A.SPIRE Industrial Innovation Days 2026

# From Secondary Raw Materials to Digital Product Passports: The DigInTraCE Approach to Circular and Traceable Value Chains

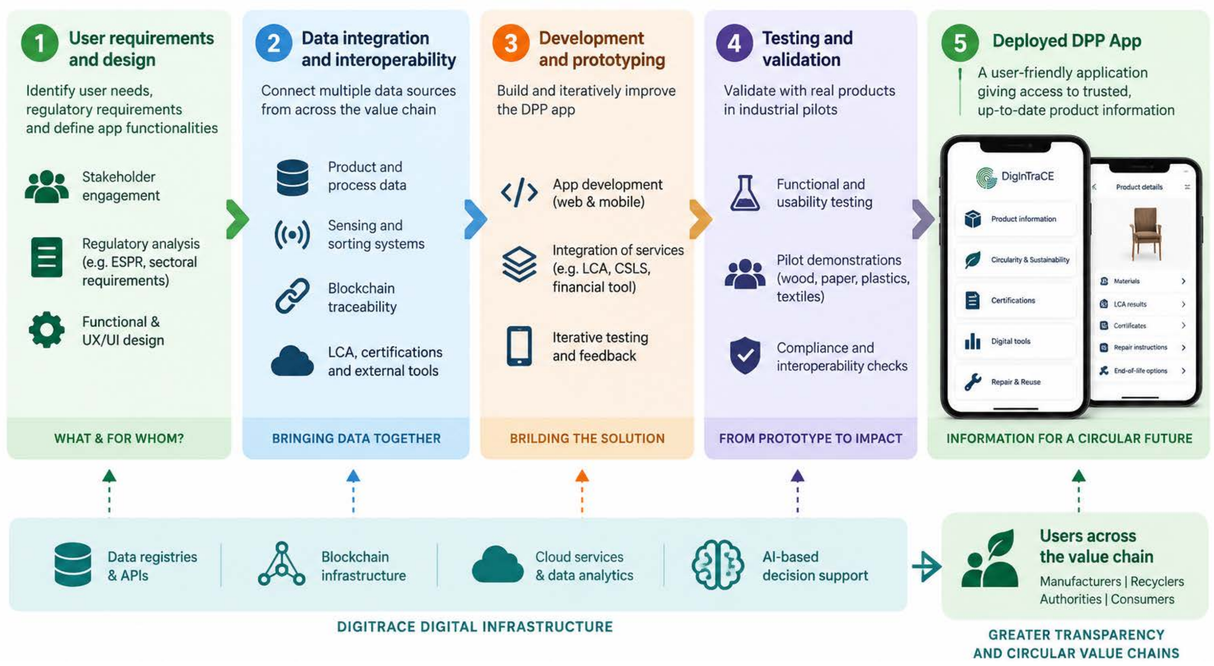
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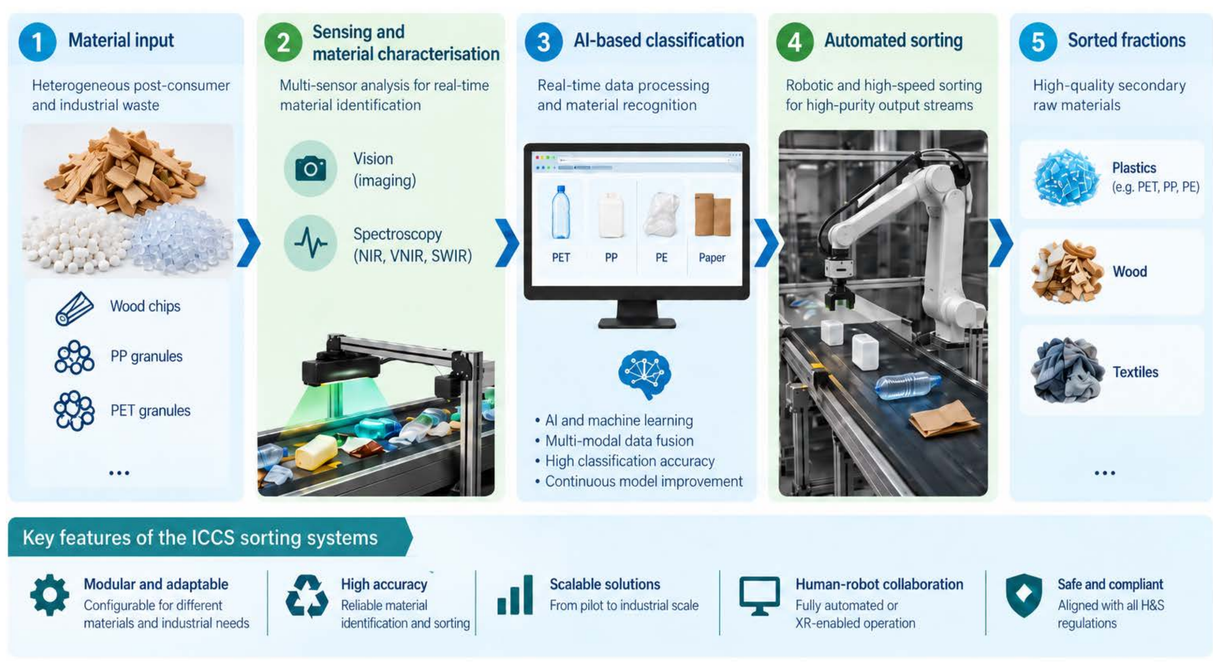
European process industries are increasingly required to reduce emissions and waste while improving the use, quality and traceability of secondary raw materials. Achieving truly circular value chains requires the integration of physical material flows with reliable digital information throughout the entire lifecycle, from the generation and characterization of secondary resources to their sorting, upgrading, reuse and incorporation into new products. The EU-funded DigInTraCE project addresses this challenge by developing an interoperable and decentralized traceability framework that combines advanced sensing, material characterization and sorting technologies with digital tools supporting circularity, sustainability and industrial decision-making. The project is demonstrated across four industrial value chains covering wood-based products and furniture, wood and pulp & paper, recycled plastics and polymer/textile applications, enabling the validation of different recycling, reuse and upcycling pathways.




A key element of the DigInTraCE approach is the connection between the physical and digital dimensions of the value chain. Advanced sensing techniques, including spectroscopic and imaging technologies, together with automated sorting systems, enable the identification, classification and quality assessment of secondary materials and support their efficient routing towards suitable valorization pathways. The generated material and process information is progressively integrated into a dynamically updated Digital Product Passport (DPP), supported by blockchain-based traceability, smart tags and interoperable digital services. The DPP provides access to information related to product identification, composition and properties, material origin, environmental and circularity performance, certifications, repair and reuse opportunities, Life Cycle Assessment and complementary decision-support tools. In this way, DigInTraCE establishes a continuous information flow from secondary raw material generation → sensing and characterization → sorting and upgrading → manufacturing → product use and end-of-life, supporting greater transparency and more informed circular-economy decisions. The resulting data, methodologies and digital tools can also complement the Raw Materials Information System (RMIS) by strengthening knowledge on secondary raw materials, their characteristics, transformation routes and potential reintegration into European industrial value chains.

## Circular Economy & Secondary Raw Materials | Material Flow Analysis | Environmental Sustainability




The DigInTraCE DPP mobile application provides structured access to **product information, circularity and sustainability data, certifications, and digital services** across the product lifecycle. Supported by **blockchain, smart tags, IoT-based data, LCA, financial and closed-loop supply-chain tools**, it strengthens traceability, transparency, circular design, repair/reuse decisions, and data-driven resource management.

ICCS developed and validated **high-accuracy sorting systems for wood and plastic secondary streams**, combining advanced sensing, real-time material classification and automated separation. The solutions include **HSI-based wood-chip sorting and a dedicated plastic-flake sorter with an optimized pneumatic system**, improving material purity and supporting higher-value reuse and recycling pathways.

Let's trace the path to sustainability with DigInTraCE!

DigInTraCE EU Project

https://www.digintrace.eu/

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