APPENDIX

# Digital Product Passport

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# APPENDIX

# 1 Legislation related to DPP

## 1.1 Common legislation

### 1.1.1 Chemical regulation

Chemical legislation consists of four major entities: **REACH directive (EC 1907/2006), Seveso III Directive (2012/18/EU), CLP regulations (EC 1272/2008), and SCIP rules of the Waste Framework Directive (2008/98/EC).** In addition, the future requirements will be affected by the **EU chemicals strategy.**

**REACH** (Registration, Evaluation, Authorization and Restriction of Chemicals) addresses the use and production of chemicals and how they can potentially impact the environment and human health. Among other things, it sets the standards for how to collect and communicate information on chemicals along the supply chain. For example, it dictates the format and processes according to which (IUCLID program) the information on the hazardous properties of chemical substances should be handled and exchanged. **CLP regulations** for Classification, Labelling and Packaging of chemical substances complements the REACH directive by setting the standards for harmonized classification and labeling of chemical substances.

**SCIP** (Substances of Concern in articles and Products) is a database related to REACH collecting information on artifacts containing substances of concern. The aim of the database is to enable safe reuse of products after their end-of-life – in other words, safe waste management of the products.

**Seveso III directive (2012/18/EU)** *on the control of major-accident hazards involving dangerous substances* aims at preventing chemical related accidents. Among other things, it regulates the information management of storing large amounts of hazardous chemicals. In other words, it sets the requirements for companies to know the location, quantity and quality of these chemicals in their premises.

**EU chemicals strategy** is an initiative by the European Commission to better protect citizens and the environment, and boost innovation for safe and sustainable chemicals. The strategy aims at improving current legislation and is proposed to include the “safe-and sustainable-by-design” principle which targets to replace hazardous chemicals. This is planned to be done by establishing an EU-wide safe and sustainable-by-design support network that would promote the sharing of information and cooperation across sectors.

### 1.1.2 Circular economy, sustainability, and waste related regulation

DPP relevant regulation in the field of circular economy, sustainability and waste management is currently centered around the **Waste Framework Directive (2018/851 and 2008/98/EC)**, **Waste Statistics Regulation (2150/2002), the Basel convention,** and the **Eco-management and Audit Scheme.** In the near future, the field will be affected by the **Circular Economy action plan, and Extended Producer Responsibility scheme.**

**Waste Framework Directive (2018/851 and 2008/98/EC)** defines the fundamental concepts and definitions in the field of waste management. That is, it sets the scene for waste hierarchy, "the polluter pays principle", and the Extended Producer Responsibility. It also defines the rules for the calculation, verification and reporting of data on waste.

**Waste Statistics Regulation (2150/2002)** sets the standards for the design of waste management statistics in the EU, which creates data for the EU for monitoring the implementation of the Community policy on the recovery, generation, and disposal of waste.

**The Basel convention** is an international treaty that is designed to reduce the movements of hazardous waste between nations.

**Eco-management and Audit Scheme (EMAS)** is an EU management instrument designed by the European Commission. Its purpose is to help organizations in evaluating, reporting and improving their environmental performance. DPP could possibly be used in EMAS audit by improving the data management of the auditee.

**Circular Economy action plan** is part of the Green Deal initiative in the EU and is set up to make sustainable products the norm in the EU. It has 35 actions defined and it will impose requirements in both areas – textiles and batteries. For example, it will set rules for the accounting, transparency and sustainability of the sourcing of raw materials, carbon footprint and recycling. Accordingly, it will set the standards for information management of the product lifecycle, repair service data and end-of-waste criteria.

**Extended Producer Responsibility** is an approach in which "a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle". The concept is already in use but as part of the circular economy action plan, EU member states will introduce further mandatory EPR schemes for all packaging by the end of 2024.

### 1.1.3 Safety and product responsibility related laws

General product safety and responsibility related regulation is centered around the **General Product Safety Directive (GPSD) (2001/95/EC).** Its main implication for DPP is that it dictates the rules for providing consumers with the necessary information in order to assess the risks associated with a product, particularly when this is not directly obvious.

### 1.1.4 Regulation related to reporting

Reporting related general regulation is currently centered around the **Non-Financial Reporting Directive (NFRD)** which dictates how organizations should disclose social and environmental information in their annual reports. The implication for DPP is that DPP could prove beneficial in reporting CO2 scope 3 emissions regulated by the directive. In the future, **Corporate Sustainability Reporting Directive (CSRD) (2014/95 EU)** will expand the sustainability related reporting regulations also to smaller companies.

## 1.2 Battery-related legislation

### 1.2.1 Data management and accessibility

Currently, the regulation on data management is not very specific and the main component driving the legislation is the **Batteries Directive (2006/66)**. According to it, batteries should be labelled with information on chemical symbols (Hg, Cd, Pb), capacity, and waste disposal indicator (crossed-out wheeled bin symbol). In the future, the situation will change with the **new EU regulatory framework for batteries** and the **Ecodesign preparatory study for batteries.**

The new EU regulatory framework for batteries aims to contribute to

> *"…ensuring a level playing field through a common set of rules; promoting a circular economy; and reducing environmental and social impacts throughout all stages of the battery lifecycle."*

The framework will also

> *"establish requirements for sustainability, safety and labelling to allow the placing on the market and putting into service of batteries, as well as requirements for their end-of-life management."*

**The concrete implications for information management and labeling** as of Jan 1st 2027,

> *"…batteries should be marked with a label with information necessary for the identification of batteries and of their main characteristics. Various labels on the battery or the battery packaging would also provide information on lifetime, charging capacity, separate collection requirements, the presence of hazardous substances and safety risks. Depending on the type of battery, a quick response (QR) code would give access to the information"*

In addition, by Jan 1st 2026, the framework will also require setting up an electronic exchange system for battery information i.e. **battery passport** for industrial and EV batteries in the market.

**The EU preparatory study for batteries** aims at expanding the ecodesign requirements to the field of batteries. The initiative will impose rules on various areas such as information management (battery management systems 'BMS'), determination of battery State of Health (SoH), and traceability of battery modules with serial number and/or information stored in the BMS. The initiative will also dictate rules on the suitability of a battery for second life applications. In other words, there will be regulations on the information management of the capacity of each module, capacity decrease, possible increase of internal resistance, cooling demand, efficiency reduction, self-discharge and its evolution, calendar age, energy throughput, temperature statistics, errors, and negative events of a specific battery unit. The accessibility of this information will be managed with bar or QR codes. Other information requirements will include parameters such as battery manufacturer, battery type and chemistry, capacity, voltage and power limits, lifetime, temperature limits, among others.

### 1.2.2 Waste management, recycling, reuse, and sustainable product policies

Waste management, recycling, reuse and sustainable product policies in the field of battery regulations are currently centered around three sets of legislation: **the Waste Directive (2008/98), the ELV (end-of-life vehicles) Directive (2000/53) and the Batteries Directive (2006/66).**

**The Waste Directive (2008/98)** sets the general definitions of waste and recycling and sets other basic concepts related to waste management, such as extended producer responsibility. The **ELV directive (2000/53)** covers the lead acid batteries of original parts in vehicles (as opposed to 2006/66 which covers replacement batteries and other batteries) and focuses on waste prevention, material coding, treatment obligation, collection systems, information management and quota monitoring. In addition to data management themes, **the Batteries Directive (2006/66)** also imposes regulations on waste management with regards to batteries. The directive calls for proper waste management of batteries, including recycling, collections, take-back programs, and disposal. It also sets waste battery collection rates, and regulates the use of hazardous substances in batteries, removability from equipment, environmental performance of batteries in their life cycle and suitability of batteries for second life applications. In the future, **the EU regulatory framework for batteries** is set to replace 2006/66 and will bring several changes such as requirements for carbon footprint calculations and declarations, and rules on tracking data related to the lifetime of the battery.

### 1.2.3 Transport regulations and safety

With regards to safety regulations, the current state-of-the-art is that there is no overarching legislation specifically regulating the safety of energy storage systems, hence the safety of such installations is based on applying existing safety standards in the field of reuse, transport, and chemicals. One example of such regulation is the **ADR treaty for the carriage of dangerous goods**

which defines the allowed transport methods for different types of batteries depending on the weight, power, critical state, etc. Another example is the **Low Voltage Directive (2014/35/EC)** which covers batteries operating with a voltage between 50V and 1000V for AC and 1500V for DC and defines the attributes needed for acquiring CE approval of a product. **The EU regulatory framework for batteries** will also affect safety related regulations. In the future, there will be common safety requirements for stationary battery energy storage systems. For example, there will be common requirements for insulation levels, coolants, and other critical systems but the details of the changes remain to be clarified.

## 1.3 Textile regulations

### 1.3.1 Data management

**According to the textiles and clothing legislation**[1], textile products must be labelled or marked whenever they are available on the market. The indication of the fibre composition of a product is mandatory at all stages of the industrial processing and commercial distribution of that product. All products containing at least 80% by weight of textile fibers, including raw, semi-worked, worked, semi-manufactured, semi-made, and made-up products are covered by the regulation. The regulation does not cover size, country of origin, or wash/care labelling.

**The Sustainable Products Initiative (SPI)**[2], which will revise **the Ecodesign approach**[3] and propose additional legislative measures as appropriate, aims to make products placed on the EU market more sustainable. As part of the SPI the Commission has committed to expand of Ecodesign Directive to a wider range of products, including textiles. This means that textile products not complying with a minimum level of sustainability, as set out in these new Ecodesign requirements, will not have EU market access. Under the new Ecodesign rules it must be mandatory to disclose product-level information on material and chemicals content: **bill of materials**, material and chemical content, product origin including sourcing of raw materials; **social impacts of production**: factory-level info on workers´ rights throughout the supply chain; **company-level information**: companies' corporate social and environmental policies, targets, practices, risks and impacts on human rights including labor rights, as well the environment and governance, and auditing outcomes.[4]

**The Corporate Sustainability Reporting Directive**[5] (CSRD) (2014/95/EU), an EU law requires certain large companies to disclose non-financial to

[1] Legislation (europa.eu)
[2] Sustainable products initiative (europa.eu)
[3] environmental-csos-recommendations-for-the-eu-strategy-for-sustainable-textiles-june-2021.pdf (europa.eu)
[4] *Environmental-CSOs-Recommendations-for-the-EU-Strategy-for-Sustainable-Textiles-June-2021-1.pdf (ecostandard.org)
[5] Corporate sustainability reporting | European Commission (europa.eu)

publish information related to **environmental matters, social matters and treatment of employees, respect for human rights, anti-corruption and bribery, and diversity on company boards** (in terms of age, gender, educational and professional background). There is **also a proposal for CSRD** that extends the scope to all large companies and all companies listed on regulated markets (except listed micro-enterprises), and it requires the audit (assurance) of reported information, introduces more detailed reporting requirements, and a requirement to report according to mandatory EU sustainability reporting standards, and requires companies to digitally 'tag' the reported information, so it is machine readable and feeds into the European single access point envisaged in the capital markets union action plan.[6]

Proposing a comprehensive EU strategy for textiles-based industry and stakeholder input, **the EU Strategy for textiles**[7] will have Ecodesign measures to ensure that textile products are fit for circularity. Applying to the new sustainable product framework will also ensure the uptake of secondary raw materials as well as tackling the presence of hazardous chemicals. This will boost the EU market for sustainable and circular textiles, including the market for textile reuse, address fast fashion and drive new business models, and empowering business and private consumers to choose sustainable textiles and get easy access to reuse and repair service.

Under the new Ecodesign rules it will be mandatory to also disclose product-level information on **circularity performance** and the expand of the Ecodesign approach, part of Sustainable Products Initiative (SPI), will set information requirements to the products durability/lifetime expectancy, repairability, reusability, recyclability, and product care guidance, but also comprehensive environmental footprint information. durability/lifetime expectancy, repairability, reusability, recyclability, and product care guidance of a product. The Ecodesign approach will impose comprehensive rules on **environmental footprint information**, starting with CO2 and material footprint, but progressively extended to more dimensions, including a product's Product Environmental Footprint (PEF) profile when this is available - i.e. once the PEF Category Rules[8] for apparel and footwear are finalized[9].

The European Commission considers **Extended Producer Responsibility (EPR)** schemes as a regulatory measure to promote sustainable textiles. EPR schemes on textiles would require e.g. information on commercial guarantee periods. To date, France is the only EU country with an EPR scheme for textiles. The Netherlands has called for an EU-wide obligation for EPR for textiles, and Sweden has set in motion plans to introduce an EPR for textiles from 1 January 2022. Outside the EU, the UK government has committed to review and consult on an EPR for textiles (including at least all clothing, as

[6] https://ec.europa.eu/commission/commissioners/2019-2024/mcguinness/announcements/remarks-and-eu-side-event-disclosures-cop-26-eu-sustainability-reporting-standards-and-future_en
[7] Strategy for textiles (europa.eu)
[8] Single Market for Green Products - The Product Environmental Footprint Pilots - Environment - European Commission (europa.eu)
[9] About PEF - Sustainable Apparel Coalition

well as other household and commercial textiles, such as bed linens) in England.[10]

### 1.3.2 Waste management

*European countries export a large amount of their used clothes. Much of the used low quality synthetic textiles which are exported end up on a landfill or as rubbish in production countries. These countries are therefore negatively affected by the emissions and pollution from the production, as well as the enormous waste-problems connected to overconsumption of textiles and the shipment of used textiles outside the EU. There is a need to regulate the export of used clothes.*[11]

*As one of the main building blocks of the European Green Deal, the new circular economy action plan sets out initiatives for the entire life cycle of products, targeting product design, promoting circular economy processes for production, fostering sustainable consumption, and aiming to ensure that the resources used are kept in the EU economy for as long as possible. At the same time, the circular economy policy is designed to protect the environment and empower consumers.*[12]

*Waste shipment within and outside the EU is critical in achieving these circular economy objectives. Regulation (EC) No 1013/2006 on shipments of waste (WSR) is the main legislative act regulating transboundary movements of waste. However, deficiencies in the current design and implementation of the regulation are hampering achievement of the European Green Deal's circular economy objectives. A revision of the rules is therefore necessary*.[13]

Textile waste became an important topic on the EU's policy agenda after **the revision of the Waste Framework Directive** in 2018, which introduced an obligation for the EU Member States to separately collect textile waste on 1 January 2025. The revision of the Waste Framework Directive lays down obligations to reduce mixed waste and to increase preparations for the reuse or recycling of waste, and thus **the implementation of separate textile waste collection** is a prerequisite for achieving ambitious European targets. In the current planning, the Commission foresees measures to reduce waste generation through re-use of products or components, and material information including information on chemicals. The EU will again revise the Waste Framework Directive in the coming years, which may lead to new requirements for the member states and will subsequently affect the textiles

[10] Exploring EPR for textiles: taking responsibility for Europe's textile waste | European Circular Economy Stakeholder Platform (europa.eu)
[11] *Environmental-CSOs-Recommendations-for-the-EU-Strategy-for-Sustainable-Textiles-June-2021-1.pdf (ecostandard.org)
[12] *Environmental-CSOs-Recommendations-for-the-EU-Strategy-for-Sustainable-Textiles-June-2021-1.pdf (ecostandard.org)
[13] Waste Shipment Regulation (europa.eu)

business. The separate textile waste collection will be mandatory in Finland already in 2023.[14]

Another initiative that may impact textiles is **the Revision of Waste Shipment Regulation** (announced in the European Green Deal). This revision will have implications on plastic waste trade causing serious environmental and health impacts in third countries. The purpose of the review is to facilitate recycling in the EU and to make more stringent the provisions on shipment to third countries, prevention of inappropriate export of waste and secondary/reused materials. For the textiles industry, the revised regulation may place a ban on certain types of textiles waste to be exported to third countries, especially blended synthetic textiles. The Commission will also undertake various incentives to boost textile recycling infrastructure and the secondary raw material market, e.g., end of waste criteria for certain types of textiles may be created in the coming years.

The Commission has committed to consider **a ban on the destruction of unsold/returned durable goods in the Circular Economy Action Plan**. Also, as Member States will be required to meet a new requirement to set up separate collection schemes for textiles by 2025, will **extended producer responsibility (EPR)** as a regulatory measure to 'promote sustainable textiles and treatment of textile waste in accordance with the waste hierarchy'.[15]

### 1.3.3 Sustainable product policies and ecological planning

**EU green public procurement (GPP) criteria**[16] are designed to make it easier for public authorities to purchase goods, services and works with reduced environmental impacts. The use of the criteria is voluntary. GPP criteria for textiles products and services focus on the key area(s) of environmental performance of a product and it is comprehensive criteria that considers more aspects or higher levels of environmental performance for use by authorities that want to go further in supporting environmental and innovation goals.

As part of the Circular Economy Action Plan, the European Commission is developing two key policies on transparency: **the Substantiating Green Claims Initiative** and **the Empowering Consumers Initiative**, which will require companies to substantiate claims they make about the environmental footprint of their products/services and will help consumers to play their role in a green transition.

**The Substantiating Green Claims Initiative**[17], which is expected to be published in March 2022, will require companies to prove their environmental declarations against a standardised methodology. Doing so, according to the

[14] What's in the Pipeline? A Closer Look into the Upcoming EU Policies Impacting Textiles (policyhub.org)
[15] What's in the Pipeline? A Closer Look into the Upcoming EU Policies Impacting Textiles (policyhub.org)
[16] Green Public Procurement - Environment - European Commission (europa.eu)
[17] Environmental performance of products & businesses – substantiating claims (europa.eu)

European Commission, will help to prevent greenwashing, where products are falsely or exaggeratedly marketed as environmentally friendly. This should help commercial buyers and investors make more sustainable decisions and increase consumer confidence in green labels and information.

**The Empowering Consumers Initiative**[18] helps consumers play their part in achieving a more sustainable economy. The green transition is a key goal of the EU consumer policy revision (the 'consumer agenda'). The policy revision proposal aims to ensure that consumers obtain reliable & useful information on products, e.g. on their lifespan and repair options, prevent overstated environmental information ('greenwashing') and sale of products with a covertly shortened lifespan, and set minimum requirements for sustainability logos & labels.

**The Product Environmental Footprint (PEF) initiative** is part of the "Single Market for Green Products Initiative"[19] initiated by the European Commission. The goal is to make it easier for companies to put green products on the European market and for consumers to identify them. The sector will only be able to make green claims related to the environmental impacts covered by PEF. PEF is a Life Cycle Assessment (LCA) based method to quantify the relevant environmental impacts of products (goods or services). The PEF methodology is designed to be a standardized way of measuring the environmental performance of a product. The aim of the PEF is to create a common language and method for calculating a product's environmental footprint, which is the foundation for a set of specific rules, and are a common approach across the EU, normally created at an industry level.

The European Union has taken important step in protecting EU consumers' health against chemicals known to cause cancer and reproductive health problems, limiting the use of these hazardous chemicals in clothing, textiles, and footwear[20]. Following a new restriction under the REACH Regulation, adopted on October 2018, 33 chemicals that are carcinogenic, mutagenic, or toxic for reproduction (CMR) can no longer be used in everyday clothing, textiles and footwear above a certain concentration limit.[21]

[18] Commission initiative 'Empowering the consumer for the green transition': have your say! | Plateforme des acteurs européens de l'économie circulaire (europa.eu)
[19] Single Market for Green Products - The Product Environmental Footprint Pilots - Environment - European Commission (europa.eu)
[20] Chemicals - Environment - European Commission (europa.eu)
[21] GROWTH - Item (europa.eu)

# 2 Benchmarks

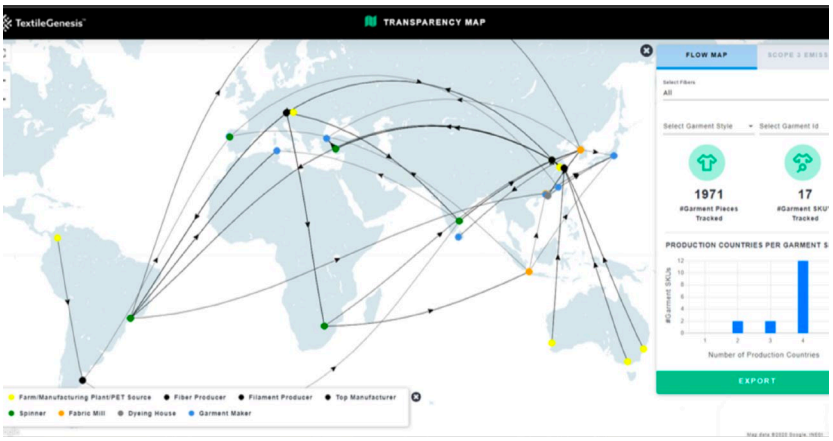
The understanding about digital product passport and ongoing projects were gathered by looking at both public and private DPP initiatives ad well as other publications and projects.

## 2.1 Central public product information systems and initiatives

The understanding about digital product passport and ongoing projects were gathered by looking at both public and private DPP initiatives ad well as other publications and project.

### TextileGenesis

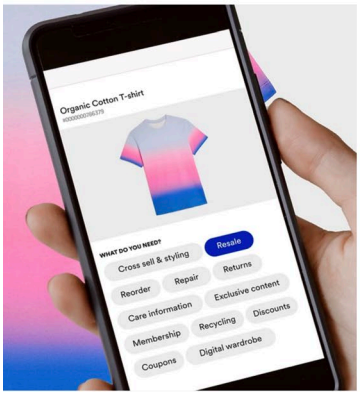
- ecosystem based on GS1 framework
- Blockchain combined with **GS1** traceability
- Fiber to retail
- Value-chain inventory optimization
- Our platform allows digitization and traceability of any textile asset such as fiber, yarn, fabric, or garment through FibercoinsTM (patent pending). Any sustainable textile player can issue FibercoinsTM directly linked to his textile asset. Digital twin.
- The first fiber-to-retail traceability data standard for the apparel
- Source: https://textilegenesis.com/

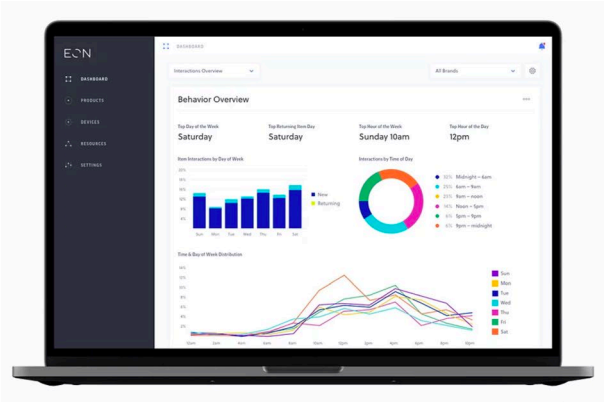



### EON

- Public Circular Product Data Protocol
- “An industry pioneer”
- Products become part of smart systems that connect to customers, services and applications

- QR Code, RFID, NFC or digital fingerprint
- Share brand content and drive cross-selling, share styling advice, care instructions, sustainability information, or offer new services like resale.
- Partner integrations: resale, recycle, repair
- API, pre-integrated partners, standardized data protocol (aligned with existing standards such as **GS1**)
- Analytics to brands on product interaction, use and resale
- Link: https://www.eongroup.co/



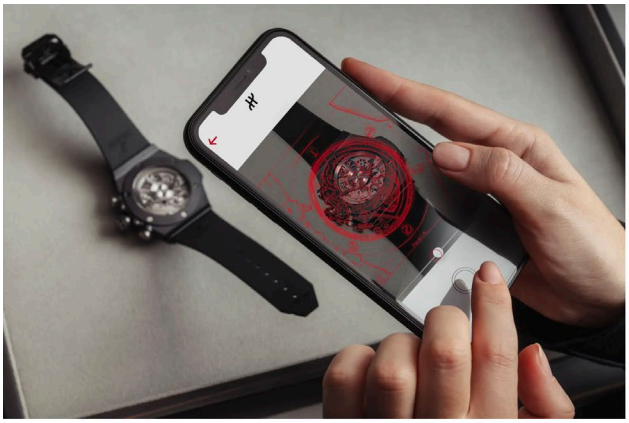



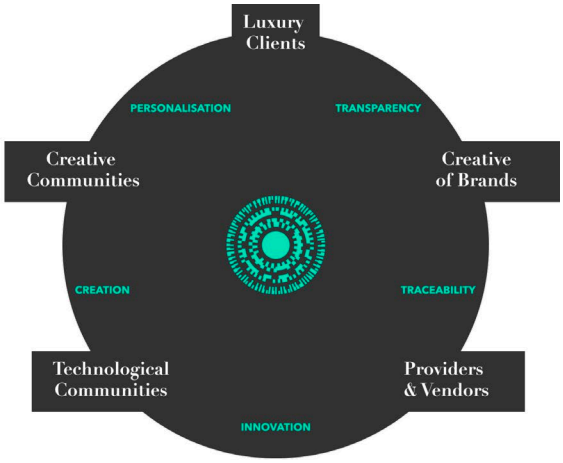

**Aura Blockchain Consortium**

- Raw material to second hand sales
- Private permission-based blockchain to decide which information to give access to
- Advantage to have same system when same issues, same suppliers, same distributors, same needs
- Optional integration to own website/storytelling
- Trust with suppliers down the line, because it is possible to put false information on the blockchain
- Watches AI image recognition, clothing QR, bags chip, carpets NFC-tag, depends on product
- Aura light: landing pages, cloud management

Source: The State of Fashion 2022

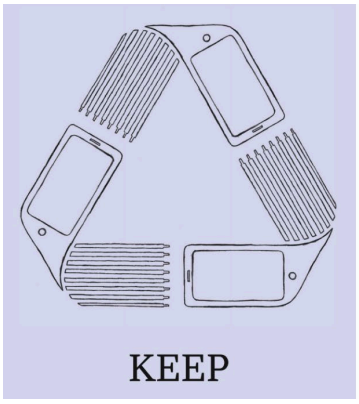
- Link: https://auraluxuryblockchain.com/






**KEEP**

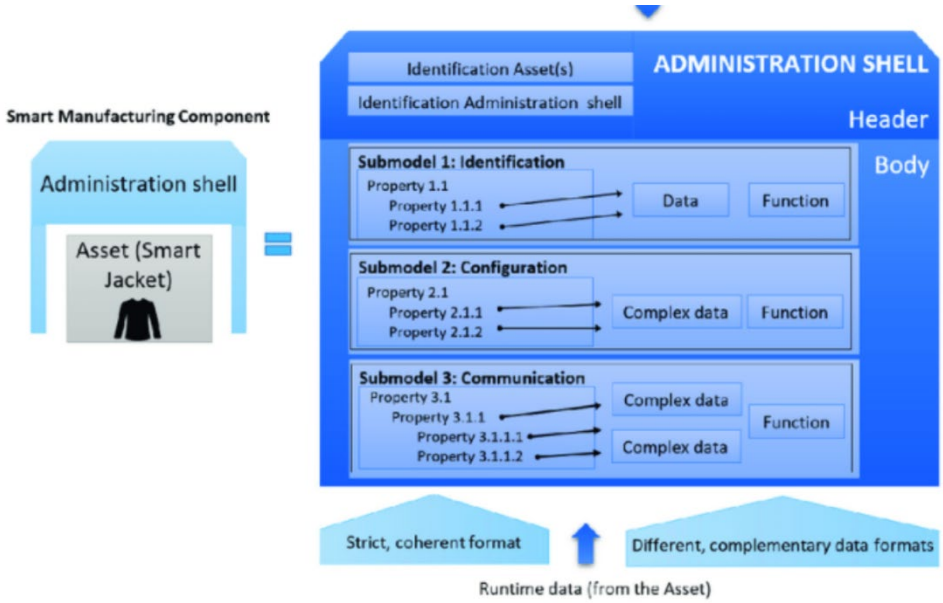
- Keep Electrical and Electronic Products (KEEP), a project launched in 2018 and completed in June 2021
- Evaluated and a prototype built
- The system assigns each product a unique product identifier, e.g:
- a barcode and/or QR code, that t allows organisations and users of the product across its life cycle to access and share information about the product
- value-specific and historical information about key events in the product's life, including production, distribution, purchase, repairs and services, reuse and recycling
- KEEP_report.pdf (keepelectronics.com)





**Asset administration shell (AAS)**

- Records and retrieves data on manufacturing equipment, represents a digital image of the real production object, “digital twin”.
- A conceptual link between the real and digital worlds
- In testing phase; has been used primarily in progressive industrial companies and for optimizing internal industrial production processes and procedures
- Data (if available) can be mapped over the complete product life cycle, from development to the end of the product’s life - continuously capturing and storing data in real time - however, real-time that has turned to be a challenge
- Data sets can, for example, consist of pre-configurations of production machines, material properties of intermediate products, limit values for use (e.g., maximum speed, highest possible operating temperature) or manuals, CAD drawings, key production figures (for example, target and actual values) or maintenance information
- AAS has so far been used primarily in the production of complex production objects to create a network between appropriately equipped suppliers, integrators, machine manufacturers and other industrial users




**IMDS AND IDIS**

IMDS (International Material Data System)

- all materials used in the manufacture of a vehicle are collected

international dismantling information system IDIS

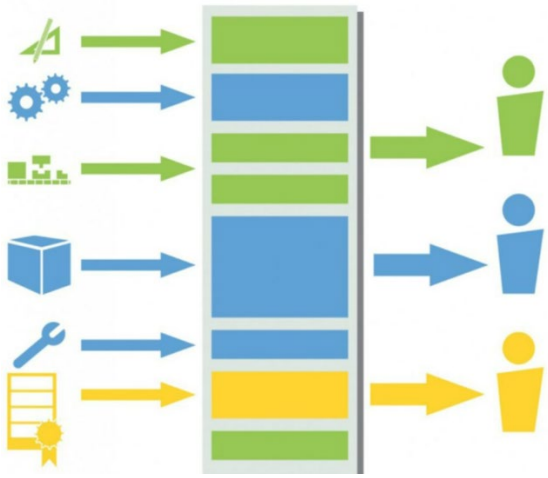
- vehicle manufacturers can deposit data to support disposal companies in the environmentally friendly treatment of end-of-life vehicles

(PDF) Towards a Digital Product Passport Fit for Contributing to a Circular Economy (researchgate.net)
https://www.mdsystem.com/imdsnt/startpage/index.jsp
The IMDS (International Material Data System) is the automobile industry's material data system. Initially, it was a joint development of Audi, BMW, Daimler, DXC, Ford, Opel, Porsche, VW and Volvo. ... In IMDS, all materials used for automobile manufacturing are collected, maintained, analysed and archived.


**Materials passport platform**

- Building sector
- Material information provided by manufacturers and suppliers
- A record or documentation of properties of materials in order to facilitate recycling and reuse
- increases transparency on the circularity characteristics of building materials and information includes such as technical data sheets or environmental product declarations (EPD)
- BIM is seen more comprehensive tool for collecting information on entire building level

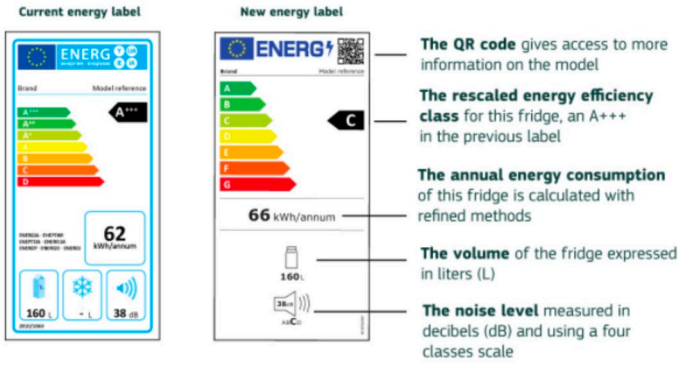
(PDF) Towards a Digital Product Passport Fit for Contributing to a Circular Economy (researchgate.net)



**ENERGY LABEL**

- Product group or model-specific information must be published both on a label and on product data sheets
- In the respective product group-specific implementation measures, the contents and information are further specified
- For example:
    - the label for refrigerators must include the manufacturer's name
    - the efficiency class
    - the electricity consumption per year
    - the volume of the refrigerator/freezer
    - compartment and the maximum noise level for the corresponding model.
    - The product data sheet, which must also be provided by the supplier, contains further information such as the exact design or duration of the manufacturer's guarantee
- Recyclability and repairability is included from 2021 onwards
- Retailers do not enter or provide any new information, but they are responsible for ensuring that labels are placed on the respective products

About the energy label and ecodesign | European Commission (europa.eu)




**European Product Registry for Energy Labelling**

- The centralised energy labeling database built by the Commission

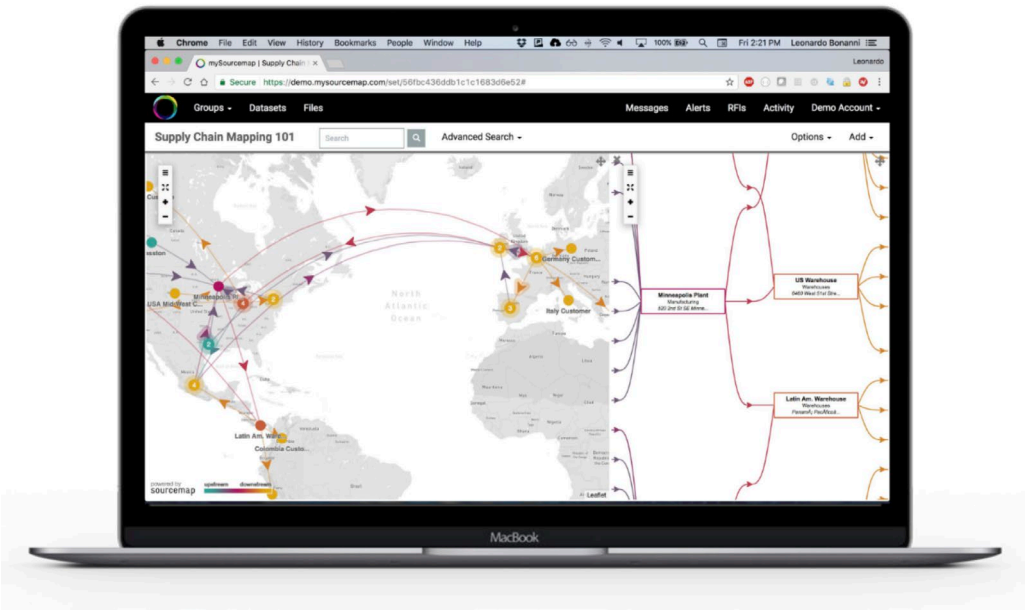
Link: https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/product-database_en

**Sourcemap**

Source: https://sourcemap.com/

- Enterprise software to tackle end-to-end supply chain challenges
- Supply chain visualizations, fiber to retail

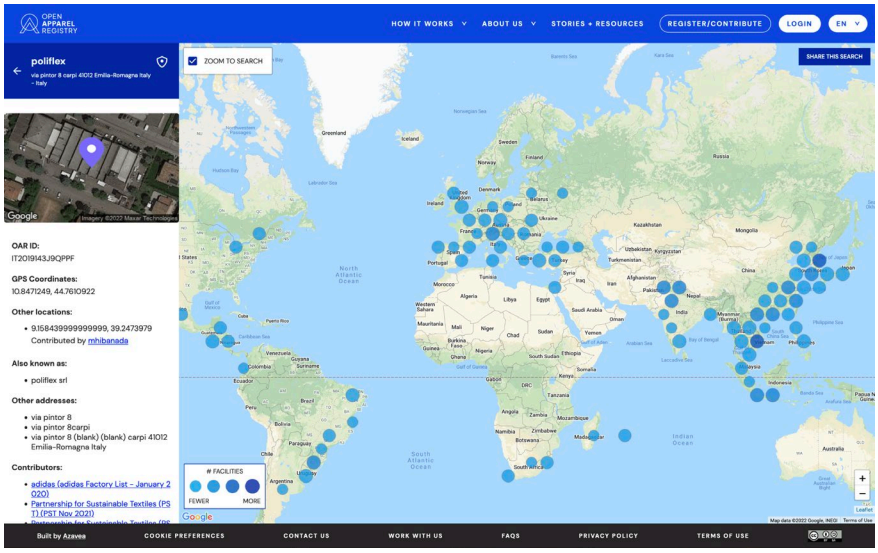
- Sub-tier supplier discovery
- Supplier risk analytics
- Supply chain reporting




## Open Apparel Registry

- Mapping garment facilities worldwide
- Unique ID to each facility
- Target groups and stakeholders: Brands, facilities, civil society, multi-stakeholder initiatives, third party services, researchers
- Over 75k apparel facilities in 128 countries
- The OAR is established as a non-profit corporation

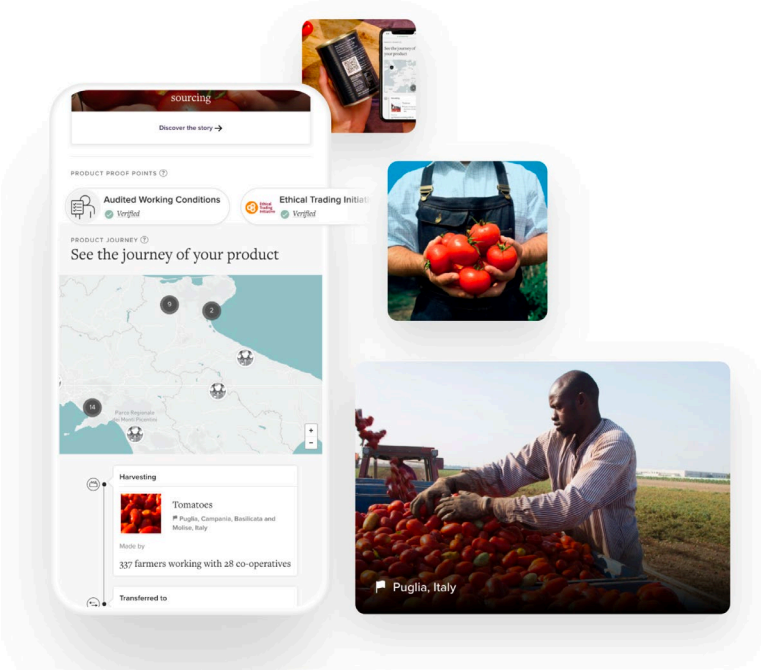
https://info.openapparel.org




## Provenance

- Verification of the claims with third-party certifications
- Product story can be linked to website or social media
- Analytics
- How sustainable is Provenance's use of blockchain technology?
    - Although solutions are being developed, the energy consumption required by public blockchains is a legitimate cause for concern. That's why we use blockchain very conservatively at Provenance. We only ever use it to record third-party verification of Proof Points, where we believe a decentralised approach adds unique value to the brand and shopper.

- Source: https://www.provenance.org/

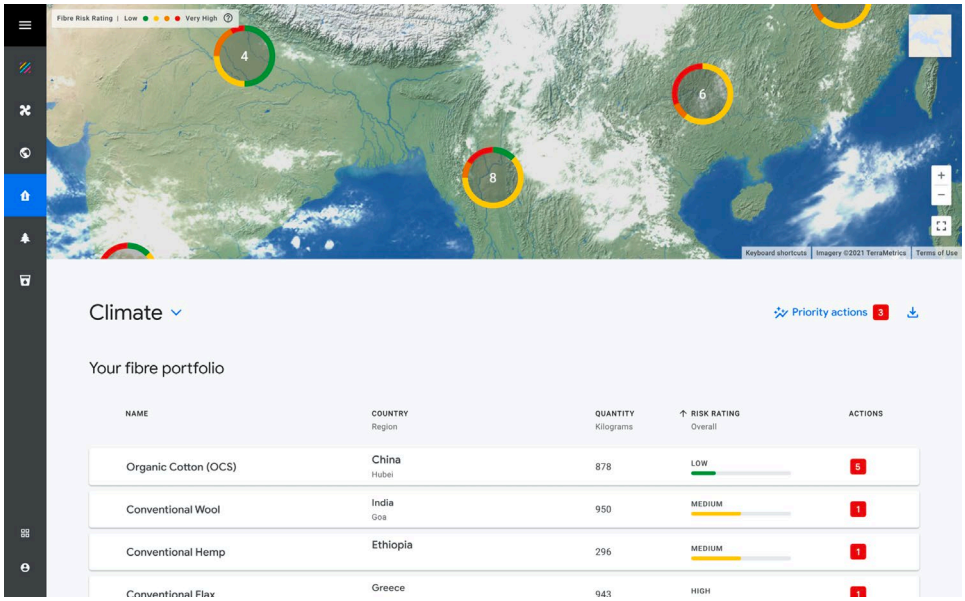



## 2.2 Private product information systems and initiatives

**Global Fibre Impact Explorer (public/private, Google, WWF, Stella McCartney, Textile Exchange)**

- Upload company fibre portfolio and assess your data
    - Recommendations to act on findings
- The Global Fibre Impact Explorer assesses fibre portfolios across five key risk and impact categories: air pollution; forest; biodiversity; climate; and water usage and quality.
- In addition to founding contributor Stella McCartney, other leading fashion, luxury, denim, and athletic brands and retailers - including adidas, Allbirds, H&M Group and VF Corporation, among others... The tool will be opened up for broader industry access in 2022.

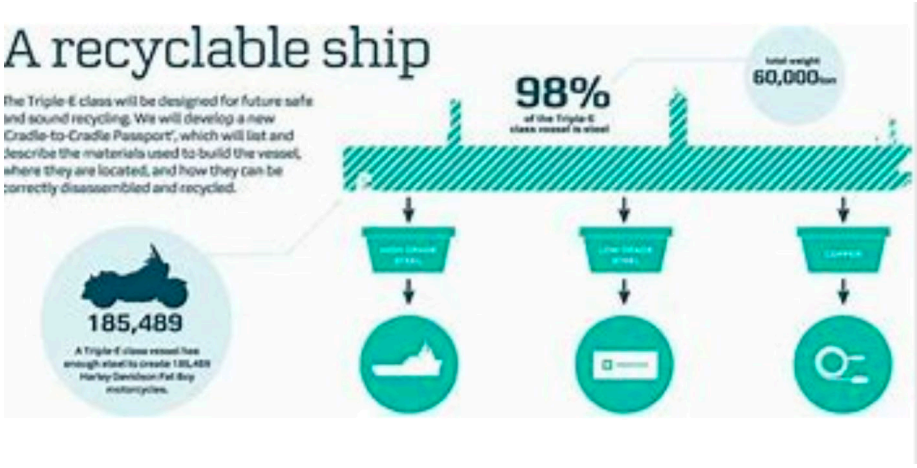
Sources: https://globalfibreimpact.com/ & https://blog.google/outreach-initiatives/sustainability/helping-fashion-brands-make-more-sustainable-decisions/




**Cradle-to-Cradle by Maersk (C2C)**

- Cradle to Cradle passport by Maersk for shipping industry for reusing and recovery of shipping steel
- objective to recycle materials used at the end of a product's life. Maersk's passport shows, for example, which materials are used in which location of a ship and provides, e.g. information about quality differences in the steel used.
- The Passport comprises an online database to create a detailed inventory that can be used to identify and recycle the components to a higher quality than is currently possible

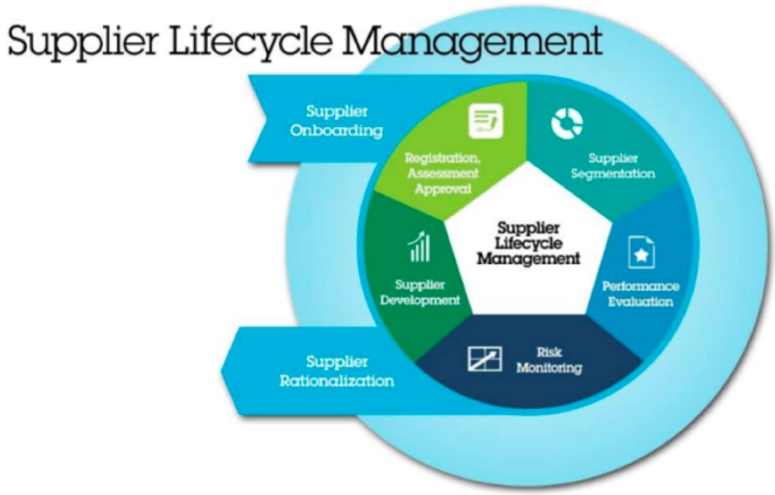
https://www.oecd.org/sti/ind/48354596.pdf



## IBM

https://www.ibm.com/blogs/blockchain/2019/11/transform-your-supply-chain-with-blockchain-enabled-digital-passport/

- Supplier lifecycle management
- Trust Your Supplier: https://trustyoursupplier.com/




## Tradelens

Source: https://www.maersk.com/apa-tradelens https://www.tradelens.com

- Maersk+IBM
- Hyperledger Fabric blockchain technology https://en.wikipedia.org/wiki/Hyperledger
- Ecosystem, platform, marketplace

| | Provenance[69] | WWF, Traseable, Sea Quest Fiji, Conensys[70] | Beefledger[71] | Belagricola, IBM[72] | Walmart, IBM[73] | Accenture, Bill of Lading |
|---|---|---|---|---|---|---|
| **Geography** | Indonesia | Fiji | Australia | Brazil | Central America | United Kingdom |
| **Commodity** | Tuna | Tuna | Beef | Grains (incl. Soybeans) | Mangoes | 12 containers |
| **Platform** | Unknown | Ethereum (hybrid) (ConsenSys Proof of Stake) | Ethereum with ERC20 smart contract (permission-less) | Hyperledger Fabric (permissioned) & smart contracts (IBM Agritech) | Hyperledger Fabric (permissioned) (IBM Food Trust) | Ethereum with permission layer on top (hybrid) |

## GS1

https://gs1.fi/sites/default/files/2021-09/Tietokuvaukset_versio%203.1.17.pdf

https://www.gs1.org/voc/Product

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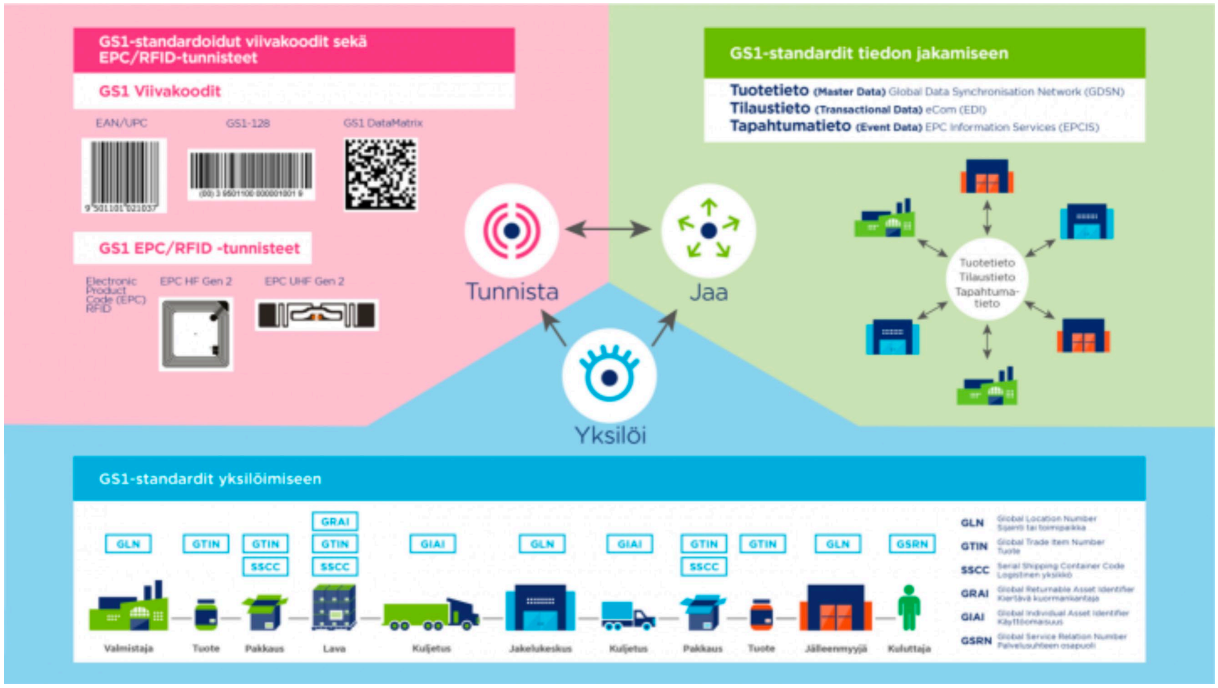
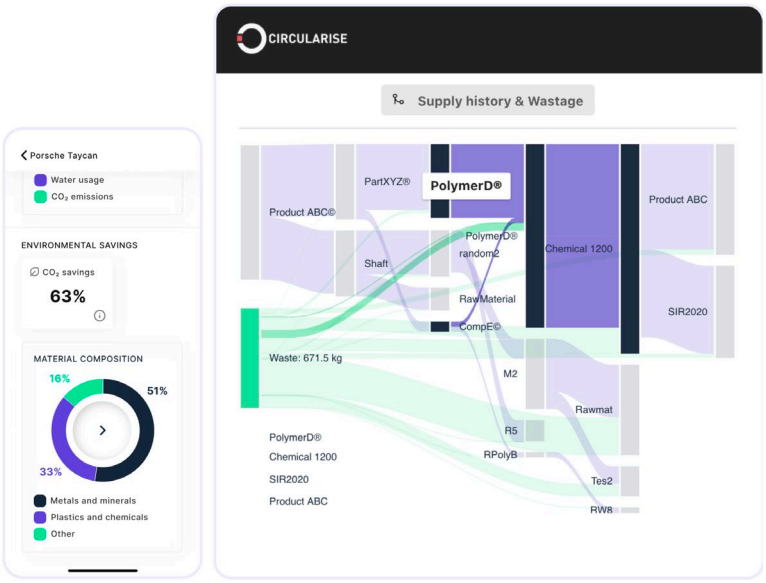


## Circularise

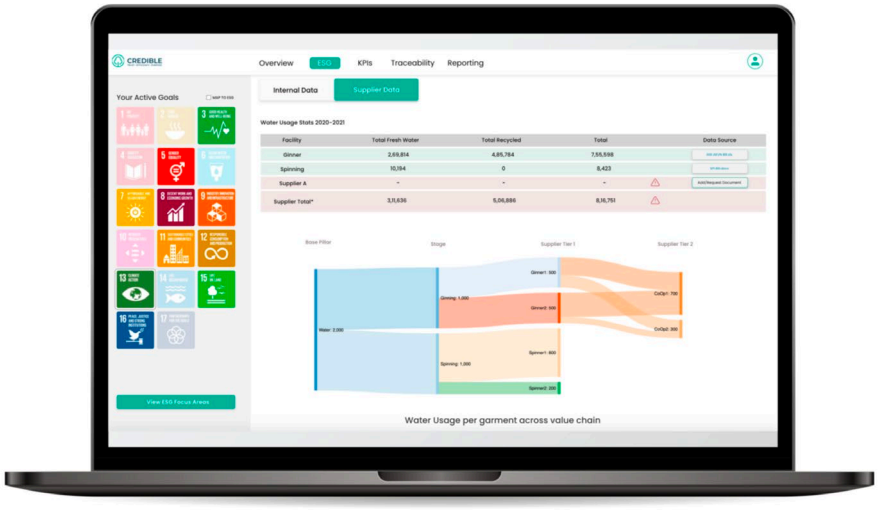
- Circularise is a supply chain traceability and transparency start-up founded in The Netherlands in 2016.
- Circularise is the leading software platform that provides end-to-end traceability and secure data exchange for industrial supply chains.
- Digitising and tracing materials
- Material information accessible to customers and regulators without sharing sensitive and proprietary material composition information
- Source: https://www.circularise.com/




## Credible

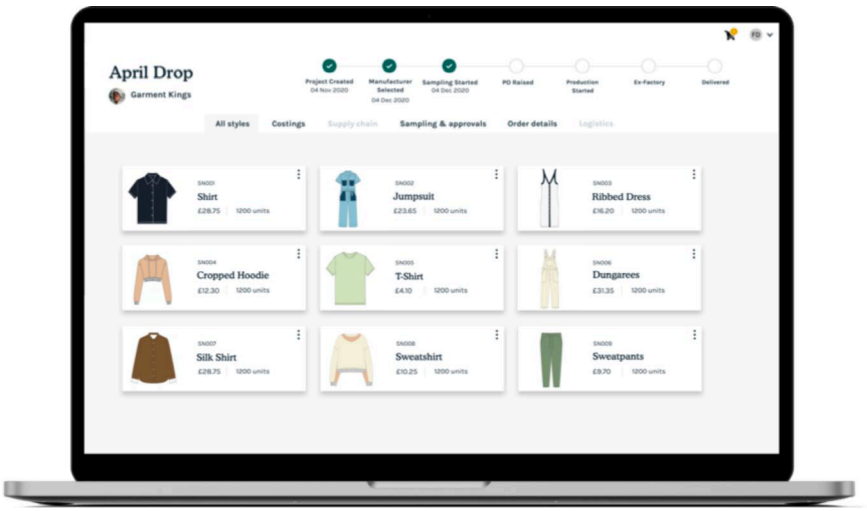
- Blockchain and AI
- Seed to end product
- Turning PO's to lens to supply chain
- Reporting integrations - GRI, SASB, CDP

Source: https://www.infinichains.com/




## Supply Compass

- Sustainable Product Development & Delivery Software for Fashion
- Communication with suppliers
- Source: https://supplycompass.com/




## Everledger

- Everledger Platform is a blockchain-based product authentication platform
- Item-level identities

- Provenance record

Source: https://everledger.io

### Tracr

- end-to-end tracing for diamonds

Source: https://www.tracr.com

### SSAB

Smart Steel –solution
Source:
https://www.ssab.fi/tuki/calculators-and-tools/smartsteel

## 2.3 Other benchmarks

**TrustTrace**
Link: https://trustrace.com/

- TrusTrace's open architecture platform ensures we are able to integrate seamlessly with other sustainability solution providers within the ecosystem

**Haelixa**
Link: https://www.haelixa.com/

**Aware**
Link: https://www.wearaware.co/

**Circularity.ID**
Link: https://circular.fashion/en/software/circularity-id.html

- The circularity.ID® Open Data Standard allows fashion brands to publish their product data in a format that can be utilised by a variety of software applications along the product lifecycle.

**Fibre Trace**
Link: https://www.fibretrace.io/

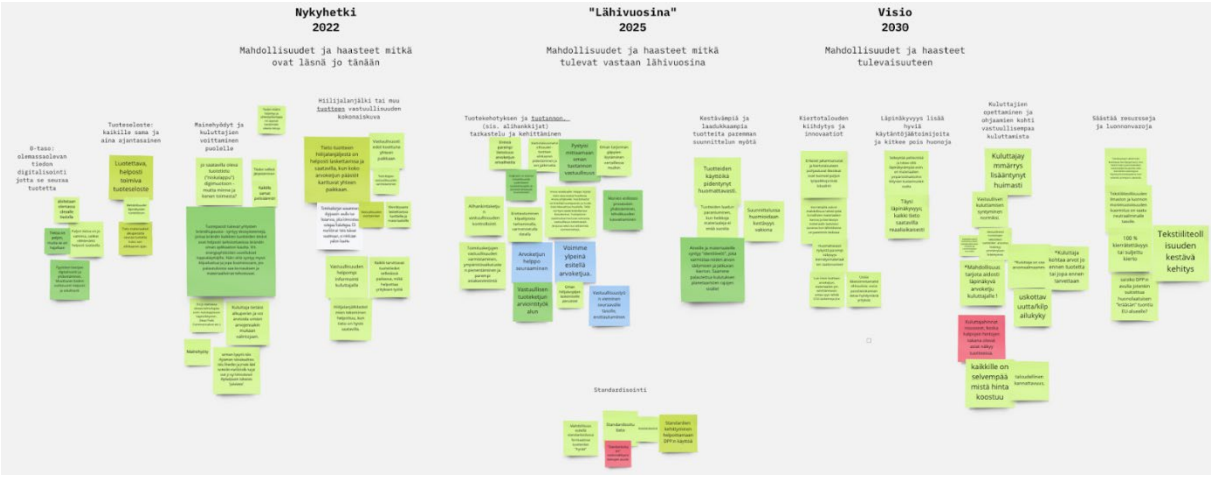
**Chestny ZNAK**
Link: https://www.roedl.com/insights/life-sciences-law/russia-product-%20counterfeiting-digital-marking-medication

## Digital nameplate:
https://www.zvei.org/en/press-media/publications/zvei-recommendation-the-digital-nameplate

# 3 Stakeholder workshop materials

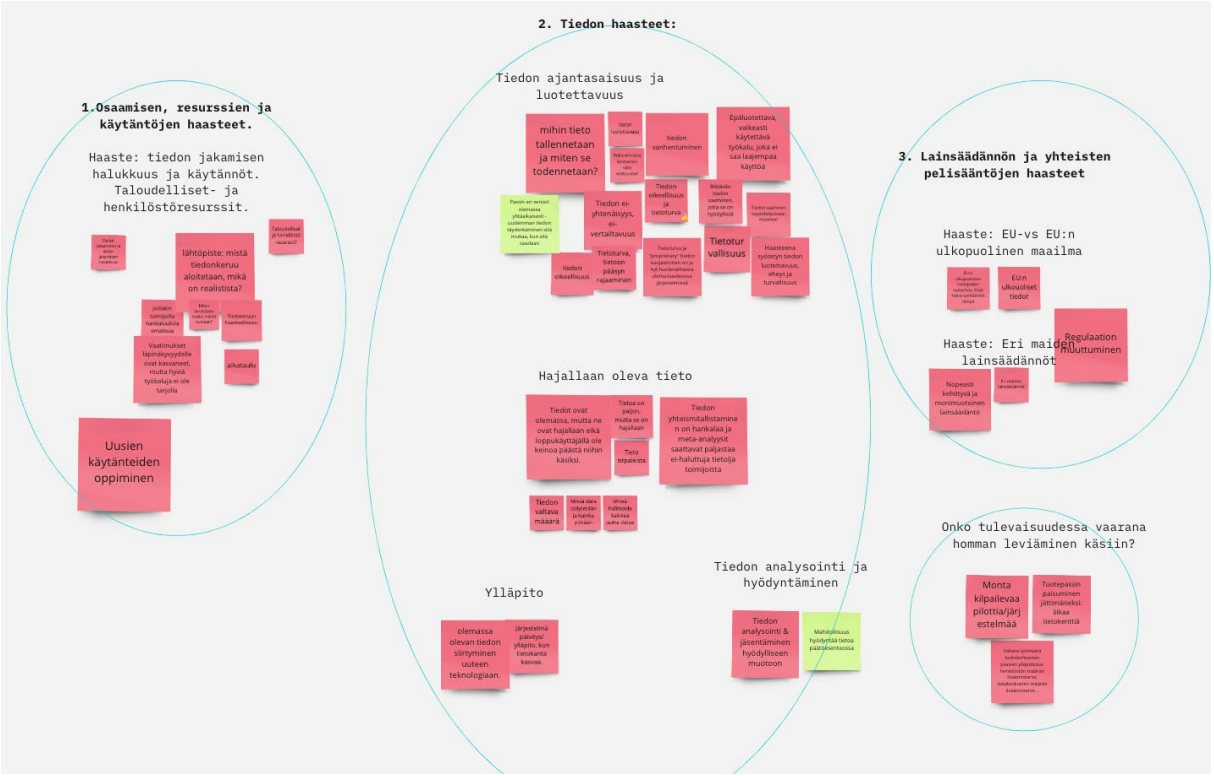
## Business needs and values

Source: DPP development workshop 4.2.



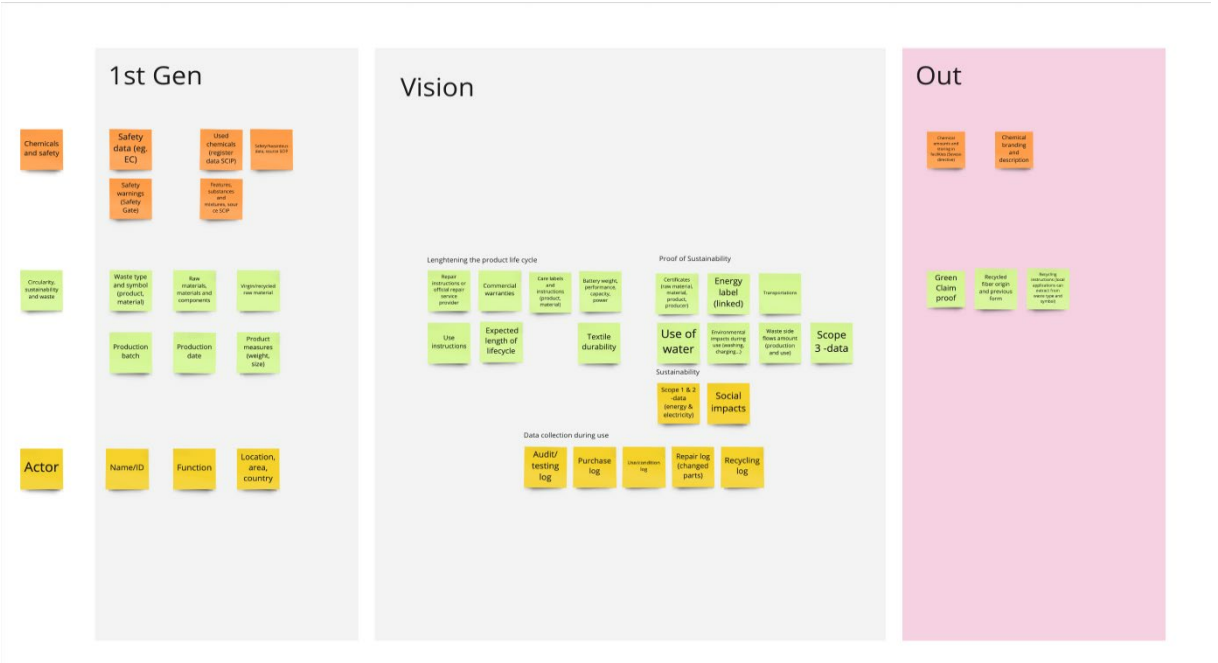

## Challenges for businesses

Source: DPP development workshop 4.2.



## Data needs

Source: DPP development workshop 4.2. and regulation



# 4 Examples of textile and battery vision concepts

The DPP concept drafted in the first part of the project was developed further in two workshops held in April and May 2022. The workshops were arranged to collect input from companies in the textile and battery sectors. The first workshop focused on the DPP for textiles, and the second workshop addressed the DPP for batteries.

The following chapters present the DPP vision concepts that resulted from the workshops.

## 4.1 Example of textile vision concept

Based on the textile sector company and expert interviews, the vision concept for DPP in the textile sector was updated to include additional stakeholders that influence the field of possible action for textile companies.

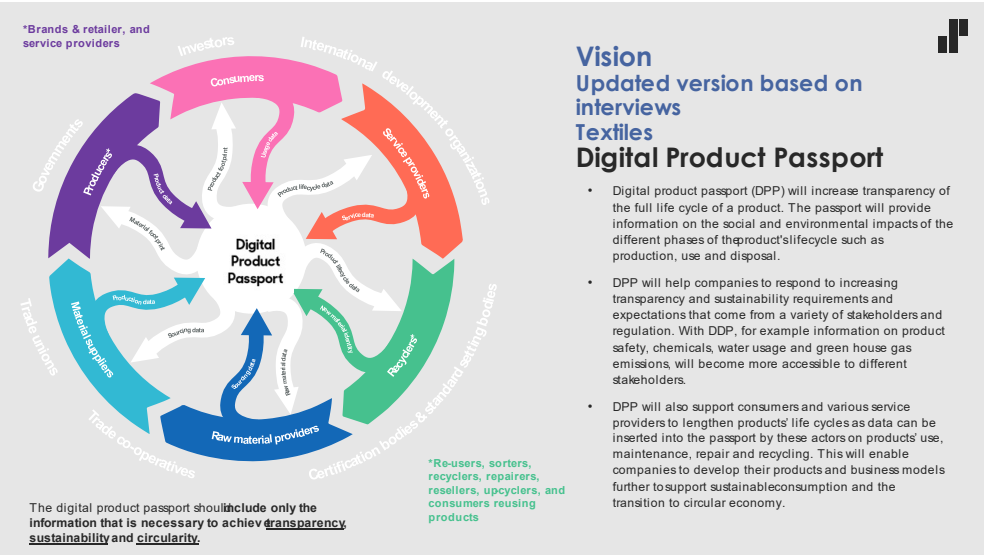



*Figure 1 DPP vision concept for textiles*

In addition to raw material provides, material suppliers, producers, consumers, service providers and recyclers, the following stakeholders need to be considered when assessing the possibilities and challenges that the textile sectors companies may face in implementing the DPP:

- Governments
- Investors

- International development organizations
- Certification bodies and standard setting bodies
- Trade co-operatives
- Trade unions.

These stakeholders can assist and/or set requirements to the textile sector value chain actors in implementing the DPP. Hence, they influence the environment in which the textile sector companies and other value chain actors operate.

Between different textile sector actors, there are differences in terms of the data generated by the actor for the DPP; the information needs of the actor for the DPP; the value of the DPP for the actor; and type of support needed for the actor to implement the DPP. The following paragraphs focus on these issues.

### Raw material providers

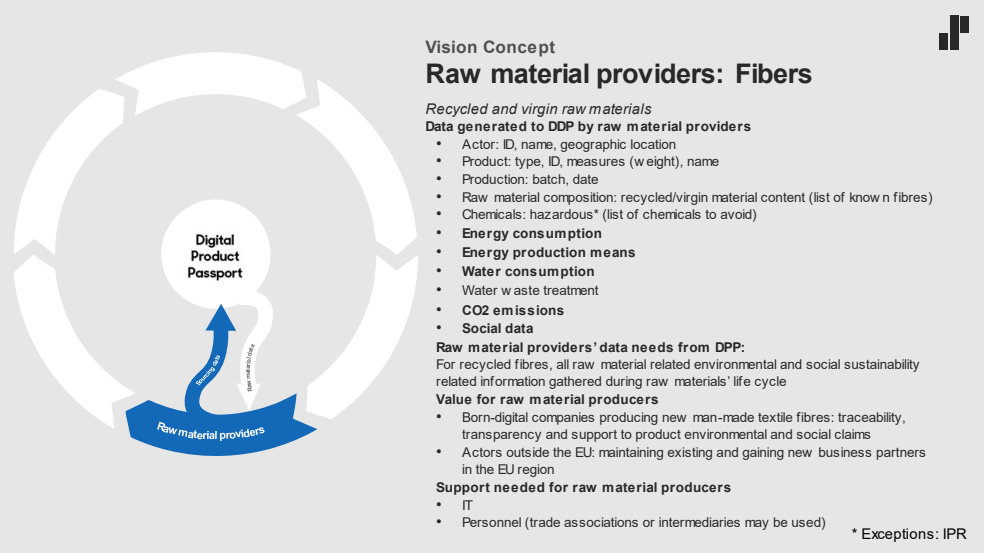



*Figure 2 DPP for the raw material providers of textiles*

The specific data needs for raw material providers are listed in the figure above. For textiles, material providers are considered to be producers of virgin or recycled fibres. Despite being the first part of the value chain, the raw material producers in the textile sector can also have information needs from the DPP when recycled materials are used in fibre production.

### Material suppliers


*Figure 3 DPP for the material suppliers of textiles*

The specific data needs for material suppliers are listed in the figure above. For textiles, material suppliers can include a number of different suppliers that supply components and materials for assembling the final textile product. In this project, the focus is on yarn and fabric producers.

## Producers

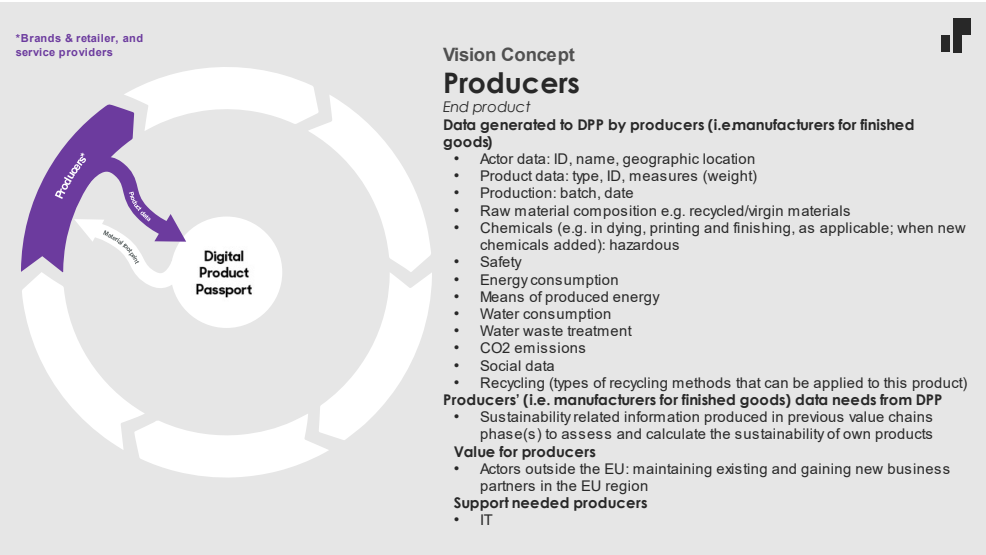



*Figure 4 DPP for the producers of textiles*

The specific data needs for producers are listed in the figure above. For textiles, these actors are defined as the manufactures of finished textile goods.

## Consumers

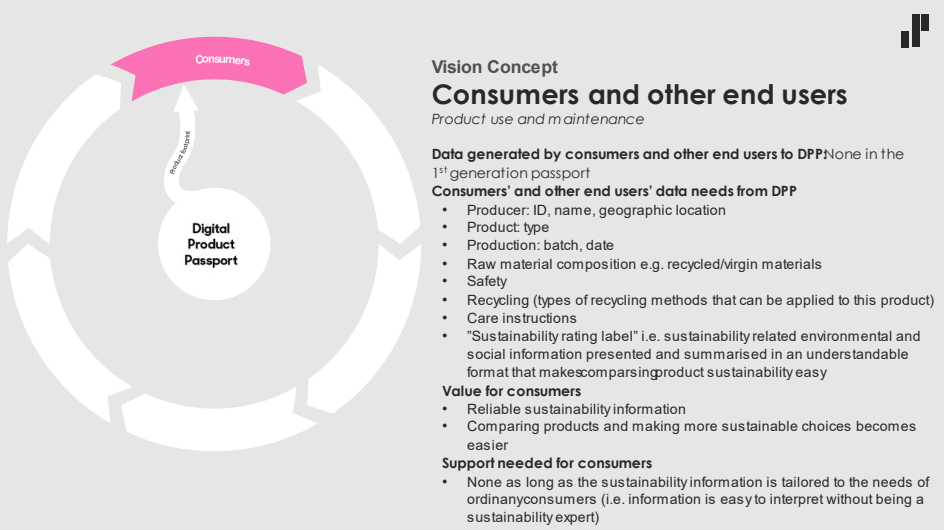



*Figure 5 - DPP for the consumers and other end users of textiles*

The specific data needs for consumers and other end users of textiles are defined in the figure above. For textiles, this category includes consumers and other end-users such as company end users using for example leased clothing or textiles.

## Service providers

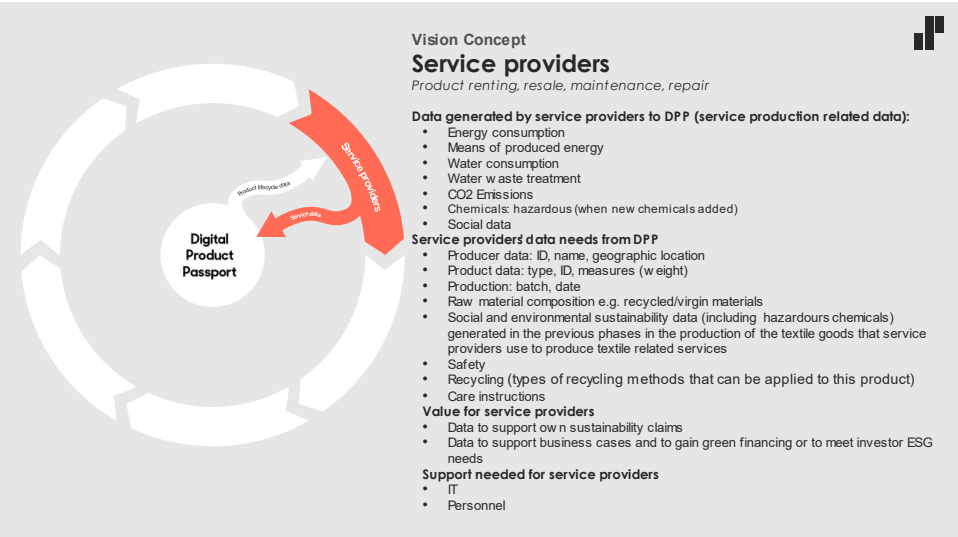



*Figure 6 DPP for the service providers of textiles*

The specific data needs for service providers of textiles are defined in the figure above. For textiles, this category is defined as all organizations that provide value-added services on textiles such as leasing, amending, repairing, washing, and recycling back to use as same products.

### Recyclers

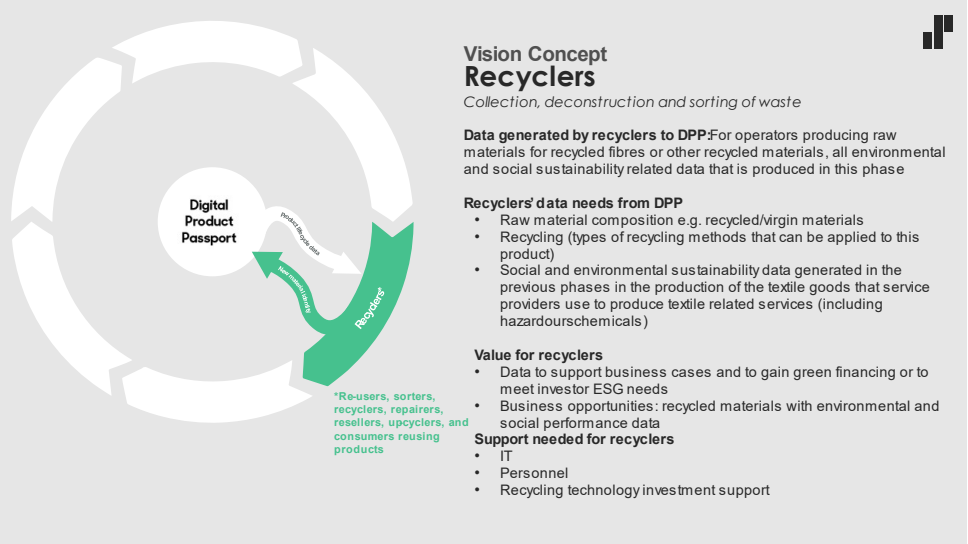



*Figure 7 - DPP for the recyclers of textiles*

The specific data needs for recyclers are defined in the figure above. For textiles, this category is defined as all organizations that do collection, deconstruction and sorting of textile waste.

## 4.2 Example of battery vision concept

### Raw material providers

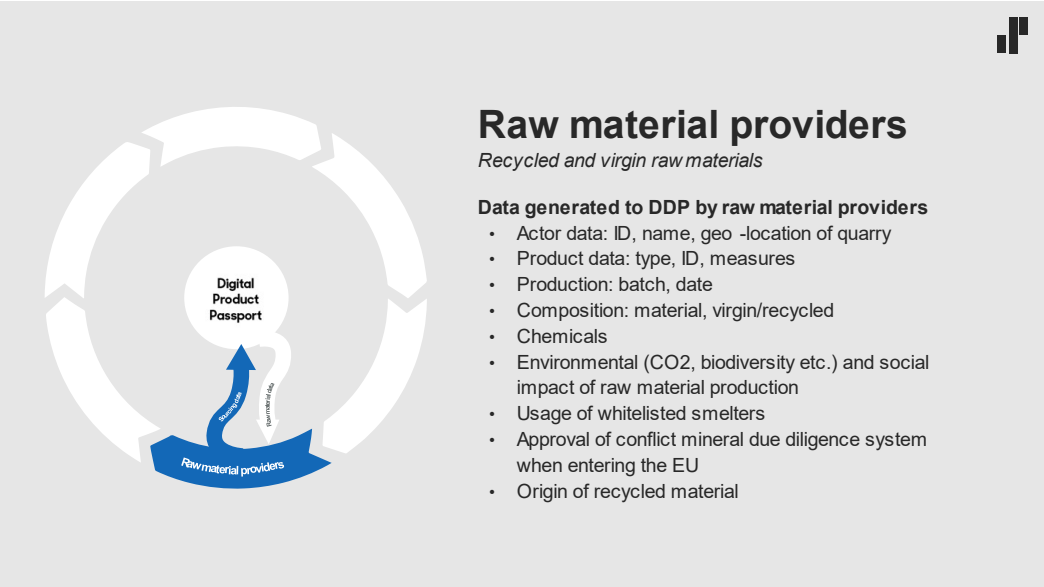



*Figure 8 DPP for the raw material providers of batteries*

The specific data needs for raw material providers are listed in the figure above. For batteries, material providers are considered to be either the importers or excavators of first stage materials such as lithium or cobalt. Since this is the first part of the value chain, it is natural that raw material providers only create data and do not fetch it from DPP.

### Material suppliers


*Figure 9 DPP for the material suppliers of batteries*

The specific data needs for material suppliers are listed in the figure above. For batteries, material suppliers are defined as the organizations that refine raw materials to more sophisticated intermediate substances or products such as lithium hydroxide or battery cells.

## Producers

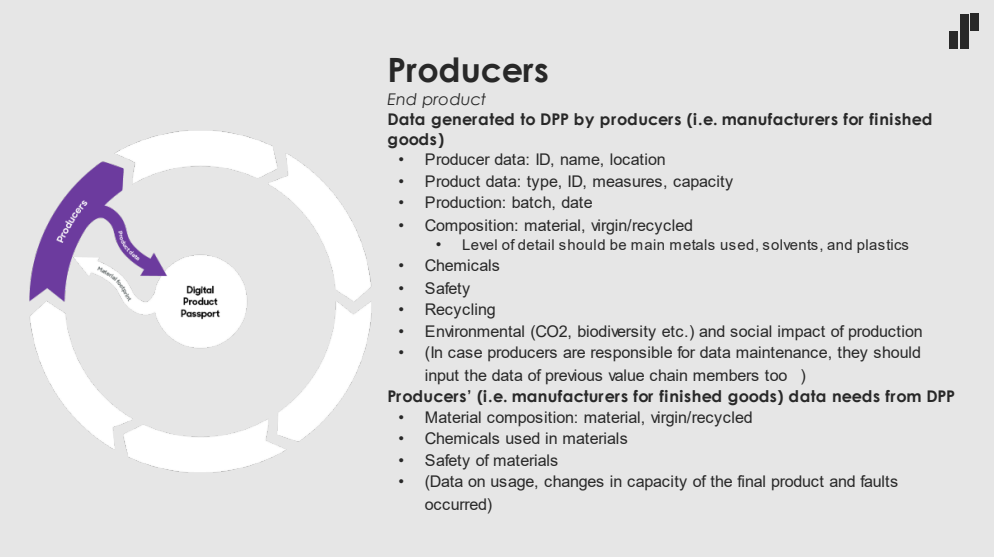



*Figure 10 DPP for the producers of batteries*

The specific data needs for producers are listed in the figure above. For batteries these actors are defined as the ones that assemble the intermediate products (chemicals, cells etc.) together and create the final usable product. If possible, producers would find it useful for their product development to have access to actual data on usage, changes in capacity of the final product and faults occurred. However, final users of the batteries may not consent to providing access to these data.

## Consumers and other end users

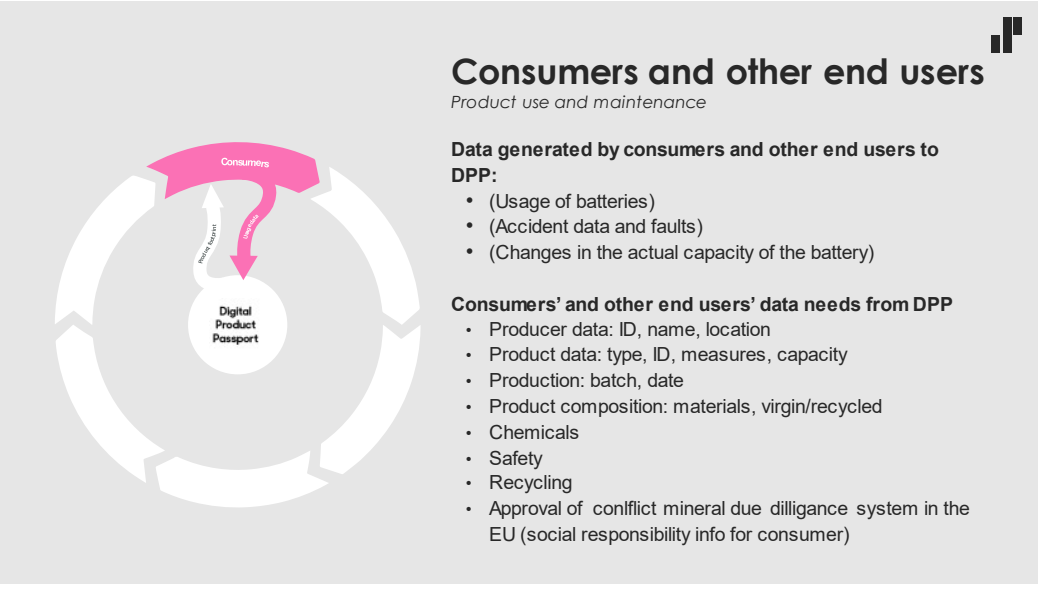



*Figure 11 - DPP for the consumers and other end users of batteries*

The specific data needs for consumers and other end users of batteries are defined in the figure above. For batteries, this category is defined as either the final B2C end user of battery units or products that contain batteries, or organizations that use batteries as part of their final products. It is noteworthy that the model for handling usage-related data should be defined and one should weigh the benefits it yields to producers with user data protection.

### Service producers

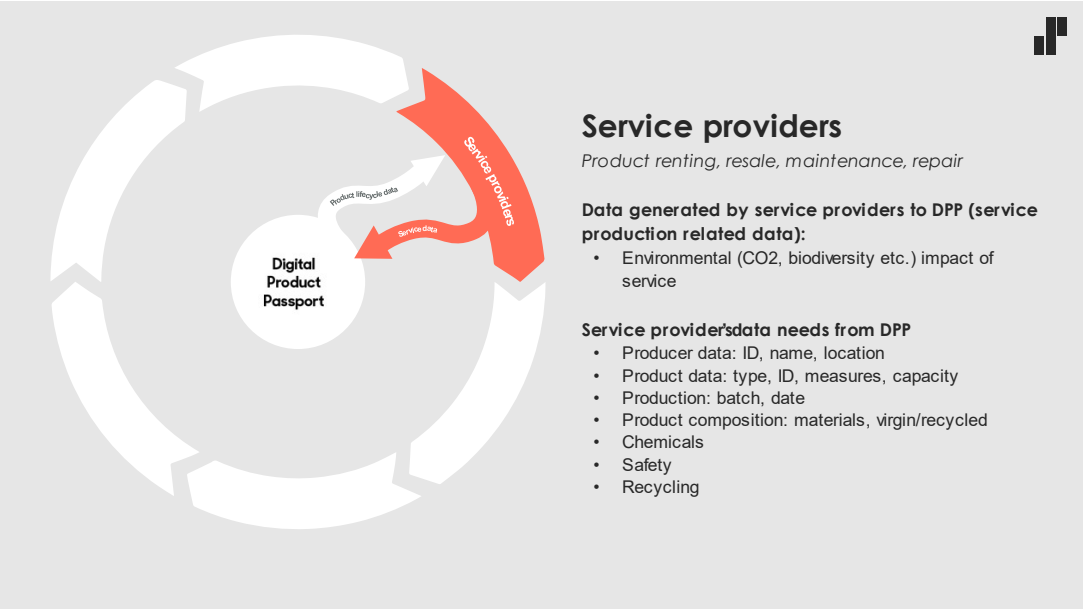



*Figure 12 DPP ffor the service providers of batteries*

The specific data needs for service providers of batteries are defined in the figure above. For batteries, this category is defined as all organizations that provide value-added services on batteries.

### Recyclers

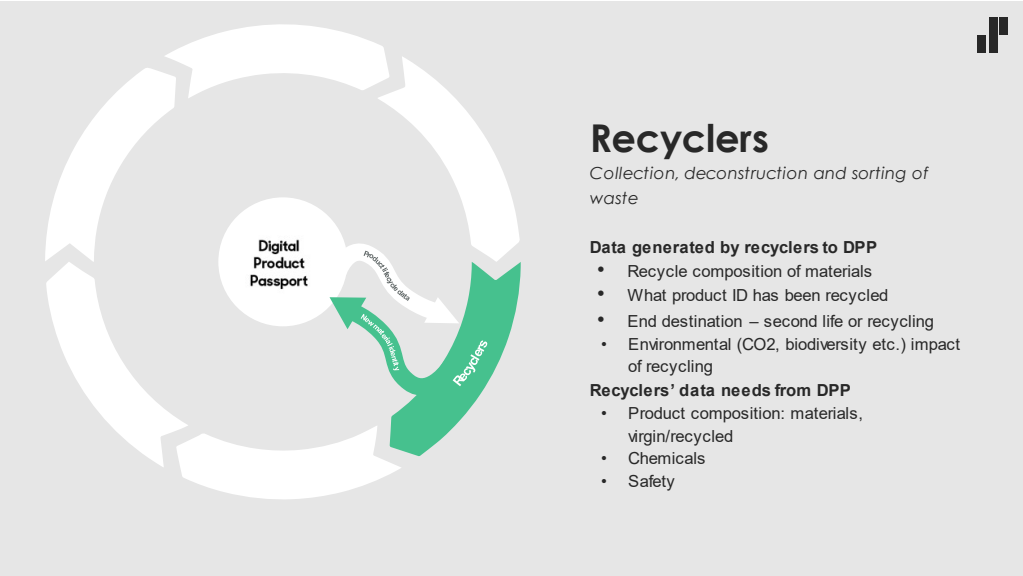



*Figure 13 - DPP for the recyclers of batteries*

The specific data needs for recyclers are defined in the figure above. For batteries, this category is defined as all organizations that do collection, deconstruction and sorting of battery waste.