T1.2 Traceability, transparency & product data in CE

- ”Minimum viable product” of textile data

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Summary – final report text

This subtask of TELAVALUE project focused on studying the utilization of product data within product and material life cycles in the context of circular economy (CE). We adopted a Minimum Viable Product (MVP) approach to determine the essential data elements required. Within this task, we established a starting point for a data model by examining existing models used for garments to see how they suit for CE purposes. Additionally, we selected two specific use cases: consumer re-use perspective and sorting for automation, aiming to enhance circular economy initiatives through data insights.

The results revealed that different use cases necessitate distinct datasets, making it challenging to minimize data requirements. It was also noted that to obtain useful data for CE, new data elements are needed to provide insights into the garment's usage phase, which are absent in current data models. The following two data categories/elements were defined:

1. "Maintenance Book": containing information on how the garment is maintained, repaired, modified, and by whom.

2. Circularity Information: requiring quality data elements to describe the current condition of the garment (e.g., New, Like New, Ok, Poor).

These new data elements necessitate a dynamic data model that can be updated during the usage phase. This imposes additional requirements on data management systems, necessitating capabilities for uploading and modifying data, verified access rights management, data exchange APIs, and other software infrastructure.

While we focused on two specific use cases, supporting all use cases within CE could result in a large dataset, posing additional challenges in data maintenance and management, leading to extra costs.

Objective of the task

- MVP (Minimum Viable Product) approach to understand requirements for product data fields that will support circular economy
  - Requirements are based on different needs of use cases (and the main actor of use case) in value chain
- Identify minimum set of data points that can support use cases

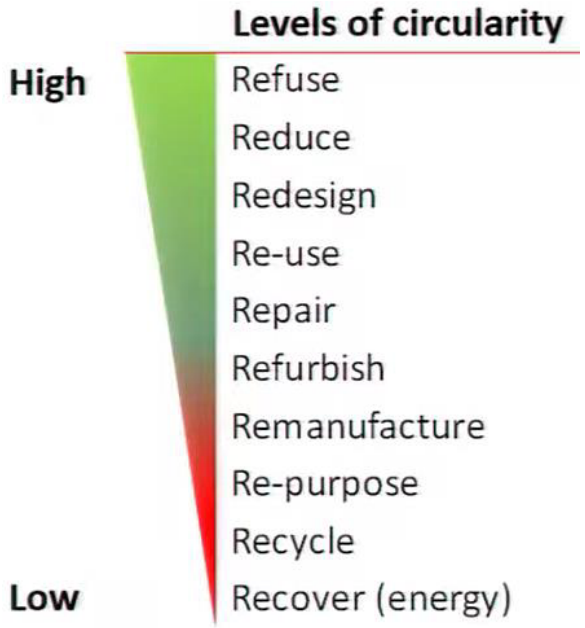
Methodology and data model

- As legislation soon requires DPP (Digital Product Passport) there is a lot of different initiatives for data models around Europe
- As background material for data model we used:
  - STJM DPP pilot and documentation
  - Data ”mashup” from TexRoad (the data model is based on work done by **Circular Fashion** and EoN)
  - JRC Policy report; Ecodesign for Sustainable Products Regulation - preliminary study on new product priorities https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/2023-01/Preliminary%20ESPR%20WP%20Report_MERGED_CLEAN_.pdf
  - Expected Battery DPP https://thebatterypass.eu/resources

- An expert Workshop with Traci Kinden from TexRoad 25.-26.4. in Espoo
- In the Workshop we focused on the garment specific DPP – Reflection of how data is accumulated and used along the garment lifecycle with specific uses cases
- The data model we used and modified is **NOT a recommendation for DPP data model**; our objective was to study the requirements and usage of data in different use cases in circular economy

Use case focus and background

- Our focus was on circular economy Rs and use cases especially on R's that can have large environmental impact
  - Reuse / consumer
  - Repair / Refurbish / Company performing repairs - Info they receive
  - Repair / Refurbish / Company performing repairs - Info they upload
  - Sorter (support automation) - decision making for post-consumer waste
  - Sorter info they upload / Recycling - Info they need
- Chosen focus and reasoning
  - Use case 1 Reuse of clothing:
    - the environmental impact of reusing textiles is 70 times lower
  - Use case 2 Sorting – decision making for post consumer
    - High potential for data driven decisions and automation; currently performed mainly manually



Data model – top hierarchy

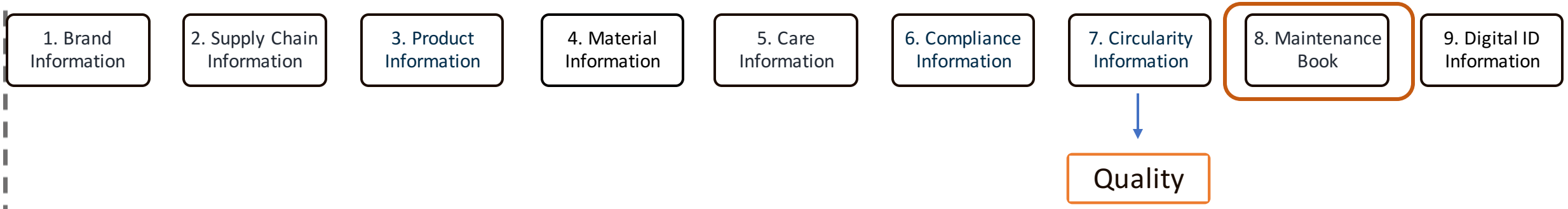
1. Brand Information
2. Supply Chain Information
3. Product Information
4. Material Information
5. Care Information
6. Compliance Information
7. Circularity Information
8. Maintenance Book
9. Digital ID Information

Short explanation of top hierarchy categories

- Brand Information; Brand information of the product and label (3)
- Supply Chain Information; Information of the manufacturing companies, spesific production places
- Product Information; Product ID system to uniquely identify a product
- Care Information; Care icons
- Compliance Information; Presence of harmful substances, chemicals and certifications
- Circularity Information; Information for circularity and End of Life phase
- Digital ID information; Type of physical carrier in the product

- Data model fully with subcategories presented in Appendix 1 (Televalue_data_MVP_Appendix)

Data model modifications – top hierarchy

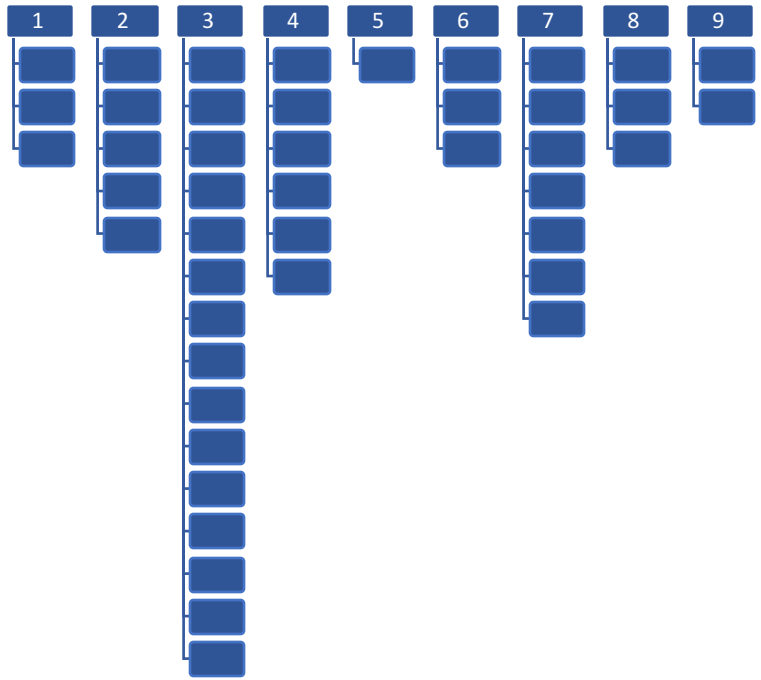


Out study recognised extensions needs to data hierarchy to support selected use cases (re-use and sorting) :

- Top level: Maintenance Book
  - Definition: this category contains information of how the garment is maintained; repaired, modifications and by whom, relates to Circularity Information
- Second level under Circularity Information
  - Definition: New, like new, ok, poor - Consumer facing for reuse
    - Could be expanded to support standardized quality of new clothing or measured quality of clothing/fibres at EoL (End of Life)

Visualisation and comparison of data needs 1/2

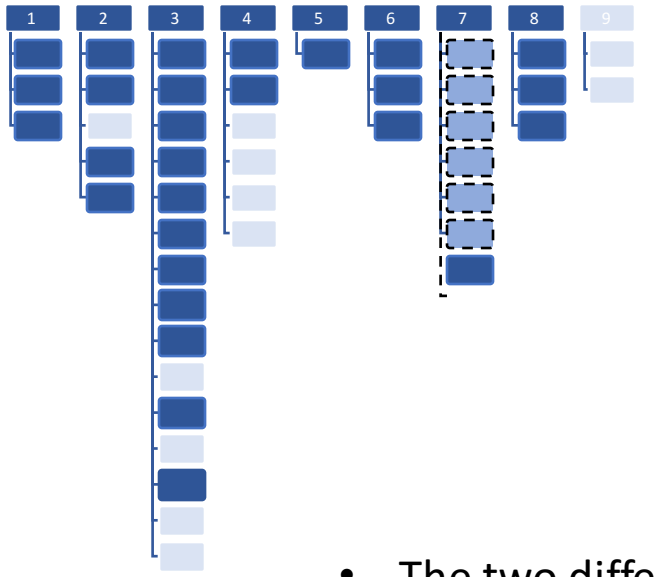
Original data model



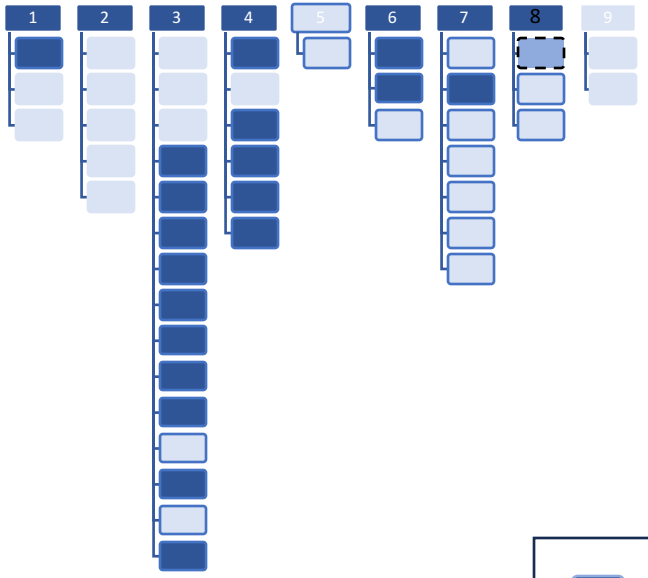
- First row in images is presenting the top level data hierarchy, follow-up elements describe the next level of data items in data model
- On the following slides is the similar visualisaton for two chosen use cases

Visualisation and comparison of data needs 2/2

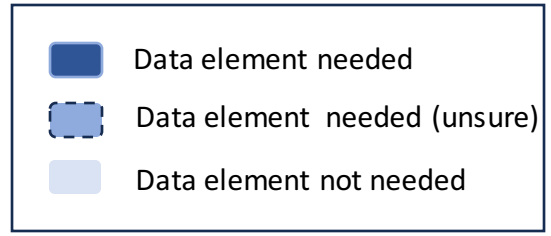
Usecase Reuse (consumer)



Usecase Sorting (and to support automation)



- The two different images for two usecases visualises and compares the different needs of MVP data elements
- Both different use cases has their own minimum set of data elements



T1.2 ”Minimum viable product” of textile data – our conclusions (1/2)

- In general different use cases of circular economy Rs’ require different minimum set of data
- The DPP should always bring an economical incentive; clear benefits of adopting it for those who use it
    - exception is reporting required by authorities
- Our uses cases defined DPP to be dynamic to support circular economy Rs’
    - Identified need for upload of information of different players from the use phase of End of Life phase
        - E.g. owner of repair service provider could provide information to ”Modification and Repair History” data field
    - New data entered to data model during the use phase need to be high quality and verified from each player that has possibility to upload data to DPP
    - If DPP system is dynamic we need capabilities for uploading and modifying the data including such as (verified) access rights management, data exchange API’s and other SW infrastructure
- Data management and infrastructure require economic and computing resources
- Technically implementing dynamic DPP is possible, but
    - Complexity vs (economical) feasibility of dynamic DPP infra needs to be understood and evaluated
        - Complexity of the ICT System can drastically grow for dynamic DPP and effect on the economical feasibility of solution
    - In real life we need to evaluate carefully the benefits of high-quality dynamic data and it’s benefits to use cases understand the feasibility
- DIGITALEUROPE’s points out also issues to dynamic DPP liability and timely updates of data as well as energy usage of system where the DPP is garment specific (not batch of model specific) https://www.digitaleurope.org/resources/the-future-of-eco-design-necessary-conditions-for-the-success-of-the-dpp/
- When DPP is in place
    - lifecycle visibility/extension - > what is the business model here to support extending the lifetime of the garment?
    - brands & authentication of high-end products, secondhand sales
    - sorting is “long term” benefit, at least 10% of the recycled garments should have the identifier in place in order to make any sense for the sorting automatization

T1.2 ”Minimum viable product” of textile data – our conclusions (2/2)

- Existing data fields in value chains would provide benefits if opened and shared to the stakeholders in circular economy
  - For example: use case for second hand market
    - Defining resale value
    - Authentication of the product
  - For example: use case for sorting
    - Exact and fine detail material info for recycling and creating uniform waste flows
    - Defining valuable/saleable garments for resale markets

- For second hand / sorting market quality data field would have lot of value, if is defined quantified/standardised way. Quality can be multidimensional, and different measures should be able to present standardised way
  - Visual/aesthetic quality effecting the resale , Task is difficult due to the subjectivity of quality attribute
  - Wear effecting the reuse
  - Quality of fabric/fibres effecting the recycling path
- Leading EU project Cirpass publications has present-day information and views on textile DPP (https://cirpassproject.eu/project-results/)