Global Digital Product Information System framework and standards

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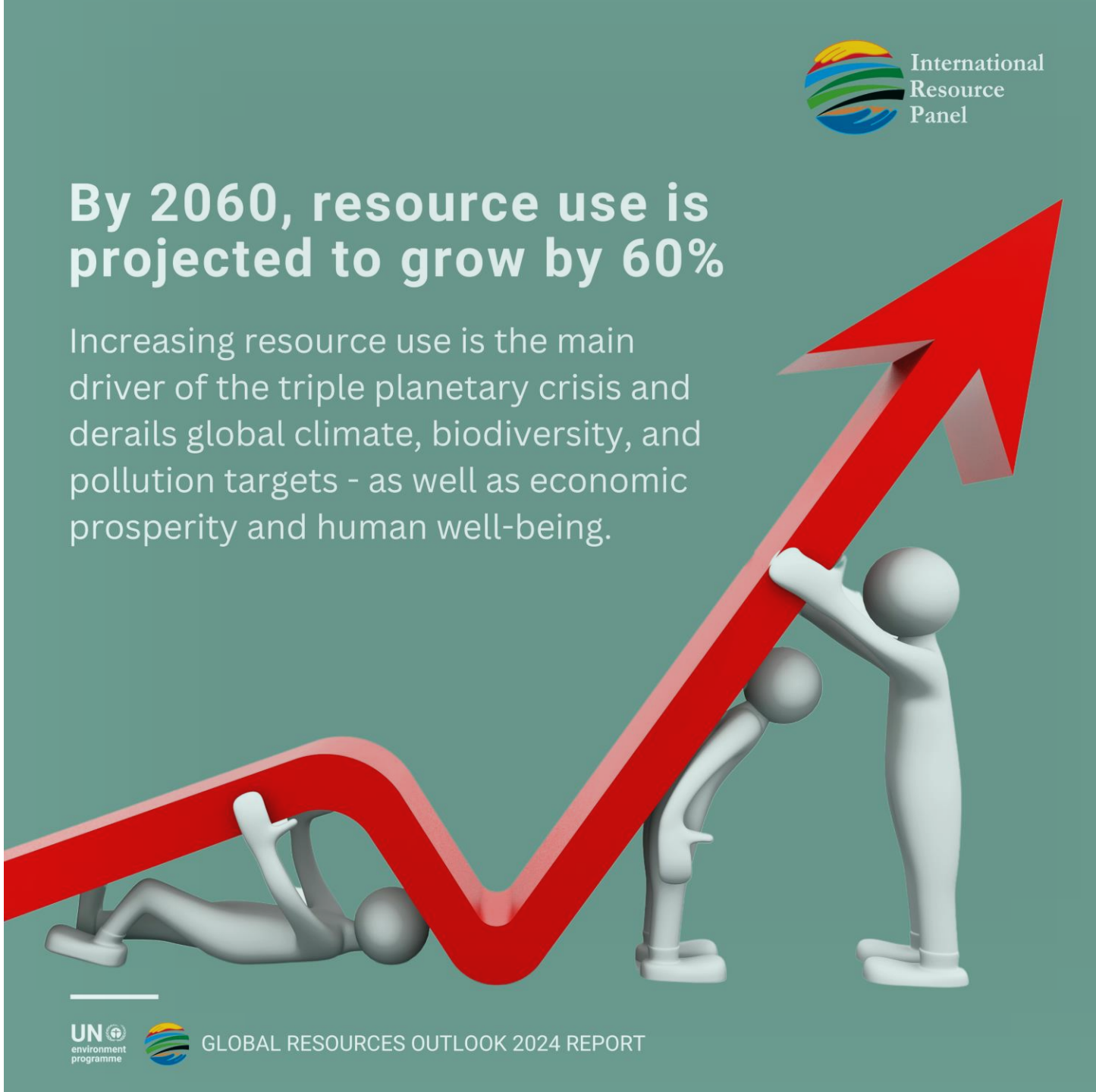
Mainstreaming sustainability and circular economy in an age of rising resource use

- A **sustainable & circular economy** requires great **transparency** and **traceability** of products, to make better decisions, from the extraction of raw materials to the **end-of-life** of products.
- Over **90% of consumers** globally express an interest in **healthy and sustainable** products (GlobeScan 2023).
- **Digitalization** will become key to systematizing, integrating and democratizing **environmental data**, knowledge and insight for new collaboration opportunities and **impact**.



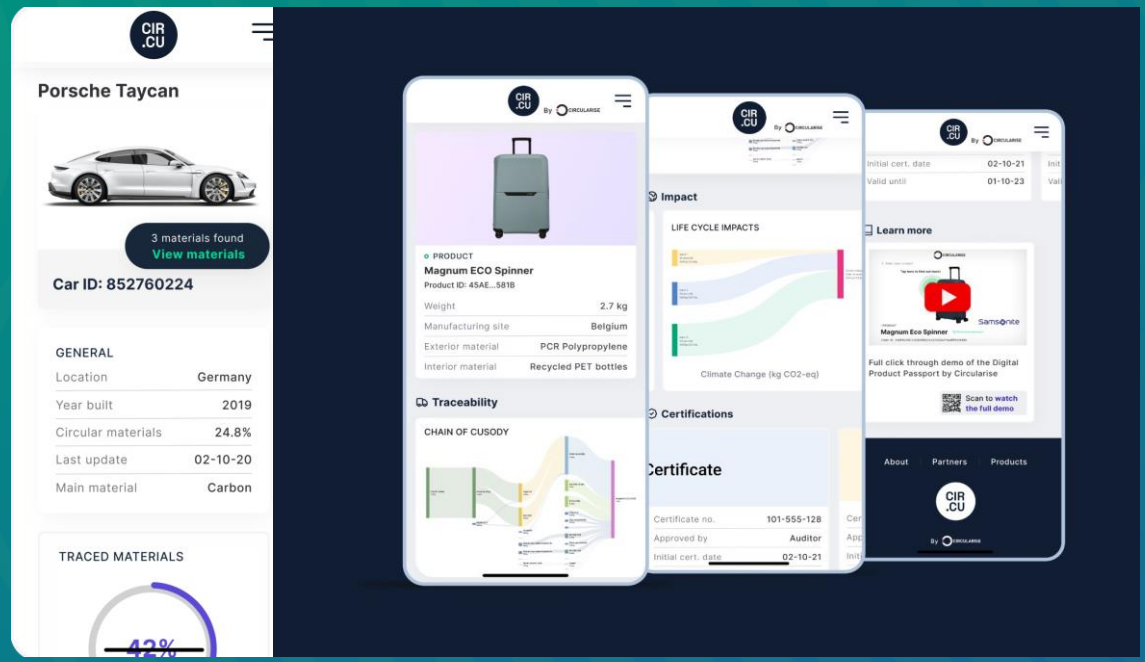
Introducing Digital Product Information Systems

Definition

Digital Product Information Systems (DPIS) are digital platforms that enable the exchange of sustainability and circularity data across different stages of a product's lifecycle.

Benefits

- **For consumers:** transparency, support in making sustainable choices, support eco-labelling, builds trust, customer protection
- **For businesses:** compliance, reduce costs, more efficient production and value creation opportunities
- **For goverments:** helps implement effective circular economy and environmental policies, compliance information



1. Impact Initiative
Digitalization 4 Circular Economy

MISSION

Accelerate the implementation of **digital product information systems,** enabling sustainability and circular economy transitions in a resource-constrained world.

Goals of the initiative

- **Learn:** Increase understanding of DPIS globally and learn from pears
- **Contribute:** Create and bring in knowledge on relevant topics and collaborate on joint outputs
- **Showcase:** Show ongoing efforts on DPIS, including sector-specific applications and research

How to join

D4CE 2026 is open to join
Contact: Laetitia.Montero@un.org

To achieve that vision, DPIS systems must be interoperable and put sustainability and circularity at its core

Ensure sustainability and circularity is at the heart of DPIS

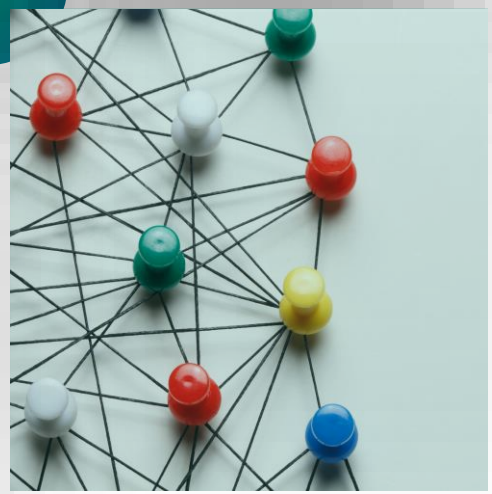
- Provides support in developing DPIS for circularity and sustainability
- Pilots DPIS in high impact sectors

Link DPIS to global sustainability agenda

- DPIS supports consumer protection and sustainable consumption
- DPIS enables multilateral environmental agreements implementation

Promote sustainable global markets through DPIS

- Brings in voices from medium and low-income countries
- Enable market access to businesses (in particular SMEs)



Create a unified landscape of globally interoperable DPIS

- Support interoperability of various DPIS solutions
- Contribute to global standards on DPIS

One planet
handle with care

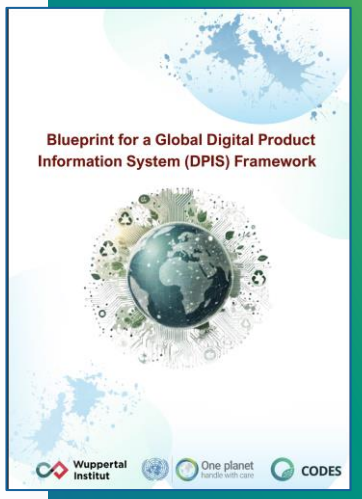
Over the last years, Digitalization 4 Circular Economy contributed to key publications to accelerate adoption of DPIS

Blueprint for a Global DPIS Framework

Prepared by the Digitalization 4 Circular economy initiative, this report provides a foundation for a global framework for Global Digital Product Information Systems (DPIS) that will guide the design of interoperable digital solutions that embrace circular principles and are inclusive by design.

DPP Assessment Textile in Global South

UNIDO, with UNEP support, conducted a readiness assessment in key textile exporting countries of the Global South. Findings identify critical gaps that need to be addressed to scale Digital product passports (DPPs) in textile industry in global south.



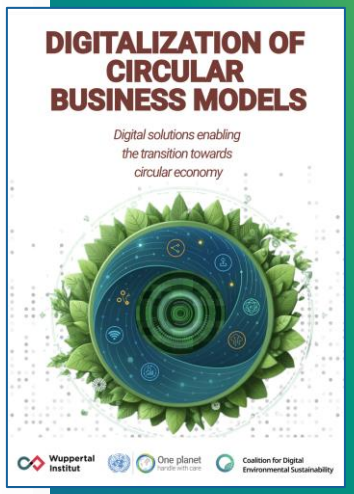
Intervention lab: Global digital standards

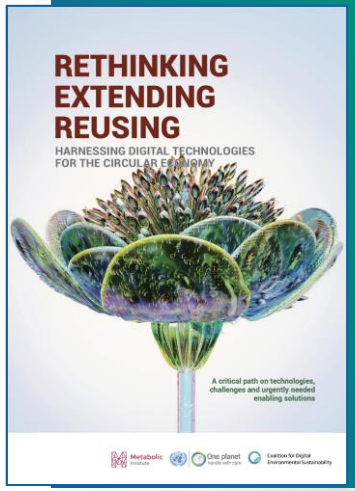
Digitalization of Circular Business Models

Supported by the Wuppertal Institute, this report explores how digital technologies—IoT, AI, and Digital Product Passports—drive circular business models. These solutions advance the circular economy while reducing costs, creating value, and reshaping value chains.

Harnessing digital technologies for circular economy

This report shows what digital pathways and technologies are available to unleash the potential of the circular economy. It identifies opportunities, as well as challenges and barriers.



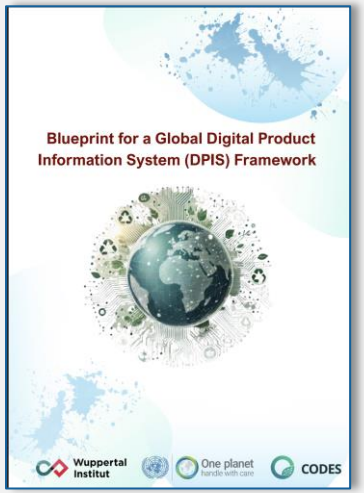


Intervention lab: Business models

2. Building on the blueprint in 2026 UNEP will co-develop a framework for global action on DPIS

2025

Blueprint for a Global DPIS Framework



2026

Global Framework for DPIS

Common framework to harmonize and scale DPIS placing circularity and sustainability at its heart

Key principles;

- Embed sustainability and circularity; defining data categories
- Defining fundamentals incl. technical architecture, governance, financial mechanisms
- Ensuring equity and inclusion; develop in an inclusive process with feedback from transition economy countries

To be used by: Policy-makers, DPIS implementors

General Product Information

01

- General Information.
- Identifiers.
- Technical specifications
- Component information
- Company information
- Product process data

Materials & Composition

02

- Material information.
- Regulated and High Impact Categories.

2026

Global Framework for DPIS

Circular R-Strategies

07

- Cross Strategy Activities / Horizontal Circularity.
- Maintenance & Repair
- Reuse
- Refurbish
- Upgrade
- Repurpose
- Remanufacture.
- Recycle
- End-of-life

Instruction and Lifecycle Information

03

- Setup and Instructions.
- Lifecycle Monitoring.

Compliance

06

- Regulation.
- Standards.
- Labels/ Certificates
- Governance

Social Life Cycle Assessment

05

- Worker.
- Local community.
- Value chain actors
- Consumer
- Society
- Children
- Just transition

Environmental Life Cycle Assessment

04

- Climate Change.
- Toxicity and Ecotoxicity
- Eutrophication and Acidification
- Land Use
- Water consumption and scarcity
- Fine Particular Matter Impacts

Organize regional and expert consultations

Objective of consultations

Regional and expert consultations enable us to co-develop the framework, enhance awareness, and integrate regional priorities and stakeholder feedback

What happened so far

- **10 consultations**
- **Involved 300 experts**
- **Total 86 countries represented**

What is coming up

- **Africa consultation - 10-13 February 2026 in Malabo, Guinea Equatorial**
- **Expert consultation critical minerals with UNEA national focal points**

July 2025
Latin America consultation
16 countries represented
Included ministries, standard setting bodies and consumer protection agencies.

Setting the standard for sustainable digital transformation, globally

ITU-T Standardization Sector

Sets international standards for sustainable digital transformation.

ITU-T Study Group 5

Environment, EMF, climate action and circular economy

- Electromagnetic compatibility, resistibility and lightning protection
- Soft error caused by particle radiations
- Human exposure to electromagnetic fields (EMF)
- Circular economy and e-waste management
- ICTs related to the environment, energy efficiency, clean energy and sustainable digitalization for climate actions

Digital Product Passport

- *ITU definition*

Digital Product Passports: Structured collection of product-specific data conveyed through a unique identifier.

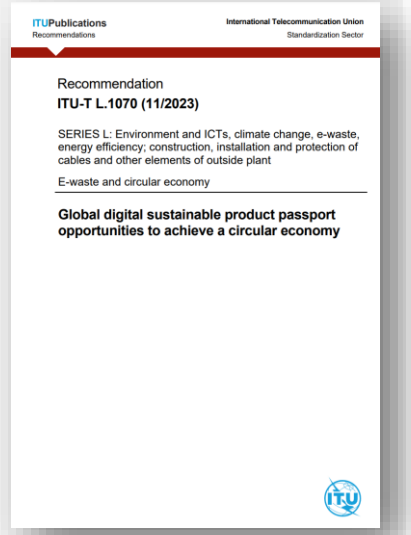
ETSI TS 103 881 V1.1.1 (2024-01)

TECHNICAL SPECIFICATION

Environmental Engineering (EE);
Global digital sustainable product passport opportunities to achieve a circular economy

Digital Product Passport Opportunities
ITU-T L.1070

Provides an overview of global and common opportunities to represent sustainability, mainly environmental-related, details about digital technology products


ITUPublications
Recommendations
International Telecommunication Union
Standardization Sector

Recommendation
ITU-T L.1070 (11/2023)

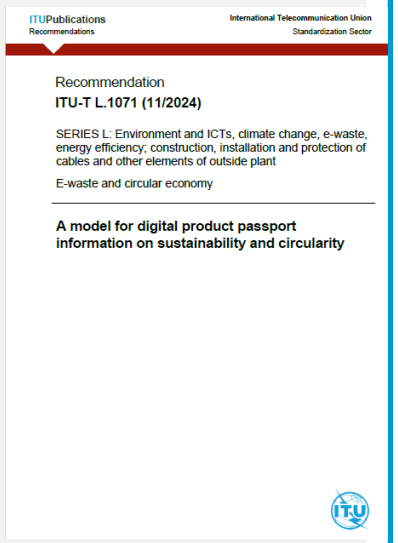
SERIES L: Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

E-waste and circular economy

Global digital sustainable product passport opportunities to achieve a circular economy

Digital Product Passport Information on sustainability and circularity
ITU-T L.1071

Provides a structured collection of information items organised to represent circularity and environmental sustainability information in accordance with relevant standards of ICT products for various actors during the product lifespan up to final recycling.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E-waste and circular economy

A model for digital product passport information on sustainability and circularity

ETSI ES 204 082 V1.1.1 (2025-01)

ETSI STANDARD

Environmental Engineering (EE);
An information model for digital product information on sustainability and circularity

Jointly developed with ETSI

What is inside ITU-T L.1070?

Provides an overview of global and common opportunities to represent:

- sustainability, mainly environmental related (including human health),
- details about digital technology products:
  - Collective ICT product models
  - Batches
  - Individual product items.

Global scope for harmonization, i.e., relevant to any region

Example of information that could contain in the scope of regional and global conventions

- globally harmonized system for classification and labelling: categories, symbols and risk phrases for hazardous substances
- UN Numbers for hazardous substances
- Hazardous substances and materials SDSs
- Harmonized systems codes for trade categories of products and e-waste
- Basel Convention codes
- Transport codes
- Schemes for classification and labelling of raw and secondary materials
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- product conformity database
- Traceability registries.

Desirable principles

- Digitalization
- Data findability, accessibility, interoperability and reusability
- Usefulness
- Accuracy
- Inclusivity
- Transparency
- Accountability
- Standardization
- Information privacy
- Information protection

Data quality properties

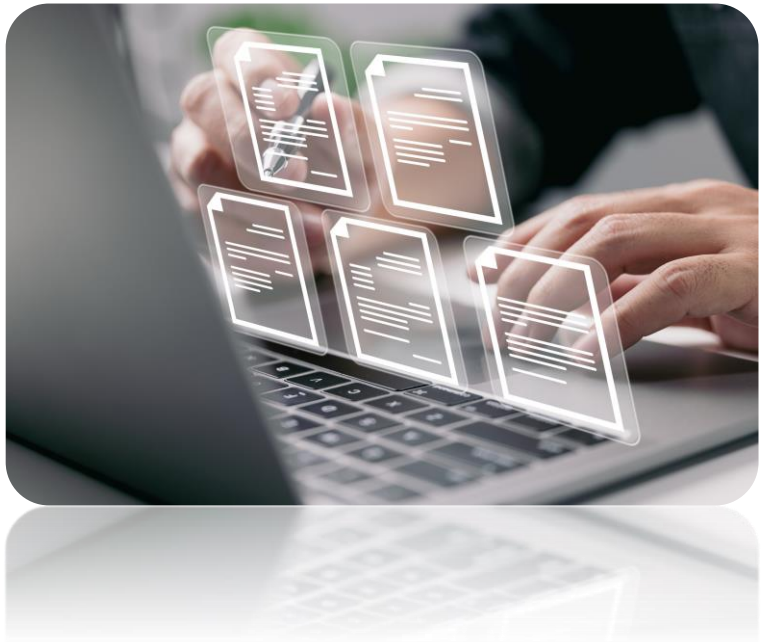
- Accessibility
- Free access to relevant information
- Persistency
- Authenticity
- Identifiability
- Composability
- Integrity
- Verifiability
- Traceability (of products)

What is inside ITU-T L.1071?

Mapping of different terminology between EU ESPR and B2B DPP data model and propose a model for the information

Table 1. Mapping of environmental information in this Recommendation to the B2B DPP data model

Environmental sustainability information model	B2B DPP data model
environmental information item/instance	sustainability claim
informed value	claimed value
criteria source	criteria reference
reference value	benchmark value
source of the reference value	benchmark reference



Topic	*Standard or regulation*	*Criteria reference*	*Environmental information / Claimed values (Metric)*				*Conformity*					*Rationale*
Code/name from vocabulary	Source URI	Criteria URI	Name	Value	Unit	Accuracy	Reference/Benchmark value	Source for the reference value / Benchmark reference to evidence to value	Conformance indicator (boolean)	Expected evidence	Reference to conformity evidence	Description
Low halogen electronics: electronics.halogen	ITU-T L.1015	https://www.itu.int/rec/T-REC-L.1015/#PCB-chl	PCB and accessories, chlorine: electronics.halogen.chlorine	100	ppm	empty	900	https://x.int/standard-about-benchmark-value	true	Evidence PCB and accessories meet requirements	https://manufact.com/DPP1/electronics.chlorine	PCB and accessories < 900 ppm chlorine

Ongoing work

L.DPP4C - Consumer-oriented environmental information and reversed value chain information about ICT goods on digital product passports

- Will analyse the use of DDP to provide information to customers and how this information needs to be conveyed to consumers.
- Will define which product information is useful to be included in DPP with particular attention to the reverse value chains and how to present it.

Inputs are welcome

New ongoing work on DPP system architecture – ITU-T SG20

- **Draft Recommendation ITU-T Y.DPP-ICT "Requirements and System Architecture of Digital Product Passport for ICT Goods"**

  Identifies requirements and defines a system architecture for Digital Product Passports in the ICT sector that links ICT goods to their digital passports across their lifecycle, from manufacturing and distribution to use, repair, reuse, and end-of-life

- **Technical Report ITU-T YSTR.OS-DPP-ICT "A case study of an open-source Digital Product Passport system for ICT goods use case**

3. Sector pilots & Implementation guidelines

Pilot DPIS in **high-impact sectors** to generate practical evidence for the Global Framework, inform **national policy design** develop sector-specific DPIS modules that address **sector-level** data and governance needs.

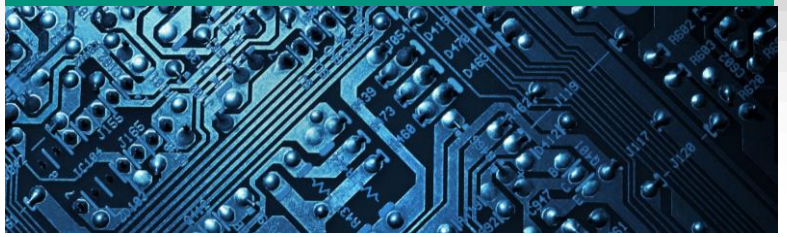
3 ongoing pilots, guidance:

Textiles sector

- **Pilot program in Argentina:** Testing DPIS framework and develop full DPIS solution.
  Key partners: BCRC Sth America

- **Pilot Program in India, Indonesia, Africa: InTex project**

Electronics sector



- **DPIS guidelines for electronics:** develop guidelines for a modular and scalable data system design of Digital Product Information Systems (DPIS) for ICT products
  Key partners: ITU

Pilot Project – Basel Convention Secretariat and Uruguay

Traceability System for the Management of Used Lead-Acid Batteries (ULABs) – Implementing DPP

Objective: Design and implement a traceability system enabling complete tracking of ULABs throughout their life cycle, transmitting real-time information to competent authorities, with potential for replication in other Latin American countries.

- **Phase 1 – Diagnosis and Project Design: starting 2026**
  - Assess environmental regulations and propose improvements.
  - Identify key stakeholders and conduct participatory workshops.
  - Define viable systems, estimate costs and validate selected solution (DPP)
  - Pepare terms of reference and pilot project implementation plan.
- **Phase 2 – Development and Execution of the Pilot Project: ending 2026 and 2027**
  - Develop traceability system including DPP with selected company
  - Implement pilot project and adjust according to results.
  - Design a plan to replicate the system in other countries in the region.

New Standard under development

L.DPIS - Guidelines for a modular and scalable data system design for Digital Product Information Systems (DPIS) for ICT goods

- Relevant data categories and subcategories, in order of importance.

- Support the design of DPIS approaches for ICT products, facilitating:
  - traceability,
  - circularity, and
  - informed decision-making across the product life cycle.

Data categories

- General product information
- Materials and composition
- Instructions and lifecycle information
- Environmental life cycle assessment
- Social life cycle assessment
- Compliance
- Circular Economy R-Strategies

Inputs are welcome

One planet connect with care | Sustainable Digitalisation

UN environment programme

ITU

Potential global benefit

- They can be linked and provide information on compliance with regulations and standards that can be digitally verified.
- It benefits all stakeholders and reduces the burden of making informed decisions to optimize and assess the sustainability of products.
- Harmonized global system for product information exchange that provides a balance between transparency and confidentiality, as well as privacy, security and verifiability.
- Discussion, consensus, standardization and legislative processes can enable agreements to develop concrete and specific specifications, including mandatory and voluntary values for countries (recommended or optional) in these systems.

Thank you

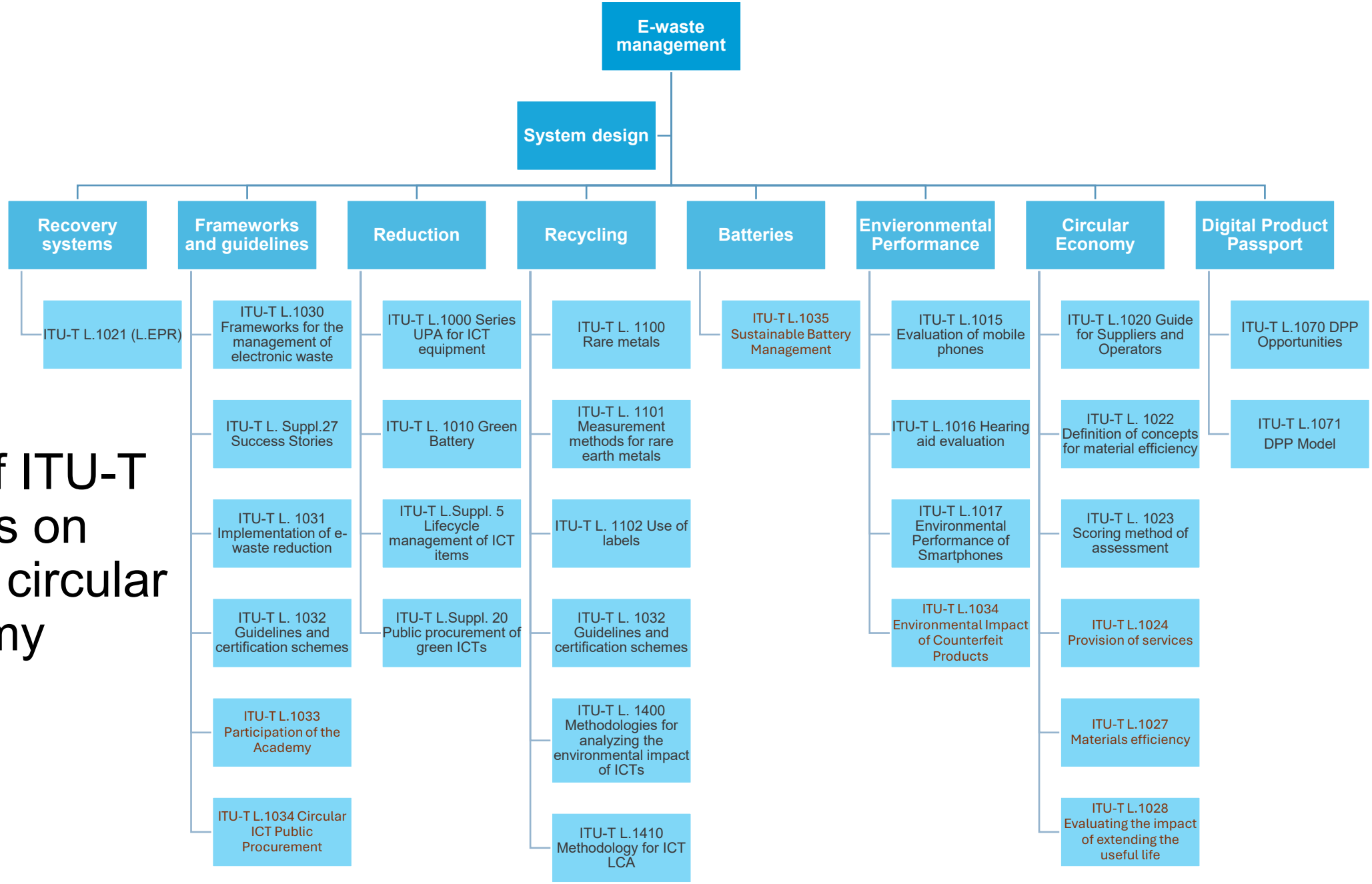
Email

tsbsg5@itu.int

Website

SG5: Environment, climate change and circular economy

Overview of ITU-T standards on e-waste and circular economy



Beneficiary users

- Facilitates the activities of product operators:
  - Manufacturers
  - Buyers
  - Owners
  - Repairers
  - Remanufacturers
  - Recyclers
  - National authorities
  - Auditors
- It could empower consumers with relevant information.
- It may have different content depending on the role and accreditation of the operator.