CHALMERS INDUSTRITEKNIK

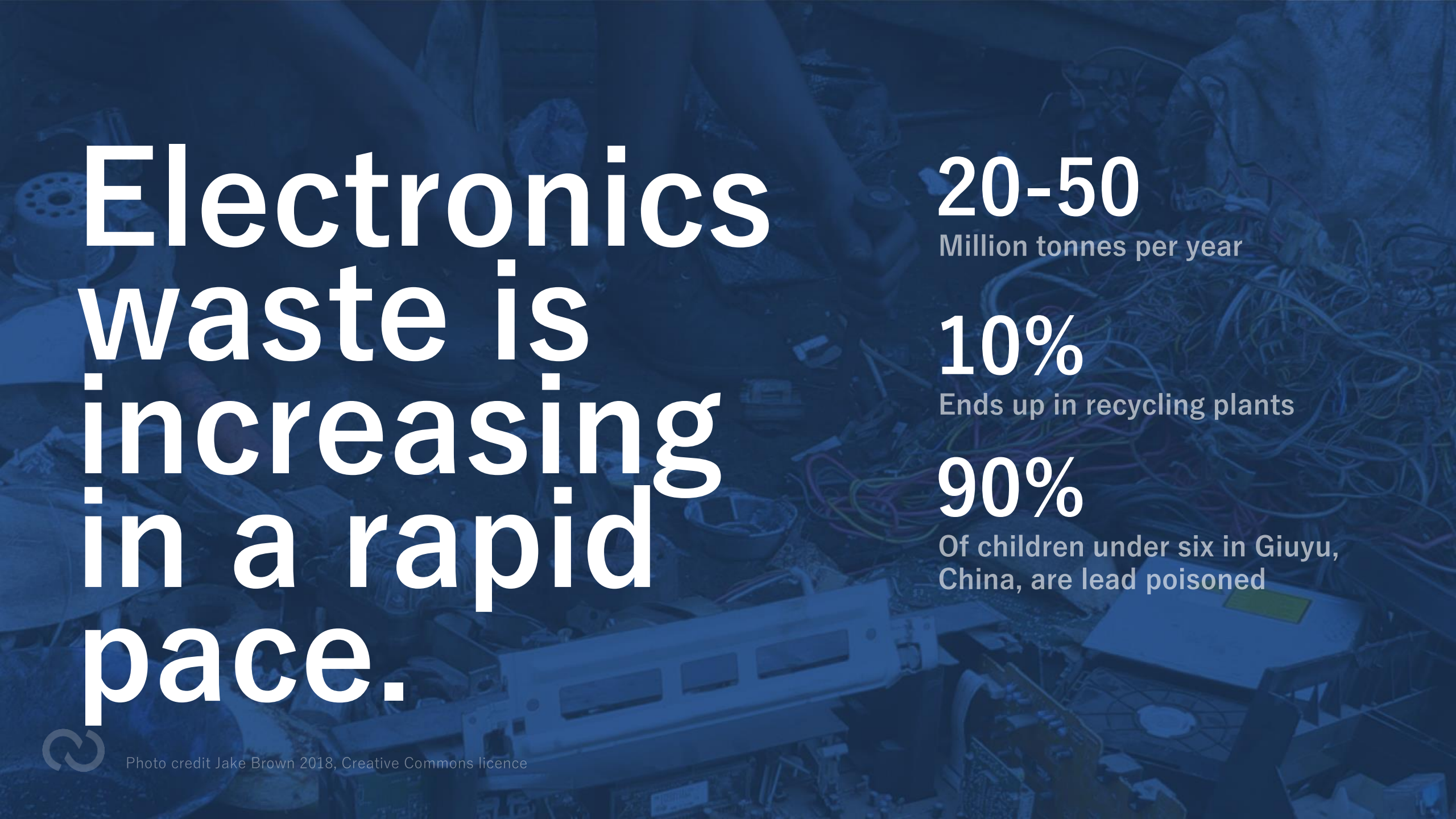
VINNOVA
Sweden's Innovation Agency

KEEP

Keep Electrical and Electronic Products

A traceability solution for electrical and electronic products in a circular system

Jessica Wehner
2021-11-17



Electronics waste is increasing in a rapid pace.

20-50
Million tonnes per year

10%
Ends up in recycling plants

90%
Of children under six in Giuyu, China, are lead poisoned

Photo credit Jake Brown 2018, Creative Commons licence

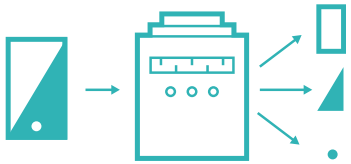
Society and industry are in dire need of a tool that can facilitate circularity.

KEEP – all materials, each component, every origin. For any EE product.

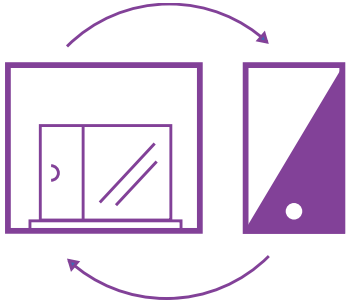
A traceability solution can facilitate and streamline sustainable production, re-use and material recycling.

Traceability solution enables circular economy

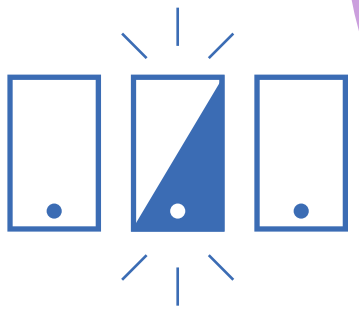
Materials recycling



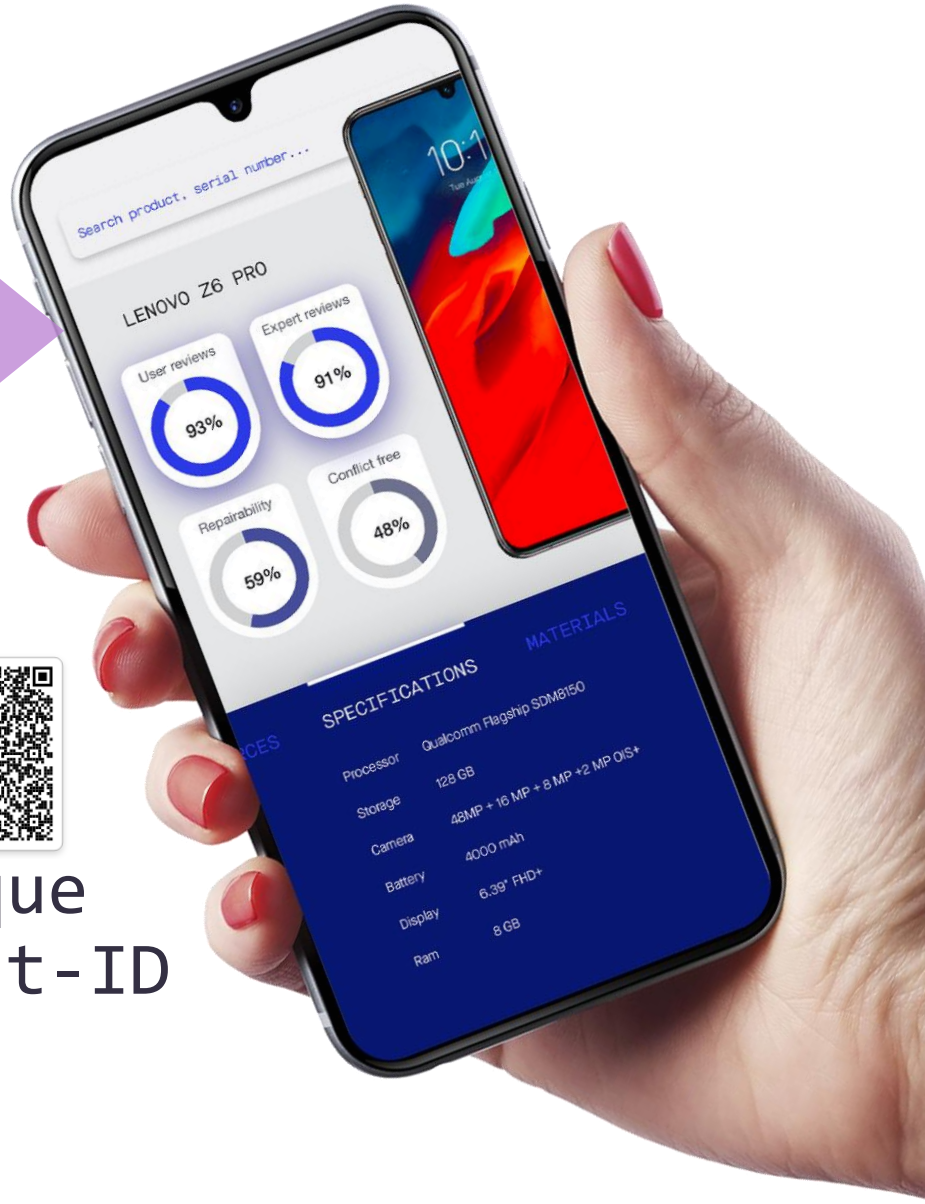
Re-use



Sustainable production



unique
product-ID



Traceability solution

Traceability solution

Unique product ID

Material recycling
- material content
- product and component values
- service and repair guides
- product history

Producer
- better control of the products and supply chain
- data on product use and services

Purchaser
- easier access to requested info
- compare manufacturers and products

Remanufacturer
- product and component values
- service and repair guides
- product history

Waste collector
- sort right
- keep statistics

Service
- service history
- repair guides
- access to spare parts

Consumer/user
- choose sustainable products
- buy used, ensure authenticity
- troubleshooting + repair guides
- Sort right at end of use

Reseller
- choose sustainable products
- answer consumer questions

Certifier
- easier access to information

VINNOVA

Phase 1

Prestudy

2018

Phase 2

Proof-of-concept

2019-2021

Phase 3

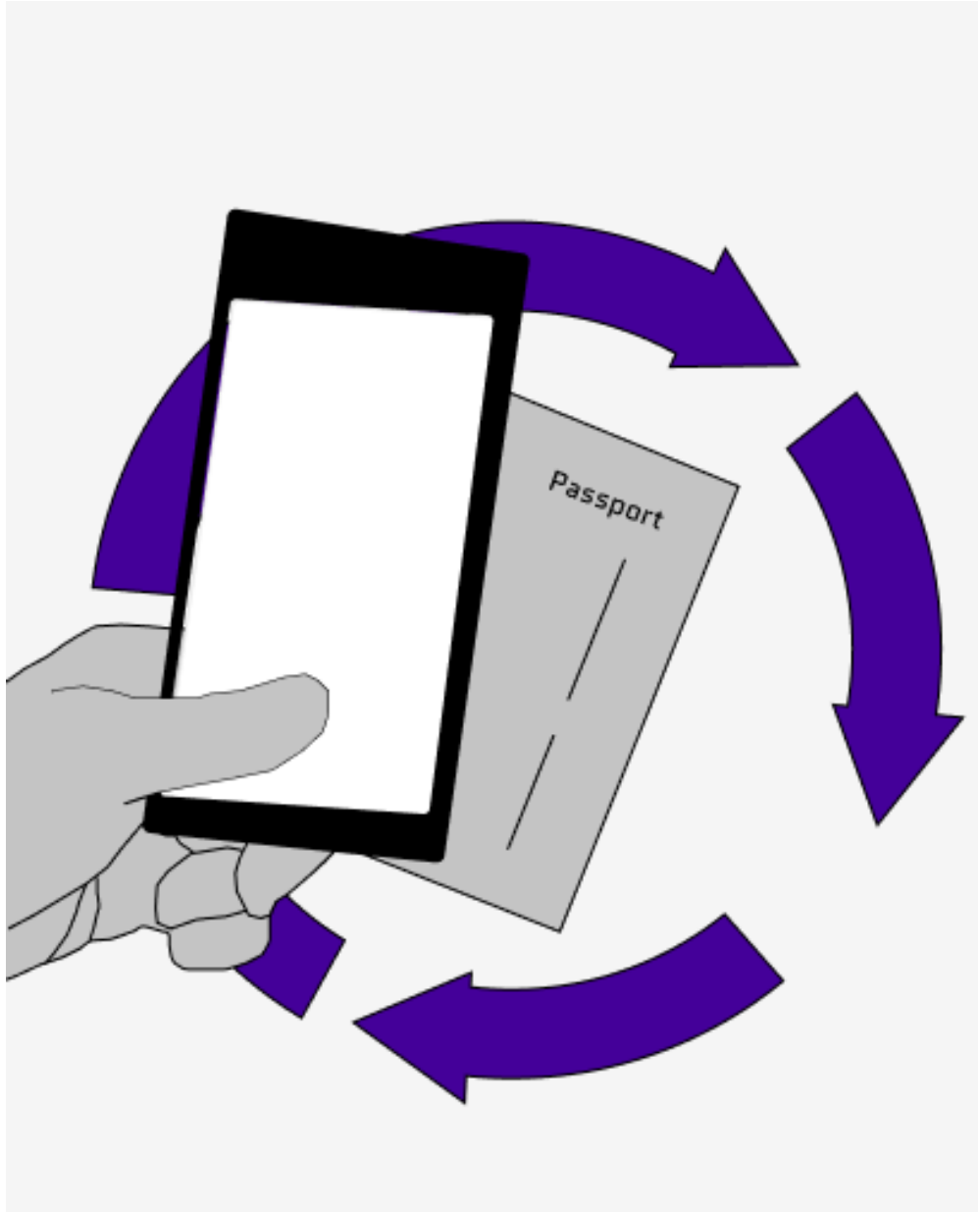
Full scale testing, evaluation & future steps

2022-2024

Product passport

Digitalisation can also help improve the availability of information on the characteristics of products sold in the EU. For instance, an **electronic product passport** could provide information on a product's origin, composition, repair and dismantling possibilities, and end of life handling.

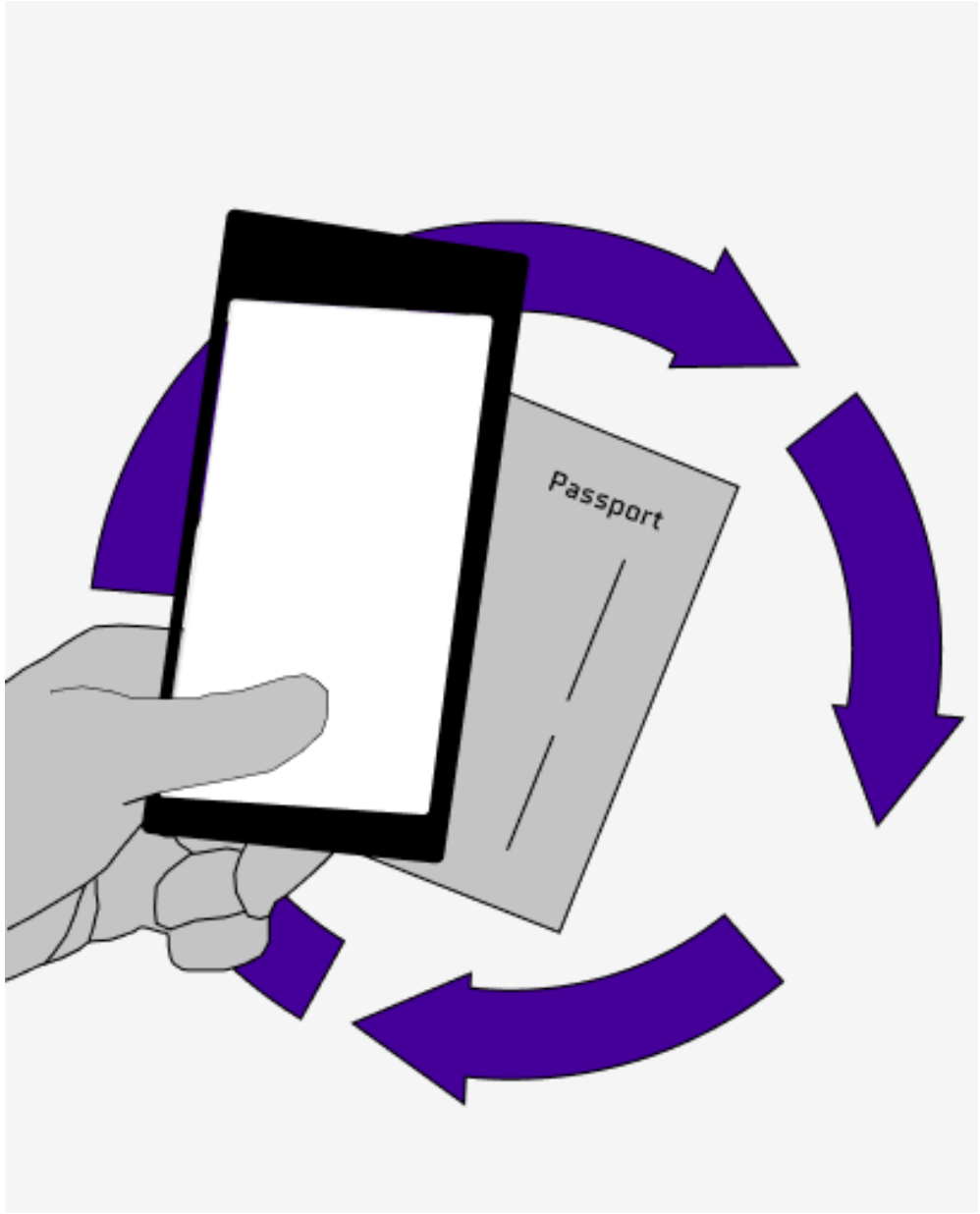
The European Green Deal, COM (2019)



Product passport

Recent progress

- Sweden’s government has announced to actively develop product passports
    - Named point 1.1.1. in Sweden’s circular economy action plan



https://www.regeringen.se/informationsmaterial/2021/01/cirkular-ekonomi---handlingsplan-for-omstallning-av-sverige/

Aim in phase 2

1) Define the information needs throughout the value chain to enable a circular system;
2) Develop a prototype;
3) Evaluate the prototype together with actors in the value chain.

Information sharing and standardization

GS1 Sweden

Project management

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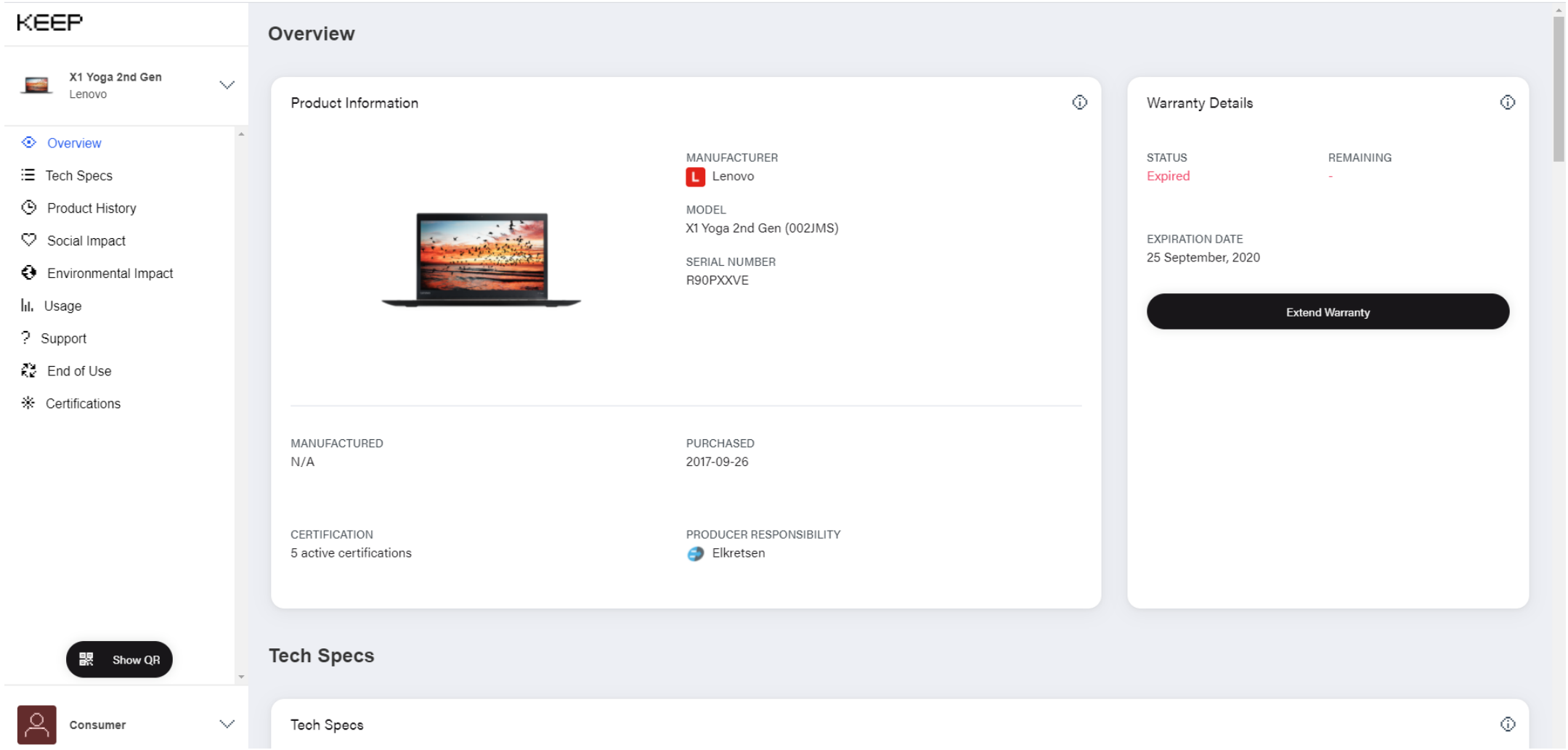
Project group in KEEP Phase 2


Search product, serial number...
Product overview
Specifications
Components
PROTOTYPE
LENOVO Z6 PRO
User reviews
93%
Expert reviews
91%
Repairability
59%
Conflict free
48%
COMPONENT MAP
Battery
Processor
Backplate
Transistor 351
Transistor 171
Transistor 226
keepelectronics.com

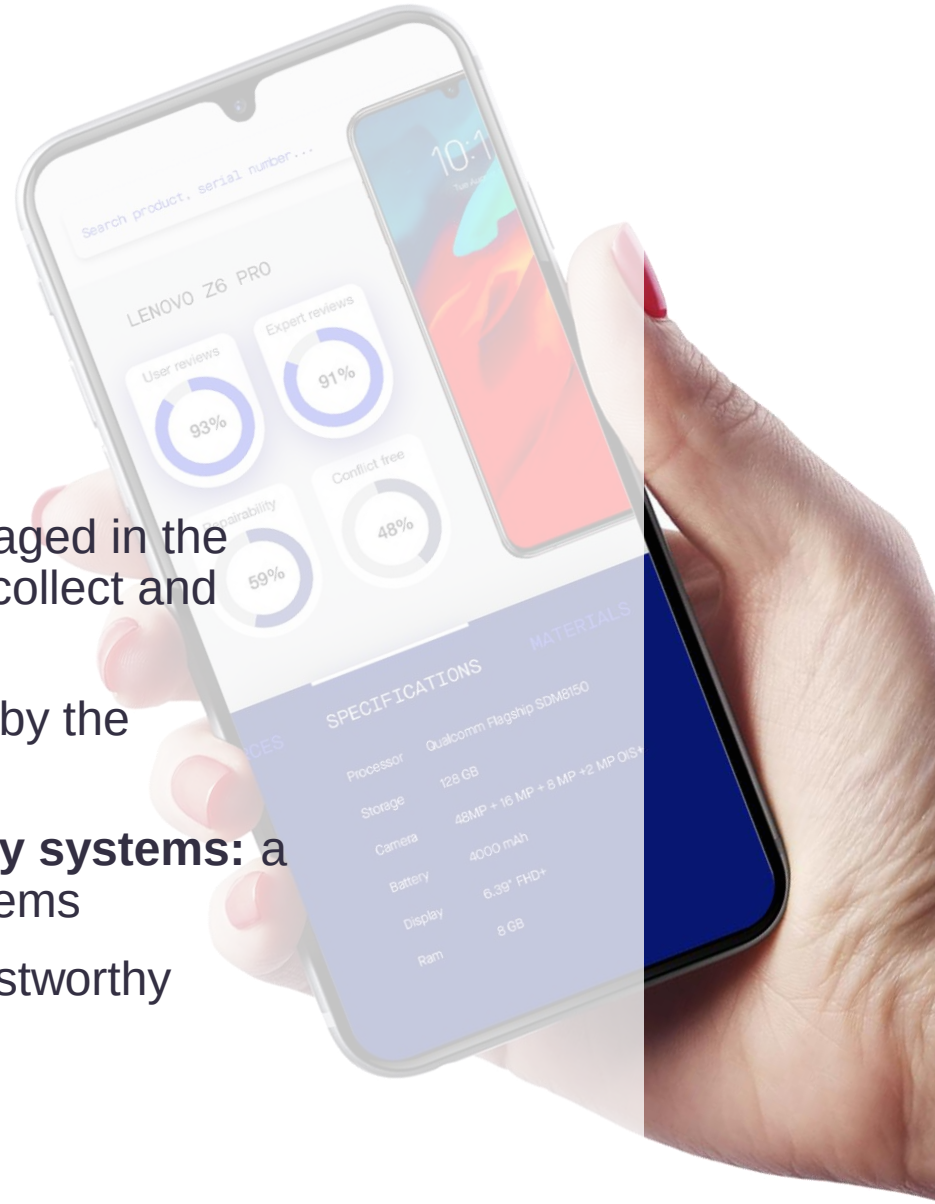
Prototype



Prototype at keepelectronics.com

Base of the back-end

- **One information sharing standard:** information must be packaged in the same way independently of what traceability system is used to collect and share the data
- **Decentralized storage of data:** product specific data is stored by the producer
- **Routing layers to transfer data between different traceability systems:** a standard is needed that allows communication between all systems
- **Trustworthy data:** data in a traceability system needs to be trustworthy
  - Correct at entry
  - Not changed along the way

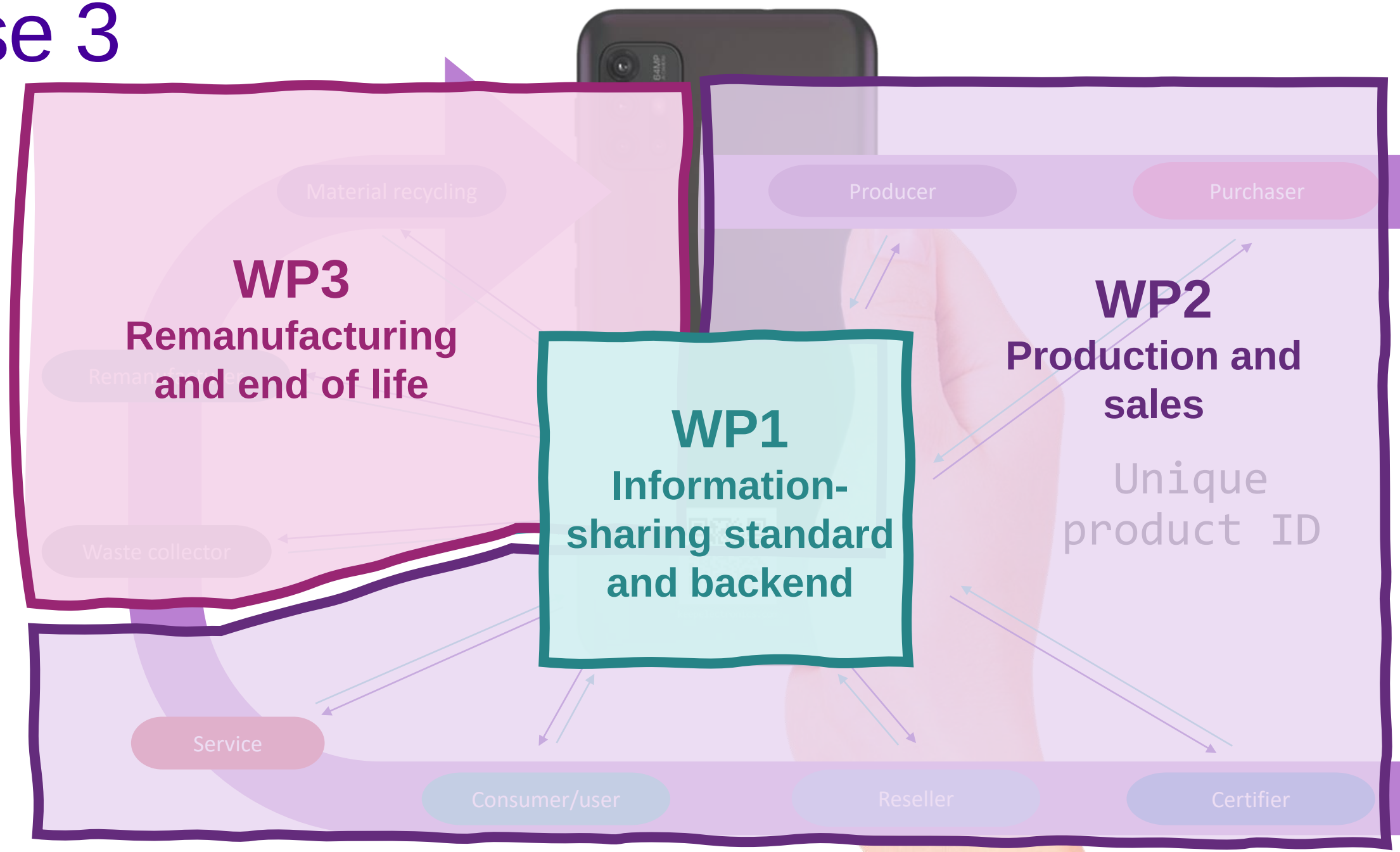


Final report KEEP Phase 2

You can find the final report of KEEP Phase 2 at **keepelectronics.com**

KEEP phase 3

Phase 3


Material recycling
Producer
Purchaser
WP3
Remanufacturing and end of life
WP2
Production and sales
WP1
Information-sharing standard and backend
Unique product ID
Waste collector
Service
Consumer/user
Reseller
Certifier

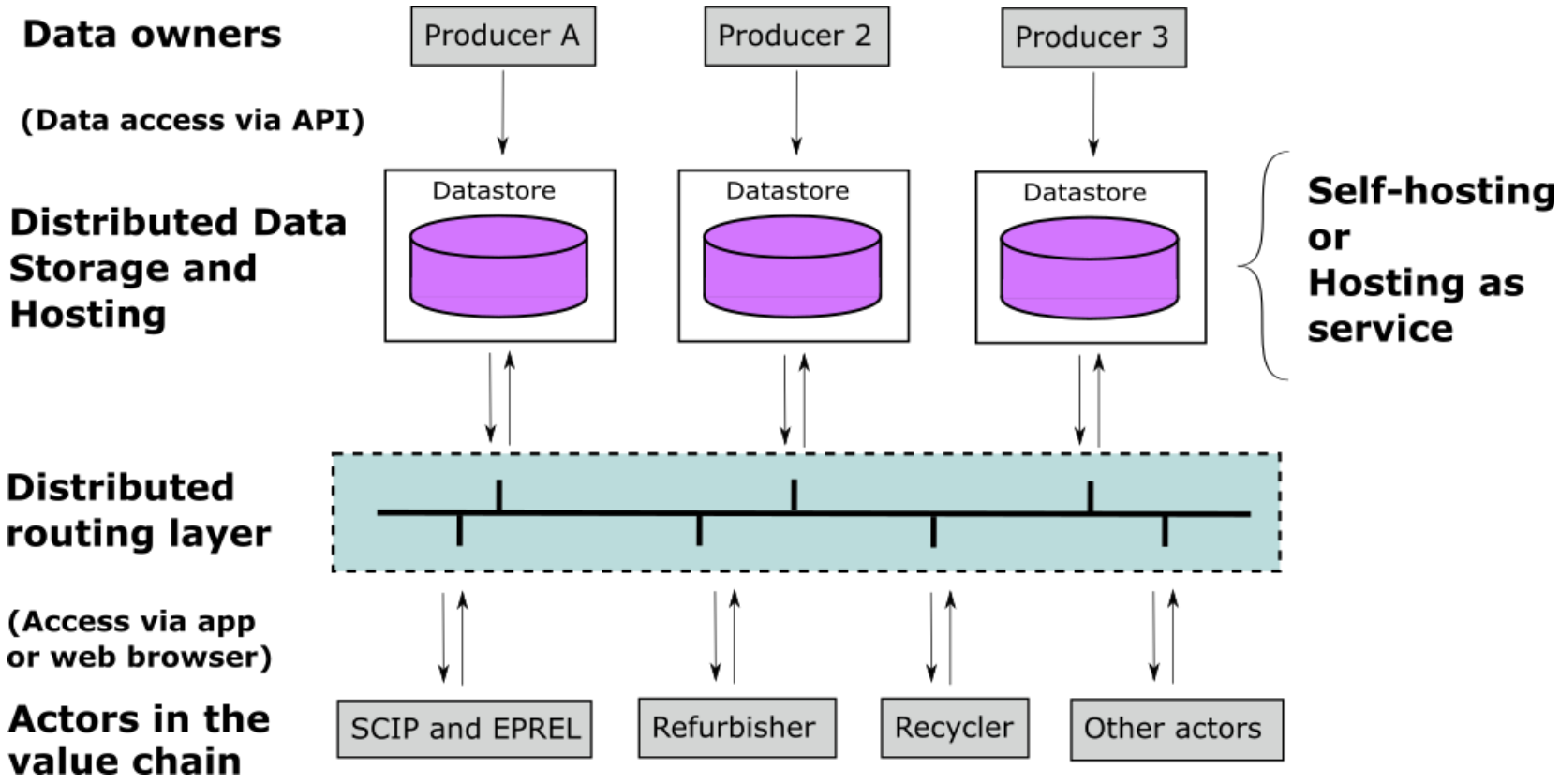
Work package 1: Information-sharing standard and backend

Objective 1

Develop a common standard for information sharing and access

Objective 2

Develop and implement architecture for trusted data access



Work package 2: Production and sales

Objective: Test how products can be tagged and what information can be stored to create value for actors in the early parts of the life cycle

Work package 3: Remanufacturing and end of life

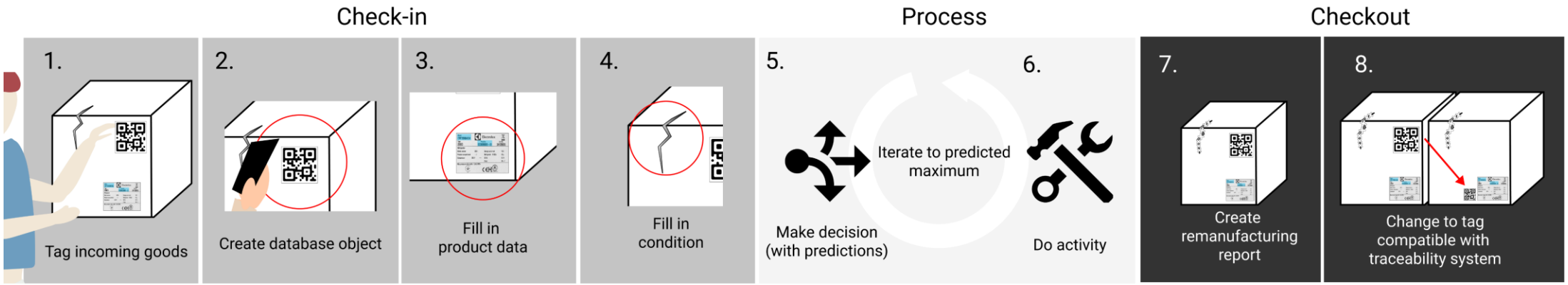
Objective

Test how products can be tagged in the later parts of the life cycle and what information can be collected and shared with actors both upstream and downstream in the life cycle

Activities

3A. Develop the prototype for starting traceability at remanufactures into a functioning solution

3B. Test the developed solution



A1. Information sharing standard and backend

1. Information sharing standard for which data is to be shared (What)
2. Information sharing standard for how data is to be shared (How)

A2. Production and sales

Genomföra tester där producenter och återförsäljare märker produkter med en unik identitet och delar information om produkterna via dessa.

Test Environment A (Manual)
Data collection: *Excel*
Data sharing: *Developed prototype*

Test Environment B (Advanced)
Data collection: ChainTraced
Data sharing: BLIPPA.COM

Test Environment C (Purchasers)
Data collection: TCO CERTIFIED
Data sharing: TCO CERTIFIED

Test Environment D (Advanced)
Data collection: CIRCULARISE
Data sharing: CIRCULARISE

Testers
Lenovo, clas ohlson, TRANSPARENT, Mousetrapper, Dustin, Telia

A3. Remanufacturing and end of life

1. Utveckla och testa en lösning för spårbarhet i återbruksprocesser
2. Bevaka och kartlägga behov av spårbarhet för materialåtervinning

Test Environment E (Advanced)
Data collection: GIAB
Data sharing: GIAB

Test Environment F (Advanced)
Data collection: Foxway
Data sharing: Foxway

Testare
SCANDI GRUPPEN AB, El-Kretsen, NORSIRK, ASCDI

A4. Businessmodell, evaluation and interface

TechBuddy, Smithereens AB, twist

A5. Management

Coordindation of project + test environments, dissemination of results

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KEEP – a part in the CIRCLA consortium

CIRCLA – a collaboration of five Swedish innovation programs (BioInnovation, Metalliska material, PiiA, Re:Source och Swedish Mining Innovation)

- 4-5 Swedish traceability projects anchored in different industries
- Financed through Vinnova, waiting for an answer now
- Start: asap

PiiA
Process Industrial IT and Automation

METALLISKA MATERIAL

RE: SOURCE

BIO INNOVATION

VINNOVA
Sweden's Innovation Agency

SWEDISH MINING INNOVATION

Thank you!

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