Climate Innovation Insights
Accelerating the transition to sustainable production systems

RECYCL3R
increasing packaging recycling with the use of digital passports

Key messages

- EIT Climate-KIC start-up recycl3R has developed a consumer application that provides information on packaging to enable more and better recycling.

- The exchange of data between different organisations can enhance recycling rates. However, the data currently collected is often inaccurate and in varying formats, making comparison difficult.

- Digitalisation can support circular business models by producing increasingly accurate data of different kinds. Recycl3R's app generates real-time consumer data, which is invaluable to consumer-facing businesses.

- Digital innovations alone cannot transform our linear production and consumption system; they need to be supported by other system elements (e.g. policy, standards).

Introduction

Better recycling of products and materials is a crucial step towards building a circular economy, as it can boost the availability and quality of waste streams recovered (1). The circular economy refers to a restorative economic model, which seeks to extend the life of products, components and materials by keeping these in use within the economy for as long as possible. Circular strategies include, but are not limited to: eco-design, re-use, repair, refurbishment, remanufacturing, product-service systems and recycling. High-quality recycling has direct climate benefits through its reduction of both the de-

mand for virgin resources and the energy involved in producing them. Recycling one tonne of plastic, for example, saves up to three tonnes of CO_2 equivalent compared with producing the same amount from fossil fuel-derived feedstock (2), while using recycled aluminium to manufacture a drinks can saves 95% of the energy used to make one from primary aluminium (3).

Recycling rates are improving across Europe, but they vary from country to country (4). Around 67% of packaging waste in the EU is recorded as being recycled (5), but this figure must climb to 70% by 2030 in order to fall in line with the European Commission's Directive on Packaging Waste (6). The remaining 30% gap provides an additional opportunity for CO_2 emission reduction and materials savings.

Informed consumers play a key role in enhancing recycling rates. Often waste reaching recycling companies' premises is diverted to landfill simply because it was placed in the wrong bin – and the cost of sorting is too high. Digitalisation has a key role to play in this context, enabling greater consumer engagement with circular economy models (7) by making recycling easier through the provision of clearer information.

Recycl3R is a start-up based in Mallorca, Spain. Its mission is to help people recycle more by improving and increasing the recycling information available to them. Working with CPG brand owners and retailers, Recycl3R gathers information about the recyclability of product packaging. Working with municipal authorities, it aggregates information about waste collection points. Through the use of a mobile or web-based app, the consumer scans a unique identifier displayed on the shopping receipt or the product packaging – either a barcode, a QR code or a 'Smart Tag' (functional electronic labels used in packaging) – which creates a 'digital passport' for the packaging materials. Information is provided to the consumer on how to recycle the packaging as well as the location of their nearest recycling facility. Rewards are given (e.g. supermarket loyalty points, donations to charity) when the consumer sorts and disposes of their waste correctly (see Figure 1).
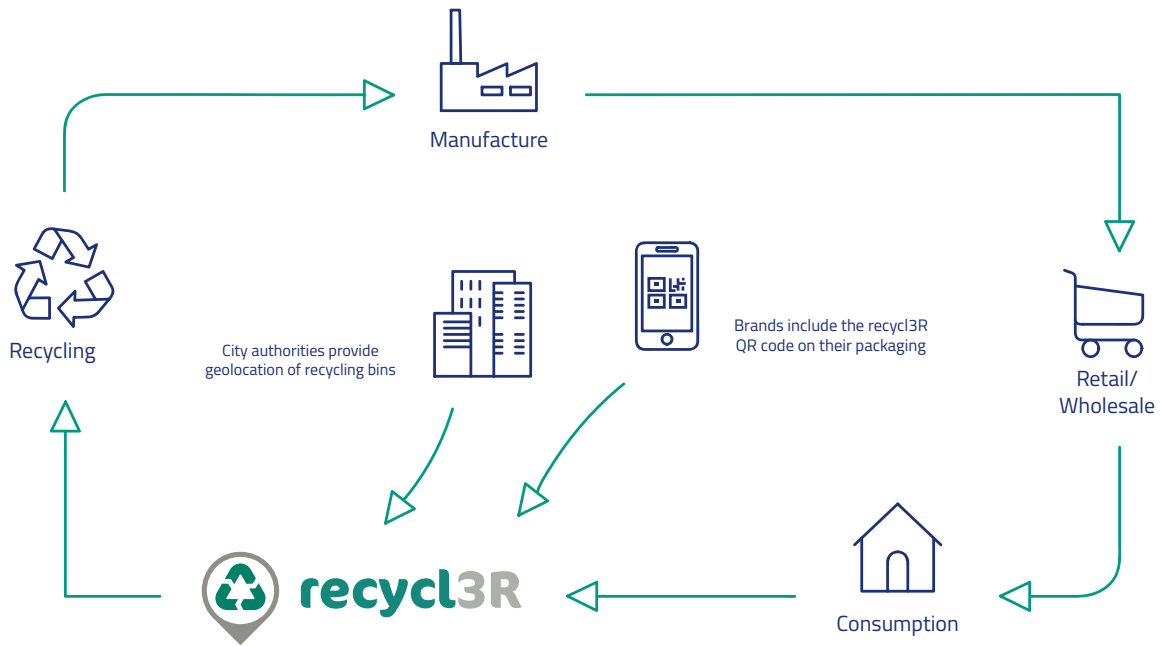
Figure 1: overview of how recycl3R's digital service intervenes in existing production and consumption systems to increase recycling

Recycl3R's business model

The idea for the start-up was born from public consultation work carried out by recycl3R's parent organisation, an environmental consultancy called Lmental, in 2011. "We spoke to people about environmental issues and all of them were asking for more recycling information to help them," says Iván González, recycl3R's CEO.

This led to the development of a web-based business-to-consumer (B2C) service, Dondelotiro.com ("where do I throw it"), which advises consumers where to dispose of their recycling waste. This B2C service was originally developed to test the market and validate key assumptions regarding consumer needs. Despite a marketing budget of zero, the site gains 10,000 new users a month and is supported by over 150 public and private entities who publish their data on this platform. Dondelotiro.com provides valuable data for the recycl3R business-to-business (B2B) service.

"We realised we needed to create a business model from it," says González. "We talked to retailers, brands and companies ... and discovered that there was interest for such a service in the consumer goods industry, as it can provide valuable information on consumer behaviour, in addition to recycling." Recycl3R was subsequently launched in 2016 and joined Climate-KIC's Spanish accelerator programme in 2017.

Recycl3R charges business an annual fee for the use of recycl3R's platform of recycling information and rewards plus a variable fee depending on how often users interact with the service offered through the app. The app can be customised with the client's own branding. The main benefits for recy-

cl3R's clients are threefold: their green credentials are boosted; they open a new channel of communication with their customers; and they gain access to a new and valuable source of business intelligence based on the data collected by the app. The latter has become an unexpected source of value for this start-up and it is driving corporate interest in recycl3R's business model. Currently, large retailers tend to rely on consumer panels to understand how their products are used at home – a time-consuming and broad-brush approach. Recycl3R's platform provides real-time information on consumer behaviour, along with profile information – such as age and household size, about the consumers themselves – all of which is invaluable to retailers.

In 2019, recycl3R conducted a pilot in five supermarkets in two Spanish cities in partnership with Carrefour Spain, where customers can try out the app on tens of thousands of products. In the UK, recycl3R worked with Unilever on an internal pilot, connecting with an app developed by the company to recycl3R's service (8)

System Conditions

With climate change requiring urgent and concerted action, there is a need to reconfigure and transform our economies and societies. Revolutionary digital technologies alone will not live up to the mark as they are not guaranteed access to market; it is often the surrounding environment that proves decisive on whether an innovation will flourish or perish. This is because the innovation is a part of a wider system and influenced by key system elements, such as: Policy, Skills, Behaviour, Market Structures, Information Flows, Organisational Governance and Finance. Innovation needs to happen on all these fronts ('systems innovation') in order to achieve substantial system transformation.

Recycl3R: Enablers

Organisational Governance
Building both a pan-European network and working with local partners has been necessary in order to bring recycl3R's innovation to life. Participating in EU research projects has been a key mechanism in the development of wider networks. Early on, recycl3R applied to join TagItSmart, an EU-funded research project that aims to use IoT technology to create a digital ecosystem of products and materials based on Smart Tags. Through TagItSmart, recycl3R met Evrythng, a company that has built a platform for connecting smart objects, which recycl3R subsequently incorporated into its service. And it was through TagItSmart that recycl3R first made contact with Unilever and, in turn, Carrefour. "Without TagItSmart this would have been impossible," says González. Today recycl3R sits at the hub of an ecosystem of actors, all seeking to increase resource productivity and benefiting from generating value collectively.

Recycl3R: Challenges

Market Structure
The biggest challenge faced by recycl3R early in their journey was getting a foothold in the retail market. As González points out, for a small start-up to contact and partner with a large retailer is much more complicated than simply picking up the phone. González credits joining TagItSmart and accelerator programmes with kick-starting the process of finding early adopters with whom to collaborate.

Initially, recycl3R took a broad approach to penetrating the consumer goods market – until their mentor in Climate-KIC's Spanish accelerator programme suggested that recycl3R narrow its focus by choosing a beachhead market (9). Following this advice, in 2017 the team built its first app for a small, local soft drinks company in Mallorca. Building this first iteration took a year, after which the start-up had a product it could demonstrate to bigger potential clients – such as current partner Carrefour Spain – allowing the company to successfully enter adjacent markets.

Information Flows
Pulling together packaging information from various public and private sources is an ongoing and significant challenge. There is a lack of standardisation of these information flows; the various actors in this value chain use different systems, different languages and even different concepts for the same things. This also slows down recycl3R's expansion, as the standardisation of information flows across new geographies would require significant investment.

Understanding and integrating the information for a single product – a soft drink can, for example – is straightforward enough. But in the case of a complex retailer, such as a large
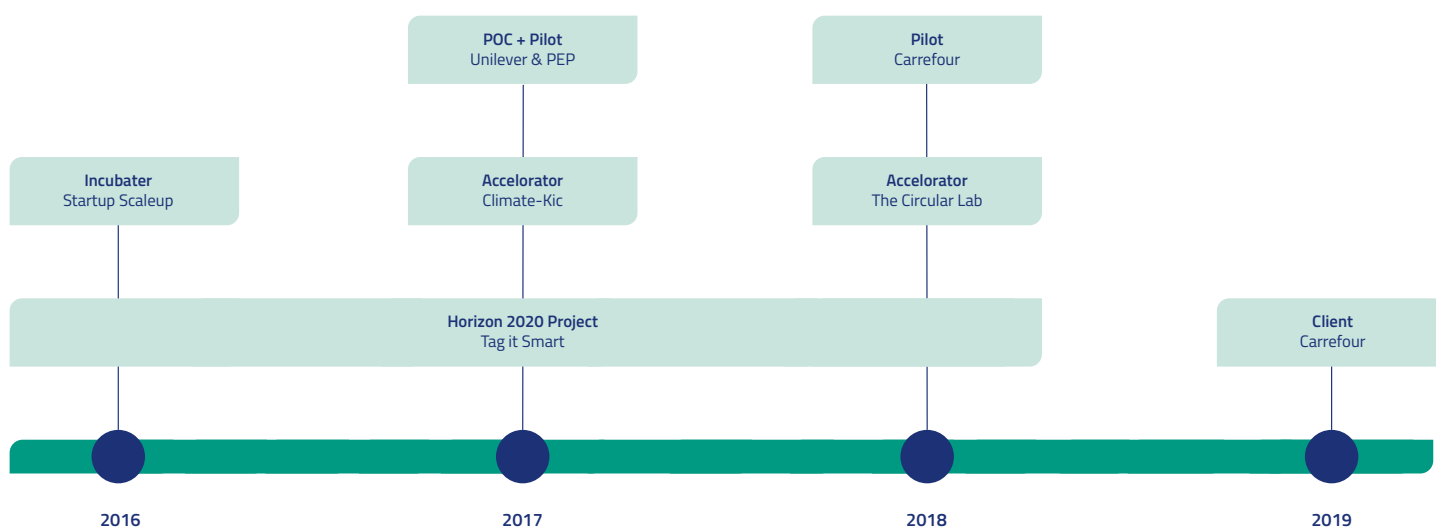

Figure 2: Recycl3R's Roadmap to Commercialisation

supermarket chain, it is very difficult to collect and standardise the recycling information for its entire portfolio of own products, let alone the other brands on its shelves.

In order to facilitate expansion, in 2019 recycl3R is seeking €250,000 in external investment – a necessary capital injection following a lean commercialisation process based on founder's capital, funding through TagItSmart and a €25,000 investment from the accelerators it participated in.

Conclusion and lessons learnt

Changing consumer behaviour is critical to accelerating the transition to a circular economy and digital technologies can play a big part in enabling this. Recycl3R's applications provide consumers with the information they need to recycle more packaging and incentives to encourage them to do so.

Central to their success has been the development of strategic partnerships through participation in EU research projects and acceleration programmes. Key observations from their experience thus far are:

▪ **Regulators and corporates can do more to encourage standardised information flows.** There is both value and

climate impact to be realised in standardising the way information about packaging, recycling and waste collection is organised and presented. National and European policymakers can encourage greater homogenisation of municipal recycling systems and information. Pressure – both upwards from consumers and downwards from national and supranational bodies – can be a useful lever in making this happen.

▪ **Digitalisation supports the creation of new data – and data is valuable** Initially, recycl3R believed the value it offered clients was through better green branding and consumer engagement. It later turned out that the data on consumer behaviour generated by the app attracted corporate interest in recycl3R's business model, and also drives retailers to invest in collating information on their packaging.

▪ **Partnerships can solve problems that are insurmountable for individual smaller players.** Start-ups should take every opportunity to explore and leverage connections, both to build credibility and open the door to collaborating with the big market players who can make a significant impact.

Scaling up the roll-out of digital passports on products and packaging has the potential to facilitate greater re-circulation of material flows, retaining value within our economies and contributing to substantial reductions in climate impact.

Endnotes:
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