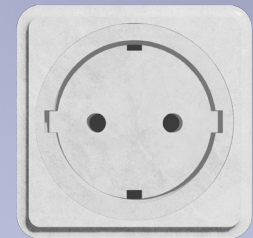


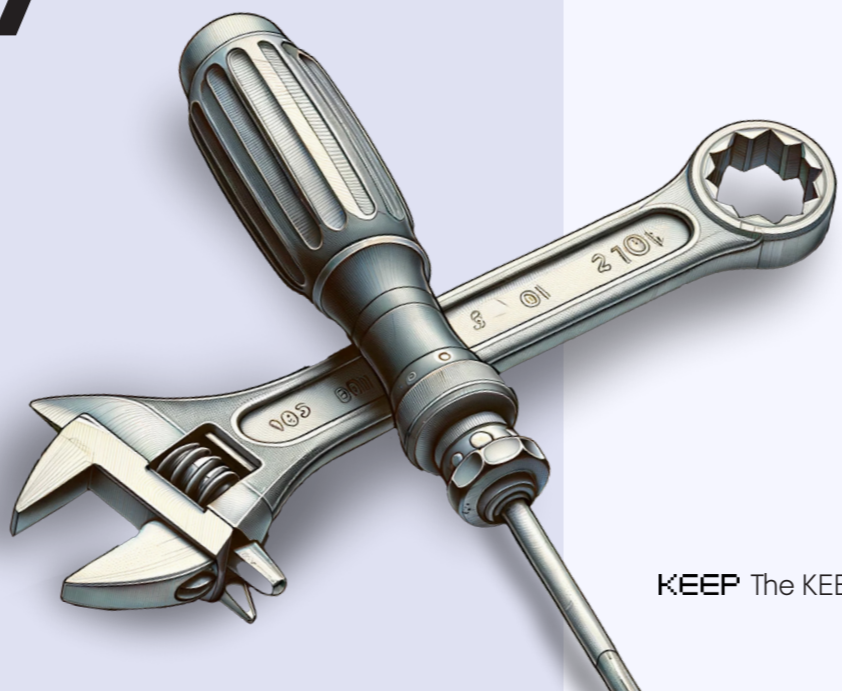
KEEP

Phase 3



1

The KEEP Journey



2017-2024

The journey of KEEP started in the end of 2017, when a group from Chalmers Industriteknik together with 7 organisations applied for a pre-study to explore how traceability could support circular economy for electrical and electronic products. The pre-study was granted funding by the Swedish Innovation Agency Vinnova, and became KEEP phase 1. During 2018, talks were held with different companies and organisations along the value chain of electronic products about how traceability could support them in, for example, prolonging longevity of products and making material recycling more efficient. Back then, people were often sceptical to the chances to implement traceability systems.

Despite some scepticism, we applied and got funding for KEEP phase 2, which started in spring 2019. The project had grown and now gathered 14 organisations who also saw potential and wanted to explore a possible traceability solution. During the two years of KEEP phase 2 the interest in traceability systems skyrocketed, much thanks to the discussions in the EU commission about digital product passports and their mentioning in The European Green Deal.

In the spring of 2021, the strategic innovation program PiiA (Process industrial automation) together with 4 other strategic innovation programs, wanted to finance an umbrella project about traceability. This was a great opportunity as KEEP phase 2 was coming to an end and we were eager to continue our work on traceability.

This umbrella project became Trace4Value which brings roughly 70 partners together, where KEEP's third and final phase is 1 of 5 projects financed by Vinnova through the program Sustainable Industry. KEEP phase 3 is a consortium of 23 partners and the main focus of the project has been testing parts of a full traceability system.

If we thought the interest in traceability and the digital product passports was big in 2021, we had no idea how big it would be a few years later! The EU commission has the long-term goal to implement a digital product passport for every product sold in Europe. Late in 2023, the final draft of the Ecodesign for Sustainable Products Regulation (ESPR) was published, outlining the general requirements for a digital product pass. The first product category, the batteries, is expected to be implemented at the latest in February 2027.

There is strength in having such a diverse consortium, allowing us to gather a broad range of perspectives. We are very proud and grateful to have had the chance to lead the work of such a competent group of very interested people. We hope the learnings from this project will be the seed of other joint ventures and innovation projects.

KEEP it up!

Sophie Charpentier

Chalmers Industriteknik

Kalle Ekdahl

Boid

Max Bekken Björkman

Chalmers Industriteknik

2 Background



What is DPP?

The Digital Product Passport (DPP) is a collection of product data that emphasises circularity in products. A digital representation of a physical product improves the flow of information along the supply chain, enabling product verification and management of product sustainability.

The purpose of having a digital product passport is that the product has a unique identity that can be linked to a data source with information about that particular product. In that way, the product passport gives both businesses and consumers access to product information directly from the supplier or other data sources chosen by the supplier. The information in the DPP may include the product's sustainability performance, origin, warranty, recycling and instructions for installation or repair.

A Digital Product Passport (DPP) is composed of several parts:

- A structured collection of product related data
- A pre-defined scope and agreed data management and access rights
- An access via electronic means through a data carrier
- A unique identifier

In other words, to get information about a certain product, one scans a data carrier, e.g. a QR code, which has a unique identifier (number) to access data about the product. This person can access certain data depending of their level of access.

There are several purposes for a DPP system:

- Enhance sustainable production
- Increase re-use
- Improve material recycling
- Support consumers to make sustainable choices
- Support authorities to verify compliance

Value Chain

The global value chain is a complex model with simultaneous flow of information and material. The value chain is often divided into two parts: upstream and downstream. Upstream supply chain is the process of getting materials to the manufacturer, while downstream supply chain is the process of getting products from the manufacturer to the end consumer.

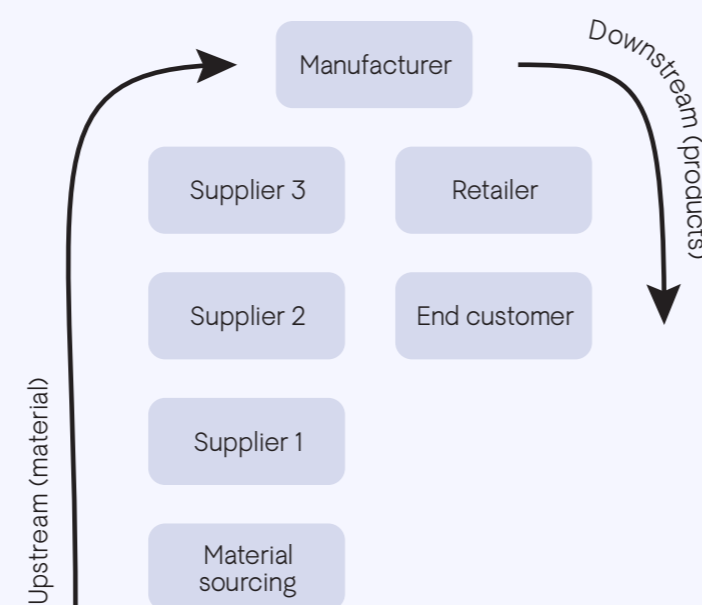
Challenges within the different global value chains are many and include:

- Different levels of technical and automated maturity.
- Lack of technical and automated infrastructure and effective processes both upstream and downstream.
- Clear and anchored strategy and goals for visibility/transparency/traceability
- An effective way of sharing data between trading partners within the value chain
- The value chain is global - many different countries and stakeholders involved.
- Commitment and capacity to change
- Lack of internal and external alignment within and between stakeholders in the value chain
- Lack of knowledge about upstream partners

Today's value chains include countless stakeholders from all over the world and myriad solutions that record and exchange data. These systems need a common language to communicate effectively. Interoperability refers to the basic ability of these systems to easily connect and

communicate with one another to share data. Interoperability enables solution choice across stakeholders, which is critical to meet the large scale data sharing demands of the global value chain.

As industries are evolving so fast, interoperability between value chains is even more important in the sense of simplifying and streamlining the recording and exchange of data, to be able to comply with upcoming demands and regulations, e.g. DPP.



Standards

In the context of traceability and digital product passports, the ability to share data between trading partners in long, complex, global supply chains is essential. The data sharing of course has to be enabled at technical level so that data can be sent between systems seamlessly. But in order to bring value, the data that is exchanged must also be able to be understood and processed unambiguously. This is where international standards come in, both at a technical and a semantic level, i.e. ensuring that the information is defined and understood consistently.

In order for companies to make available all data points required in digital product passports, they will need the capability to receive and assess traceability data originating from the upstream supply chain participants, all the way to the raw material production. Since supply chains are very international, especially in the area of ICT products, the standards used to accomplish traceability (identification of products and parties, data capture technologies and data sharing) must be international and not regional or national. Without traceability solutions based on international standards, costs will be greater, and benefits will deteriorate.

While KEEP partner GS1 Sweden's standards provide the building blocks for interoperability, industry agreement is also needed to determine how to use and apply these standards in a prescriptive way for a defined use case. It is essential that industry application standards describe the following:

- Identification requirements (upstream goods, finished products, trading partners, physical locations)
- Labelling requirements for data carriers to ensure strong fidelity between information and the objects it describes
- Master data requirements for products, parties, and locations
- Critical tracking events/key data elements

However, each stakeholder in the value chain must take accountability to contribute to visibility, transparency and traceability to keep the goods and information flow unbreakable. This is to be able to exchange data effectively, about an object between stakeholders, to be aligned with upcoming demands and regulations.

KEEP Prototype

The idea of developing a front-end prototype came in the second phase of KEEP. The intention was twofold:

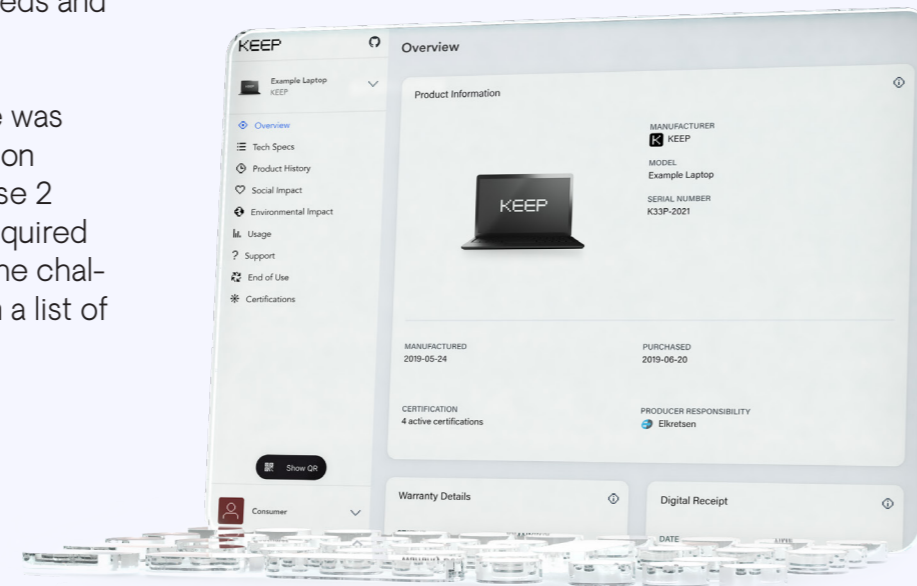
1. To visualise how the system could work and to understand what information is important for different actors; and
2. To test how the system would work in practice and better understand which of its aspects proved easy, difficult, or impossible to implement.

The front-end solution was developed based on the different needs of the actors involved. For consumers, it is important to compare and select products based on performance and environmental impact, whereas recyclers need to quickly assess the value of a product's various components. By conducting a series of workshops with many actors in the value chain, a framework of needs and required data points could be constructed.

Based on that framework, a web-based prototype was designed and developed to test how data collection would proceed. The three producers in KEEP phase 2 selected an existing product and collected the required data during a 4-week period. The test illustrated the challenge of acquiring information but also resulted in a list of obtainable data.

The prototype is a valuable tool for bringing an abstract idea to life and helps to advance the innovation process. The web-based prototype is easily accessible for a wider audience, and when combined with a user guide, it communicates what a traceability system could look like and the value that it brings.

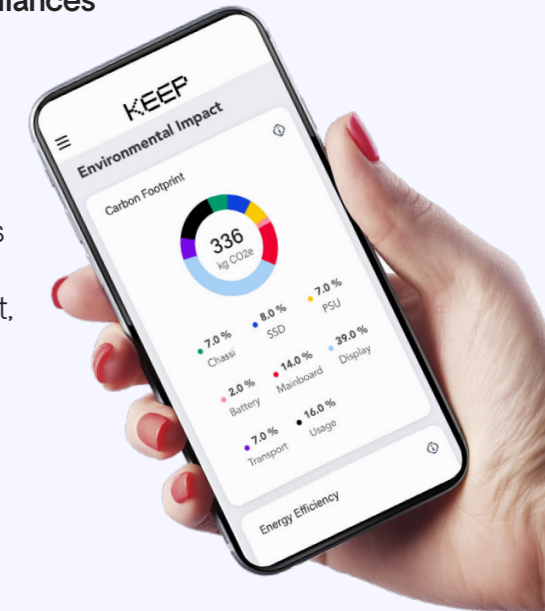
The prototype can be found on the [KEEP website](#) and on [Github](#) with a GNU license.



Categories

- Overview**
Presents basic information about the product as well as a digital receipt and warranty information.
- Tech Specs**
Detailed technical specification for the product.
- Product History**
A timeline showing important events during the products lifetime from production to end of life.
- Materials**
Detailed list of the product's material contents.
- Parts**
List with product parts, highlighting the most valuable parts. Possibility to order spare parts.
- Suppliers**
Information about the product's supply chain.
- Social Impact**
Social impact parameters such as corporate responsibility, factory wages and working time.

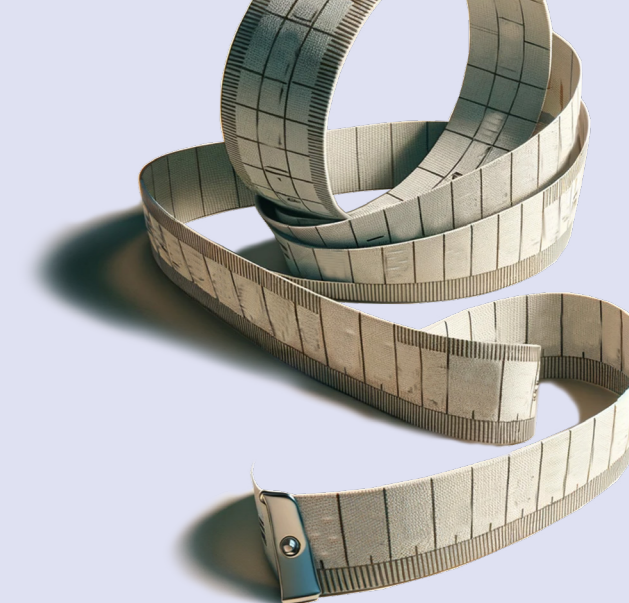
- Usage**
Statistics about how the product is used.
- Support**
Product support such as troubleshooting guides, repair guides and service requests.
- End of Use**
Information about the resell value of the product and how to find the nearest collector.
- Certifications and Compliances**
List with all the product's certifications and compliances.
- Environmental Impact**
Summary of the product's environmental impact including carbon footprint, energy efficiency and recycled content.

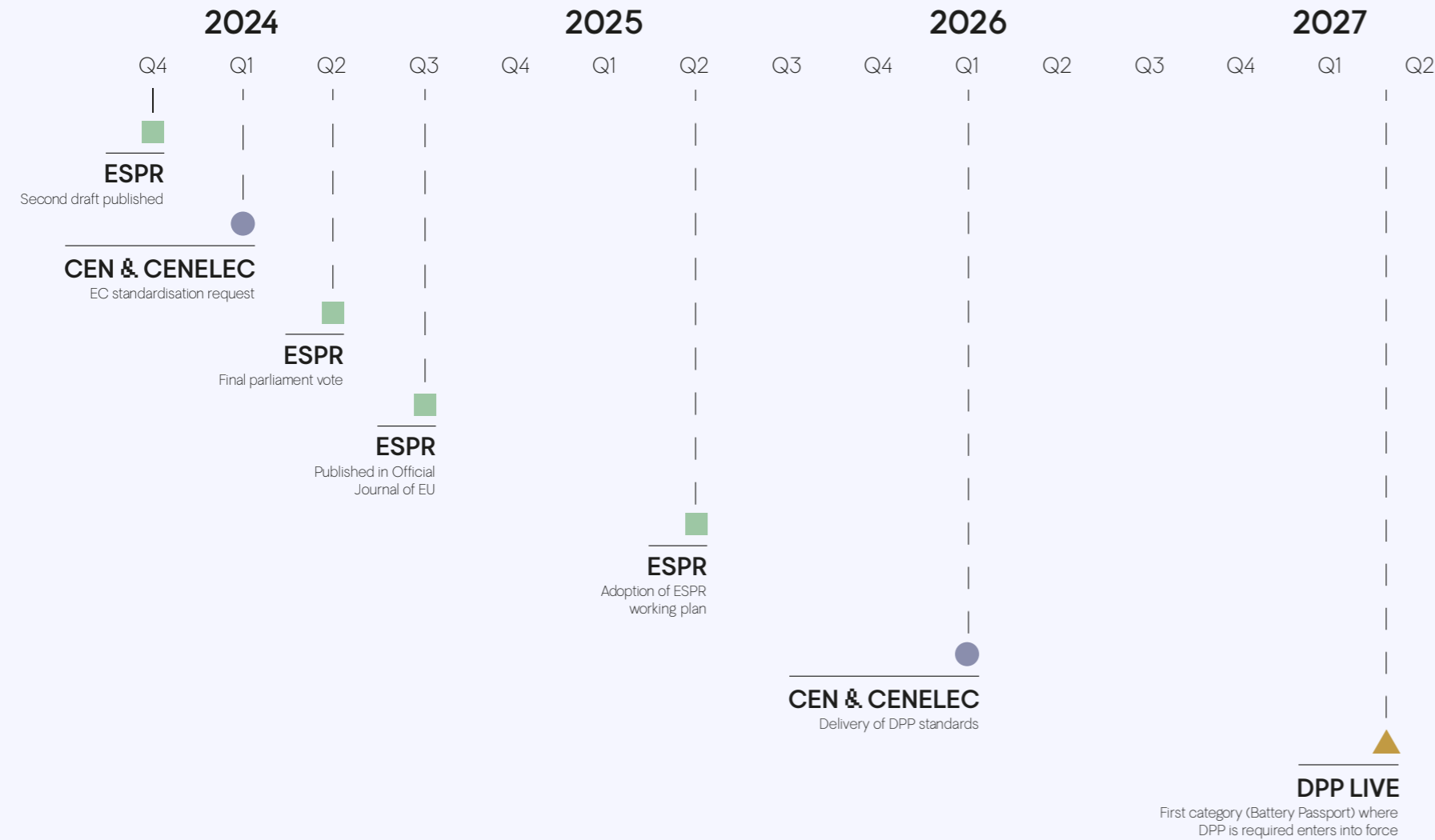


Project Partners



3 Regulation Timeline





Footnotes

The regulations landscape is complex, but focus in this timeline lies on the work related to the ESPR and on the upcoming digital product passports. For a more comprehensive list of regulations for electronics and electrical product, see the [timeline](#) initiated by Martin Willers, CEO @ Transparent, and contributed to by many others. This is a snapshot of current regulation status and is prone to change.

■ The Ecodesign for Sustainable Product Regulation (ESPR) is a new regulation that aims to improve EU products' circularity, energy performance and other environmental sustainability aspects. The digital product passport is one of the requirements.

● Standards are required in 8 areas:

- Unique identifiers
- Data carriers
- Links between physical products and digital representation, look-up mechanism
- Access rights management
- Interoperability, including data exchange protocols and formats and data processing
- Data storage and data persistence
- Data authentication, reliability, integrity
- Data security and privacy

▲ Each product category requires a separate delegated act, which specifies the necessary information for a specific type of product.

From the adoption of a delegated act there is an 18 months delay of entry into force to allow companies to comply with the new requirements.

It is expected that the delegated acts on textile and iron & steel, the first 2 product categories prioritized after batteries, are adopted in the second half of 2025, with an implementation start mid 2027.

4

Project Pilots

Clas Ohlson

The goal of the pilot was to test the process of placing QR codes on a product specifically for compliance with the Digital Product Passport (DPP), which, when scanned, would link to the product's specifications, user manual, and available spare parts. In this case, QR codes were placed on the outside packaging of several solar cell lamps that went to market for Clas Ohlson in the spring of 2023.

The pilot involved several key roles, including a product compliance specialist and a digital solution developer, who were responsible for collecting data, setting up the QR code, and overseeing the technical implementation. Additionally, personnel at the purchasing office played a crucial role in ensuring the process with the supplier to label the products was secure. The setup phase of the pilot required approximately a month to complete, focusing on collecting and securing data as well as the technical setup.

Due to uncertainties around e.g. GDPR, data from customers who scanned the QR code was not collected for the pilot. This aspect requires further investigation before it can be included in a test. The team also awaits standardization regarding data sharing, which led to not prioritizing user data in the pilot.

The pilot's significance, in relation to the DPP, lies in its testing of the process for adding labels to actual products and setting up a technical process to make DPP information available despite the lack of a common standard.



Outcomes of the pilot include the realization that scaling up on more products is now more feasible, since a process is in place. However, it highlighted the need for further investigation into how to collect data on generated traffic and whether the setup should allow direct access to more specific data required by customers.

The next steps involve more in-depth investigation into how to effectively collect data on generated traffic and the potential to scale up the application of QR codes on more products. The pilot has shown the potential of making product information more accessible based on the user's actual needs rather than just providing it at the time of purchase. It also highlighted the benefit of offering easier access to spare part and repair information, which can extend the product's lifespan.



Clas Ohlson is a Swedish retail company offering solutions for home fixing that are accessible for everyone. The company has evolved from its early beginnings to become a significant player in the retail sector, providing a wide range of products and services that aim to simplify everyday tasks for consumers. Clas Ohlson emphasizes good corporate governance and a values-driven culture to efficiently incorporate ethics, environment, and social issues into its strategic decisions and work approach.

Trapper Data + Blippa

In this pilot, Trapper Data started by planning their product's entire lifecycle, from production to customer engagement. They identified the adjustments needed in various hardware to potentially make the system work on a larger scale, and set up a portal with the help of Blippa for the QR codes to redirect to. The portal was populated with information and registered in the database. Additionally, QR codes were developed in the label making software and tested throughout the process – from production to sales – to ensure the hardware could handle them at every stage.

Trapper Data also involved a customer for end-to-end project testing. The initial plan was to involve a retailer but due to time constraints they ended up going directly to the end customer. They shipped keyboards as a test order to this customer for evaluation and received feedback after they assessed the process. Finally, they managed one product return.

Mouse Trapper
the wellness mouse

Trapper Data, the company behind the Mousetrapper keyboard, was founded with the launch of its first product in 1994. With its origins rooted in Scandinavia, Mouse-trapper quickly became a market leader, leading to an international expansion. They focus on combining attractive and functional design to make their products fully ergonomic, while also committing to sustainability and innovation to meet the demands of the market.

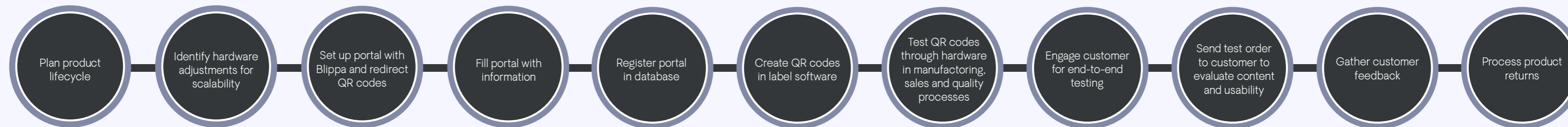
Blippa's platform enables businesses to create QR microsites for comprehensive product lifecycle management, making each product uniquely digital and easily traceable. It serves a wide range of industries by facilitating efficient product tracking, tracing, reordering, reselling, and recycling. With its no-code approach, Blippa helps businesses enhance sustainability and streamline their product management processes.

blippa.com

QR/user flow: Pilot



Pilot milestones



Comments from Trapper Data

Were there any challenges that you haven't managed to solve yet?

Yes, a few. Implementing this system fully will require us to update or purchase new QR scanners and printers. Also, we currently use a standard EAN code on the product packaging, and incorporating both EAN and QR codes into our current process poses a challenge. Additionally, we're looking into how we can link quality testing and automating the QR code creation in a single step, which requires adjusting the software used for quality control. We also haven't been able to test the system with intermediaries, such as retailers who would register the sales date for warranty purposes in the database.

Which roles were involved in this project?

The pilot involved a variety of roles: purchasing, production, finance, sales, software engineers for the label/QR code development and of course Blippa for user interface and database management. A significant portion of the time was spent understanding how to best adapt our own processes.

What regulations or GDPR aspects did you consider?

Since we offer the service and database as a voluntary added value to the end users, we didn't put a major emphasis on GDPR. We believe a simple consent/information at the product's customer registration with a Yes/No option should suffice.

What are your takeaways from this pilot?

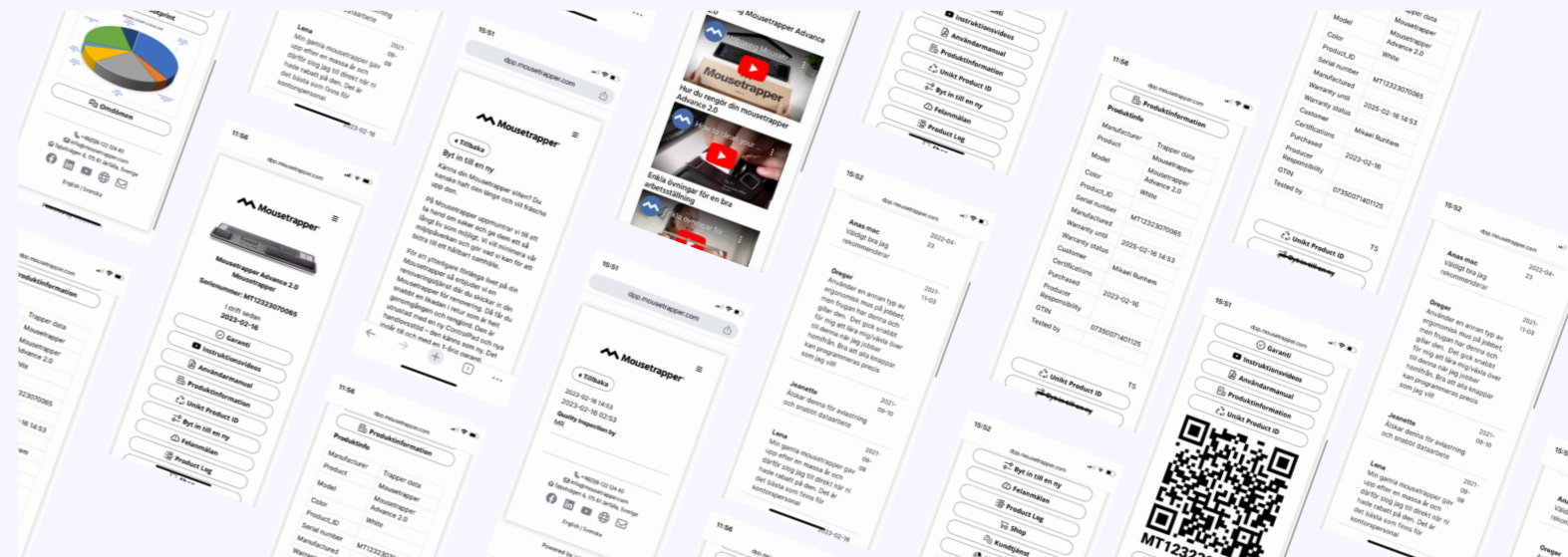
We're largely satisfied with the outcomes of the project but believe it would have been useful to also see the intermediary step involving a retailer and the challenges that could have presented. We have gotten quite far in both planning and implementation of this system and we know what remains to be done and have a clear idea of how to proceed.

Why is this project valuable to you in relation to DPP?

It's very valuable to have a solution ready to implement on how we can easily adapt the business in case of new legislative changes or regulations in the field. The next step would involve linking the software for quality testing with a QR code generator that reads the product and its information already in the factory. The tool would then print a lot number label with a QR code. Until the system is expanded at our retailers, we have limited possibilities to actually implement this system, but it usually progresses quickly once there is new legislation.



QR/user flow: Desired



Telia + Circularise

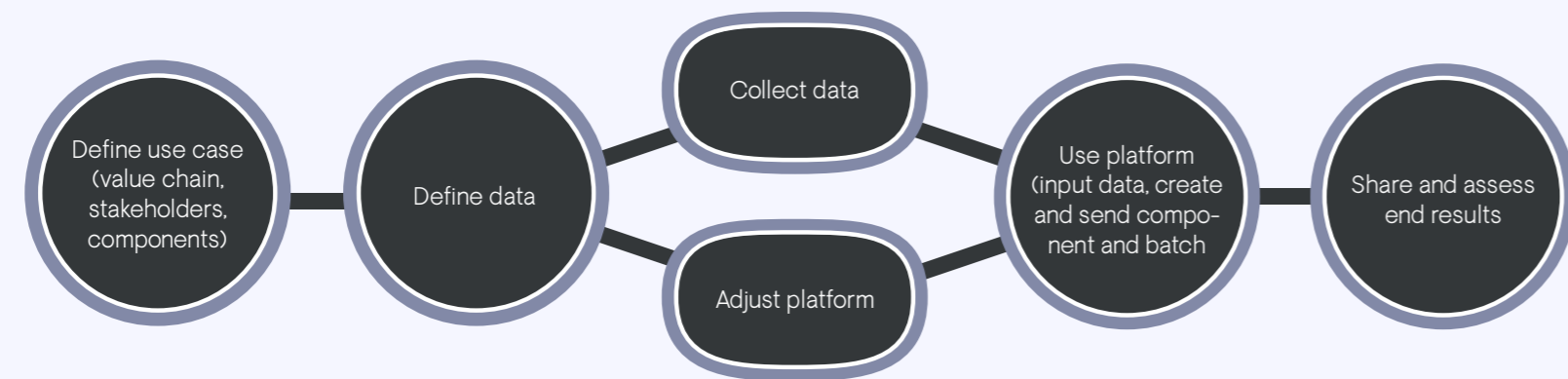
The initiative undertaken in this pilot project focused on demonstrating the capabilities of the Circularise traceability platform through a use case provided by Telia. The primary objective was to mimic the data flow through a supply chain, to test and assess the platform's efficacy. This entailed the following tasks:

1. Aligning the data requirements with Telia's needs and the platform's traceability features.
2. Mapping out the components involved and identifying the stakeholders within the value chain.
3. Collating data related to each component, and then feeding it into the platform to generate a Digital Product Passport (DPP).

Throughout the project, responsibilities were divided as follows:

- Circularise managed project operations, including clarification meetings, data flow discussions, and organizing collaborative workshops to achieve project outcomes. Once the data was compiled, Circularise put it into the platform, with the results subsequently presented to Telia for review. Circularise also facilitated system access for participants, providing necessary onboarding assistance.
- Telia provided the requisite data, detailed information flows, and any necessary account creation and data entry on the platform. Telia utilised the system to input agreed-upon data and undertook an evaluation of the chain of custody, impact data, and simulation results.

To maintain confidentiality, NDAs were established before project commencement, where the scope of the project and tasks for each stakeholder were defined, as well as the conditions regarding the data and further legal requirements. The overall project workflow is presented below.



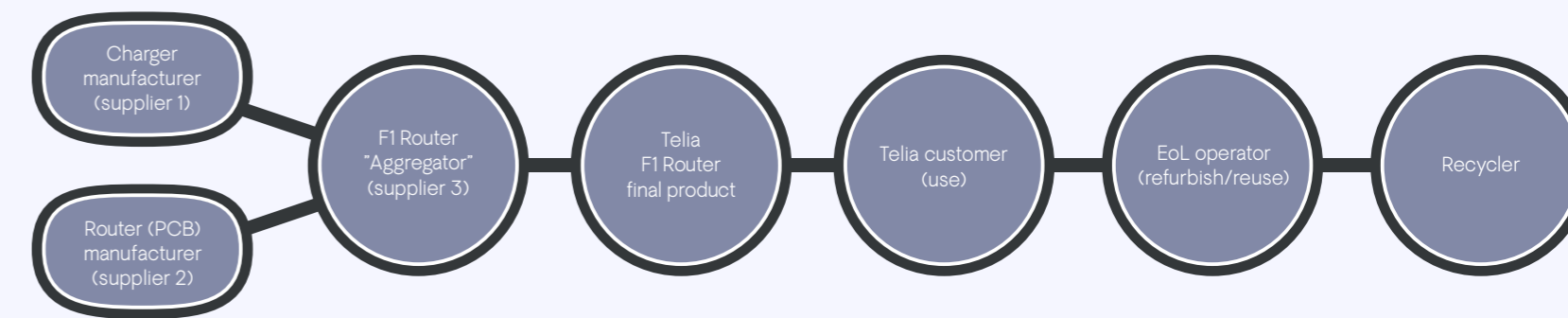
Process

Telia selected a router for the traceability exercise with the corresponding value chain. The types of data shared along this chain were determined, including custody chain and production details, based on templates and guidance from Circularise. Data included production data, mechanical properties and certifications. With this definition, Circularise implemented necessary adjustments on the platform, to respond to the needs of this industry, and this particular use case.

After defining the necessary data and value chain, Telia gathered the required information, using actual supplier data complemented by dummy data where needed. This was supplied to Circularise, who set up the relevant accounts and made system adjustments tailored to the use case.

The charger and PCB suppliers send the components to the aggregator, who then sends this to Telia for the manufacturing of the router. These routers are then delivered to the customer for use and later returned to Telia for refurbish/repair by an external party. The routers are after repair and validation, sent back to Telia for further use by new customers. Finally, the end-of-life stage is included where the routers are to be dismantled and recycled by an assigned recycler.

Product flow



Telia is a leading Nordic and Baltic telecommunications company offering a wide range of services, including mobile voice and data, broadband, TV and streaming and ICT solutions. The company is known for its efforts to enhance digital communication and connectivity, serving both individual and business customers. With a history dating back to the 19th century, Telia has played a pivotal role in the development of the telecommunications industry in the region.

Circularise creates software to enhance the traceability of products and materials within supply chains. Their technology allows companies to verify the origins, certificates, and other critical data of products and materials, aiming to facilitate the transition to a circular economy. Circularise's solution addresses challenges in achieving end-to-end supply chain transparency, overcoming issues related to trust, privacy, and data accessibility, thereby supporting sustainable and circular business models.

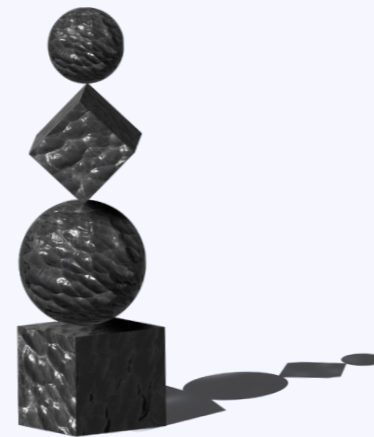
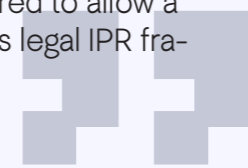
Learnings

The pilot project's learnings emphasize the importance of aligning definitions and getting agreements on data collection and metadata early. Legal processes for agreements take significant time, a factor often underestimated. Cultural differences and past experiences are crucial, especially in projects with little prior collaboration or clear structure.

It was noted that legal timelines often exceed expectations, highlighting the need to consider cultural variances in business practices and the enhanced reporting times of involving non-EU sub-suppliers during pilot trials.

Comments from Telia

At this early stage pilot a data collection and reporting process has given us a valuable introduction to what a future real implementation would result in related to challenges. A proper implementation of DPP must be thoroughly prepared and resources secured to allow a smooth implementation. That also includes legal IPR framework and agreements.



GIAB's Planetary Model

GIAB has prior to this pilot developed the Planetary Model™ - a model that presents the total value of a product by analyzing the negative impact (footprint) and positive impact (handprint) of the product's entire value chain, including both production and second hand market. Raw data such as resource use, production impact and second hand potential is fed into the model which spits out handprint, footprint and planetary points, determining the product's compiled impact on the ecosystem. As opposed to other models, the Planetary Model™ includes many parameters when calculating climate impact, such as water use, waste, fossil energy use and ecosystem impact.

In essence, the impact of a product's lifecycle is often much larger than the impact from reuse processes like repairs and transportation. This highlights the substantial benefits of reusing and maximizing the use of already manufactured products.

GIAB specializes in extending the lifespan of products through principles of circular economy. With a mission to dismantle linear industry standards by retaining functional products in the market rather than becoming waste, GIAB aims to be an internationally recognized catalyst for resource-efficient business development. The company operates with a core expertise in sustainability and circular economy, providing comprehensive services from logistics to repair and resale, leveraging digital and innovative solutions to modernize traditional reuse and efficiently manage increasing return volumes.



Comments from GIAB

What was the goal and the involved participants?

The pilot was designed to test and evaluate the Planetary Model™, specifically its application in calculating the handprints of external reuse processes that fall outside GIAB's Circular Platform. The testers were Dustin, Clas Ohlson and Lenovo, who in different ways facilitate the reuse phase of products as a complementary business offering.

What did the setup phase require in terms of time and staffing?

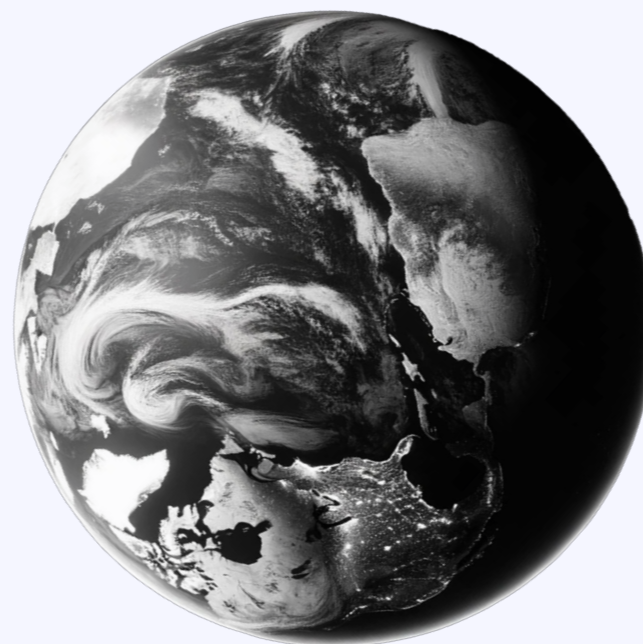
Setting up the pilot took about a week, but that was on top of a year's groundwork by GIAB in developing the Circular Platform and the Planetary Model™. For the pilot, we compiled a team of programmers, LCA experts, and sustainability experts. In terms of necessary data we had to ensure compliance with regulations, including GDPR, driven by the CSRD's demand for scientifically grounded data.

How does the model relate to the DPP?

The model (and also this pilot) are valuable for the future of traceability as the Planetary Model™ provides data for the DPP, which in turn will enhance the data foundation for the Planetary Model™. A win-win situation.

Based on the insights of the pilot, what are the next steps?

The knowledge acquired from the pilot now forms the foundation for strategic discussions on translating these learnings into business collaborations between GIAB and the three stakeholders. We're looking at how to integrate these insights into concrete business opportunities and partnerships.



Comments from Dustin

What was done in the pilot?

The purpose of the project was to create a sustainable aftermarket for products from our e-commerce for the handling of returns, reclamations or products damaged during transportation. From the project start in 2022 to the end, a total of 1982 products were handled within the project, which equals to 29 876 ton CO2 that was avoided, according to the GIAB calculation model for environmental savings in the recycling process.

During 2023, we moved into a new phase where they handled products from our own Dustin take back program, not products that are taken back from our brokers.

What was required in the setup and who were involved?

The only person involved was the Circularity Lead who is responsible for our take back programme. She was directly providing GIAB with data they were requesting. It took about three weeks to provide the data, and about one month to finish the first phase of the project.

Why, in relation to the DPP, is the pilot important?

The pilot is definitely significant in relation to DPP, as it serves as a framework for effectively managing product data, ensuring accuracy and accessibility. It facilitates informed decision-making, enhances operational efficiency, and supports compliance with regulatory standards. The pilot plays a crucial role in emphasizing transparency and trust with stakeholders in similar projects.

What are the next steps?

We are currently engaged in discussions to determine the feasibility of advancing into additional official collaboration with GIAB. Should this materialize, it would present significant advantages for our circularity initiatives and contribute substantially to our objectives.

Why should similar projects take place?

GIAB exemplifies innovation in fostering sustainable growth through the implementation of circular economy principles within organizations. Their approach to processes and business models offers invaluable insights that can greatly benefit companies like Dustin, facilitating a deeper understanding of circular economy dynamics, product reuse strategies, and optimized returns logistics. For us, partnering with GIAB presented an excellent opportunity for enhancing our commitment to sustainability and advancing our circularity initiatives.

Dustin

Dustin Group is an online reseller of IT products and services, operating through Business-to-Business and Business-to-Consumer segments. It offers hardware, software, and related services to small and medium-sized businesses, large corporates, public sectors, and private customers. Their strategy emphasizes accessibility, affordability, and comprehensive support services to enhance customer experience and satisfaction in the digital age.

Comments from Clas Ohlson

What was the primary goal and the involved participants?

The goal was to understand how we can effectively visualize the impact of giving products a second life and the project involved our Compliance & Sustainability specialist, digital analysts and the customer service department.

How much time did it take?

It took about 2 days and three meetings to summarize data on refurbished and repaired products.

Why is this pilot important in relation to the DPP?

It's crucial for understanding if we can present this data to customers in a standardized, relevant, and compliant way.

We developed an interesting tool for assessing the environmental impact and understood the challenge of summarizing product-level data. It showed the potential of visual tools in communicating environmental impacts, though finding value-adding claims for customer behavior change was challenging.

Is there something you wish you had known at the beginning?

More specific data on actions taken on returned products would have been beneficial.



El-Kretsen + Blippa

El-Kretsen, Sweden's largest producer responsibility organization for waste electrical and electronic products, has around 5,000 battery bins across Sweden for collection of small batteries. Together with Blippa, El-Kretsen initiated a pilot project within KEEP where battery bins located in four municipalities were tagged with QR codes and connected to Blippa's system. This was the first time the battery bins were connected to the cloud and tracked online.

The main purpose of the pilot and the tracking is to get better control of the battery collection system. This is made possible by registering where battery bins are located geographically and logging different events. This could be about monitoring filling rates and frequency of collection, flag if bins are damaged and therefore need replacements as well as when bins are replaced.

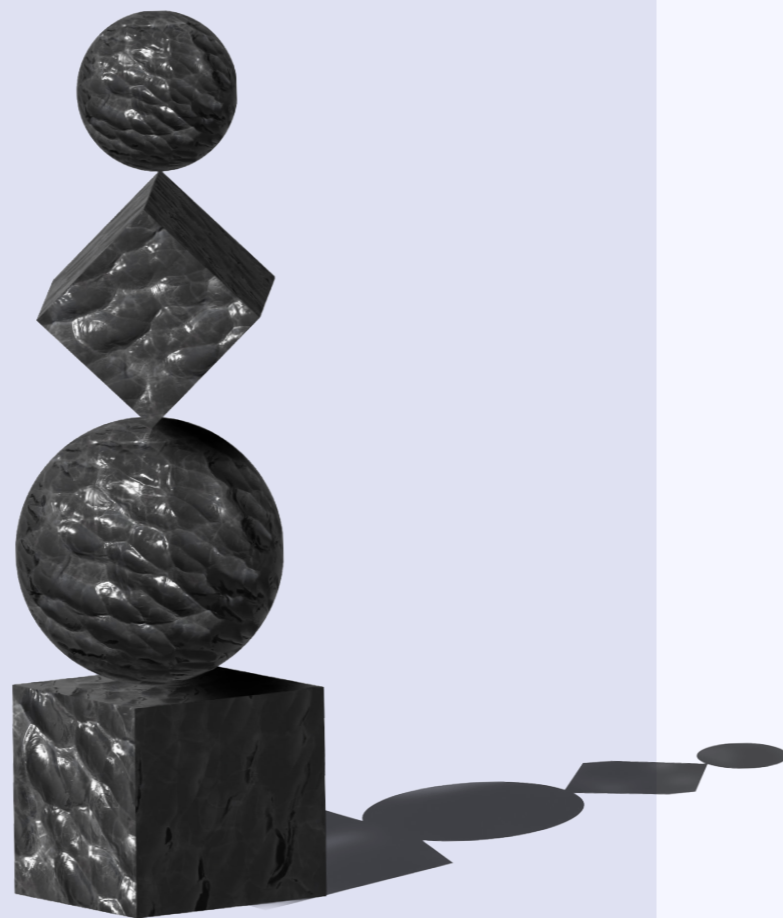
El-Kretsen is established in 2001 by electronics producers through their trade organizations, facilitates the recycling process for electronic products and batteries in Sweden. It operates a nationwide collection system, collaborating closely with Sweden's 290 municipalities, producers, and recyclers to make environmental responsibility easier. As a non-profit organization, El-Kretsen is owned by 19 trade associations and strives to offer qualitative solutions that are economically and environmentally responsible.

So far, the system has gotten a positive response and several benefits have been recognized:

- Several user categories: Apart from El-Kretsen, the system is designed to be used both by waste collectors and the public.
- Simple to use: To register events and add information, a smartphone and its camera is used to scan the QR code. This takes the user to a web page where information can be added.
- Information goes in two directions: When it comes to public users, the system can both be used to inform them about batteries and the collection, but also make El-Kretsen aware of damaged or full bins that need to be emptied.
- Overview of the collection system: El-Kretsen gets a good overview of the battery collection system via Blippa's web user interface.
- The pilot is still ongoing and planned to expand further before a decision is made whether it should be introduced as something permanent and rolled out across the nation or not.



5 Use Cases



ChainTraced

ChainTraced

ChainTraced is a company focused on digital end-to-end traceability for the metallic value chain. It offers a platform to trace material and quality data of products from raw material to end-product, addressing operational challenges and strategic quality management needs within the manufacturing industry. With the growing demand for sustainable production, ChainTraced has expanded its platform to include greenhouse gas data management, supporting the transition towards circular business models and empowering secure, sustainable supply chains through efficient, collaborative, and transparent sharing of critical product data.

The ChainTraced traceability system allows companies to visualize their process and corresponding emissions. A company contacts ChainTraced to access the traceability system for a certain product. It gives information so its suppliers (and their suppliers) are onboarded in the system.

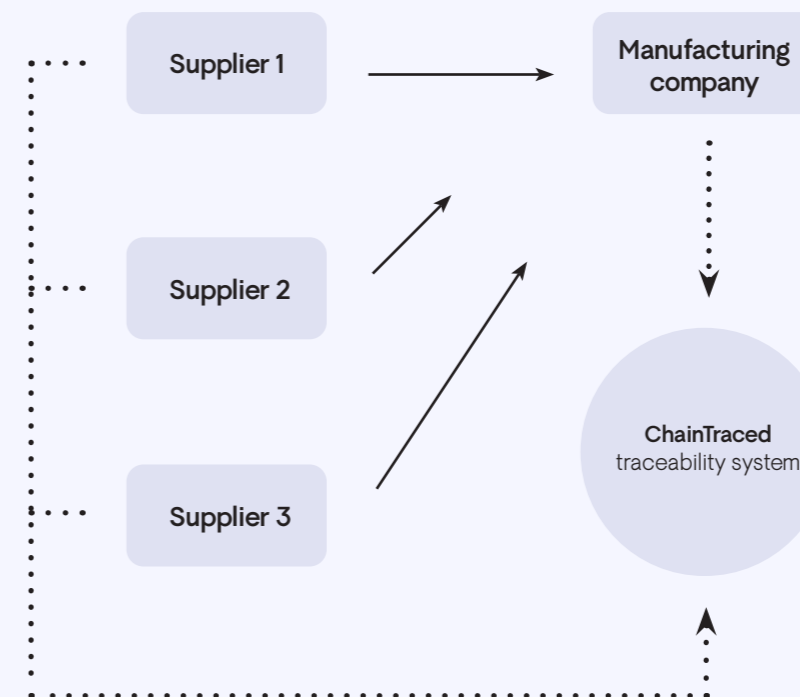
The system gathers information and allows the company to visualise:

- Upstream information
 - Carbon footprint calculated for each step and each suppliers,
 - Properties/results from measurements (such as elongation, strength etc.), displayed per batch.
- Downstream information
 - Footprint is adjusted at each step of the manufacturing
 - Certificates.

Benefits of sharing information include:

- Increased insights through analysis of product critical parameters allowing a company to identify which process/suppliers are emitting the most
- Opportunity to optimize production with access to material properties
- Possibility to see all shipments from a specific lot, which facilitate recalls, for example.

..... Flow of information
 — Flow of goods



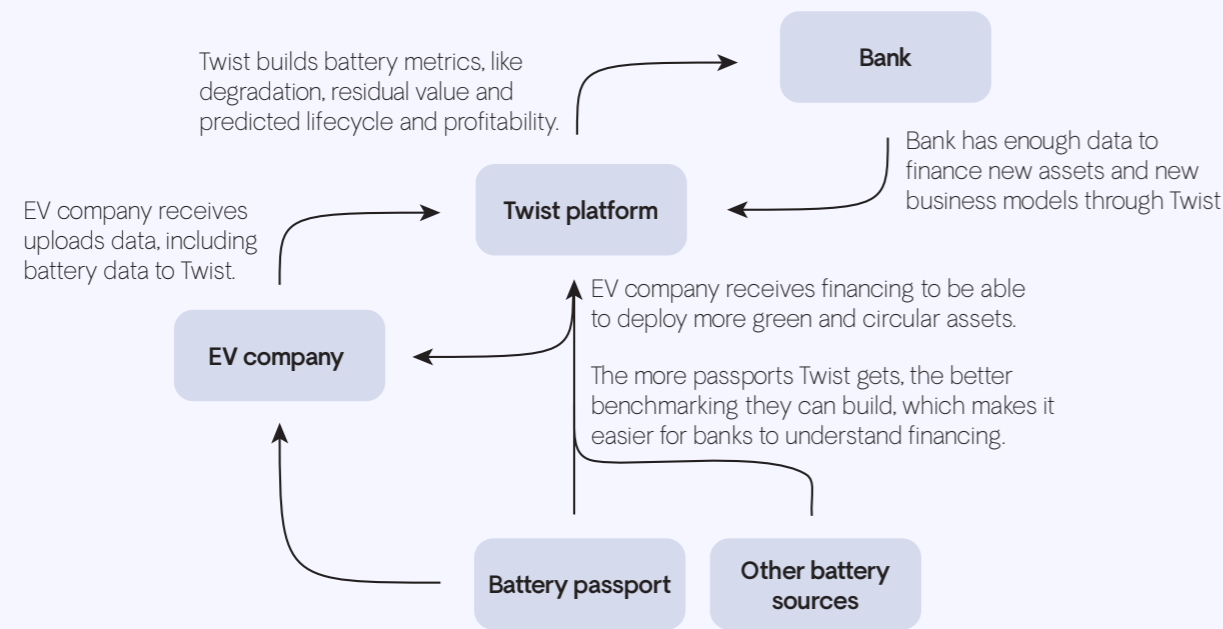
Twist

Financial institutions want to finance more battery powered hardware, e.g. EV's and battery storage. As such, they need to fully understand the metrics around batteries. Because there is not enough historic data on these new types of assets, i.e. batteries or EV's, banks need to understand what it might look like in the future.

This is how Twist comes in, where Twist can use the battery passport data to give accurate predictions on e.g. residual value and lifecycle.

TWIST

Twist offers a platform designed to unlock funding for the circular economy, catering especially to the electrification era's emerging asset types and usage-based risks. It provides tools for funders to manage these risks effectively through its innovative 4C framework, which focuses on cashflows, collateral, carbon tracking, and circularity of assets. This approach helps in analyzing, monitoring, and simulating the financial and environmental performance of assets and contracts, enabling faster and more efficient funding processes for fleet operators and financial institutions.



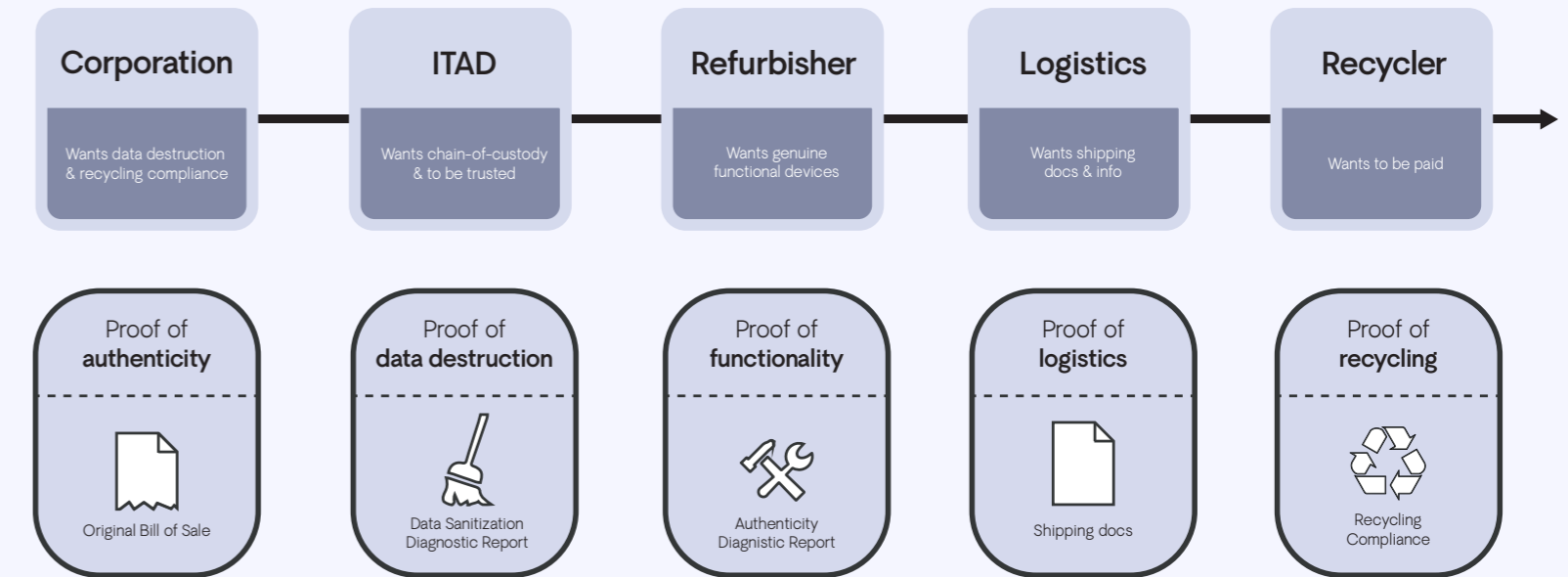
OBADA

OBADA

The OBADA Foundation is a non-profit coalition focused on the IT asset disposition sector, established to steward the OBADA Standard alongside ISO for developing open protocols for ITAD industry data models. They aim to foster a sustainable digital economy by creating an open-source blockchain protocol for tracking IT assets throughout their lifecycle. Their efforts focus on enabling secure ownership verification, combating counterfeits, and promoting recycling within the IT supply chain, benefiting stakeholders like OEMs, software companies, and recyclers.

OBADA is defining a standard back-end to enable interoperability of Digital Product Passport data. This effort is crucial for ensuring that different systems can effectively communicate and exchange information about physical assets.

OBADA has built an "ITAD Blockchain" enabling anyone to create a DPP in order to track a physical asset.

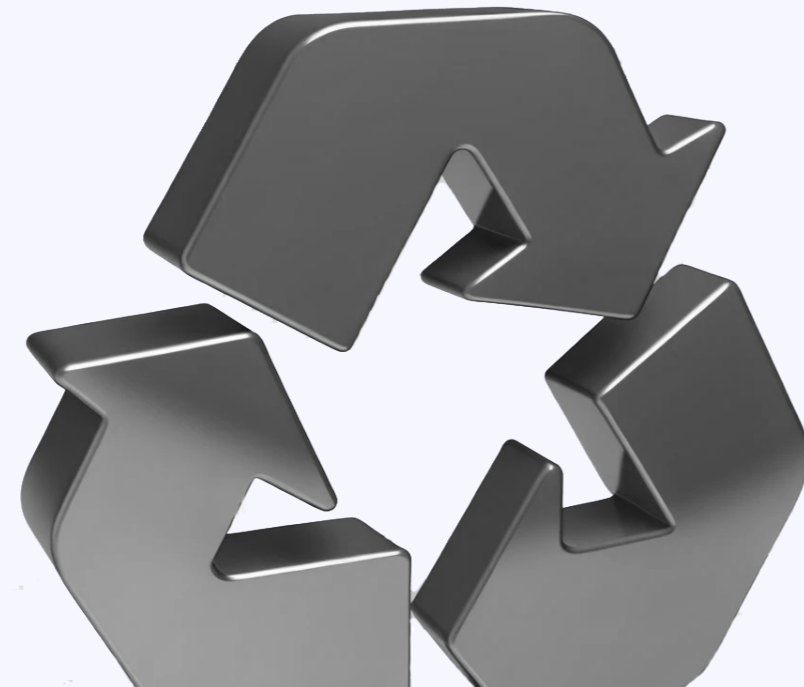


Recyclers

Pre-treatment of WEEE (Waste Electrical and Electronic Equipment) is carried out at production facilities and can be divided into different stages during which the sorting gets increasingly detailed. In the first stage collected and incoming WEEE are loaded onto a conveyor belt along which operators sort out specific products and remove certain ingoing components.

As an example, due to legal requirements (the WEEE Directive in the EU) and safety reasons, batteries must be removed from products before the remaining parts of the products can proceed down the production line. ICT products are normally sorted out both due to their content of batteries and precious metals. This type of products are then dismantled where their valuable PCBs and batteries are removed. If the same kind of products would come with DPPs, it would be possible to get hold of more information and based on that expand today's processes and activities.

In this way DPPs can play a role in pointing out, for instance, high-value products, parts and components for which there is a market demand for remanufacturing and/or reuse, as well as parts and components that need special care. One way to put it would therefore be to say that DPPs could make it significantly easier for pre-treatment actors to remove specific components from such products they handle today and enable them to be reused.



6 Comments



TCO Development

Sweden

Assessing the direct impact of a consortium project such as KEEP can be challenging. The dynamic environment with such a diverse group of stakeholders, all having different perspectives, motivations and backgrounds makes it difficult to justly capture the project in metrics. Yet, because of this complexity, the most invaluable asset emerged: the network itself. Having direct access to a network of professionals and organizations, all united by a common interest in exploring the potential of digital product passports have been a truly invaluable asset.

A personal testament to this is the upcoming TCO Certified generation 10, which will introduce a criterion for all certified products to possess a unique product identity. This significant step towards adopting DPP practices is to a large degree the outcome of collaborative efforts and insights gained through the KEEP project. Throughout the project, witnessing the growth and learning among the members was truly inspiring.

It's clear that the project has equipped many with the knowledge and drive to advocate for, and implement better product traceability practices within their organizations and domains. Looking ahead, I am eager to follow the ripple effects of this in the years to come. KEEP may be ended, but convinced that we will see its legacy contribute to more sustainable product traceability practices for many years to come.

Hannes Mäki

Digital Strategy Manager

ASCDI/OBADA

United States

A few years ago, an extraordinary idea emerged from a collaboration of global companies, each with a rich history in the computer and telecom equipment sector dating back to the 1970s. This idea was rooted in a simple yet profound realization: the circular economy's success hinges on transparency. The essence of circularity – the resale and reuse of products – demands a foundation of trust. For users to confidently adopt pre-owned products, they need assurance about the product's history and quality.

To address this, we mapped the journey of tech equipment through the market, pinpointing key stakeholders in the process. This list included manufacturers, distributors, end users, resellers, refurbishment facilities, data erasure companies, and repair services. Each of these players traditionally operated within their own information silos, often guarding confidential data and trade secrets. The challenge was monumental: devise a system that facilitates the safe, reliable exchange of this fragmented information.

Our solution? The creation of OBADA (Open Blockchain for Asset Disposition Alliance). This initiative represents a groundbreaking approach to information sharing in the circular economy, leveraging the security and transparency of blockchain technology.

OBADA has created an open standard which gives circular economy stakeholders the tools to information in a secure yet transparent fashion in the pursuit of a more sustainable world. We hope to have ISO approve this standard.

KEEP has introduced us to some very innovative people from Europe who showed us that we are not alone on this journey and that our efforts are part of a larger, global movement dedicated to responsible stewardship of technological resources. Over the last few years, KEEP has been a constant source of inspiration. As we progress and move forward with our upcoming CIRPASS 2 pilot, we will carry with us the spirit of unity and shared vision that KEEP has exemplified.

Jospeh Marion

Company President, ASCDI

Trace4Value

Sweden

The speedy start and good progress in the Trace4Value project are based on good practice; the sub projects and sub project managers were carefully chosen based on previous work that could be continued in the joint undertaking Trace4Value. When starting out in Trace4Value, KEEP had already been through two phases of Vinnova UDI, Utmaningsdriven Innovation, which meant that KEEP brought a consortium of partners who already knew each other and had agreed on how the challenge could be tackled.

For the other sub projects in Trace4Value, KEEP has had an important function as forerunner with experience in using existing standards to address a new challenge in traceability, aiming at solving parts of the digital product passports for electrical and electronic (EE) products through a traceability system to promote and enhance sustainable new production, reuse and recycling.

Collaboration and exchange of experience and ideas with other stakeholders and sub projects in Trace4Value have been very valuable and the collaboration will continue beyond the formal project period.

The overall vision of the sub project KEEP was to investigate traceability solutions for electrical and electronic (EE) products. This is in line with the EU's call for an electronic passport for EE products that was first mentioned in 2019 (The European Green Deal, COM (2019)) to provide information on an EE product's origin, composition, dismantling possibilities, and end-of-life cycle handling. Today, there is an evident lack of such information and, therefore, a great need to develop a traceability solution to keep track of information.

KEEP has gathered 23 partners to facilitate information sharing through traceability solutions that collect information about EE products from all stages of a product's life cycle.

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