DPP-Enabled Reverse Logistics KPI & Decision Dashboard

This document summarizes the prototype concept you can develop alongside your thesis and use as a portfolio project when applying for tech-focused sustainability roles.

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1. Purpose of the Prototype

Create a Digital Product Passport (DPP)-enabled analytics tool that:

• Uses structured product data to evaluate reverse logistics performance

• Calculates economic and ecological KPIs

• Recommends the optimal End-of-Life (EoL) option (reuse, repair, remanufacture, recycle)

• Compares decisions made WITH vs WITHOUT DPP information

This demonstrates technological capability and directly supports your thesis.

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2. Tech Stack

• Python (pandas) – Data processing & KPI engine

• Streamlit – Interactive dashboard & UI

• CSV / JSON – Mock DPP data

• Optional: FastAPI – REST layer

• Optional: Power BI – Professional-level visualization

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3. Prototype Architecture

Product Data (mock DPP) → Data Processor → KPI Engine → Decision Engine → Dashboard (Streamlit)

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4. DPP-Like Data Fields

Each product (washing machine) includes:

• Core identifiers (product_id, model, year)

• Return context (condition, return reason)

• Technical/DPP fields (materials, repairability, disassembly time)

• Cost/impact parameters (labor rate, footprint, recycling yield)

• Information completeness score (0–1)

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5. KPIs Calculated

Economic KPIs:

• Inspection cost

• Disassembly cost

• Processing cost

• Transport cost

• Recovery value

• Net value

Ecological KPIs:

• Avoided CO■

• Recovered material mass

• Landfill avoided

• CO■ per € recovered

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6. Decision Engine Logic

1. Feasibility checks

2. Score each EoL option using:

total_score = 0.55*econ_score + 0.45*eco_score – info_penalty

3. Output "Why this recommendation"

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7. With DPP vs Without DPP Comparison

Scenario 1: Low info completeness $\rightarrow$ Poor decisions

Scenario 2: High info completeness (DPP) $\rightarrow$ Better decisions

Dashboard shows improvements:

• Net value

• Avoided CO■

• Material recovery

• Decision confidence

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8. Deliverables for Your Portfolio

• Working Streamlit app

• GitHub repo with documentation

• Screenshots and 1-page summary

• This PDF (concept note)

Next Steps

I can now generate:

• The dataset template

• Streamlit UI skeleton

• KPI formulas and scoring model

• Roadmap for completing the prototype in 14 days