

# KEEP

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

Open Project Meeting

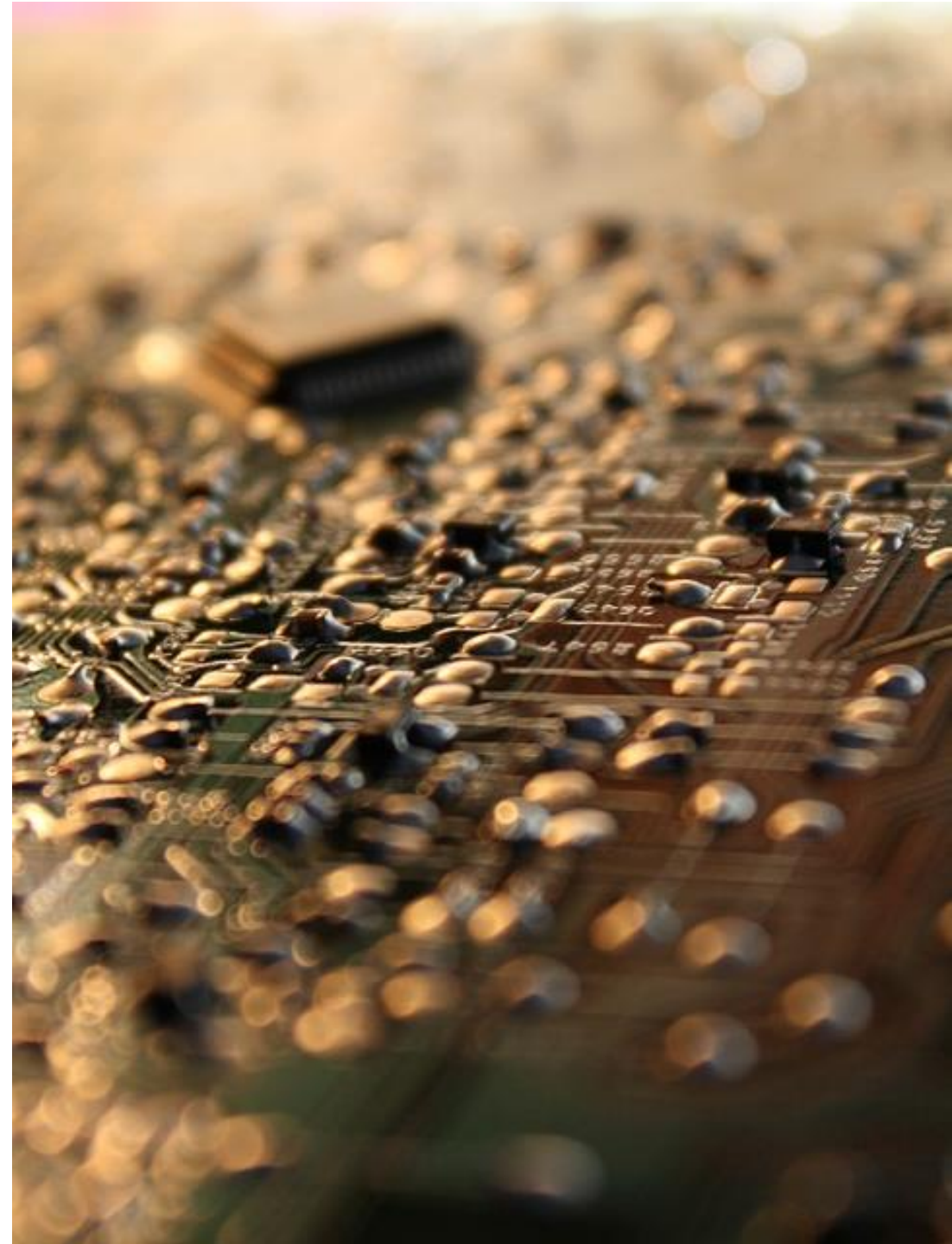
Sophie Charpentier, Kalle Ekdahl (Max Björkman)

2023-09-05



# Agenda

- Welcome (14:30-14:40)
- KEEP 3 (14:40-15:00)
  - Pilot presentation (15:00-15:20)
- What comes next? (15:20-15:30)
- Questions, discussions (15:30-16:00)





# Today's goal

Give an overview of our project

Discuss what happens after KEEP 3

Answer questions

Get input from you!



# Why is traceability important?



2019



The EU as a global leader

A European Climate Pact



## Mobilising industry for a clean and circular economy

Sustainable products as a norm

Focus on sectors with large impact

- Electronics and ICT
- Batteries and vehicles
- Packaging
- Plastic
- Textiles
- Buildings
- Food, water and nutrients

Up to  
**80%**



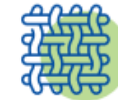
of products' environmental  
impacts are determined at  
the design phase



Electronics



ICT



Textiles



Furniture



High impact  
intermediary  
products

Public authorities'  
purchasing power  
represents

**14%**  
of EU GDP



# Making sustainable products the norm in a more resilient Single Market

2022



# KEEP





Search product, review rating

APPLE IPHONE X

User reviews



Expert reviews



Phase 1 – Pre-study  
2018 (Vinnova, UDI step 1)

COMPONENT MAP

The European  
Green Deal

Battery

Processor

Backplate

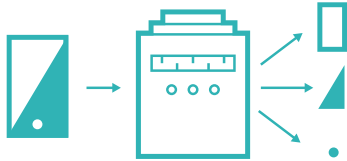
Translator 351

Camera 178

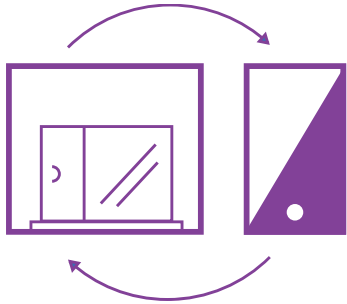


# Traceability solution enables circular economy

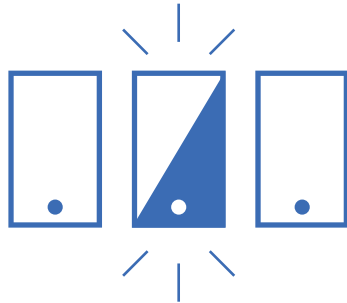
Materials recycling



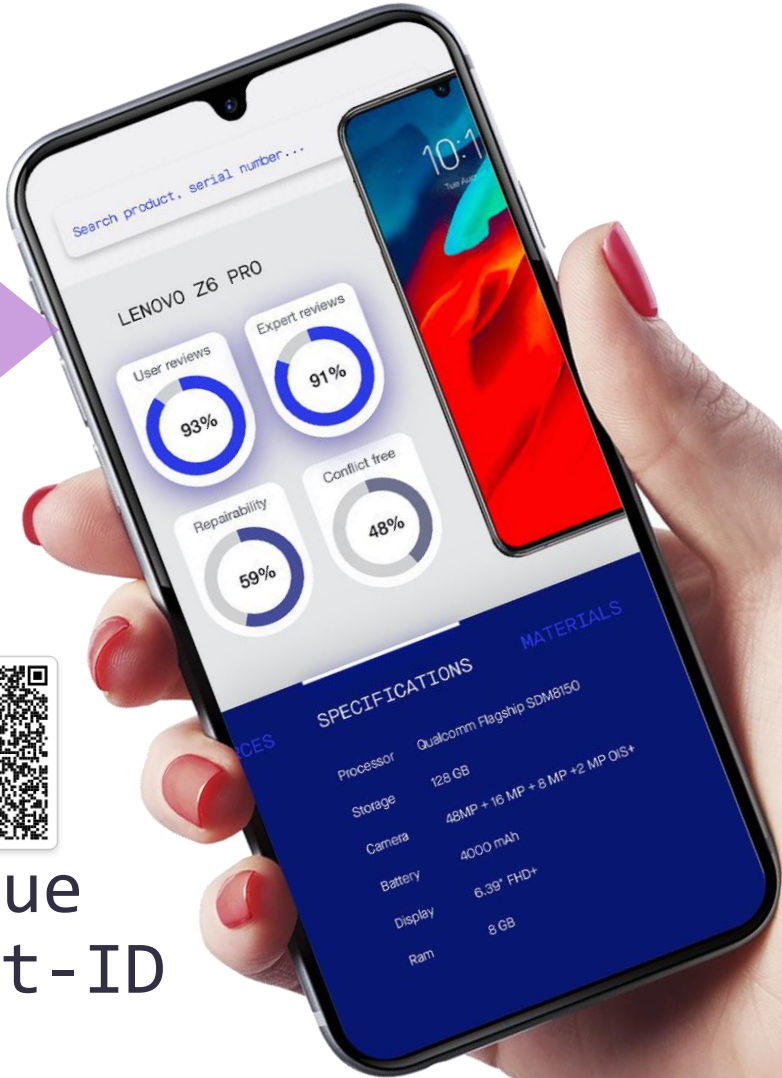
Re-use



Sustainable production



unique product-ID



# Traceability solution





# Traceability solution



**Phase 1 – Pre-study**

2018 (Vinnova, UDI step 1)

**Phase 2**

Development of prototype

2019-2021 (Vinnova, UDI step 2)

**The European  
Green Deal**



# Final report from KEEP Phase 2

You can find the final  
report of KEEP Phase 2 at  
[keepelectronics.com](http://keepelectronics.com)





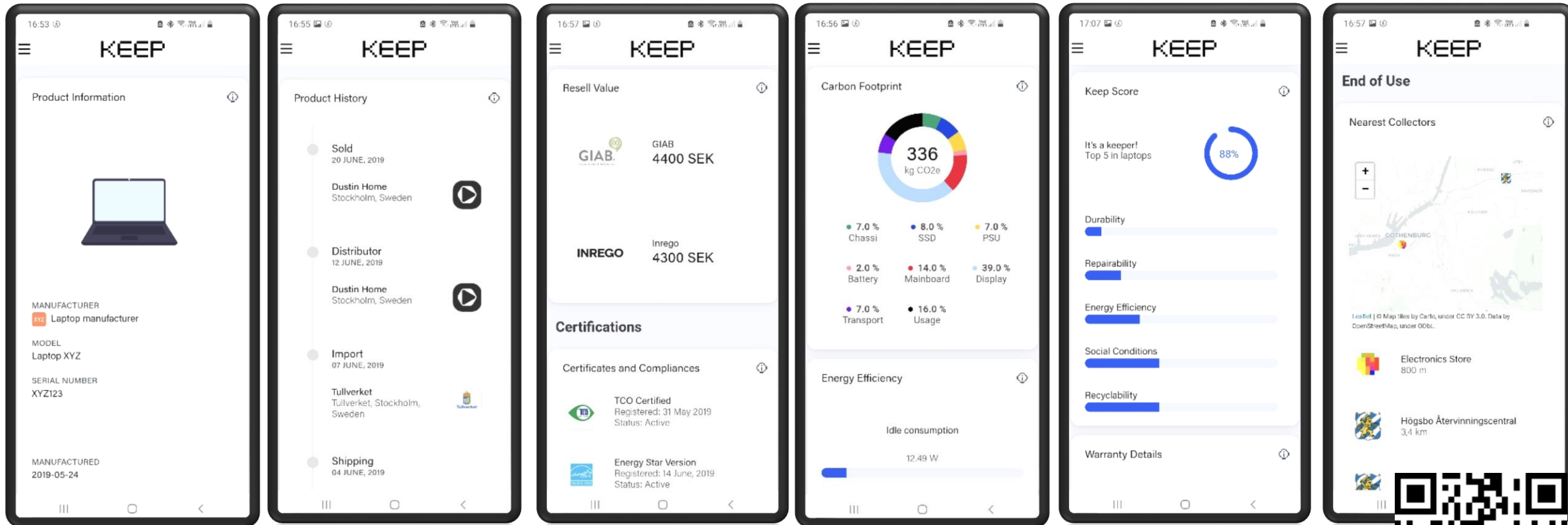
## Information need throughout a product's life cycle

Information category	Information	Value for							"Easiness" to collect	Trustworthiness
		Producer	Reseller	Consumer	Purchaser	Service & Support	Re-manufacturer	Recycler		
Overview	Certifications	High	High	High	High	Medium	Medium	Medium	Easy	High
	Producer responsibility	Medium	Medium	Low	High	Low	Medium	High	Easy	High
	Warranty information	High	High	High	High	High	Medium	High	Easy	High
	Digital receipt	High	High	High	Medium	High	Medium	Low	Medium	High
Tech specification		Medium	High	Medium	High	High	Medium	High	Easy	High
Product history		High	Low	High	High	High	Medium	Medium	Hard	Medium/High
Social impact	Corporate responsibility	High	High	Medium	High	Low	Low	Low	Easy	Medium
	Worker satisfaction	Medium	Medium	Medium	Medium	Low	Low	Low	Hard	Low
	Working time	Medium	Medium	Medium	High	Low	Low	Low	Hard	Low
	Factory wages	Medium	Medium	Medium	High	Low	Low	Low	Hard	Low
Environmental impact	Carbon Footprint	High	High	High	High	Medium	High	Low	Hard	Low
	Energy efficiency	Medium	High	High	High	Medium	Low	Low	Easy	Medium/High
	Recycled content	Medium	High	Medium	High	Medium	Medium	Medium	Medium	Medium
	Product Recycling Index	Medium	High	High	High	Medium	Medium	High	Hard	Medium
Usage		Medium	Low	Medium	Low	Low	Low	Low	Hard	High
Support	Device Status	Medium	Low	Medium	Low	Medium	Medium	Medium	Hard	Medium
	Troubleshoot	Medium	Medium	High	Low	High	Medium	Low	Medium	Medium
	Repair guides	High	Medium	High	Low	High	High	Medium	Easy	High
	Service Request	Low	Medium	High	Low	High	Low	Low	Easy	High
	Repairability score	High	High	High	High	High	High	Medium	Medium	Medium
End of use	Nearest collector	High	Low	High	Low	Medium	Medium	Low	Easy	High
	Resell value	Medium	Low	High	Low	Medium	High	High	Medium	High
	Wipe Device Data	Medium	Low	High	Low	Medium	High	Low	Medium	Medium
Materials		Medium	High	Medium	High	Medium	Medium	High	Medium	Medium
Parts		Medium	High	Medium	Medium	High	High	High	Medium	High
Supply Chain		High	Medium	Medium	High	Low	Medium	Low	Hard	Medium



# Decentralised information...

... presented in a unified interface



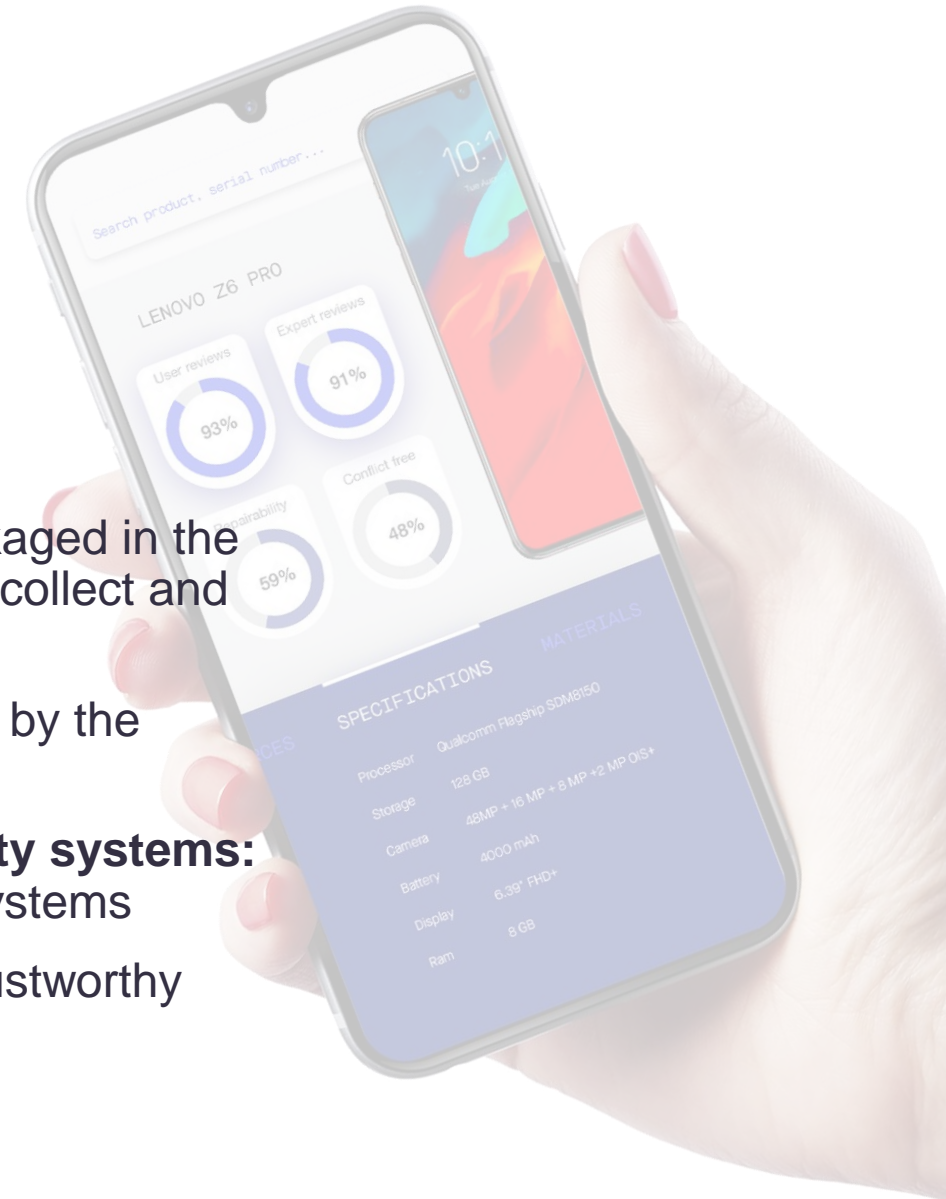
Now on GitHub! <https://github.com/Chalmers-Industrieteknik-CE/keep-prototype>

<https://keepelectronics.com/>



# Learnings from KEEP 2

- **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





### Phase 1 – Pre-study

2018 (Vinnova, UDI step 1)

### Phase 2

Development of prototype

2019-2021 (Vinnova, UDI step 2)

### Phase 3 – Trace 4 Value

Pilots

2021-2023

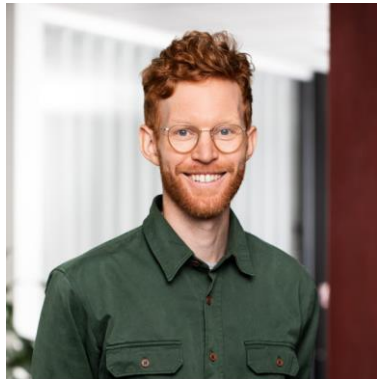
The European  
Green Deal



# KEEP: Project management team



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**ASCDI**  
Association of Service,  
Communications,  
Data & ITAD Providers



**The Circularity Hub**



# We are KEEP



The project participants represents a large part of the value chain: manufacturers, retailers, recyclers and recyclers of EE products, certification organizations, technology suppliers of traceability systems, researchers and consultants



**TRANSPARENT**



## WP1. 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)



## WP2. Production and sales

Conduct tests where manufacturers and retailers label products with a unique identity and share information about the products via them.



Test Environ. A

Test Environ. B

Test Environ. C

Test Environ. D

## WP3. Reuse and recycling

1. Develop and test a solution for traceability in reuse operations
2. Monitor and identify needs for traceability for material recycling



Test Environment E

Test Environment F

## WP4. Business models, evaluation and interface



## WP5. Project management

Coordination and result dissemination





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Coordination and result dissemination



## WP1: Information sharing standard and backend

1. A further development of the "Information need throughout a product's life cycle" matrix
2. Based on results from WP2 and 3, understanding of how the information is packaged by one actor so it is understood by the actor that needs it.



# Identity carrier task force

Discussions about what type of information carrier are suitable (and not suitable) for a successful of the digital product pass



## WP1. Information sharing standard and backend

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Coordination and result dissemination





## WP2 - Production and sales

- Figure out how bits and pieces of a large traceability puzzle would work practically from product companies' perspective
- Document learnings



## WP2 - Production and sales

1. Identifications of group of companies with similar interests
2. Design and implementation of tests
3. Documented learnings from the test environments
4. Recommendations for future work



# WP2 – Pilots

Product history log



+ *partners*



# WP2 – Pilots

Identity carriers on solar cell products





# WP2 – Pilots

Identity carriers on computer keyboards



# WP2 – Pilots

Possibly another one on the way...





Product Information



MANUFACTURER



Lenovo

MODEL

Yoga 2nd Gen (002JMS)

SERIAL NUMBER

R90PXXVE

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MANUFACTURED

PURCHASED

2017-09-26



# WP3: Reuse and recycling

- Overall goal to **explore and test how a traceability system can help increase the reuse and recycling rates** of electronic products
- What kind of data is particularly important to achieve this? How can we work to get there "IRL"?
- This is currently carried out in two main test "environments" with a primary focus on product history data (compare with a vehicle ledger / service book for a car)





# WP3: Reuse and recycling

- The two test environments:
  - Product history data generated and added to products **by or via producers and brand owners** within for example warranty periods, and the **sharing of it to actors enabling reuse** (*refurbishers and resellers of used products (here referred to as “reuse actors”)*)
  - Product history data generated and added by **reuse actors** that specify **what has been done to products** before they are sold and put to use again

# WP4: Business model, evaluation and interface

- Evaluating the different interfaces of the system
- Evaluating the functionality of the system
- Focus is on investigating what value the data provides to different organisations that share and use the data. This can be economic, environmentally or social value.
- Suggesting how traceability systems and/or product passports can promote circular business models and innovative ideas



# What is next?



### Phase 1 – Pre-study

2018 (Vinnova, UDI step 1)

### Phase 2

Development of prototype

2019-2021 (Vinnova, UDI step 2)

### Phase 3 – Trace 4 Value

Pilots

2021-2023

### EU Support och Coordination Action

Product passport for electronics, textiles and batteries

2022-2023

The European Green Deal

### Product passport for furnitures

2021-2023

### Trust 4 Value

Policy development

2023



# TRACE 4 VALUE

The logo consists of two stylized, overlapping loops. The left loop is blue and the right loop is orange, forming a continuous, flowing shape.

## Spårbarhet för hållbara värdekedjor

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Malin Rosqvist  
RISE / SIP PiiA



# Delprojekt

Arbetspaket	Koordinerande organisation	Arbetspaketsledare
<b>0: Projektledning</b>	RISE	Malin Rosqvist
<b>1: Kommunikation, policy &amp; påverkan</b>	RISE	Isabella Winberg
<b>2: Informationsdelning</b>	Chalmers Industriteknik	Sophie Charpentier
<b>3: 4 steps to GTIN</b>	Svenskt trä	Bernt Olausson
<b>4: Cirkulärt kretslopp för näringsämnen och matproduktion</b>	Mälardalens högskola	Monica Odlare
<b>5: KEEP – Spårbarhetssystem för elektriska och elektroniska produkter i ett cirkulärt system</b>	Chalmers Industriteknik	Sophie Charpentier
<b>6: TrusTrace - Traceability technology for brands</b>	Swin Technologies AB	Marianne Uddman
<b>7: Digitala tvillingar i cirkulära värdenätverk</b>	Ragn-Sells	Mikael Lindecrantz



# **CIRPASS: Collaborative Initiative for a Standards-based Digital Product Passport for Stakeholder-Specific Sharing of Product Data for a Circular Economy**

[CIRPASS – Digital Product Passport \(cirpassproject.eu\)](https://cirpassproject.eu)

# Core objectives & additional objectives

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- CO1 – Unambiguous cross-sectoral definition and description of the DPP
- CO2 – Define a cross-sectoral product data model with demonstrated usefulness for the Circular Economy
- CO3 – Clarify requirements related to product identification
- CO4 – Propose an open DPP data exchange protocol
- CO5 – Build stakeholder consensus on key data for circularity and related open standards to be included
- CO6 – Develop use cases and roadmaps for piloting, deployment and circular business value generation of cross-sectoral DPPs
  
- AO1 – Facilitation of cross-sectoral open stakeholder dialogue
- AO2 – Create an inclusive forum facilitating knowledge sharing and discussion (research and industry)
- AO3 – Provide an initial evaluation methodology of the potential net environmental benefit for specific products

# Consortium – 30 partners

## Coordination (technical & administration)



Industrial Networks and Associations



## Batteries



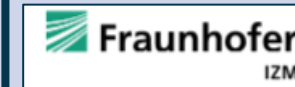
## Electronics



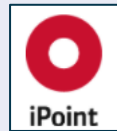
## Textiles



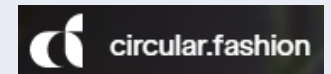
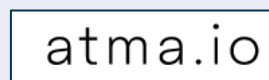
## Cross-cutting expertise – RTO:



## Cross-cutting expertise – Standards, Circular Economy consultancies, solution providers



in Europe





# Trust 4 Value

Policy development for sustainable industry

- Build capacity in the area of traceability by increasing organizations´ knowledge and understanding of the entire traceability chain and thereby actively influencing future policy.
- Broadly increase organizations´ knowledge and understanding of how data generated within the traceability chain can be used to meet the eligibility requirements set in existing and upcoming legislation, and how these affect an organization´s own operations as well as the steps before and after in the value chain.



# How to stay in touch?

- Next open meeting early 2024
- Trace 4 Value open meetings (27 September)
- Trace 4 Value newsletters (upcoming)
- Email to Sophie



**Thank you!**

# CHALMERS INDUSTRITEKNIK

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