November 2024

Developing circular economy through software-enabled reverse logistics

Vincent CABANEL
Associate at Via ID

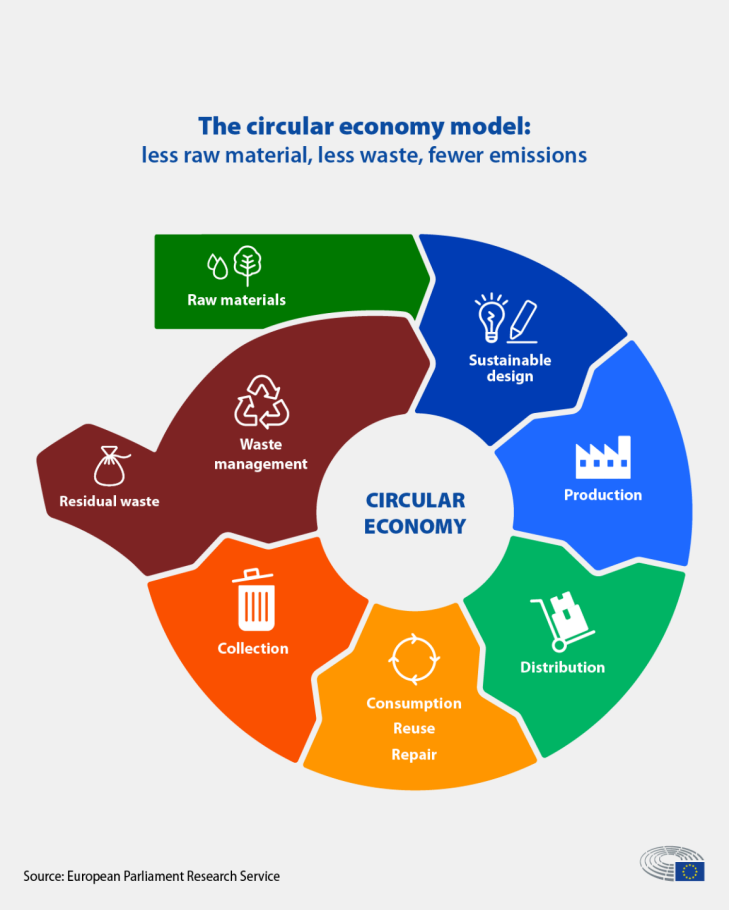
Table of contents

Individuals are becoming increasingly mindful of their consumption choices, hence businesses are under pressure to meet novel sustainability standards. It's like now every company has to highlight its ESG (Environmental, Social, and Governance) and impact strategy, think of the number of companies that are now mentioning "green" or "sustainable" in their commercials. **While the "sustainability claims" are growing, it's not because most companies are now non-profit, they're addressing a growing demand for products with ESG-related claims, whose top concerns are durability, repairability, and measurable carbon footprint.** In addition to regulatory pressures, companies are also motivated to improve their reverse logistics processes to enhance their brand image. According to a 2021 survey by IBM and the National Retail Federation, nearly 70% of consumers in the U.S. and Canada are willing to pay a premium for products from brands that are perceived as sustainable .

This shows that brands are therefore placing importance on reverse logistics.

70% of global greenhouse gas (GHG) comes from material extraction and use, while only 7.2% of used materials are cycled back into our economies. The circular economy is mandatory for fighting climate change (it could help decrease GHG emissions by 40% by 2050).

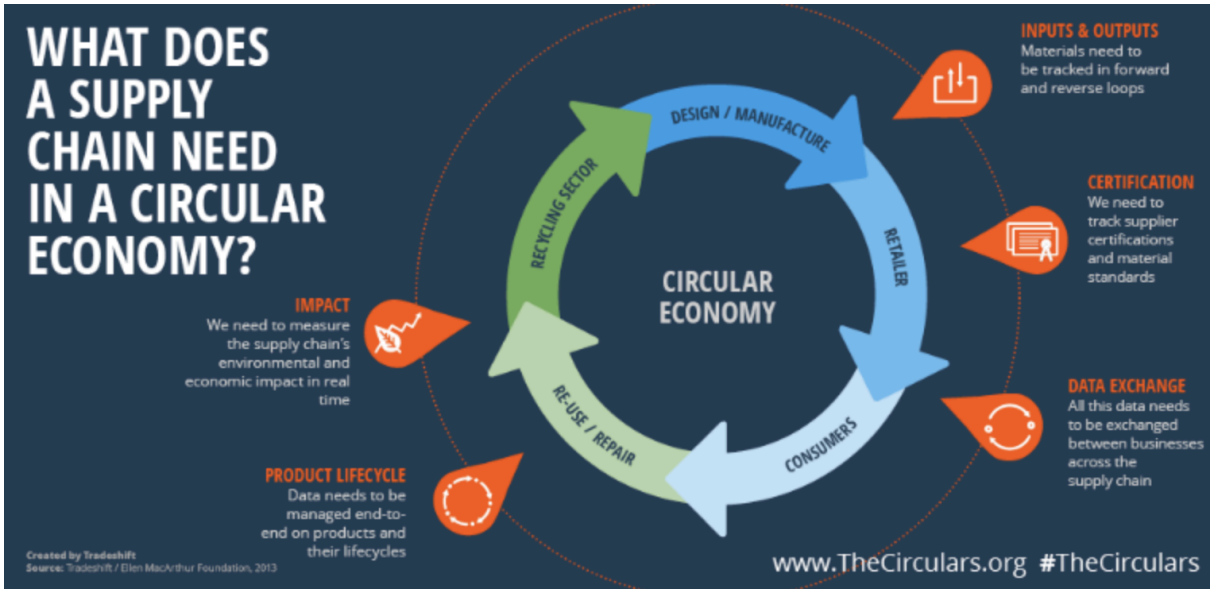
Simply put, the circular economy is the opposite of a linear economy (produce-use-throw away), it involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and productions as long as possible. It's about reducing waste to a minimum.



In the mobility space, the shift to EVs is clear. While we must acknowledge these vehicles are "clean" (emissions depending mostly on the electricity source), their manufacturing and batteries are largely carbon intensive at the production stage (60% of GHG for EV production for the latter, mainly because of the materials needed to produce it). The carbon footprint of recycled battery materials is 4x smaller than raw ones from primary sources.

After use, or for repair, products, components, and materials need to be moved. In our EV production example, using recycled materials, especially at the industrial scale, would need better battery collection and recycling, thanks to qualitative and highly efficient sourcing of used materials, and great reverse logistics.

Reverse logistics in the circular economy is the process of collecting and aggregating products, components, or materials at the end of life for reuse, repairment, recycling, and returns. Data is a key component of effective and profitable circular supply chain models.



Source: TheCirculars.org

Reverse logistics is a real enabler of decarbonization: inefficient returns and collections (for repair) lead to additional transportation, hence higher carbon emissions due to extended delays, as well as increased costs. **Efficient reverse logistics help in developing products designed to be repaired, refurbished, resold, repurposed, and source used materials for building second-life products or second-life distribution businesses.**

In order to scale the circular economy thanks to recycling and repair, reverse logistics must be scaled as well. Software-enabled reverse logistics isn't new and is already used for most of reverse logistics operations. However, I think there's a growing need for building and scaling "focused circular economy ecosystems" (closed loop between economic agents operating different activities with aligned interests, with a high level of interoperability, you can think about the above circular economy loop applied to a

given industry, such as waste management or tire recycling): **if you want the circular economy to scale, sourcing of used-materials and geographic coverage are mandatory, and software is a real enabler for that, since physical boundaries aren't an issue anymore**. There's a big momentum for building software-enabled reverse logistics solutions focused on an ecosystem, so let's dive in!

The market drivers: regulation and brand image

Brands that excel in reverse logistics can differentiate themselves by showcasing their dedication to reducing waste and contributing to a circular economy. For example, outdoor apparel company Patagonia has built a strong brand image around its commitment to sustainability. Through its "Worn Wear" program, Patagonia encourages customers to return used clothing, which the company then repairs, refurbishes, and resells. This initiative not only reduces waste but also strengthens Patagonia's reputation as a leader in sustainable fashion.

In this context, new circular-based business models (which can be, in some cases, even more profitable than linear-based business models) are being developed, examples include Decathlon with its rental offer, and Michelin and its Tire-as-a-Service offer.

Another driver is playing a major role: regulation. The EU launched its Circular Economy Action Plan (CEAP) in 2015, aiming at reducing the importance of linear-based business models; the CEAP recognizes "batteries and vehicles" as having a high circularity potential. This regulation is included in the EU's Green Deal.
The Corporate Sustainability Reporting Directive (CSRD) will play a pivotal role in decarbonizing companies' carbon emissions, favoring the development of sustainable operations and businesses that fall into companies' Scope 1. The CSRD entered into force in January 2023 and the first reporting is expected for January 2025 based on the 2024 fiscal year.
The Waste Electrical and Electronic Equipment (WEEE) Directive in the European Union requires producers of electronic goods to finance the collection, treatment, and recycling of e-waste. In 2020, the EU collected approximately 4.5 million tonnes of e-waste, representing a collection rate of 45% of the total e-waste generated. This has forced electronics manufacturers to develop reverse logistics processes to handle the returns and recycling of their products, ultimately driving more sustainable practices within the industry.

We need more vertically-focused fintech for the mobility industry

Despite its importance, reverse logistics presents several challenges for companies. **Implementing effective reverse logistics processes requires navigating complex logistics networks, managing high costs, and ensuring the quality and safety of returned products.** Additionally, the lack of standardized processes and data management systems can hinder the efficiency of reverse logistics operations.

The challenges:

1. Complex Logistics Networks

Reverse logistics involves the movement of goods from the end-user back to the manufacturer or another point in the supply chain, which is often more complex than forward logistics. **Products may need to be collected from multiple locations, sorted, and transported to various facilities for inspection, refurbishment, or recycling.** This can be particularly challenging in industries with a large geographic footprint or high product variety. Software-based solutions help in orchestrating all these stakeholders.

2. High Costs

The costs associated with reverse logistics can be significant. Companies must invest in the infrastructure needed to collect, transport, and process returned goods. This includes the cost of transportation, labor, storage, and processing. **In some cases, the cost of reverse logistics may exceed the value recovered from the returned products**, making it difficult for companies to justify the investment. Accurate planning and routing, based on data, mitigate the cost-associated challenges.

3. Quality and Safety Concerns

Ensuring the quality and safety of returned products is another challenge in reverse logistics. Products that are refurbished or recycled must meet the same quality and safety standards as new products, which can be difficult to achieve, particularly with complex or high-tech products. Companies must implement rigorous inspection and testing processes to ensure that returned products are safe and meet customer expectations. **Shared view and transparency within an ecosystem about what the quality standards are is mandatory**, better alignment of all the stakeholders through information shared more simply, on a dedicated platform for the ecosystem, is part of the answer.

Technological innovations making reverse logistics software effective

Advancements in technology are playing a critical role in overcoming the challenges associated with reverse logistics. Software solutions are enabling companies to streamline their reverse logistics processes, optimize resource allocation, and gain visibility into the lifecycle of their products. These innovations are particularly evident in several segments within the mobility startup ecosystem.

The automotive industry, particularly the electric vehicle (EV) sector, faces significant challenges related to reverse logistics, especially concerning battery recycling. EV batteries contain valuable materials such as lithium, cobalt, and nickel, which can be recovered and reused. However, **collecting, transporting, and recycling these batteries is complex and requires robust reverse logistics processes.**

Startups such as London-based Circulor provide great products for developing sustainable supply chains, and circular business models. Circular offers a traceability solution that connects all supply chain actors from upstream to downstream to ensure complete, real-time visibility for better supply chain performance, carbon footprint tracking, and compliance with regulatory standards. Its core business is the metals and minerals used in batteries, renewable energy, and construction. **The startup leverages blockchain and AI to provide traceability data to build closed loops for recycling EV batteries**. Jaguar Land Rover and Volvo are among its customers.

The retail sector, particularly in e-commerce, has seen a significant increase in product returns, driven by the rise of online shopping. According to a report by the National Retail Federation, U.S. consumers returned approximately $428 billion in merchandise in 2020, **representing 10.6% of total retail sales**. Managing these returns effectively is crucial for reducing waste and improving profitability.

Software platforms like Rever are helping retailers optimize their reverse logistics processes. The primary objective of Rever's platform is to streamline the complex returns process for online stores. Given the significant costs involved, some fashion companies, including Inditex, have started charging customers for returns. The startup aims to integrate with online stores, initially providing alternatives to full economic reimbursements. It also offers instant payment to customers, eliminating the typical two-week waiting period common in the industry. In exchange for this service, Rever charges a commission.
In addition to facilitating alternative return options, **Rever's technology encompasses various features such as logistics order creation (integrating with different parcel companies), customs administration, data analysis, and purchase trend analysis.**

The fashion industry is one of the largest contributors to global waste, with millions of tons of clothing ending up in landfills each year. However, innovative startups are using

reverse logistics software to tackle this problem by managing the collection and recycling of textiles. **It's the "take-back-as-a-service".** Generally, the startups collect unwanted textiles, often surplus, damaged, and returned merchandise, from individual consumers and retailers. From there, the providers sort, categorize and assess the quality of those materials to determine if the life of the garment can be extended, usually in the form of reuse, resale, and, in fewer cases, textile-to-textile recycling.

Founded in 2022, US-based Supercircle works with more than 50 brand partners, including Parachute, J.Crew, and Reformation, as well as 30 recycling partners. Over the last 18 months, the company has diverted more than two million garments from landfills. SuperCircle helps brands launch and operate branded take-back programs through which customers can send in used apparel and earn rewards. SuperCircle also partners with brands to take in excess and damaged inventory. Brands send their used materials to SuperCircle's recycling facility in Las Vegas. From there, machines chop off any extraneous, non-textile features like buttons and zippers. Then, products are sorted based on their fiber type. Once enough material of a certain kind has been collected, the textiles are sent to one of SuperCircle's 30 recycling partners. Each item is tracked, so retailers know where their garments wind up. Brands also get access to real-time data about the performance and environmental impact of their individual take-back program.

The construction industry generates a significant amount of waste, much of which could be recycled or reused. However, managing the deconstruction of buildings and the retrieval of materials is a complex process that requires effective reverse logistics.

Netherlands-based GeoFluxus is a unique platform that maps, analyses, and forecasts where, how, and which materials can be saved from becoming waste. The startup's goal is to get rid of the concept of waste altogether. **GeoFluxus provides support to companies to become more sustainable and facilitates the transition to a circular economy by managing companies' usage and disposal of resources.** The analytical insights and surfaced alternative processors support the decision-making regarding supply chain sourcing and management.

The opportunity

The momentum behind reverse logistics in the circular economy is growing, driven by the convergence of regulatory compliance, sustainability reporting, and technological maturity. Companies are under increasing pressure to reduce waste and enhance their sustainability efforts, making reverse logistics not just a regulatory requirement but also a strategic imperative.

As the circular economy gains traction, companies are discovering new revenue streams through reverse logistics. By recovering and reusing products and materials, companies can reduce costs, create new products, and tap into new markets. For

example, the global market for refurbished electronics is expected to reach $44.1 billion by 2027, driven by the increasing demand for sustainable and affordable products.

To capture value in a booming market, we think successful software-enabled reverse logistics products will have the following:

- **Strong partnerships and collaboration:** aligning the interests of various economic agents, including manufacturers, retailers, logistics providers, recyclers, and consumers. Building strong partnerships based on shared sustainability goals is crucial.
- **Interoperability, tracking, and standardization:** ensuring that systems can easily exchange data, advanced asset tracking leveraging top-notch technologies, and communicating in real-time, regardless of the technology stack used by different participants. Standards should cover everything from data formats and labeling to handling procedures and quality checks.
- **Automation and efficiency:** Leveraging automation to streamline reverse logistics processes, such as sorting, processing, and inventory management, is key to scaling operations. Automated systems can help in quickly identifying the best disposition path for returned goods, whether it be refurbishment, recycling, or disposal.
- **Sustainability Metrics:** establishing clear sustainability metrics and reporting mechanisms to track and communicate the environmental impact of reverse logistics activities can help build trust with stakeholders and consumers. This includes tracking the reduction of carbon emissions, material recovery rates, and waste diversion.

Contact us:

vcabanel@via-id.com

Vincent Cabanel

Written by Vincent CABANEL
Associate at Via ID

Discover our website:

www.via-id.com

Follow us on social networks!