

The digital product passport

The ticket to sustainable circular economy

Nowadays, environmental protection and sustainability are important values that influence our consumer behavior in many ways. The digital product passport is an innovative idea that has the potential to fundamentally change the way we interact with products. Thanks to the digital product passport, consumers can make conscious decisions and choose products that correspond to their values and needs. At the same time, it opens up new opportunities for companies to communicate their sustainability efforts transparently and strengthen customer trust. This gives them the opportunity to develop digital business models and rethink their own value chain. With the Industry 4.0 tool Eclipse BaSyx, the digital product passport can be implemented for companies in all sectors.

The digital product passport is part of an EU-wide package of measures to promote the circular economy. It not only contains information about where the product comes from, but also about its exact composition and how it was manufactured. The digital product passport even offers insights into repair and dismantling options, including recycling and correct disposal of the product. The implementation affects all industries and services, with far-reaching effects on almost all corporate business processes.

However, the key to the digital product passport lies in standardized data communication. This enables manufacturers, users and disposal companies to ensure the interoperable exchange of data throughout the entire product life cycle.



Regulations and advantages

The digital product passport is being introduced in various sectors and will be mandatory for batteries from 2027, for example, in the form of the battery passport. It is at the heart of the environmental policy digital agenda of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), in close cooperation with the EU Commission. Companies with more than 500 employees are already required to collect most of the information in order to comply with the EU's ESG (Environment, Social, Governance) reporting and the German Supply Chain Act:

- Durability, reusability, retrofittability and reparability of products
- Transparency across the entire life cycle, including the raw materials chain
- Ecological information on greenhouse gas emissions, water consumption and other environmental impacts
- All information relevant to recycling, such as ingredients, potential hazards, instructions for dismantling and correct disposal

As a company, you can also gain further benefits from implementing the digital product passport. It could be expanded with various services and, for example, actively inform about measures that have a positive impact on the service life or service life of a product. In the long term, this product passport can lead to an increase in efficiency in maintenance, service and recycling processes. Processes in the value chain can be planned and controlled much more reliably on the basis of the data.



A practical example: the metal industry

The study "Digital Product Passport: the ticket to achieving a climate neutral and circular European economy?", conducted by the Institute for Sustainability Leadership at the University of Cambridge (CISL) and researchers from the Wuppertal Institute, provides an illustrative example of the use of the product passport:

In the metal industry, it is very important to have precise information about the products: Where do they come from, how much energy was used in their production and what emissions are associated with them? Tracking the recycling process is also often a challenge, especially for metals such as aluminum, which have a long lifespan of 35–50 years before they are recycled.

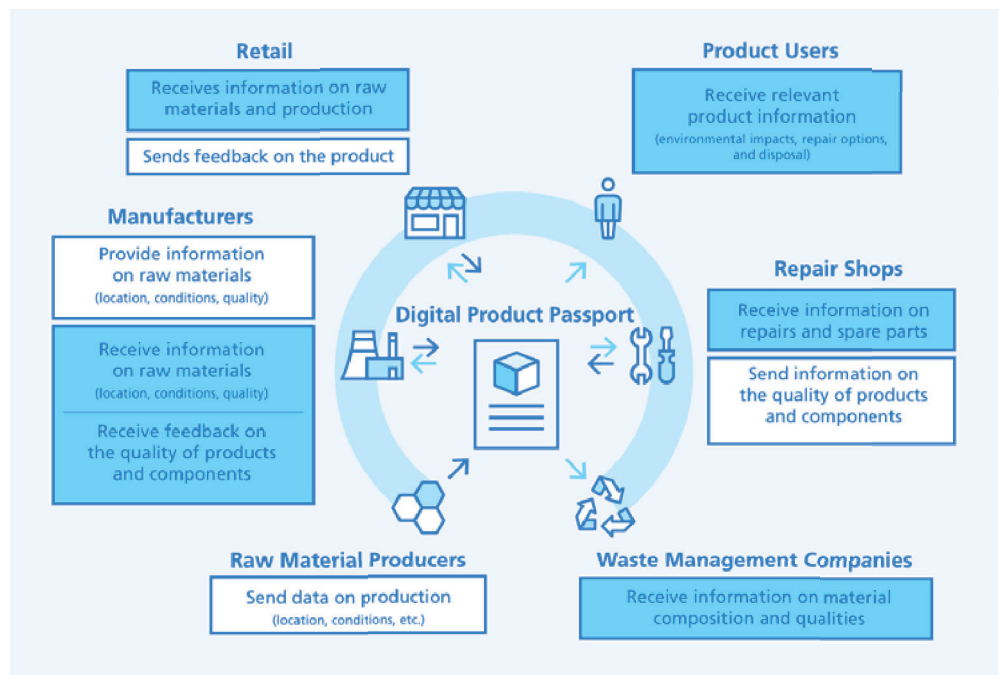
Hydro, a leading aluminum manufacturer, has started a pilot test in collaboration with a customer, a renowned furniture manufacturer. Together they have developed a product passport that contains important information about a bench made from recycled aluminum and wood. This product passport offers consumers the opportunity to gain an insight into the production process and discover the story behind the piece of furniture. This transparency positively influences customers' purchasing

decisions, as they can view selected information about the production of the bench and better understand how and where the product and materials were sourced and manufactured.

The technology behind it simply explained

With Eclipse BaSyx, the digital product passport can be implemented for companies in all sectors. Everything is based on this Industry 4.0 tool and the Asset Administration Shell as a sector and industry-wide standard for Digital Twins. This means that a wide range of requirements for the digital product passport can be implemented.

With Eclipse BaSyx, Fraunhofer IESE has created a platform on which standards-compliant communication between machines or goods and software takes place. BaSyx not only provides the IT infrastructure, but also offers additional components that enable rapid implementation of Industry 4.0. This means that different implementation scenarios, such as the digital product passport, can be realized with the same technological basis.



The digital product passport combines the most important elements for promoting the circular economy.