vulnerability to damage, dependency on smartphone technology
NFC Tags	Convenience, interactivity and consumer engagement, flexibility (store various types of data), security	Limited range, cost, device compatibility, privacy concerns
Watermarks	Invisibility, tamper resistance, longevity	Limited data capacity, requires specialized equipment, readability challenges

DATA ACCESS

Regarding data accessibility, ESPR specifies each stakeholder's access privileges. While consumers can access only public data, regulatory authorities can obtain deeper insights via additional DPP information. These access rights are expected to be detailed in the Delegated Acts, due to be written by the end of 2025.

The governance framework of the DPP system specifies the rules of data access, sharing, and updates. Data access may be granted either by the governing body, or through the responsible economic operators (REOs) (depending on how the final system architecture will be configured).

The ESPR stipulates that access to DPP data should be provided freely and with minimal barriers, accompanied by well-defined access rights[34], ensuring that users can readily obtain the information they require without undue complexity.

Lastly, ESPR emphasizes the importance of obtaining explicit consent before engaging in any secondary use of DPP data[35]. Such measures are instituted to uphold the confidentiality and integrity of the information housed within the DPP, safeguarding against unauthorized exploitation.

IT SYSTEM AND INTEROPERABILITY

In contrast to the clear direction for DPP data requirements, the technical DPP system requirements (comprising the system architecture and the unique identifier) are not as well defined.

There are no specific DPP system requirements stipulated by the European Commission beyond overarching principles outlined within the ESPR. To address this, the Commission has funded the CIRPASS consortium to guide DPP deployment across all sectors.

ABOUT CIRPASS: GUIDING DPP

The CIRPASS consortium was tasked with creating a clear concept for DPP, defining cross-sectoral product data models and developing roadmaps for deployment; additionally they sought to demonstrate the benefits of DPP for the circular economy.

The consortium is composed of 31 member organizations[36] representing industry, research, digital infrastructure and standards, across Europe and beyond. The project has reached the conclusion of part 1[37], with their DPP User Stories which reference use cases for various stakeholders across the value chain[38].

As a result of the project, CIRPASS has made recommendations for several aspects of how DPP should be implemented in Europe, including:

- Initial Information requirements (sector-specific)[39]
- DPP systems architecture[40]
- DPP cross-sector and sector-specific roadmaps[41]
- DPP costs and benefits for small and medium enterprises (SMEs)[42]

The CIRPASS project concluded in March 2024, with CIRPASS-2 commencing a pilot for a standardized DPP system for the European Union[43] between 2024 and 2026, in the run-up to finalizing the DPP data requirements (in the 'Delegated Acts').

As part of its work, CIRPASS has established ESPR 'user stories' (including for textiles), describing the processes by which DPP data would be exposed, accessed and managed between stakeholders along the circular value chain. This has provided guidance for how a DPP system could be implemented, operated and maintained.

CIRPASS's proposal for the DPP information system is centred around the product identifier and includes two parallel (and interoperable) architectures for providing DPPs: HTTP uniform resource identifier (URIs) and decentralized identifiers (DIDs). CIRPASS evaluated both architectures from a structural and a data flow viewpoint and then further validated them against the requirements of the DPP system. The DPP stipulations according to the ESPR[43] and further explanations can be found in the table below.

ESPR DPP STIPULATIONS	INTERPRETATION
A persistent unique product identifier (Art.9 (1a))	A unique identifier, for the product that will last over time, for example a numeric code as a serialized GTIN according to GS1 standard.
A machine-readable data carrier (Art.9 (1b) & (1c)) based on standards	There are several options: QR code, NFC tag, RFID, etc, all of which come with pros and cons. For the moment the QR code is the preferred/recommended from a consumer access simplicity point of view, while the recycler needs to scan in bulk and could thus not make use of a QR code.
Use of open standards (Art.9 (1d))	The system needs to follow open standards to enable interoperability, i.e. ability for various systems to 'communicate' or exchange data.
An open interoperable data exchange network without vendor lock-in (Art.9 (1d))	An API based data exchange approach.

ESPR DPP STIPULATIONS	INTERPRETATION
Technical, semantic and organizational aspects of end-to-end communication and data transfer. Interoperable and machine-readable data formats (Art.10 (1a))	The DPP needs to be designed to ensure seamless communication and data transfer across various technical systems and platforms. It will involve defining standardized formats for encoding information in a way that machines in the technical systems can easily interpret.
Free of charge and easy access, based on defined access rights (Art.10 (b))	Users will have clear and defined access rights within the system to easily obtain the information they need. The rules for sharing and updating data are expected to be stipulated by the governing body of the DPP system, with access granted by the governing body or responsible economic operator (i.e. the brand or retailer) depending on the final system architecture.
No secondary use without consent (data usage control) (Art.9 (1da))	Data contained in the DPP cannot be used for any purpose other than its original intended use without obtaining explicit permission from relevant parties involved. This protects the privacy and integrity of the information stored within the DPP.
Decentralized data storage, meaning information stored by the responsible economic operators (REOs) or a certified independent third-party product passport service providers authorized to act on their behalf (Art.10 (c) & (d))	Data storage is distributed across multiple locations, held by the data's creator (or their appointee) and is not aggregated in a single centralized location.
Archiving: Availability of a back-up copy through a certified independent third-party DPP service provider (Art. 9 (3a))	Providing an additional layer of security and reliability to the DPP system, a back-up copy of the DPP data should be provided.
DPP information points may be either static or dynamic (updatable). DPP information points may be either public or have restricted access	The static DPP datapoints contain fixed, unchanging data, constant over time (such as country of origin or season of intended sale). Dynamic datapoints are updatable and can be modified or refreshed throughout a product's lifecycle to reflect changes in the product's status or information (ie a repair that changes the material composition of the garment). Some data will only be available to certain actors. For example: consumers will need to access publicly available information whereas authorities will need to access other DPP information that is not interesting for the consumer to see.

CONSIDERATIONS REGARDING THE DECENTRALIZED DATA SYSTEM

The ESPR guidance states that decentralized data storage is a requirement for DPP systems, meaning that data is held and managed by the data's creator (or their appointee) and is not aggregated in a single, centralized, location[45]. This poses some advantages and disadvantages:

ADVANTAGES

The decentralized approach maximizes robustness, resilience and security of data provision and maximizes opportunities for a diverse commercial market to evolve for DPP provisioning (DPP-as-a-Service). It allows allocation of responsibility with the relevant stakeholders, distributing the workload associated with fulfilling DPP.

DISADVANTAGES

The disadvantage of a decentralized system is that there is no single known and authoritative place that has all DPP information in the single market. While this is true, it does not mean that a web portal and search engine (as required by Art. 12a [ESPR]) is impossible or even difficult to achieve. It does not stand in the way of obtaining DPP information, it is simply a consideration in terms of standards and interoperability.

UPDATES ON STANDARDS

This book was launched in June 2024, but the Standards supporting DPPs continue to evolve. To read the latest updates on data access and governance, CIRPASS and CIRPASS 2, current gaps and more, go to our knowledge hub.

DPP STANDARDS

Within the CIRPASS DPP data roadmaps the consortium evaluated standards in relation to the fashion industry, concluding that besides the GS1 standards, there are only less widespread standards used for special market segments. More specifically, it notes that:

"In the last 60 years, apparel and shoes were buyer markets with the main focus on price, not on sustainability. Thus, only very few visionaries have thought about material cycles and how to save natural resources. As a result, the use cases behind the few existing standards and/or classification systems were determined by the fragmented views of individual organizations and always focus on individual use cases. So far, no respected industry player or association has aligned or integrated the fragmented landscape and developed a comprehensive, unified standard." [46]

To this end, CIRPASS cites the standardization request (SReq) from the European Commission to two organizations: The European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC). The organizations will attempt to generate a suitable standardization basis and stakeholder alignment; however, precise

alignment across various sectors and their full international value chains would appear to be a difficult task. The ESPR data groups for each sector set a basis for determining where standards do, or don't exist, for textile products, and for which data groups additional data evaluation is needed. For example, CIRPASS highlighted in their roadmap report that "interviews with various stakeholders, showed that a clear standard for the Product Environmental Footprint (PEF) is hoped for and is so far missing. The same is true regarding a clear standard on the quality of waste and feedstock"[47].

In a gap analysis, CIRPASS highlighted these data groups stipulated in the ESPR text as outside of the standards covered in the GS1 package (and therefore lacking for the textiles sector):

(a) durability;

(b) reliability;

(c) reusability;

(d) upgradability;

(e) reparability;

(f) possibility of maintenance and refurbishment;

(g) presence of substances of concern;

(h) energy use and energy efficiency;

(i) water use and water efficiency;

(j) resource use and resource efficiency;

(k) recycled content;

(l) possibility of recycling;

(m) possibility of recovery of materials;

(n) environmental impacts, including carbon and environmental footprint;

(o) expected generation of waste.

In summary, these points need to be considered in the evolution of any standards pertinent to the development of a DPP in textiles, according to the CIRPASS findings. Besides defining standards for the DPP data, the findings also state that standards are required for the IT system architecture, including for the data carriers and unique identifiers, access rights management, data exchange protocols, data storage, data processing, data authentication, reliability, integrity, security and privacy. There is also a need to define a standard for the DPP registry.

As stated, the European Commission issued a standardization request to CEN and CENELEC, tasking them with the development of harmonized standards for an interoperable DPP system. These standards are expected to be delivered by December 31st, 2025[48].

"The work to specify standards for the DPP system has recently beens initiated by CEN/CENELEC, based on a standardization request created by the EU commission. The aim is not to develop new standards where standards already exist, but rather to select which standards should be used to establish a DPP eco-system. The EU Commission has a preference for international standards that are mature and already widely used by companies, but also wants to encourage use of modern innovative technical solutions.

The CEN/CENELEC work is divided into eight categories ranging from product identifiers and data carriers to data management and archiving. CEN/CENELEC will deliver its results no later than December 31st 2025.

Industries already using standards such as GS1 or other ISO 15459 compliant standards for product and facility identification will be able to continue doing so. Industries currently not using standards-based identification will have to implement standardized identification schemes compliant with ISO 15459 or equivalent (GS1 or other) in order to meet the requirements for interoperability across identification schemes. This requirement may impact companies in the beginning of the supply chains more, as this type of standards are not as widely adopted upstream as for consumer products sold in retail."

"

Staffan Olsson
Head of Public Affairs
GS1 Sweden

DPP SCOPE

In terms of scope, the ESPR wording states: "this Regulation shall apply to any physical good that is placed on the market or put into service, including components and intermediate products." Therefore, all 'responsible economic operators' - whether corporations, SMEs or micro businesses - are in scope for ESPR, and therefore DPP.

SME-SPECIFIC DPP CONSIDERATIONS

Considerable research has been conducted to establish the consequences of DPP for SMEs, who

WHAT IS AN SME, EXACTLY?

In the EU, SMEs are enterprises (any entity engaged in an economic activity) that:

- employ fewer than **250 people**
- have an annual turnover not exceeding **EUR 50 million**, and/or an annual balance sheet total not exceeding **EUR 43 million**

Within the SME category, **small enterprises**:

- employ fewer than **50 people**
- have an annual turnover and/or annual balance sheet total that does not exceed **EUR 10 million**
- employ fewer than **10 people**
- have annual turnover and/or annual balance sheet total that does not exceed **EUR 2 million**

SOURCE

account for over 99%[49] of the fashion brands operating in the EU. CIRPASS concludes: “While DPP implementation is expected to be supported by, and produce, positive impact on SMEs, the cost may be relatively heavier [compared to that for corporate brands][50]. As a result, ESPR proposes a number of measures to help SMEs mitigate risks and costs related to DPP implementation.”

To this end, CIRPASS has predicted that to support SMEs in filling the digital divide gap, DPP-as-a-Service operators (intermediaries) will offer low-cost DPP data storage and access facilities.

DATA AND SYSTEM DEFINITIONS

Interoperability refers to the ability of different systems, devices, or applications to communicate, exchange data, and use the information that has been exchanged. Interoperability ensures compatibility and seamless operation between various components within a system or between different systems.

Harmonized data refers to data that has been standardized or aligned across different sources and systems to ensure consistency and compatibility. In the context of textiles, this would ensure that data related to textile materials, manufacturing processes, specifications, quality standards, and other relevant information is consistent, compatible and comparable across various systems and stakeholders.

Decentralized Data: Decentralized data refers to a data management approach where data is distributed across multiple locations or nodes rather than being stored in a central location. In a decentralized data architecture, each node typically maintains control over its own data, which can enhance data security, resilience, and scalability.

Digital Systems or Architecture: A digital system or architecture refers to the structure or framework of interconnected digital components, including hardware, software, networks, and protocols, that work together to perform specific functions or tasks. They enable various digital processes, services, and applications to operate efficiently and effectively.

THE ‘WHEN’

This chapter answers the questions:

When will DPP be introduced, and when will it be enforced?

When will all the unknown DPP criteria and guidance be finalized?

When should I start preparing for DPP?

NOW: EU REGULATIONS IN PLACE, TODAY

The textiles sector is already subject to some regulatory requirements for mandatory product information at the EU level. EU policy instruments already in place[51] to encourage and enforce sustainable textile production in Europe include the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation, the Industrial Emissions Directive (IED), the Ecodesign Directive (now replaced by ESPR) and the EU Textile Labelling and Fiber Composition Regulation (Ecolabelling)[52].

In addition, the EU Waste Framework Directive (revised in 2018) includes an obligation by EU member countries to separately collect textiles by 2025.[53]

NEXT: ESPR AND DPP

The Ecodesign for Sustainable Product Regulation **(ESPR) was formally adopted** by the European Parliament and the Council of the European Union on 23rd April, 2024.[54]

When a revolutionary regulation like the ESPR is launched, it also comes with a more technical explanatory document called the "**Delegated Acts**." The **Delegated Acts for Textiles** will explain the 'nitty gritty' details of **how to comply with ESPR** and what datapoints should be captured in the **DPP**. These Acts are still being worked out, and are expected to be adopted at the end of 2026, a delay of one year vs. the original timeline, followed by implementation of the requirements for textile products around the end of 2027, with enforcement commencing from end 2029[55]. From then on, all 'in scope' products available on the European Market must comply with ESPR and have a DPP attached, available for the consumer at the point of purchase.

SME IMPLEMENTATION

With respect to implementation for SMEs, the ESPR public text states: "the Commission shall provide economic operators with sufficient time to comply with such requirements, particularly taking into consideration the needs of SMEs, including micro-enterprises.

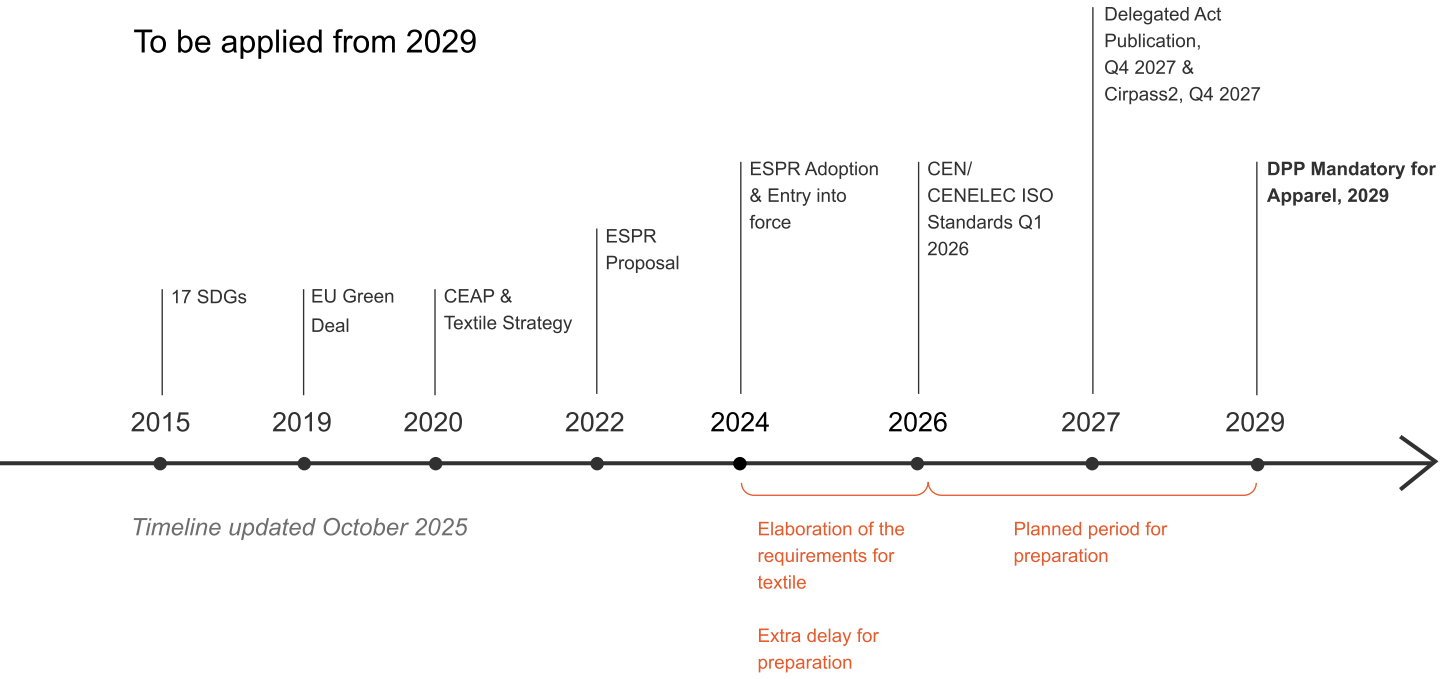
MYTH BUSTER #4

Not all DPP data requirements are new - some existing EU regulations (including REACH chemical compliance and EU Ecolabelling) already partially fulfil the DPP data requirements – they simply need to be integrated into the DPP data and system framework. Brands have already got some of the data they need to get going with DPP.

TIMELINE

Requirements for Textile Products under the ESPR

To be applied from 2029



Timeline updated October 2025

The date of application of the delegated act shall not be shorter than 18 months from its entry into force, except in duly justified cases for the whole act or for some specific requirements or in cases of partial repeal or amendment of delegated acts where a shorter date of application may be set." Additional considerations for SMEs can be found in the CIRPASS report: A Study on DPP costs and benefits for SMEs[56].

MYTH BUSTER #5

Even though the DPP standards and requirements (via the Delegated Acts) are yet to be finalized, brands and retailers should act NOW to prepare for DPP, using the findings of the most recent and comprehensive textile DPP pilot study, outlined in the '*How*' section of this book.

BUT, HOW?

Having examined why the European Union is introducing new laws and regulations to govern textile waste and textile product impacts and circularity potential, it's time to dig into how digital product passports can be implemented to comply with ESPR requirements.

As of now, no complete DPP data or system solution is available, but there is a great deal that brands and retailers can do to prepare.

"[At New Look] we welcome regulation, and advocate for convergence between markets on how we should express that information. New Look is preparing for DPPs and other disclosures [and] we are aligning our business, and partners, to automate accurate data at scale."

"When it comes to planning and preparing for upcoming regulations including EPR and DPP, the direction of travel needs to be clear for all. No brand, supplier or SME has money to waste and needs to invest wisely in a culture shift in terms of providing the transparency and data being asked of them."

"

Sue Fairley
Head of Sourcing, Sustainability and Quality
New Look

THE ‘HOW’

This chapter answers the questions:

How should I implement DPP - what are the essential components and steps?

How (and from where) should I gather DPP data?

How should I connect my DPP data to a DPP system?

How can brands implement DPP on live products today?

THE ‘HOW’

Based on the DPP product use cases preceding this book, you’d be forgiven for thinking that DPP is simply about attaching a scannable code to a garment that’s connected to consumer product information. Spoiler alert! DPP is not that; that is merely the proverbial cherry-on-top of what DPP actually is, so the industry, to date, has plenty of examples of DPP ‘cherries’ but no ‘DPP cakes’, so to speak.

DPP TEXTILE PRODUCT PILOT

In order to conduct a textile-specific pilot of DPP from end-to-end (data and system) TrusTrace led a pilot study in partnership with Trace4Value (comprising the The Research Institute of Sweden Research (RISE)[57] and the Swedish innovation agency Vinnova[58]) and enlisted stakeholders across the textile product value chain.

The pilot sought to fulfill the DPP requirements as outlined in the ESPR, and drew from the aforementioned CIRPASS research and reports, as well as data protocols and guidance from other organizations establishing frameworks and standards for DPP. The project started in Q2 2022 and will end in Q3 2024.

PILOT GOALS

The pilot aimed to achieve these 4 keygoals to help steer the fashion industry toward DPP readiness:

1. Establish the textile product data needs (**data protocol**) for DPP in accordance with the latest regulatory developments, brand requirements and consumer needs;

2. Use **standards** and protocols to enable interoperability of the DPP system;

3. Build the right **architecture and infrastructure** to collect, link and share DPP data in accordance with ESPR;

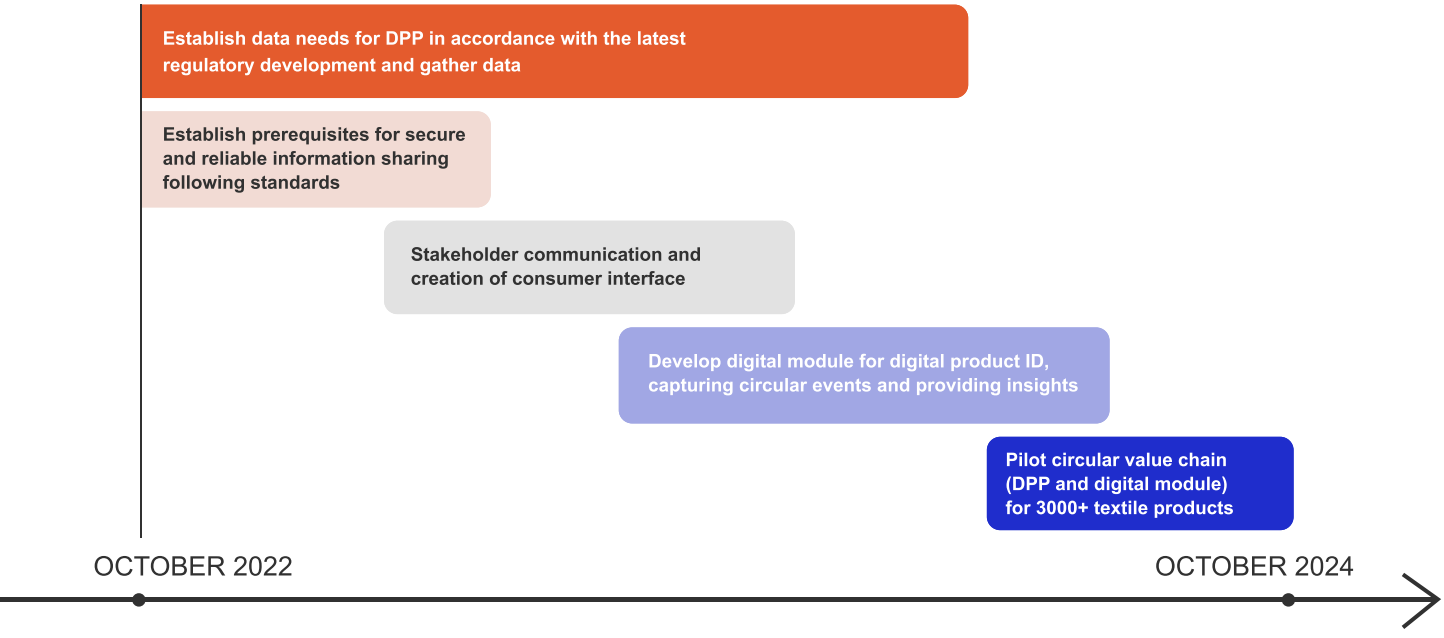
4. Create a **user interface** connected to the scannable **data carrier** for the consumer to interact with.

Crucially, the pilot ran on live supply chain data (not mock data, as other DPP initiatives have) in a live environment, with real products, real suppliers and real consumers. In addition, the system architecture was built within the pilot to test how data would be gathered and shared between stakeholders.

HOW DID THE PILOT WORK?

To hit the 4 overarching goals outlined above, the pilot ran concurrent work streams whereby the data needs for the passport were analyzed and a protocol devised to securely obtain and share the required data. The consumer interface for sharing the product information (via the scannable data carrier) was created, and the technical architecture of the module for connecting the digital product ID to the product data was established. Following this, the digital IDs were created for each product, along with individual data carriers for every live product within the pilot (over 3000 garments). These were introduced into garments in the production phase in CMT factories, in partnership with garment label suppliers (who printed the data carrier - QR code - on the respective labels). The products entered the market via retail and ecommerce sales channels, and the live product pilot began. The products remain in circulation, and data on consumer interactions from scanning the QR code and engaging with the user interface is being collected for future analysis.

PILOT ACTIVITIES



WHAT DID WE DO IN THE PROJECT?

- Provided each product with a unique ID
- Attached a QR code for each product, linking the unique ID and product data
- The information can be accessed by brands, consumers and authorities by scanning the QR code

HOW DID WE DO IT?

- Prioritized data based on brands requirements, policies & consumer needs
- Used standards and protocols to enable interoperability
- Built the right architecture and infrastructure to collect, link and share data
- Created the consumer interface

WHY IS A DATA PROTOCOL NEEDED TO ENABLE A DPP SYSTEM?

PRIORITIZE DATA NEEDS
The data protocol informs what type of data to collect, based on brands requirement, policies and consumer needs

COLLECT THE RIGHT DATA
The right type of data is collected from various data sources using a resolver and APIs

ENABLE INFORMATION SHARING
The collected data is organized and clustered using the data protocol which is based on global standards

SHARE INFORMATION IN A DPP
The data is visible to the consumer and other stakeholders in a DPP interface after scanning the QR code

STAKEHOLDERS

To reflect the full value chain, the pilot consortium members represented the different actors according to the DPP guidelines within ESPR, and addressed the DPP user story requirements identified by CIRPASS. The consortium members and their roles are described in the table below.

TrusTrace: Project Manager of the pilot, digital solution provider, digital product passport technology provider, spearheading the development of the data protocol together with Circularista and TexRoad Foundation.

Circularista: Co-Project Manager of the pilot, spearheading the development of the data protocol.

GS1 Sweden and Swedish Institute of Standards: Providing expertise within DPP standardisation for the development of the data protocol.

Kappahl and Marimekko: Equipping 3000 of their products with DPPs, stakeholders in defining the Trace4Value data protocol.

TexRoad Foundation: Creating the data protocol.

2BPolicy: Providing expertise in ongoing and forthcoming policy work for the development of the data protocol.

Rudholm Group: Creating the labels and QR codes for Kappahl DPPs.

Trimco Group: Creating the labels and QR codes for Marimekko DPPs.

Aalto University: Master thesis to investigate the challenges and opportunities of the DPP in textiles.

PILOT DELIVERY AND OUTCOMES

GOAL 1: DATA PROTOCOL

The data protocol was devised from current and best knowledge on standards and regulatory developments, as well as the findings from previous pilots – an approach that ensured the protocol was both applicable and valid. In addition, optional datapoints were included by the brands according to the data they would choose to share with consumers, offering the opportunity to test consumer engagement and interest in different types of DPP data. The resulting data protocol consists of nine categories of data and a total of 125 datapoints to be fulfilled for a complete textile product DPP.

Devising the protocol wasn't smooth sailing, though, with the biggest challenge being that existing data protocols didn't cover the DPP pilot's data scope. Prior to this pilot, TrusTrace led a C-PLM[59] project to evaluate the data required to enable clothing resale, repair and recycling, and so the findings of this were used as the foundation for the 'circularity data' facets of this DPP protocol.

A snapshot of the data protocol, illustrating one item number in each info group.
The full protocol, listing every datapoint across the 9 categories (125 datapoints in total) is available here.

INFO GROUP	ITEM NUMBER	DATA FIELD NAME	EXAMPLES	DATA FORMAT	DEFINITION
Brand Information	100,00	Brand	*Kappahl*	Open text (brief)	The primary brand of the product, and typically the brand on the label.
Supply Chain Information	200,00	Supplier Name	*COTTON DIVISION*	Open text (brief)	The name of the company operating the specific manufacturing facility where production took place.
Product Information	300,00	Product Identification Systems	*GTIN*	Text (fixed format)	The Product ID system a brand uses to uniquely identify a product that will be digitized. Today, companies use different systems for identifying their products, such as GTIN, SKU or Style Numbers.
Material Information	350,00	Component	*Body, trim, lining fabric, etc*	Text (from standard list)	Part of the product that is being described with info about material type, fiber composition, recycled content, etc.
Digital Identifier	370,00	Data Carrier / Identifier Type	*RFID thread, NFC chip, QR code, etc*	Text (from standard list)	The type of physical data carrier attached to the product.
Care Information	400,00	Care Image	*Care icons image*	Image (format?)	Image of care icons.
Compliance Information	500,00	Harmful Substances	Yes / No	Open text (brief)	The presence of harmful substances must be disclosed with the mention "contains a harmful substance" if said substance is present at a concentration higher than 0.1% (in weight) in the product. The statement is followed by the name of all the harmful substances present in the product. French Decree No. 2022-748; Art. R 541-221.IX.
Circularity information	600,00	Performance	TBC	TBC	TBC
Sustainability information	650,00	Circular, Sustainable, Social Brand Statement	*The [Company Name] Foundation uses philanthropic resources to find, fund and facilitate disruptive innovations, initiatives and research that enable a socially inclusive and planet positive textile industry.*	Open text (multi-line)	Information provided about circular, sustainable and social practices in place, as written by the brand. Excludes certifications on product. This information is guided by the Green Claims Directive.

A further challenge was that unclear data definitions in ESPR guidelines made the protocol tricky to define in full; however, this informed the creation of what is a flexible protocol, so that it can be adapted to the (as yet finalized) recommendations and guidelines from the European Commission. Ultimately, the result is the most comprehensive textile-product specific DPP data protocol to date, which is suitable for guiding brands in their first efforts to understand and navigate DPP data collection.

The brands taking part in the pilot didn't have all the data required in the pilot protocol and so they focused on fulfilling the most critical data sources (and sidelining the unclear or optional ones). For example, the product carbon footprint methodology is not yet clear in the ESPR guidance, so even if the brands had product footprint data, they were reluctant to include it due to potential breach of Green Claims legislation (which demands that data to back up such footprint claims is available and demonstrable to 'prove' its validity). In addition, brands chose areas of interest they wished to convey to consumers as a way of engaging them on these aspects of product impact. For one, it was supply chain traceability, for the other, it was the materials impacts.

On this point, the pilot showed that the absence of clarity on some 'impact data' points is no way a barrier for brands to start preparing for DPP. The data protocol can be thought of as containing two types of datapoints: objective 'direct' ones - like the country of product manufacture, as well as subjective 'methodology-dependent' ones - like footprint calculations. The objective ones are defined and within reach already. The subjective ones relate to 'macro-industry' standards and methods that must be set at the industry level – all brands are in the same boat when it comes to waiting for those decisions to be made. This will be addressed in the Delegated Acts down the line.

The pilot threw up a communications curveball in terms of data sharing with consumers. For brands manufacturing products for distribution to markets both inside and outside the EU, the inclusion of DPP data carriers on all of them was possibly problematic. During the pilot data evaluation, one brand determined that some data was EU-centric, and either not relevant or possibly inaccurate for consumers outside of the EU, should they scan the QR code and view the data displayed in the consumer interface. In order to deploy DPP data carriers across entire

production runs, the brand was hoping for clarity that would ensure data was not EU centric, and assurances that any disclosures required in the DPP were not at odds with consumer data disclosure/privacy in markets outside the EU.

The brands involved in the pilot worked across internal departments to collect the data required for DPP, spanning: sustainability, merchandising, quality and IT. Whilst this required more resources and effort than predicted, it highlighted the potential for shifting DPP from sustainability to product and merchandising departments where it could be used to add value to consumers and better respond to their needs and their role in product use, care and wider brand engagement. To take this point further, it showed how DPP could offer a bridge between sustainability and sales, connecting what can be otherwise an isolated department separated from the business 'bottom line.'

GOAL 2: STANDARDS

The main barrier for applying standards to the DPP pilot data and system was that these standards (and ontology) have not yet been defined. TrusTrace worked with GS1 and SiS to set standards in a protocol that work in accordance with the guidance at the time of the pilot, but that have an open framework allowing for modifications as more guidance comes from the European Commission.
Key limitations included restricted capacity within the pilot for mapping out all available standards - an extensive endeavour that was out of scope. Furthermore, DPP standards are currently under development in the CEN/CENELEC standardisation project.

The brands in the pilot felt that absent standards were preventing the 'level playing field' they sought with DPP, particularly with respect to consumer-facing product information meant to enable better purchasing decisions. Unless standards are in place for the information to be shared to consumers, objective comparisons between products will not be possible.

Once again, industry guidance will eventually be obtained via the CENC/CENELEC project outcomes, prior to DPP implementation.

Rather than being a barrier to DPP, the absence of fully-defined standards is a temporary roadblock, and is a macro-industry problem requiring a solution from outside of brands' immediate remit. For now, the critical point to know is that standards are coming, and data gathering is the priority in the meantime.

The Swedish Institute of Standards notes that whilst standards are not in place for textile products, they are in place for textiles:

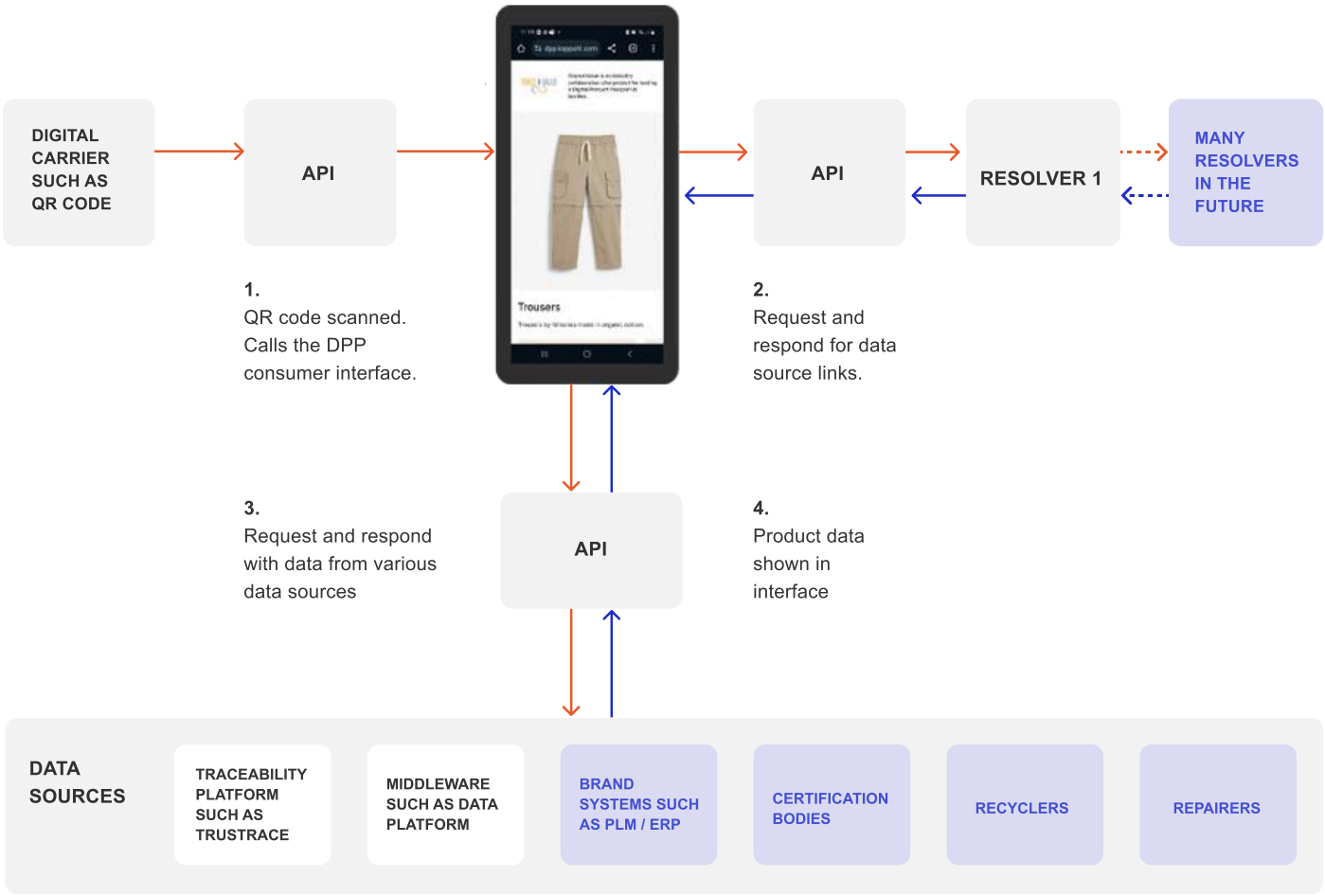
> *"It is correct that DPP-related standards have been missing in the textile sector, and price has been the focal point rather than sustainability. However, the textile sector has a tradition of standardisation and is likely very well suited for circularity focused standardisation in order to transform the value chains to sustainable practices. Circular economy [now] needs to be integrated into all standards practices."*

Laura Linnala
Project Manager Circular Economy and Biodiversity, SiS

GOAL 3: ARCHITECTURE AND INFRASTRUCTURE

To develop the pilot in accordance with ESPR, a decentralized DPP system was required. However, this architecture was difficult to implement because of brands' legacy IT systems, which could not push the data to the DPP consumer interface. Furthermore, the brands' data was scattered across numerous IT systems and was incomplete.

AN OVERVIEW OF THE DPP ARCHITECTURE



To overcome these data and systems challenges the TrusTrace team built an intermediary 'mock PLM' layer in the system, where all the data required to fulfill the DPP protocol could be collected. The system consisted of: a resolver, APIs, a mock PLM system and a user interface. The system was tested within the pilot's limited scope, but with built-in scalability using APIs and resolver to fetch data from decentralized data sources.

WHAT IS A RESOLVER?

A resolver is an online service that has a database of product IDs and relevant links to where the information about each product resides. When a QR code is scanned, it redirects the browser to the right URL to fetch the data. The resolver built for the pilot is GS1 Digital Link Standard compliant, but can also service other non standard product hierarchy.

During the pilot, the brands gathered their data from the various IT systems (including PLM and other merchandising systems) by manually downloading it and compiling it in a spreadsheet to be uploaded into the mock PLM system. One brand had already implemented digital traceability to the level of their Tier 2 and 3 suppliers for the products in the pilot, which made collating the data required to fulfil the DPP protocol significantly quicker, easier, and with less risk of human error from manual data handling.

GOAL 4: CONSUMER INTERFACE AND DATA CARRIER

At the time of the pilot, there was no guidance on which data from the protocol should be shown to the consumer; showing all 125 datapoints within the interface would not be feasible, nor logical, since the aim was to enable simpler sustainable purchasing. Similarly, there was no guidance on how the data should be shown to the consumer in an interface.

Within the pilot user interface, the consortium displayed the datapoints believed to be of interest to the consumer, based on the brands' preferences and user testing. In addition, the interface offered 'highlighted sections' which allowed brands to quickly convey the information they categorised as most important for the consumer to see before offering a 'deeper dive' into specific areas of preference. As part of the pilot, the number of consumer interactions in terms of scanning the QR code and interacting with the interface are being collected, which is expected to yield useful insights for future development.

Regarding the data carrier selection, each have differing technical capabilities, means of accessing data and pros and cons, as mentioned in the previous section. Therefore brands should consider the pros and cons carefully before selecting the carrier.

For the pilot, direct scannability of the data carrier (via a QR code) was preferred over the detection of the carrier (for example, via NFC). For the pilot, QR codes offered ease of use, low cost, suitability for the consumer use case and met the recommendations from ESPR.

To introduce the data carrier into products, the brands had to request operational changes in their production lines at CMT supplier facilities, to ensure correct labelling of garments with the specific data carrier related to that exact product and its size. This change in process required significant coordination and planning with both the garment label manufacturers printing the labels and the CMT manufacturers assembling the garments. Once the products contained the scannable QR code the brands reported something unforeseen.

In an unexpected win, the brands experienced a significant uptick in internal stakeholder engagement with DPPs once the products containing the QR codes were in their hands and could be scanned. In one case, senior management (who had previously not engaged with the DPP discussion) realized the importance of preparing for DPP once they could see the product and scan the carrier in their hands. More broadly, the potential for increased customer value as a result of the scannable data carrier was suddenly tangible, and what had only been considered a regulatory burden was instead being considered a tool for value creation.

With the pilot challenges and opportunities outlined, what were the brands' first-hand experiences of delivering the first live, end-to-end DPP pilot for textile products? More opportunities (and concerns) will unfold in the following interviews.

BRAND INSIGHTS: KAPPAHL

Insights from Sandra Roos, VP of Sustainability and executive team member, Kappahl.

Sandra Roos
Vice President Sustainability at Kappahl

- Kappahl is a leading fashion chain with around 360 stores in Sweden, Norway, Finland, Poland and the UK, as well as eCommerce.
- Founded in the 1950's, Kappahl offers affordable and responsible fashion and accessories.
- Two of Kappahl's three main production locations—Bangladesh and India–were involved in this pilot.
- The brand's aim for the pilot was to establish a tangible, operational basis for deploying DPP across their products and production locations.
- Kappahl's role was to co-create the DPP protocol, implement digital data carriers, provide DPP product data and launch the DPP products onto the European market.
- Kappahl chose to highlight: Material, Supply Chain, and Compliance in their 'deep dive' DPP data in the consumer interface.

BUILDING ON TRACEABILITY AMBITIONS VIA THE DPP PILOT

"We have been following the CSDDD, CSRD and all regulations, and it's been very theoretical and vague for many of us," explained Sandra Roos, VP of Sustainability at Kappahl. "Being part of this project and doing a DPP 'for real' was very tempting–it would be something we could [see] and scan with a mobile phone, so a tangible example was [the] expectation– and it was realized."

Being a member of the leadership team at Kappahl, Roos explained that setting the business up to operate with the dual purpose of profitability and social and environmental sustainability is integral to the business, much as it is in many Scandinavian and Nordic countries. The ambition to trace the company's supply chains exists already, she explained, and the brand uses the TrusTrace platform, which their 130 global suppliers have been invited to join.

PRODUCT SELECTION, DATA CARRIER INTEGRATION AND DATA COLLECTION

For the pilot, Roos explained that two Kappahl products were chosen to carry the digital data carrier: one by each of Kappahl's production management teams in Dhaka and Delhi.

This represented products manufactured in two of their three main production hubs (with China being the other main sourcing country).

For both of the products, the Tier 1 CMT supplier manufacturing the garment was on-boarded to the TrusTrace platform for ‘step 1’ (supply chain mapping), and then onto the platform’s purchase order trace module, representing ‘step 2.’ The mapping and tracing helped facilitate the collection of product data back to the fibre-level for fabrics, and supplier level for trims and zips (which the manufacturer sources from Kappahl’s nominated supplier list). The key source of Kappahl’s product data was therefore their Tier 1 supplier, coupled with TrusTrace data from within the tracing platform.

The digital data carrier (a QR code) was facilitated by the brand’s sole care-label supplier. Ensuring that the data on the labels was accurate and met the legal requirements of each market the product was to be sold in was the job of Kappahl’s internal quality specialist.

Individual QR codes for the serialized garment labels were printed and then sent to the two CMT suppliers, which Roos explained took “a lot of planning” since the carrier had to be unique to each product, and contained data in accordance with the specific garment type and size. Therefore, on the garment production lines, the manufacturer had to ensure careful inclusion of the label into the correct product type and size, representing an operational change to the production process (which ordinarily has one care label inserted across the entire production run).

In order to fulfill the pilot’s data protocol requirements, Kappahl utilized their PLM system, the TrusTrace platform, their eCommerce platform and order placement system; and conducted manual data entry into an excel spreadsheet (used as the data import tool into the proxy PLM system set up by TrusTrace).

LESSONS AND QUESTION MARKS

At this point, Roos said one of the key lessons was that it would be necessary for the DPP data fields shown to consumers to be standardized. “I hope the DPP will be as standardized as possible. We and Marimekko chose different sections of data to highlight to consumers in this use case–we chose to highlight compliance data, for example. It would be easier for the consumer to have one standard for what is shown, because if each company decides what [data] they want to show it would [prevent comparability between products].”

SCAN TO SEE
Kappahl's DPP

Roos is underlining that whilst current DPP guidance indicates what information should be gathered in the DPP data protocol, it does not indicate which of these datapoints should be shared to each stakeholder; nor does it indicate whether what is shared will be standardized.

Of course, a ‘level’ playing field for customers using DPP to make better purchasing decisions can only work if the DPP data is directly comparable between products, and since this is one aim of DPP, Roos has pointed out a question in need of a clear answer within the DPP’s Delegated Acts (see the ‘When’ section for more details on these).

Another lesson was that more team members were required for the pilot project than originally projected, across IT, merchandising and quality. “We knew it would be a cross-functional [effort], but now that we have done one ‘complete circle’ with DPP it will be easier to formulate a plan for the competencies needed and where those competencies should sit [in terms of roles in the company].”

DATA GAPS AND RED FLAGS

The main data ‘red flag’, according to Roos, was the expectation of climate footprint requirements in the protocol, but that they haven’t been defined yet, nor is there a standardized way for calculating the climate footprint of textile products.

During the interview, Roos points to a potential conflict if using the proposed PEF (Product Environmental Footprint) tool, since use of generic data for making product-specific claims has been ruled illegal in consumer-facing product communications in Norway, where Kappahl operates. The unclear legal situation could indicate that the PEF, utilising generic data, [if used within DPP] would not comply either. This conflict was seen as a roadblock for including footprint data in the live DPP pilot, and it was not used in the consumer interface.

“We have the [environmental impact] data, but we can’t be sure it is legal to use it," Roos explained. This conflict is considered by Roos as the major data 'unknown’ at this stage; and is one that has also been highlighted in a critique of ESPR inconsistencies and potential conflicts, published by the Cotton Research and development Committee (CRDC)[60].

SME CONSIDERATIONS

Reflecting on Europe’s enterprises consisting of 99% SMEs, Roos was concerned at the possibility of regulations not being extended to all, and instead falling only on corporations. Roos states that SMEs are thought to account for around half of the products on the market [by value] and such regulations cannot be effective if their scope is narrowed, she believes.

On the subject of SMEs being exempt from EU sustainability regulations (as they are

from CSDDD) she believes: “If SMEs are not subject to European legislation I would consider if I [should] buy something from an SME at all. Having the possibility to use DPP for circular business models and take care [of all products] at the end of life is the whole point.”

Currently, SMEs are in scope for DPP (as explained in the ESPR wording, which states: "This Regulation shall apply to any physical good that is placed on the market or put into service, including components and intermediate products” (for in-scope products, as listed in the ‘Why’ section). Therefore, **SMEs are in scope for ESPR and within it, DPP.** However, given the recent ‘watering down’ of the scope of other EU legislation related to sustainability and financial reporting (explored in detail in ‘Further Reflections’), Roos’s concerns appear valid and timely.

Regarding the feasibility of DPP implementation for SMEs (who tend to have fewer resources than corporations), Roos believes SMEs may even be at an advantage: “In one way I think it’s easier for SMEs as one person may do many roles” allowing them to cut through some of the bureaucracy and complexity inherent at large organizations. She adds: “and it doesn’t matter if the product is made or imported by a small or a large company–if you are an SME you may [still] be sourcing from a very large company, so saying that SMEs [may not] be able to import compliant products [does not make sense].”

Taking this further, she questions “If [SMEs] can’t do this in a way that is safe from forced and child labor, for example, we must ask if they should be importing such products [at all]. Do we want that kind of world?.” Furthermore, she hypotheses: if SMEs are deemed 'out of scope’ for DPP, then “what is the message we are giving to consumers? I think SMEs have the capability [to comply with DPP].”

KAPPAHL’S LESSONS, IN BRIEF:

- Setting up for DPP is easier and quicker with traceability in place back to the fibre level in the supply chain
- DPP is possible for some, but not all, datapoints in the protocol, due to unclear methodologies and standards
- Conducting the ‘live’ DPP pilot required more resources than predicted, but set the framework for who to hire and in what roles
- DPP is a facet of doing business responsibly, honestly and in compliance with fair and just standards - it’s the right thing for all business (regardless of size) to comply

BRAND INSIGHTS: MARIMEKKO

Insights from Marjut Lovio, Sustainability Manager and Masaki Kato, Project Manager, Innovation Works, Marimekko.

Marimekko is a Finnish brand with 170 stores, plus eCommerce; its key markets are Northern Europe, the Asia-Pacific region and North America.

- Founded in the 1950s, Marimekko produces premium textiles, clothing, accessories and home furnishings with the brand's unique graphic patterns and prints.
- Marimekko's key production locations include Portugal – the focus for this pilot.
- The brand's aim for the pilot was to better understand and test the requirements of DPP and consider the IT systems that might be required, as well as achieving internal know-how for what is required through DPP.
- Marimekko's role was to co-create the DPP protocol, implement digital data carriers, provide DPP product data and launch the DPP product onto the market.
- Marimekko chose to highlight: Material, Supply Chain, and Care in their 'deep dive' DPP data in the consumer interface.

Marjut Lovio
Sustainability Manager at Marimekko

Masaki Kato
Project Manager, Innovation Works at Marimekko

ESTABLISHING A PROCESS FOR DATA COLLECTION, DATA MANAGEMENT AND DPP

Marimekko joined the Trace4Value project to map an approach to preparing themselves for DPP; they felt that upcoming legal requirements were rather intangible, making it difficult to devise a concrete roadmap for DPP preparation.

During an interview, Marjut Lovio (Sustainability Manager) and Masaki Kato (Project Manager in Marimekko's Innovation Works team) shared their sustainability and information technology perspectives, respectively, from their involvement in the project.

"We became aware of the pilot project at a stage when we were thinking about how we could advance transparency in our supply chain, which in our organization sits with sustainability (where I'm from), but also in the Innovation Works team, where Masaki is working,"explained Lovio. The pilot therefore straddled those key departments.

PRODUCT SELECTION, DATA CARRIER INTEGRATION AND DATA COLLECTION

By taking part in the pilot, Marimekko agreed to collect the data specified in the protocol and provide it to TrusTrace (in Excel spreadsheet form) for use in the proxy PLM system. Marimekko does not use the TrusTrace platform and so was collaborating with them for the first time, providing all the data from their own systems.

In order to gather the required data and implement the digital carrier, Marimekko cooperated with one of their Europe-based garment suppliers who could easily provide most of the necessary data for the DPP pilot. “We didn't start from scratch with the supply chain information” explained Lovio; Kato added: “The product [we chose for the pilot] is utilizing a closed loop production model and is from one of our partner suppliers in Portugal. They take cutting waste and other leftover fabric from the manufacturing of Marimekko’s jersey products as raw material for new products. We already launched some product capsules with this material so in a way, the information was already there. It was natural for us to combine these two pilots and thus make the data gathering for DPP easier.”

Lovio and Kato also met with their garment label supplier, who printed the unique digital data carriers for each garment, according to the size. Instead of incorporating this into the existing garment care labels, the data carrier (a QR code) was printed separately and then sewn into the garment in an additional sewing operation on the production line. Kato explained that the project team preferred QR codes as the selected data carrier due to practicality and ease of use.

In terms of gathering the data, Marimekko used their supplier relationship management system, as well as their product data systems. Kato points out that “in the future, API-based solutions would allow easier connection, instead of the older systems [we use] that require extra manual work.” For example, in the pilot, Marimekko collected the required information in an excel spreadsheet, which was then provided to TrusTrace to import into the proxy PLM system; the data was then fed via the API into Marimekko’s consumer user interface.

DATA GAPS AND RED FLAGS

Lovio’s view is that for product-specific lifecycle assessment (LCA) data to meet the upcoming environmental footprint requirements, third-party verification will likely be needed. “For Marimekko it is of utmost importance to remain compliant with the green claims requirements,” she says.

SCAN TO SEE
Marimekko’s DPP

Marimekko operates in retail markets both in and outside of the EU, and therefore considered DPP data validity issues in all relevant markets. “We sell our products in the US and in Asia; and some of the DPP information is quite EU-centred; we couldn't include it because we sell on the global market where that information may not be accurate/relevant.” This finding has potential implications for how (and whether) DPP data carriers should be sewn into all products, irrespective of the market they are to be sold in.

An important opportunity in the pilot was gaining insight into how and what data is provided to consumers via DPP. Within the pilot, the Trace4Value team are collating information on how many times the DPP-enabled products are scanned and the interface is viewed by consumers. The results of this analysis are not yet available, but both brands expressed an interest in the findings and how these could relate to future customer engagement opportunities.

Lovio concluded from the pilot experience that supply chains will need to change to include data management systems if requirements like DPP and CSDDD are to be met. “From my perspective, in order to pull all the data from a complex supply chain we need agents in between [stakeholders] to take care of the data management. Of course, technology can solve some of these problems, but at the moment the data is manually keyed in by people.”

The other option, she says, would be a “forensic (tracing) or advanced technical solutions that would automatically gather the data.” Lovio’s conclusions are in line with those of CIRPASS, which predicts that DPP-as-a-Service operators will be sought (particularly by SMEs) to implement and ensure compliance with DPP.

INTERNAL AND EXTERNAL ENGAGEMENT WITH DPP

At Marimekko, Lovio and Kato observed a shift in internal team members’ interest in DPP between the start and end of the project. “When we prepared the pilot, the full extent of what DPP would offer wasn't clear yet. When we were able to share the concrete consumer interface to other teams, it sparked interest and the marketing potential for DPP was seen,” explained Kato. Lovio added that the team sees potential for integration of DPP data into their community program.

A major outcome of the pilot, observed by Lovio and Kato, was how it captured the interest and excitement of senior decision-makers once the DPP product was in their hands and scannable. This will help in laying the foundations for discussing new data solutions in preparation for DPP, and what the priorities should be, based on the pilot findings.

Lovio believes, as a result of the pilot, that while the implementation of DPP by the sustainability department may seem to make sense, it will be more effective and add more value when aligned with (and deployed by) various operational teams managing the product's lifecycle. A shift in management of DPP outside of 'sustainability' is the likely result of this finding, she says.

MARIMEKKO'S LESSONS, IN BRIEF:

- By selecting a product and supplier that already held a large part of the data required, they could fulfil the DPP use case with relative ease and ensured tangibility and successful completion.
- Traceability must be tackled to get ready for DPP and the brand is keeping an eye for the development of several options, from 'forensic' fibre-level physical tracers, through to software solutions.
- Manual data collection is time consuming and API enabled solutions would automate this process.
- The DPP footprint calculation method and datapoint is not defined yet, and therefore some of these datapoints were not included in the pilot.
- DPP has the potential to create customer value as a part of product storytelling, so it can be seen as a business opportunity for increased customer loyalty and services.

PILOT ACTIONS SUMMARY: WHAT BRANDS AND RETAILERS SHOULD DO, NOW!

Both Marimekko and Kappahl stated that obtaining the DPP data for the pilot was, in some cases, resource intensive and difficult. The brands also realized that implementing the necessary downstream product traceability and data collection will require an investment in additional technologies, for example QR code labels or RFID at product level. Furthermore, new digital strategies within their business (encompassing IT infrastructure and data management) will be required, in addition to changes in supply chains to include third-party data management systems.

The pilot outcomes are in line with the findings of CIRPASS Use Cases Report V2.0[61], and offer guidance on the first steps that brands should take to begin preparing for DPP. The key learnings from the pilot are:

Brands and retailers should act now, to:

- **Evaluate internal data systems** - map the location of the datapoints listed in the DPP protocol - where do they reside? Do all the necessary digital systems 'talk' to each other, or does data need to be collated from them manually?
- **Begin data collection** - use the proposed DPP protocol to begin filling in data fields for selected products and identify data gaps.
- **Evaluate data gaps**
  - Which datapoints couldn't you collect, and why?
  - Who has the data and how will you obtain it?
  - Is any data unobtainable, and if so why? (If it's due to a lack of traceability and transparency then get started on overcoming those limitations now; if it's for PEF or LCA related reasons outside of your control, stay tuned for more EC guidance as the DPP Delegated Acts evolve).
- Evaluate the **business opportunity** DPP presents, and consider the departmental positioning of DPP responsibilities in relation to impact, IT and product-facing teams.

For all stakeholders,
the overarching lessons from the pilot leaders were:

- Brands should start collecting data now - it may be more complicated and time consuming than it first appears!
- More clarity on exact data attributes is still to be provided (by the European Commission).

- More clarity related to IT framework is still to be provided (by the European Commission), specifically related to the:
  - Resolver infrastructure.
  - Data authorization and access.
- Close collaboration with, and trust between, all stakeholders in the value chain is key for DPP success.
- Standards will be critical to facilitate easy integration between different systems– especially product ID and other related product information.
- Implementing a traceability solution allows brands to gather high quality data with minimal effort, and will be a ‘game-changer’ when it comes to scalability of data collection across all products.
- These data efforts (and the traceability need) are relevant to not only DPP, but to compliance with other regulations, including AGEC, EUDR, FLPA.

ADDITIONAL NOTES ON FOOTPRINT CALCULATIONS AND LCA METHODOLOGY

Taking into account the as yet defined Delegated Acts and the unclear footprint calculation methodology pointed out by brands during the DPP pilot, it is clear that a new manner of analyzing the footprint of ‘circular products’ will be needed. This is because the LCA methodology in use today involves a high degree of modeling of data (which is entirely valid and acceptable within the methodology and scope of its intended use) to offer a “snapshot” of impacts in a highly specific and static scenario–that won’t encompass the necessary scope of DPP product impact from creation until end-of-life; in fact, LCAs typically exclude the product use phase because of the difficulty in modeling it.

For DPP, dynamic data will need to be gathered throughout the product’s use, repair and eventual recycling phases, thereby reducing the overall product impact across its lifespan due to increased utility and circularity of fibers. DPP therefore calls for a new impact analysis approach – not a static snapshot.

DPP lifecycle assessment (LCA) scope is ‘cradle-to-grave’, meaning it considers impacts at each stage of a product's lifecycle, from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, transportation, product use, and ultimately, disposal[62]. In contrast, the LCA scope ordinarily employed for textiles and fashion products is ‘cradle-to-gate’, with the

boundary generally being the ‘factory gate’ but with considerable room for interpretation. Excluding some or all phases beyond the ‘gate’, and the varying gate boundaries applied creates ‘apples to oranges’ scenarios where attempts at comparison are concerned (in addition to the conditions of each LCA being non-directly comparable).

Furthermore, common misuse of LCA data by industry stakeholders to compare different materials or products that have been modeled and attributed differently is a problem that new approaches will need to overcome. LCAs today may follow a standardized toolkit defining scope, data collection, data analysis, reporting and other methodological considerations, but different aspects of the kit can be deployed in each particular LCA, creating a uniquely modeled scenario. Comparing one LCA to another is usually the dreaded ‘apples to oranges’ scenario – the antithesis of what the DPP aims to achieve with respect to empowering consumer product choices.

FURTHER REFLECTIONS

This chapter answers the questions:

Now that I know the what, why, when and how of DPP, what should I do next?

What factors should I consider before starting my DPP journey?

What are experts saying about DPP from industrial and geopolitical points of view?

TRUSTRACE

In conversation with Saravanan Parisutham, co-founder and COO of TrusTrace, on the changing regulations and data requirements of global fashion, footwear and homewares industries.

Saravanan Parisutham
Co-Founder and COO at TrusTrace

TrusTrace's expertise in primary data collection, analysis and impact analysis about products and the supplier facilities in which they are manufactured in has positioned the company to understand fashion's baseline data requirements for complying with the raft of new regulations being ushered in globally, as net zero targets are nearer, and data gaps equate to business risks.

GATHERING BASELINE DATA

In preparation for the new regulation age, brands and retailers have data 'house-keeping' to do.

> *"The good news is that they can collect and clean up their data, and ready themselves for a host of global regulations by gathering what could be coined their 'MVD' (Minimum Viable Data)."*

"There are three baseline product datapoints that brands and retailers require today," explained Parisutham:

1. Location of the manufacturing units involved in the key manufacturing steps
2. Country of Origin for the raw material
3. Type of process, products and materials used for manufacturing (ex: what type of dyeing process was used, what type of cotton was used, what type of chemicals were used, etc.,)

Obtaining this basic information sets basic traceability standards within brands and enables them to get started on reporting and computing various other datapoints required by regulations such as DPP in a credible manner - product impacts, circularity potential, and compliance to various claims made about the product.

The datapoints offer a more detailed product impact picture than brands might think: “Each of these datapoints combined with a ‘coefficient’ from third-party datasets, enables us to compute the impact of the product [from cradle to grave, excluding-use phase],” explained Parisutham. For example, using the location of the manufacturing units and the emissions intensity factor for its national/local grid, and the type of manufacturing process used - brands can compute “ball-park” values for emissions of the manufacturing process. So, rather than waiting to obtain accurate data from individual factories on their emissions intensity, country-level grid emissions intensity can be used as a basic ‘first step/ proxy data.’ This allows brands to advance their understanding, while working on the long term plan of obtaining primary data for more granular assessment.

Where this gets tricky, of course, is with factories generating on-site energy (because of poor national grid infrastructure or factories having drastically different mix of energy sources (say factory has 80% renewables, while grid has 10% renewables), in which case more granular primary data is king!

DPP DATA IS ALREADY AVAILABLE

In the case of DPP data requirements, Parisutham explains, “a large proportion of what is required is product design data, [and the] information about the supply chain is a smaller proportion of the overall data requirement at the moment.”

> *“Most customers who have traced their products and got data for other [impact or regulatory] purposes [have come a long way to fulfill] DPP, which just happens to be another ‘consumer’ of the data.”*

What’s different with DPP, though, is that data flow is not in one direction, and Parisutham believes brands and retailers are yet to grasp the consequences of this: “Most think it’s one way communication from the brand to consumer - but this has to be two way communication, for example for garment repairs. Brands are responsible for the DPP data, but they need repairers to enter data about materials added to the garment, like a patch to repair a jacket, which could change the material composition of the garment.”

Further underlining the fundamental shift in data collection and management required for DPPs, the COO added that several questions remain: “who can enter data into the system about the product;

and if multiple people enter data into the product passport, how do I assure accuracy of that data? Should only approved repair houses (a closed network) be used, or can any repairer enter data?" These questions about the system architecture and data access are expected to be answered in the Delegated Acts, due to be written by the end of 2025.

HOW TO ADDRESS ALL REGULATIONS SIMULTANEOUSLY

When asked what brands should be doing now to gather and prepare data for DPP, Parisutham responds:

> *"We don't believe they should collect data for a specific regulation, we believe that they should collect data to comply with all regulations."*

"We have a simple data collection framework and use that information to meet all regulatory requirements via the AI interfaces in the TrusTrace platform" which pull the required data to compile the outputs for each individual regulation and ensure compliance, he explained. In fact, "AGEC[63] [the French anti-waste law for a circular economy] and DPP have very similar data requirements" he added.

Some data gaps were identified in the Trace4Value textile DPP pilot though, as noted by Marimekko and Kappahl teams, but these related to LCA and footprint requirements that as yet do not have prescribed standards or methodologies for inclusion in DPP, so remain somewhat unclear. The underlying data to fulfill those requirements is obtainable, it's just not clear which tools or analysis will be used to evaluate and determine those 'footprint' values and how they will be presented in the DPP. In this sense, preparing for DPP can be achieved by gathering design and product data central to any production management system today, using industry-standard LCA methodologies, and globally averaged and country-specific data to evaluate product impacts.

GREEN CLAIMS AND 'GREENHUSHING'

A final observation raised by Parisutham was brands' "reluctance to report their impact data" due to concerns over the new requirement to substantiate their 'Green Claims.' Rather than indicating an unwillingness to address their impacts, this reflection shows that in the absence of clear guidance and standards for communicating and reporting their impacts, brands might deem it appropriate (and entirely defensible) to say nothing at all, resulting in "greenhushing." Both Marimekko and Kappahl representatives

stated the lack of clear guidance was hindering their ability to report product footprint data within the Green Claims requirements, for example.

As a data platform, TrusTrace gathers and routes data to ensure accurate product impact analysis and compliance, and so has the macro understanding of what it will take to fulfil DPP data needs, as well as the operational tech system insights to plan and build solutions for its delivery of data.

Beyond the data and systems, there are gaps in the overall understanding of how the European Commission intends to govern the DPP system. ESPR has been adopted, but the Delegated Acts are yet to be written with the exact data and systems requirements for in-scope products. The industry is in new territory now too, since SMEs have been out of scope for most new regulations, but ESPR and DPP buck that trend, for now.

Most of the burden of new regulatory requirements within the EU Circular Economy Action Plan (CEAP) including the Corporate Sustainability Due Diligence Directive (CSDDD) and Corporate Sustainability Reporting Directive (CSRD) have so far fallen only on large enterprises. Concerns over potential narrowed scope in upcoming revisions of the regulation (and its DPP Delegated Acts) were raised by Sandra Roos of Kappahl. It's not only Sandra Roos who has these concerns, as evidenced in the following interview with circularity consultant, Nina Shariati.

NINA SHARIATI

In conversation with Nina Shariati, Founder of Circular Transparency; previously at H&M Group for 16 years in roles spanning buying, production and sustainability, with her most recent role being Strategist and Business Manager at H&M Group Business Development and Innovation.

Nina Shariati
Founder at Circular Transparency

During her 16 year career at H&M, Shariati was based in key production countries including Bangladesh and China. Most recently, she engaged with EU policy directives and wrote a position paper on DPP, and provided collaborative input on ESPR. This experience has highlighted some concerns to her about how restriction in the final scope of ESPR and DPP requirements could possibly undermine the product passport aims: including establishing a circular ecosystem that serves the EU Green Deal as intended.

ON REGULATION SCOPE

“What I have seen with the current regulations and directives is that when they are voted through EU Parliament level, they tend to shrink in their scope and who needs to comply becomes very narrow, so it ends up being the big corporations. And in the case of DPP, if the purpose is actually creating a you have a tool that can trace it or scan it and you access the [live] data. So there are layers to consider regarding the type of technology that is being used from a privacy perspective.”

At the macro level, the concerns and considerations raised here probe ESPR and DPP as they are proposed now, and how they might change in their final, as yet fixed, form. The possibility of unintended consequences regarding data and traceability also show the added complexity for brands and retailers when determining their chosen strategies and systems for fulfilling DPP requirements and mitigating risks. Standardisation of product definitions and data was the clear front-running concern and roadblock from a technical and feasibility perspective for both of the experts interviewed in this segment of the book.

“The purpose of gathering and sharing data should be twofold: firstly, to enable a more efficient garment collection, sorting, and resale process within this circular ecosystem; and secondly, to provide transparency to consumers–not the other way around.”

Shariati went on to add: “However, for this to materialize on a large scale, standardization of data regarding products, processes, and more is imperative. We need to define what we mean by terms such as 'batch' and 'item,' as well as clarify the categorization of accessories, jackets, and other product types”; her statements echoing the findings of the CIRPASS reports and the Trace4Value DPP textile DPP pilot study.

“There's so much work that needs to be done in terms of actually creating a harmonization on how we define and communicate what a product is.”

“Anything from components to types, and to even know what a ‘batch’ is, is in the pipeline, and RISE and others have been looking into it” she added, “It's going to be interesting to understand how AI can play a role in data gathering and getting the data correctly in its place, but you need standardization, and to be aware that the data is accurate and that the risk of inaccuracy can grow [if the elemental data is flawed].”

ON DECENTRALIZED DATA

On the subject of how the DPP system should collect and store data, the European Commission guidance calls for a decentralized system, as pointed out and tested in the Trace4Value pilot. Whilst Shariati agrees that a decentralized data sharing system that routes data as needed, via APIs, makes sense; she also has concerns about the DPP’s aim being met by the IT infrastructure and data management proposed: “I agree with the decentralized perspective, but I also want to emphasize that it's important to keep in mind why things are being done. Why are we introducing DPP? What are we trying to achieve? If the goal is to share information to customers in a holistic way so that they can compare products, you still need standardization for that to happen.”

DATA PRIVACY AND GEOPOLITICS

A point only Shariati raised, and that was somewhat of a curveball in terms of unintended consequences of DPP, was potential data privacy and consumer rights breaches.

DPP requires a digital data carrier attached to each product as a means of accessing data related to it, and stipulates that a range of carrier types are allowed, including QR codes, RFID tags and NFC labels; however, the consequences of the chosen carrier differ greatly.

QR codes are printed and must be scanned to access the data; an NFC, however, is detectable without scanning, and leads to questions about consumer privacy if they can be detected and tracked while a consumer is wearing a garment containing an NFC. “As a private person, if I buy a garment and I'm wearing it, if that system is activated and someone has a ‘reading device’, they can hack it and they can keep track [of me] as a person, meaning there is a customer and human privacy perspective [when considering the data carrier], versus simply a supply chain perspective.” As such, she warns brands, “you need to be aware that this is a risk if you use a more technology-advanced carrier than a QR code.”

Regarding trade consequences, Shariati’s view is that it's important to consider the personal privacy perspective and GDPR: “especially when you start getting into a global context of trade between China, Europe and the U.S.” where “you're stepping on very sensitive ground and there's a totally different conversation that needs to be [had] in terms of the technologies that are enabling that [enhanced] level of traceability. It's one thing to have [a product] that is ‘dead’ and you're scanning it to access data– it's something else when it's ‘alive’ and you have a tool that can trace it or scan it and you access the [live] data. So there are layers to consider regarding the type of technology that is being used from a privacy perspective.”

At the macro level, the concerns and considerations raised here probe ESPR and DPP as they are proposed now, and how they might change in their final, as yet fixed, form. The possibility of unintended consequences regarding data and traceability also show the added complexity for brands and retailers when determining their chosen strategies and systems for fulfilling DPP requirements and mitigating risks. Standardisation of product definitions and data was the clear front-running concern and roadblock from a technical and feasibility perspective for both of the experts interviewed in this segment of the book.

TEXTILE EXCHANGE

In conversation with Evonne Tan, Senior Director of Data and Technology at Textile Exchange, on the topic of tracing and obtaining data in Tier 4 (raw materials and fibres) in textile and fashion supply chains.

Evonne Tan
Senior Director of Data & Technology at Textile Exchange

Since 2002, Textile Exchange has sat at a relatively untraveled crossroad in the textile industry: where fibers are cultivated from or extracted, then processed into textiles. Their domain is Tier 4 of the supply chain: from farms to cotton gins, to synthesis of man-made cellulosic fibers and beyond.

Textile Exchange advocates for reduced fossil fuel extraction and increased 'regenerative' and recycled fibre use; the organization understands the foundation stages of textile fibers and materials better than most. As a result, Textile Exchange convenes all industry stakeholder groups, hosting conferences and member forums, and providing tools and resources including Textile Exchange's own standard for Chain of Custody certifications, in an interoperable and centralized data platform that connects 34 fibre and textile certification bodies, as well as traceability organizations.

ON FIBRE IMPACTS AND TRANSPARENCY

As already outlined in this book, DPP marks the first regulatory requirement for brands to share product-level footprint data, and textile fibre impacts will play a significant role in the DPP footprint information shared with consumers. By extension, fibre and textile impacts will implicitly influence consumer decisions regarding 'sustainable' product purchasing.

To date, the closest piece of legislation or regulation to ESPR and DPP in aim and scope is the AGEC law in France. AGEC has demonstrated that collecting and sharing fibre impact data lawfully is complex, since General Data Protection Regulation (GDPR) in Europe demands that privacy be maintained with respect to some of this data, yet transparency may be required in order to accurately evaluate fibre impacts.

Evonne Tan states that:

> *"DPP must consider the transparency implications for smallholders and marginal suppliers when going back to the fibre source, because farms are also family homes."*

She elaborates: "The AGEC law requires only the disclosure of country of origin and specific processes, such as knitting/ weaving, dyeing/printing, and cutting/ sewing as a means of circumventing smallholder privacy [restrictions]." For now, "we are awaiting the ESPR requirements to better understand how to manage supply chain transparency, which is needed for proof of impact (while ensuring data privacy and intellectual property through data semantics and access management)." "The cost of data collection is another factor to consider as estimating fibre level impact requires substantial data collection and reporting, which is an additional burden [on supply chain stakeholders]."

Furthermore regarding transparency, Tan shares that "in some cases, the enterprise the supplier procures from is part of their intellectual property. Confidentiality is important to suppliers for reasons of ingredients, availability and quality." It is not yet clear how this will be handled within DPP data requirements.

ON GRANULARITY - A HELP, OR A HINDRANCE?

Furthermore, Tan highlighted considerations about data granularity and whether or not data should be required at the product level in every case. For example, with the potential introduction of a minimum threshold of recycled material content for in-scope products, Tan says: "consideration should be given to what must be disclosed at organization level [versus] product batch, model, and article level." If all data is required at the product level "it may lead to trade-offs including durability, reparability and technical performance" she concludes. The upshot is that although DPP aims to enable product circularity, if mandatory recycled content leaves products with a shorter lifespan, the bigger picture of the sustainable textile underpinning the sustainable product is actually an unsustainable outcome.

ON FOOTPRINT CALCULATIONS AND STANDARDIZATION

As stated by the brands in the DPP pilot, the current PEF inclusion of Higg MSI potentially renders it at odds with EU Green Claims. Tan reflects: "We don't know what the data requirements of PEF will be until the Delegated Acts come into play–there are a lot of LCA gaps, and questions about data attribution. LCA is a 'snapshot' modeled within a specific scope and boundary, so attribution, particularly when there are gaps, becomes a big question."

Textile Exchange is not new to data standards, or the interoperability requirements of digital systems. The organization's data platform was designed to connect multiple stakeholders and traceability systems. Tan explains:

> *"In terms of data infrastructure, we are trying to build an interconnected framework to allow the different systems to talk to each other. We recognize that from the supply chain traceability perspective it's going to be a multi-stakeholder system."*

Tan elaborates: "The principle we follow is 'recognition first': using a system that is already built, and to see how it can operate with agreed-upon common language for integration within the digital framework."

Textile Exchange also plays a role in establishing the industry's data taxonomy, including within the Apparel Alliance Data Working Group. The Group began in 2023 with the aim of creating a shared supply chain taxonomy, and facilitating a unified approach to reporting fibre and raw material impacts across multiple supply chain tiers. Tan explains that this is a core element of the organization's mission: "Textile Exchange stands for bringing people together and helping everyone to talk in the same language."

Tan's insights highlight valuable lessons: from AGEC's handling of supply chain data transparency and GDPR, to the need for interoperable systems based on a harmonized data standard. The example shared by Tan was Textile Exchange's interoperable digital certification system, uniting 34 certification bodies in a centralized (rather than decentralized platform) and establishing a Textile Exchange standard for the platform.

Tan also flagged the possibility that granular (product-level) data could lead to unintended impact trade-offs, which should be considered to ensure overall industry movement towards environmental targets. These are all points requiring clarification in the upcoming Delegated Acts.

CONCLUSIONS AND TAKEAWAYS

CONCLUSIONS AND TAKEAWAYS

"The quicker you prepare for compliance, the smoother the transition will be for you and your customer group. This guide is a great resource to get started on that journey and navigate the current uncertainties on legislation."

Nicolaj Reffstrup
Co-Founder
GANNI

From the outset, this book aimed to open a window into the reasons why digital product passports are being introduced (environmental and economic) and how they are a facet of a much bigger EU target to reach net zero emissions by 2050. Economic growth must be decoupled from resource use (and thereby emissions, and other environmental and social impacts) and DPP is a link to better managing the utility and recyclability of products.

But DPP is also a tool for informing consumers about the impact of products they purchase, and for enabling them to repair, resell and facilitate recycling once the product is no longer wearable. The Ecodesign for Sustainable Products Regulation (ESPR) which DPP sits within, for the first time sets requirements for how products are to be designed and made with circularity in mind, if they are to be 'fit' for sale on the EU market.

DPP requires a significant shift in the way data is obtained, shared and stored, and its ability to deliver on economic and environmental aims depends on standardization of how such information is measured, collected and conveyed, to overcome the oft-stated 'apples to oranges' comparisons that have blighted the fashion industry to date.

To get going on DPP, brands and retailers have a knowledge gap to fill, and this book aims to plug that, with a comprehensive explanation of the why, what, when and how of DPP, based on the best available information and a live, end-to-end textile

product DPP pilot of over 3000 ‘on market’ products. The culmination is this guide, to get you started on the road to implementing product-enabled DPPs.

To recap, this book has provided you with step-by-step guidance, explanations and action items, including:

- Clear explanations of what DPP is, why DPP exists, how DPPs will work and when they will come into force
- Detailed scope of the EU DPP, including which enterprises and products are ‘in-scope’
- A textile product-specific DPP data protocol to enable brands and retailers to commence DPP data collection and identify and evaluate data and system gaps (and possible solutions)
- First-hand lessons from stakeholders in an end-to-end live DPP pilot of ‘on the market’ fashion products
- Expert insights on wider industry and geopolitical context for DPP preparation
- Examples of business opportunities offered by DPP beyond simply being a regulation to comply with

For further resources related to DPP and all other legislation and regulation impacting the textile and fashion industry, take a look at the TrusTrace guides and resources.

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