



## **Case study report – Bicloo**

*Good practice of circular economy business models*

# Case study report – Bicloo Upcycling

## *Good practice of circular economy business models*

**As part of the TRANSFORM-CE project, several case studies are done to benchmark existing circular economy business models. This document covers the results of the case study conducted at Bicloo Upcycling, based in Belgium. A total of 20 case studies will be done, with five cases per country (The Netherlands, Germany, Belgium and the United Kingdom).**

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## 1. Introduction and method

### 1.1 Goal of case study

TRANSFORM-CE is an international research project which researches amongst others (successful applications of) circular business models, barriers, enablers and needs for circularity, and offers in-depth support for the uptake of recycled feedstock by businesses. A core part of the project is to provide advice to businesses on their way to transition towards a circular economy (CE).

In order to help businesses with developing circular business models (CBM's), it is first important to benchmark existing CBM's of companies. This is done by conducting case study projects with 20 selected businesses throughout North-West Europe. The aim is to provide participating businesses with an in-depth analysis of their current situation and business model, to identify opportunities and provide recommendations for facilitating the transition towards a CBM for these and other companies. The case studies also present a unique opportunity to study barriers, enablers and needs for circularity (and recycling) in more detail.

### 1.2 Company background

Bicloo (from "biclou", a French familiar word for bicycle) germinated at the end of 2019, during a professional break of its founder Valentin De Rodder. With his experience in the world of cycling, Valentin identified a problem as well as a strategy to exploit: the massive incineration of used inner tubes. Wanting to make his job more meaningful and to work towards a greener world, he explored the possibility of reusing these inner tubes, no longer as waste but as a raw material. Joining his forces with the SSE workshop Les Érables for their expertise in clothing and with his friend Maxime for the commercial and accounting aspects and stock management, he tested the material sufficiently to give it a new functional life, in the shape of non-leather leathersgoods (wallets, fanny packs, computer covers), with the return to the world of cycling in mind (saddle bags, wheel covers, etc.).

**Table 1:** Overview of company

Topic	Information
Company name	Bicloo Upcycling
Website	<a href="https://bicloo.com/">https://bicloo.com/</a>
Country	Belgium
Size of company (0-10, 10-200, 200-500, 500+ employees)	0-10
Mission/vision	"I can't believe this will end in incineration whereas it can be remanufactured, sold and used in the same activity field"
Product category	Rubber
Production/operational process	Cutting, cleaning, sewing
Used materials	Bicycle inner tubes, tires

### 1.3 Case study process

The case studies are being carried out between September 2020 and December 2022. The case study process is structured in four steps<sup>1</sup>, with an iterative approach at the end of each step. The first step (circularity of the business model) aims at creating a general overview of the company, the context and its (circular) business model, to capture how the company creates and delivers value. The second step (circularity in the value chain) involves a circularity assessment of the company and its activities in the value chain. The third step (circularity of operational activities) is focussed on the circularity of the company's operational activities. The last step involves a wrap-up of the results and concludes with the case company's strengths regarding circularity, an overview of the barriers and enablers for circularity, and opportunities for further enabling circularity. The final result is a case study description, covering the previously established information.

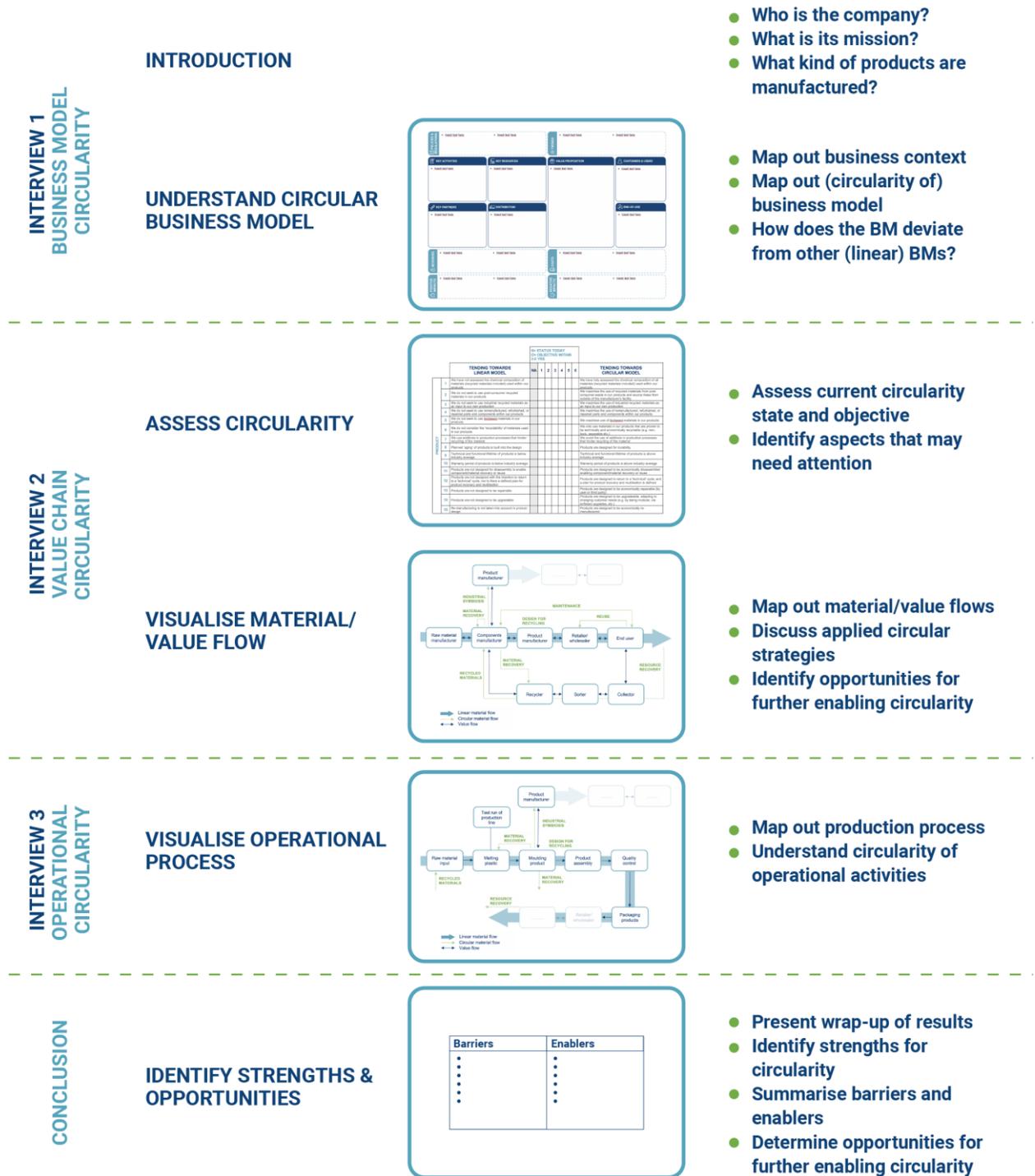
An overview of the case study analysis process is shown in figure 1 on the next page. In order to obtain the results, each of the three steps is divided into four sub steps: 1) desk research and preparation; 2) interview; 3) reporting results; 4) iteration of results. More information about the process and the steps needed for receiving the results can be found in a separate document ('case study methodology') explaining the case study process in more detail. Table 2 gives an overview of the interviewed persons for Bicloo.

**Table 2:** Overview of interviewed people

	Interviewed person	Function
Interview 1: Circularity of business model	Valentin De Rodder	CEO
Interview 2: Circularity in the value chain	Valentin De Rodder	CEO
Interview 3: Circularity of operational activities	Patricia Vion	Production Officier ("Les Érables")

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<sup>1</sup> We make grateful use of insights and methods derived from previous research, in particular the case study method of R2π (2017, 2019), the work of Circulab (2020) and the Ellen MacArthur Foundation (2017, 2019). TRANSFORM-CE case studies' methodology and templates were developed by TRANSFORM-CE partner Hogeschool Utrecht (NL).



**Figure 1:** Overview of case study process

## 2. Circularity of business model

The first step aims at creating an overview of the company's business model and the context in which it operates, to capture how the company creates and delivers value (for circularity).

The circularity of the business model is investigated by using a circular business model canvas (CBMC). This model is created for the purpose of this study and shows how the company creates, delivers and captures value, highlighting circularity aspects of the business. The CBMC of Bicloo is displayed in figure 2 and a description of each element is given below.

### Circular Business Model Bicloo Upcycling



**Figure 2:** CBMC of Bicloo

### Value proposition

In addition to making a green initiative sustainable by diverting a usable product from incineration and turning it from a waste product into a functional object (hence the name Upcycling), Bicloo insists on working locally. All the inner tubes recovered, as well as the additional parts of the product (inner fabric, zips, etc.) and the objects produced from them are Belgian - the idea in the

future is even to use as much as possible recycled products for other parts of the final product (lining). In addition, the customers for these products are concentrated in the Benelux and France. Finally, by using Les Érables, Bicloo adds social value to its activity by highlighting the role of adapted work companies.

The name of the products itself is meant to inform the customer about the amount of material that is diverted from its incineration fate: a Bicloo 48 contains 48 g of used inner tube, whatever you store in it (figure 3).



**Figure 3:** A Bicloo 48 can be used for protecting a smartphone or glasses

Bicloo also explored the possibility to make custom-made items, for example for the computer covers, but also for the aesthetic aspect, like customizing the product by laser etching. The material reacts very well to that technology, so it can be cut or engraved so.

In the long term, Bicloo would like to concentrate on the fabric, which can be manufactured in metres and therefore sold in industrial rolls that could be used for other applications like furniture, primary packaging, shock absorbent layers...

### **Customers & users**

Customers can be anyone, Belgian, French, Dutch or Luxembourgish, who wants to buy a bag, pannier, cover, etc. stamped "recycled" and "Belgian". However, in order to close the loop, the targeted audience is more specifically cyclists. The products are therefore available in a network of 100 bicycle shops and soon more thanks to new partnerships with distributors in France and The Netherlands. The intermediate product (panel of tubes sewn together) may also be sold to any designer or manufacturer willing to use it as a raw material.



**Figure 4:** Examples of Bicloo's products, with its founder Valentin De Rodder (wallets, cloth, pencil cases, computer covers, saddle bags ...)

### Key activities

First activity for Bicloo is to create a sufficient stock of raw materials to launch the remanufacturing activity, by collecting used inner tubes. For the time being, the resource is being collected from bicycle shops that offer a repair service to private individuals and that consequently collect a large quantity of inner tubes, or from interested individuals. Negotiations are ongoing with Ipalle, the intermunicipal waste management company of the Walloon-Picardy region, to provide a place in recyparks for self-deposit of used inner tubes by individuals.

The inner tubes are then taken to Les Érables workshop, where they are opened by cutting (figure 5 - left), cleaned in a washing machine, and sewn side by side to make a "fabric", which constitutes a new raw material (figure 5 - right). From this raw material, the various patterns for the sewn items are cut out, to which are added zips, black-yellow-red ribbons (for Belgian flag), lining fabrics, etc. Whenever possible, the items are dropped off in person at retailers, either by bicycle, public transport or van (especially for trade fairs that require staying for several days). When the customer is too far away, Bicloo uses traditional delivery services.



**Figure 5:** Left: opened inner tubes; Right: cloth manufactured by sewing opened inner tubes next to each other

### Key resources

Bicloo's activity focuses on recycling inner tubes. However, because of its slightly different properties and because it is also a waste product from the same field, used bicycle tyres are also a potential resource (figure 6). Several trials have already been conducted on composite objects, containing both inner tubes and tyres, where the stronger structure of tyres can give stand-alone properties to big items such as bags.



**Figure 6:** Other recycled resources are bike tyres, while inner tube gives flexibility, tyres are more rigid

Human and material resources for the transformation of materials are provided by the workshop Les Érables, as well as the expertise in manufacturing. Up to four sewing machines and twelve persons are dedicated to Bicloo production depending on the order book.

### **Key partners**

The entire database of bicycle shops known to the founder of Bicloo provides both customers (about a hundred in the Benelux) and suppliers (about 30), making them important partners.

On the other hand, the SSE workshop Les Érables is the key collaborator in maintaining Bicloo's activity, as they are at the centre of production.

### **Distribution**

As already mentioned, products distribution is mainly led by bicycle, by train or by van. More than just a passion for cycling, Bicloo's heart truly beats for a more sustainable world. It is only for distant customers (e.g. the south of France) that distribution is then carried out by the traditional delivery services.

Products are sold in a network of 100 retailers but also directly by Bicloo in fairs or through its website. Sales display furniture are made from recycled pallets.

### **End-of-use**

Bicloo is too young to have a strong certitude about the lifetime of its products, however, for the time being, customers are generally very satisfied with their durability. Design could evolve if durability issues were observed.

It is known however that, like for any leathersgoods product, a regular lubrication of the product is required to extend its life, and that direct exposure to UV and wet-dry cycles should be limited (though the products are washable and rather water resistant).

When further recycling would have to be considered at end-of-life, it is expected that difficulties may arise due to the complexity of the products, that include not only the inner tube material but also zips, fabric, tyre parts in some cases etc.

### **Costs & revenues**

*"I would like to have a salary"*

- *Valentin De Rodder, CEO of Bicloo*

This is a sentence that characterises Bicloo, which, for the moment, earns just enough to continue investing in its project, or in other words, sells just enough to produce. The business does not receive any subsidies so far and is supported by the investments of the two associates. Several functions could be carried out by other employees, but the business is not yet sustainable enough to hire. That is why, in the meantime, Valentin and Maxime play several hats roles and share the work of communication, accounting, customer research, production supervisor, etc., while Patricia Vion, forewoman of Les Érables clothing department, manages production on site. The elaboration of the website was made possible by the work of students.

## **Policies & regulations**

Producing leathersgoods that are not made of leather and using waste as a raw material make Bicloo ride in grey areas, where regulations are rather vague and difficult to understand. The low volumes concerned so far by a starting activity make that Bicloo is not held back by these considerations yet, but legal aspects will have to be tackled soon with expected growth.

It is clear that policies that would lower the price of end-products, like lower (or 0%) VAT for products made of secondary raw material would help to develop the market.

## **Trends**

Although there is a growing interest in sustainability, inner tubes are still an unsightly product that is generally associated with dirt. This is because the original product, even if it is not in direct contact with the ground, is usually changed in an outdoor environment, unprotected and subject to dirt from the ground, bike, tyre or wheel. Therefore, the public sometimes still needs to be convinced, especially since production costs for small series make the price of these upcycling products rather high and lead some potential customers to wonder:

*“50 € for a waste product???”*

- *Anonymous*

And yet, paradoxically, objects made from inner tubes with appearing patches on are more successful.

## **Positive and negative impacts**

Bicloo's project is in itself a compendium of positive impacts. It speaks in favour of sustainability, it adds value to a product derived from waste, it links local actors, it promotes the employment of people who are sometimes marginalised and does everything possible to reduce its carbon footprint.

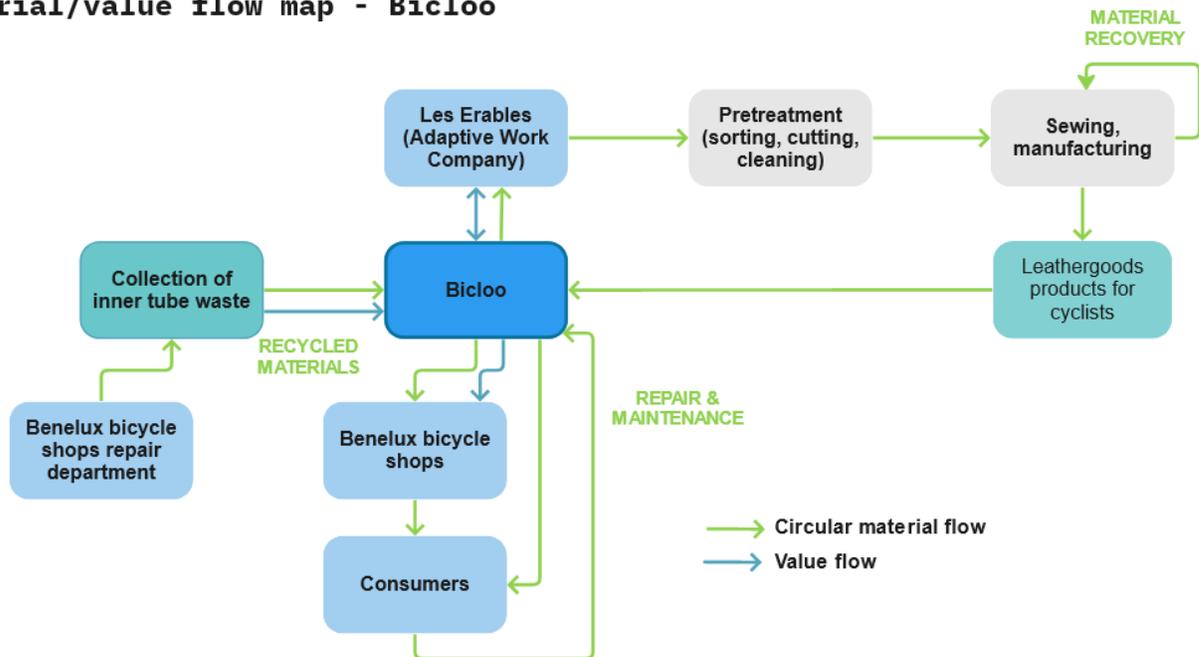
### 3. Circularity in the value chain

After analysing the company's current (circular) business model, a more detailed circularity assessment of the company and its activities in the value chain is made. The material and value flow map is presented, together with its adopted circular strategies.

#### 3.1 Material and value flow map

The ultimate goal of a CE is for resources to flow in circles, with limited leakage out of the system. To evaluate this, it is important to map and visualise the current flow of materials and value within the company's value chain. The material and value flow map of Bicloo is presented in figure 7. The value flows (blue) indicate that value is being exchanged between actors and enables an analysis of the relationships amongst key partners. The circular material flows (green) show where the material comes from, where it goes and how it may return into the cycle.

#### Material/value flow map - Bicloo



**Figure 7:** Material/value flow map of Bicloo

#### 3.2 Circular strategies

As shown in figure 7, the main circular strategy Bicloo applies is use of *recycled materials* for production, but it also implements *material recovery* of their own waste form pattern cuttings used for object with smaller pieces.

#### Recycled materials

The whole point of Bicloo is to divert reusable material flows, in this case inner tubes, from their usual incineration fate. Indeed, it seemed inconceivable to the founder that a useful material

would end up being burnt. It turned out that the used inner tube was indeed ultimately reusable, for a purpose different from the initial application: a fabric used to make false leather goods. Two ranges of recycled products are available: a semi-finished product as the inner tube fabric and finished leathersgoods articles. The latter are intended to serve as a demonstrator, a proof of concept of the merits of remanufacturing inner tubes.

### **Material recovery**

The inner tube fabric is at max 1.8 m wide (the standard perimeter of bicycle inner tubes) by an indeterminate length (depending on the number of tubes sewn in). For small objects, such as wallets or certain saddlebags, a large inner tube is sufficient for the pattern and the offcuts of these go into the trash. For larger objects, the inner tube fabric, which is both an intermediate product and a new resource, is re-cut. When the offcuts can be reused for smaller objects, they are reintroduced into the production line to minimise waste.

### **Repair and maintenance**

Bicloo offers a program of repair for its products. Considering the low-tech construction of the products, it is fairly easy to repair any part that is broken. Any product broken or with malfunction is brought back to Les Erables to be repaired for free. The customers only pay for the return and then get the product repaired for free.

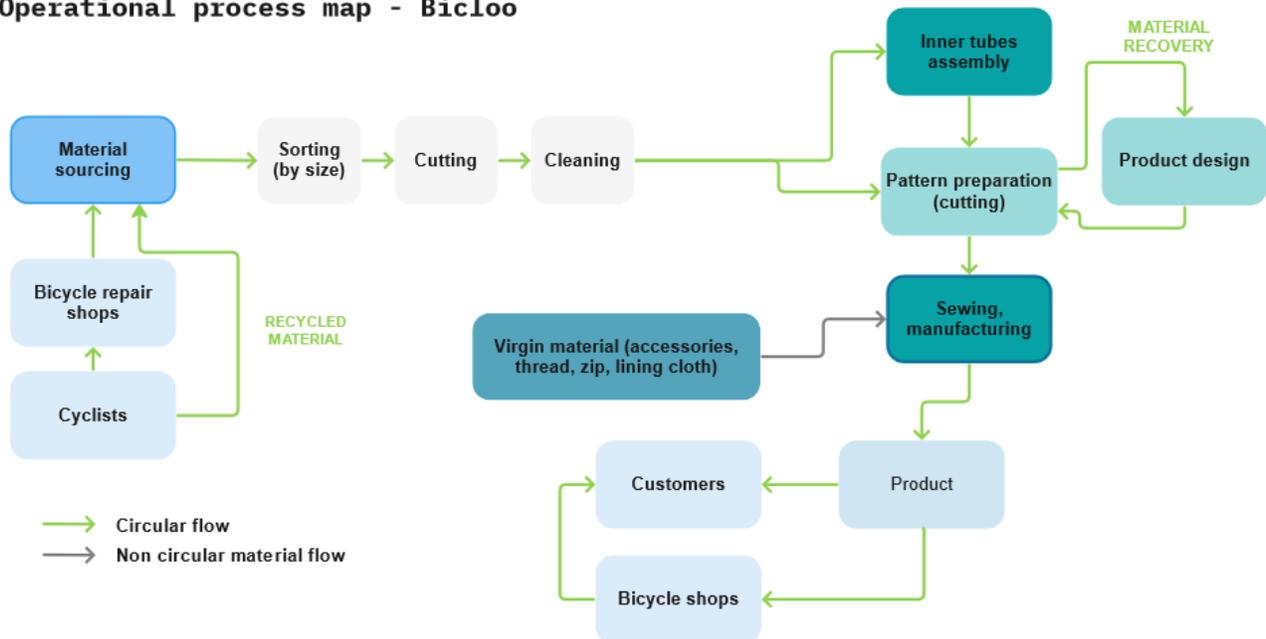
## 4. Circularity of operational activities

After assessing the circularity of the company's activities within its value chain, a more detailed assessment of the circularity of the company's operational activities is done. A visualisation of the operational process is presented, together with its adopted circular strategies.

### 4.1 Operational process map

To get a better understanding of how the company's operational activities are affected, an overview of the process is made, see figure 8. This includes circular sourcing of materials and pre-treatment, the first then the second production process and finally sale of products. Each of the steps will be further explained below.

**Operational process map - Bicloo**



**Figure 8:** Operational process map of Bicloo

### 4.2 Circular sourcing and pre-treatment

The main process of Bicloo begins in material sourcing and pre-treatment like sorting, cutting and cleaning.

#### Material sourcing

The used inner tubes are collected in bicycle stores. When a private individual encounters a problem with an inner tube (puncture), he can either change it himself, if he has the skill and a new inner tube, or he can go, with his bike, to a bicycle store that both sells new inner tubes and also offers the replacement service. It is therefore mainly in the repair units of bicycle stores that the stock of punctured inner tubes is built up.

For those who are self-sufficient in this, they have the option of either giving back their damaged inner tube to the bike shop when buying a new one, but in many cases damaged tubes are thrown

away in the "all waste" container in the recypark. This is the reason why, in addition to the bicycle stores Bicloo started discussions with the waste management organisation Ipalle to place a container exclusively reserved for damaged inner tubes in their recyparks. This action has not yet been implemented since the already collected stock of inner tubes is sufficient for the current market size. Therefore, this initiative is currently on stand-by and can be resumed when Bicloo has grown.

### **Sorting**

Once collected, the raw material can be deposited at the production site, Les Érables, to be transformed. There, the resource is inspected. Only very worn-out inner tubes (bleached, cracked, etc.) are put aside and do not enter the production. They are then returned to their original destination: the incinerator. This represents a very low percentage of the total volume (+/- 2%). Within the compliant inner tubes, a sorting is made according to their size (length and width).

### **Cutting**

To be worked on, the tubes must be flat and therefore open at one end and on the side, then unfolded. The pipette part is removed, minor punctures may be repaired with a patch.

### **Cleaning**

Once opened, the inner tubes go through a final pre-treatment stage: machine washing. The detergent used is made in Belgium by the company LaverVert, which claims sustainability and circularity itself in its business model and products.

## **4.3 Recycled raw material production**

After preparation of the inner tubes, everything is ready to transform it into a recycled cloth.

### **Inner tubes assembly**

This is the intermediate stage of transformation of the material. For small objects, whose material surface fits into that of a single inner tube, this step is not necessary. On the other hand, for larger objects, it is essential. All tubes of equivalent size are sewn together, side by side (figure 5, right). Thus, the fabric has a width equivalent to the perimeter of an inner tube (up to 1.80 m) and a virtually infinite length. This cloth is used for the manufacture of leather goods, however Bicloo aims at focusing its business model to the sale of this intermediate product in large rolls to other finished products manufacturers rather than to the production of leathergoods.

## **4.4 Designed product manufacturing**

The last part of the operational process consists of using this inner tube cloth as a new raw material, from which new products will be manufactured by sewing, before being sold to Bicloo customers.

### **Pattern cutting**

As mentioned previously, if the surface allows it, the inner tubes are directly cut (figure 9) to match the pattern of an object (e.g. saddle bag or wallet). For larger objects (computer cases, pencil cases and other bags), the patterns are cut directly from the inner tube fabric. All scraps that are large enough to accommodate the pattern of other objects are kept for this purpose. All those that cannot be recycled end up as waste.



**Figure 9:** Saddle bag pattern cut in one inner tube.

### **Sewing of final product**

For tailoring, a nylon lining is added. Thus, the transported articles are not in direct contact with the inner tube and the latter is not in contact with itself inside, which avoids potential self-adhesion of rubber surfaces. The nylon fabric (figure 10) is produced in Belgium and stamped with Bicloo logo. Zippers and other other accessories are also produced in Belgium.



## 5. Conclusion and recommendations

Based on the outputs derived from all three interviews with Bicloo, strengths of the business model and operational process in regard to circularity are identified, barriers and enablers for circularity are summarised, and opportunities for circularity are described.

### 5.1 Strengths for circularity

The major strength of the model of Bicloo may be the genuine will of its founders to make a difference by diverting material that is considered as a useless waste from incineration and offering it a second use life. They are very enthusiastic about their products and proud to have reached one ton of tube recycled in 2022 even if the first product was only sold for Christmas 2020.

One main asset is also the fact that Bicloo addresses a world its founder knows very well, with a background in sales in the field of cycling. Having a strong network of cycle shops and knowing the needs of the end-users was big help to start developing the business for resource collection, retailing network establishment, and designing products for a specific audience.

Though no business has really started yet for the intermediate product, the fact that Bicloo also aims at commercializing the cloth itself as an intermediate product for other manufacturers could also be a big opportunity to develop and consolidate the business model.

Finally, the products of Bicloo are designed to have a possible long use life, and good information about the maintenance of products is provided to the customers through the website.

### 5.2 Barriers and enablers for circularity

To ensure circularity for Bicloo and its value chain, several barriers and enablers can be pointed out. The biggest barriers are the lack of clear regulations and of financial help for the people who begin in recycling. Working on waste needs substantial implication, especially financially. Of course, it is the same for every start-up, but dealing with recycled products requires usually more process steps, especially in the sorting or cleaning part. It is therefore easier for big companies, that work mainly with virgin material to include a part of circularity than to begin right away with waste. Furthermore, laws are really vague for the beginner, who neither knows where to put the limits of his activity nor whether he can be rewarded financially for the service he renders. As far as enablers are concerned, in the case of Bicloo, the advantage is a good knowledge of the bicycle world as well as the focus on mainly one waste, that can be easily put aside. Properties of the raw material do not change much or can be used for multiple purpose thanks to the expertise in biking of its founder. The loop is nearly closed as the source and the target are both the bicycle world. Other barriers and enablers have been mentioned and explained before and are summarised in table 3 below.

**Table 3: Barriers and enablers for enabling circularity at Bicloo**

Barriers	Enablers
<ul style="list-style-type: none"> <li>• Reluctance of customers for a “dirty” or waste product, especially with the selling price</li> <li>• Regulations that are too vague (e.g. is Bicloo a recycler or a producer of false leather goods?)</li> <li>• Lack of subsidies for this kind of public interest activity</li> <li>• Production costs</li> <li>• Lack of reliable information about the material's property apart from experimentations</li> </ul>	<ul style="list-style-type: none"> <li>• Increase of global ecological consciousness</li> <li>• Tendencies for the reuse (patched inner tube more appealing)</li> <li>• One kind of raw material (same range of properties, easier sorting)</li> <li>• Inexhaustible source</li> <li>• Low-cost raw material</li> <li>• Collaboration with SSE workshop Les Érables</li> <li>• Material with good properties</li> <li>• Wide range of final products</li> <li>• Machine washable products</li> <li>• Possible lubrication to enhance durability</li> </ul>

### 5.3 Opportunities for circularity

Because the products of Bicloo have not been around for that long, there are still some opportunities to enhance circularity by Bicloo and the company's activities within the value chain. Bicloo also recognises this and means to work on further researching, discovering and testing options for circularity.

#### Recycled material

Though the main part of final products is made of a recycled material, other parts like the inner nylon lining or the zippers are not. Though it may be difficult to obtain constant sources of recycled material for the zippers, there could be a simpler opportunity to have the textile components issued from circular sources, and this is maybe where investigations towards more circularity could be considered. Maybe discarded cycling jerseys could be used as inner lining material?

#### Product take-back and resource recovery

Once Bicloo will be financially sustainable, it will be time to think about how to upgrade the finished products. Indeed, it is too early to assess the durability of false leather goods made from inner tubes. Once these data are available, developing a system for recovering used objects is possible. However, given their complexity, a dismantling system (unsewing) should be designed to recover the potentially reusable components. A reflection on an adapted design can also take place, in order to imagine products whose parts can be easily replaced or disassembled for recovery.

## References

- Circulab. (2020). *Circular Canvas: The tool to design regenerative business models*. Retrieved from: <https://circulab.com/toolbox-circular-economy/circular-canvas-regenerative-business-models/>
- Ellen MacArthur Foundation. (2017). *The circular economy in detail*. Retrieved from: <https://www.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail>
- Ellen MacArthur Foundation. (2019). *Circulytics – measuring circularity*. Retrieved from: <https://www.ellenmacarthurfoundation.org/resources/apply/circulytics-measuring-circularity>
- R2π. (2017). *Circular Economy Business Model Case Studies: Introduction and Methodology*. Retrieved from [http://www.r2piproject.eu/wp-content/uploads/2018/08/R2Pi-D3-35775-63432.2a-Case-Study-Methodology\\_v1.0.pdf](http://www.r2piproject.eu/wp-content/uploads/2018/08/R2Pi-D3-35775-63432.2a-Case-Study-Methodology_v1.0.pdf)
- R2π. (2019). *Methods and tools*. Retrieved from <http://r2piproject.eu/circularguidelines/methods-tools/>



## About the project

The problems associated with plastic waste and in particular its adverse impacts on the environment are gaining importance and attention in politics, economics, science and the media. Although plastic is widely used and millions of plastic products are manufactured each year, only 30% of total plastic waste is collected for recycling. Since demand for plastic is expected to increase in the coming years, whilst resources are further depleted, it is important to utilise plastic waste in a resourceful way.

TRANSFORM-CE aims to convert single-use plastic waste into valuable new products. The project intends to divert an estimated 2,580 tonnes of plastic between 2020 and 2023. Two innovative technologies – intrusion-extrusion moulding (IEM) and additive manufacturing (AM) – will be used to turn plastic waste into recycled feedstock and new products. To support this, an R&D Centre (UK) and Prototyping Unit (BE) have been set up to develop and scale the production of recycled filaments for AM, whilst an Intrusion-Extrusion Moulding Facility, the Green Plastic Factory, has been established in the NL to expand the range of products manufactured using IEM.

Moreover, the project will help to increase the adoption of technology and uptake of recycled feedstock by businesses. This will be promoted through research into the current and future supply of single-use plastic waste from municipal sources, technical information on the materials and recycling processes, and circular business models. In-depth support will also be provided to a range of businesses across North-West Europe, whilst the insights generated through TRANSFORM-CE will be consolidated into an EU Plastic Circular Economy Roadmap to provide wider businesses with the 'know-how' necessary to replicate and up-scale the developed solutions.

### Lead partner organisation

Manchester Metropolitan University

### Partner organisations

Materia Nova  
Social Environmental and Economic Solutions (SOENECS)  
Ltd  
Gemeente Almere  
Save Plastics  
Technische Universiteit Delft  
Hogeschool Utrecht  
Hochschule Trier Umwelt-Campus Birkenfeld Institut für  
angewandtes Stoffstrommanagement (IfaS)  
bCircular GmbH

### Countries

UK | BE | NL | DE

### Timeline

2019-2023