Interreg
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Case study report - Ozarka

Good practice of circular economy business models

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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 Ozarka, based in the Netherlands. 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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Table of contents

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 an unique opportunity to study barriers, enablers and needs for circularity (and recycling) in more detail.

1.2 Company background

Ozarka offers reusable containers for takeaway food, replacing single-use plastic (SUP) disposables. Ozarka's focus is placed on providing a complete service, rather than a product offering. They do this by means of three integrated solutions: *reusables as a service*, *DeliverZero* (reusable containers to be ordered through the DeliverZero platform) and *ARK reusables* (Ozarka's own reusable containers for semi-prepared food). Depending on the concept, the company may also take care of cleaning and redistributing the containers after use. They never ask for any upfront costs or deposits for the use of their reusable containers. A short overview of Ozarka is given in table 1.

Table 1: *Overview of company*

Topic	Information
Company name	Ozarka
Website	www.ozarka.nl
Country	The Netherlands
Size of company (0-10, 10-200, 200-500, 500+ employees)	0-10
Mission/vision	"Take away without throwing away." "Reuse containers in their originally manufactured state, as many times as possible."
Product category	Packaging containers for takeaway food
Production/operational process	Distribution and cleaning of containers, production is outsourced
Used materials	PP, silicone, glass

1.3 Case study process

The case studies are being carried out between September 2020 and December 2021. The case study process is structured in four steps[1], 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 in regards to 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. Three interviews are conducted for this case study, with one interview per step and the interviewed persons each having a different function and responsibility within the company. Table 2 gives an overview of the interviewed persons for Ozarka.

Table 2: *Overview of interviewed people*

	Interviewed person	Function
Interview 1: Circularity of business model	Michael Massa	Co-founder
Interview 2: Circularity in the value chain	Beth Massa	Co-founder
Interview 3: Circularity of operational activities	Michael Massa	Co-founder

[1] 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).

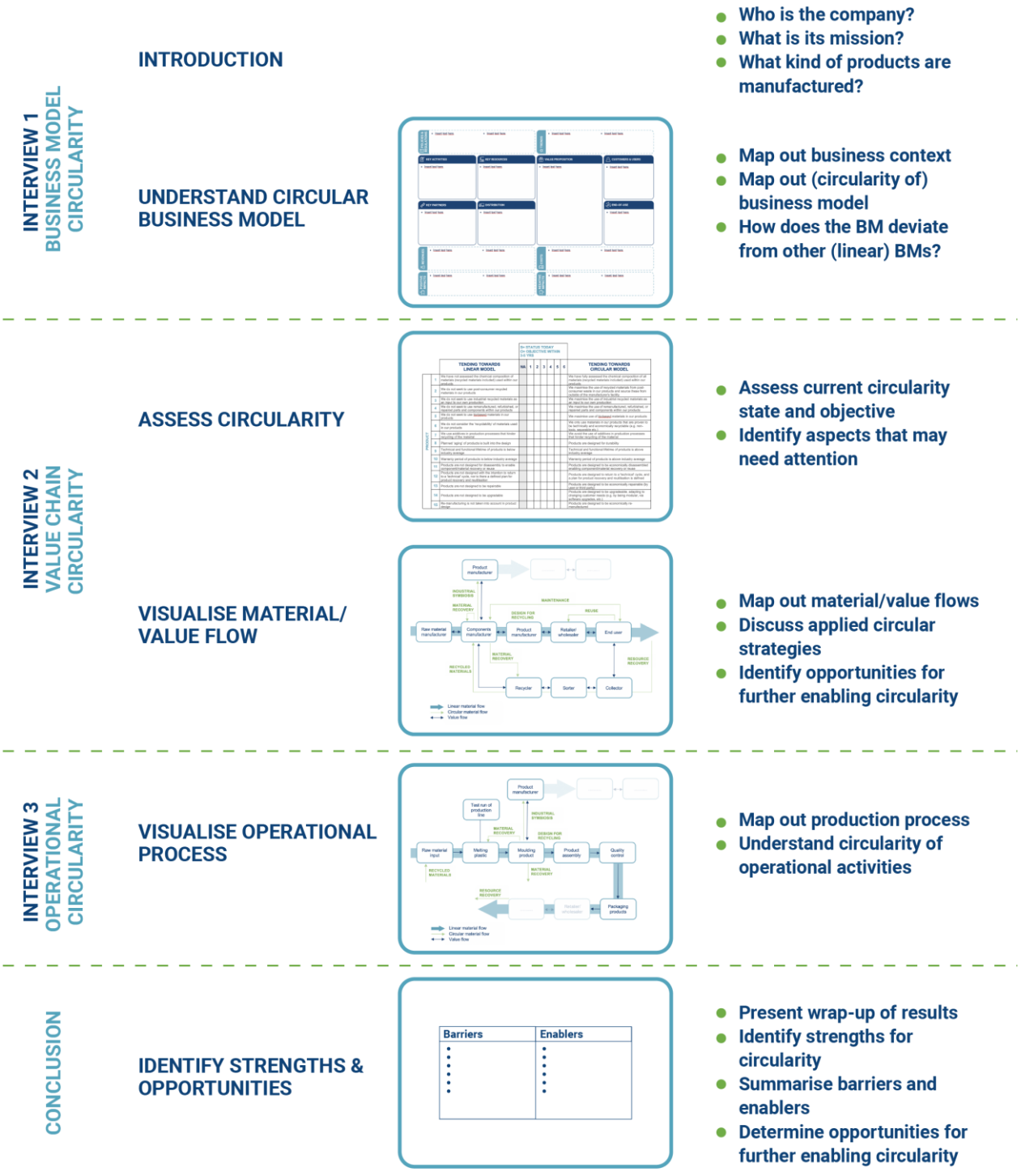

Figure 1: *Overview of case study process*

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).

2.1 Circular business model canvas

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 Ozarka is visible in figure 2 and a description of each element is given below.

Figure 2: *CBMC of Ozarka*

Value proposition

Ozarka replaces (linear) takeaway disposable packaging and substitutes these with (circular) reusable containers. Their goal is to reuse containers in their originally manufactured state, by means of three integrated solutions:

- *Reusables as a service* (B2B)
- *DeliverZero* (B2C)
- *ARK reusables* (B2B)

Reusables as a service is a business to business (B2B) service system, in which access to containers is provided and customers are only charged per use of containers. Ozarka takes care of the distribution, washing, sanitising and recirculating of containers.

DeliverZero is a food order platform for food take-out and delivery from business to consumers (B2C), where all food ordered through the system comes in a reusable container. The platform is competing with other food order platforms such as Thuisbezorgd or UberEats, with the difference being that everything comes in a reusable container. In contrast to the *reusables as a service* platform, restaurants take care of the cleaning themselves.

ARK reusables has a slightly different product offering from the other two channels, and is focussed on semi-prepared food for caterers (also B2B). The containers are not only suited for reuse, but the silicone material also allows for the container to go directly from freezer to oven to microwave to a commercial dishwasher. This provides caterers and takeaways with the option to offer semi-prepared frozen meals in the ARK containers, which consumers can then heat up in their microwave at home. Similar to *DeliverZero*, customers take care of the cleaning themselves.

The *reusable as a service* system has been operating since 2019. The *DeliverZero* platform will have a soft launch in Q2 2021 and will be fully operational in the second half of 2021. *ARK reusables* is also not available yet, but will be in the second quarter of this year (2021).

"Our only goal is that what we distribute is intended to be reused in its originally manufactured state."
- *Beth Massa, co-founder of Ozarka*

The three integrated solutions that Ozarka offers are all part of a service system rather than individual product offerings. No upfront costs apply and customers are only charged per use of the containers. Customers are paying for a high quality, premium and durable container experience compared to disposables. Next to benefits such as reduced or zero waste offered to customers, the use of Ozarka's reusable containers allows customers to distinguish themselves and lets them stand out from competition. This allows customers to position themselves as, for instance, "the only Indian restaurant that is using reusable containers".

Customers & users

The different concepts of Ozarka are all focussed on the prepared food industry and offer solutions to all types of food vendors. Each of the three solutions offered by Ozarka addresses its own type of customers, based on their needs. *Reusables as a service* is focussed on all type of food vendors, including restaurants, caterers, events, and office and institution canteens. With *DeliverZero* restaurants and takeaways are targeted, and orders are placed through the DeliverZero website. In contrast, *ARK reusables* targets takeaways, caterers and hotels (e.g. for self-service) willing to offer semi-prepared food.

Ozarka's customers range from large (chain) restaurants and caterers (e.g. Van het Land catering and Poké perfect) which they supply with several hundred containers per week, to their many smaller customers that only sell a limited amount of meals per week. Ozarka tends to be very flexible with its (future) customers and will not ask for a minimum order quantity (MOQ). Instead they ask customers what they are looking for and the amount of containers they will need per day or week. This might mean that, in order to be able to ensure a certain price point, they can only supply the customer with containers once a week. Ozarka tries to find a right balance in this and makes individual arrangements with each customer. Moreover, customers are not turned away based on its size or sales numbers. This approach allows smaller restaurants, takeaways and caterers to make use of reusable containers.

Customers that Ozarka serves are looking for more responsible ways of packing their food. Most customers have previously ordered biodegradable or compostable materials or for example PLA, and thought they were doing the right thing, but found out about the practical difficulties of these materials. They are becoming aware of the problems with SUP and are open for reusability. Education in this sense is often not needed and it is more of a sales conversation with customers.

Key activities

Ozarka's main activities consist of the distribution of the containers and acquisition of new customers. With *reusables as a service* Ozarka will also take care of washing and sanitising the containers in their cleaning facility. Depending on the sales numbers of their customers, they make deliveries of clean containers once or twice a week. Furthermore, they retain inventory and take care of warehousing. If the business scales up, Ozarka might look for supplements for distribution. They currently work together with other partners for the design and production of the containers, and the development of the food order platform. The operational process of Ozarka is further explained in chapter 4.

"It is our goal to be constantly as sustainable as possible in every aspect of our business. You just can't start with perfection or else you will never start."

- *Beth Massa, co-founder of Ozarka*

Besides the distribution, cleaning and warehousing of the containers, Ozarka is also working on further developing the current concept and business models. Opportunities are explored for setting up a container deposit system, similar to the bottle return system. They are looking for collaborations with municipalities to implement public collection points.

Key resources

The reusable containers supplied by Ozarka come in three different material types, see figure 3:

- PP clamshells or PP Mepal designs
- Silicone containers (ARK)
- Glass base with PP lid

Figure 3: *Examples of Ozarka's reusable containers (PP clamshells, ARK and glass containers). Source: Ozarka*

The polypropylene (PP) clamshells are Ozarka's most used product, whereas the glass container is only supplied to one customer. The latter is chosen because of the way food is presented in it and appears as better quality. PP is used because of its functional aspect, it is suitable for both microwave and freezer, although it is not intended for freezers and may become brittle. Other materials such as stainless steel are not used because it cannot be microwaved. For the ARK containers, silicone is used so the food can go from freezer to oven to microwave to a commercial dishwasher. In terms of colours, the PP clamshells are offered in either transparent clear or a light green version. For ARK there is a choice between grey, green and purple.

Containers can be made of sustainable materials, but if the maximum utility and life are not obtained from the material it is regarded to be a wasted opportunity. Hence the first goal is to make sure the material allows for the container to be reused dozens of times. Ozarka is willing to use the most sustainable material that fits within their strategy, which may or may not include recycled feedstock. Recycled materials are not ruled out yet, it is just not their primary goal. Ozarka will likely be more open to the use of recycled plastic feedstock in the future.

"The container itself, you can make it from the most sustainable material, but if it's not treated the way it's intended, and if its maximum utility and life isn't obtained from the material, than it's arguably a wasted opportunity."

- *Beth Massa, co-founder of Ozarka*

All reusable containers are designed in such a way that they fit well within current systems, and sizes, volumes and dimensions are similar to disposable alternatives. The containers come in

different materials, shapes and sizes to address the different needs of restaurants and caterers. The containers are stackable and nest conveniently (with the exception of the glass containers), to lower footprint when transporting and reduce space for stocking items. Customers are provided with different options and it is up to them to decide and make trade-offs. Such decisions include aspects of how stackable and nestable the containers are, if they have enough space for stocking them, whether it fits within their current system, the type of material the container is made from and its intended purpose.
Secondary packaging is used for shipments from distributors or manufacturers where the containers are purchased from. Recycled polyethylene terephthalate (PET) carrier bags are used for transporting the containers to customers. These foldable bags are washed in a clothes washer for multiple use.
Besides the reusable containers, other resources include a cleaning facility (the 'Sparkle jar') in the Amsterdam area, and a licensed food order platform (DeliverZero). Vehicles used for transportation are still running on fossil fuels but electrical vehicles might be an option in the future.

Key partners
Besides the two owners, Michael and Beth, a team of three independent contractors is available. The containers are designed in collaboration with one of the outside contractors. The production of the containers is being outsourced to different manufacturers. They work together with a Dutch manufacturer (Mepal) for one of their designs and other containers are purchased from a German distributor or directly from a manufacturer in China. If upscaling will allow for it, they would like to remove intermediate players in the value chain and go directly to the manufacturer.
Besides their manufacturers and customers, Ozarka is also actively working together with many other partners. The technology platform of DeliverZero is licensed from a US based company that operates in New York City, Ozarka is using their website and food order platform. The distribution and cleaning of containers in the Netherlands is done by Ozarka itself. The company is also looking into collaborations with municipalities for setting up public collection points. A partnership with an industrial recycler still has to be found.

Distribution
Ozarka takes care of the (re)distribution of containers. Together with the customer they establish convenient drop off and pick up arrangements. Distribution of the reusable containers is done primarily in Amsterdam. Once the container is delivered to an area they want it to travel as little as possible for each of its uses. This is especially the case for glass containers because they are heavier, leading to more transport emissions, but also applies for the other containers. Ozarka will roll out in other cities in the near future and has plans for expanding their business this year. Buy-in from investors or municipalities for return machines will help with accelerating this.
At this moment, products are directly distributed to the restaurant. This is mainly because of the single-use mind-set of most businesses, and it is unlikely that customers want to stock containers in large amounts. When this mind-set changes in the future, Ozarka may work with distributors or use a more centralised distribution centre for supplying their products.

After usage, consumers will bring the containers back to the restaurant or in the (near) future to a possible public collection point. For *reusables as a service*, Ozarka will collect the used containers and will transport them to a cleaning facility, before redistributing them. Hence, containers circulate between Ozarka, the restaurant and the end-user. For the other two concepts (*DeliverZero* and *ARK reusables*) the containers only circulate between the restaurant and end-user, as the restaurant takes care of the washing and sanitising.

End-of-use

Ozarka's core business is to reuse containers in its originally manufactured state, as many times as possible. Striking is that consumers are never charged any upfront deposits, which sets Ozarka apart from competitors. Fees are only charged if the container is not returned after a couple of weeks and notifications are send as a reminder to return the container. This prevents little transactions going in and out of the consumer's account all the time.

According to the manufacturer of the PP clamshells, theoretically, containers can be reused up to a 1000 times. Ozarka has been doing business since 2019 and some containers have been used once or twice a week since then. They do not have any containers yet that have been used a 1000 times but are very confident in saying their containers can be used dozens of times. However, it is not sure yet what end-of-life exactly means for the containers, this may for example also include containers that are too scratched.

Broken or damaged containers at end-of-life will be returned to Ozarka. Losses of products due to broken or damaged pieces happens to less than 0.25% for all containers. When the product does reach end-of-life, Ozarka takes full responsibility for it. Their goal is to ensure that nothing that is distributed ends up as trash. Containers are taken back at end-of-life and stashed for recycling. An industrial recycling partner still has to be found.

Costs & revenues

Ozarka is in its start-up phase, causing investments to be higher than their gained revenues. However, container usages are rapidly increasing, causing a growth in turnover for each subsequent quarter. Sales are expected to increase exponentially over time, as more and more businesses will become interested in implementing reusable containers. They expect to reach a point where there begins to be more revenues and less investments in the next 12-18 months.

The preliminary work, such as designing for circularity and implementing a circular business model, brings along more upfront cost. However, when containers are reusable over a greater life span, a point will be reached where investment costs will be covered and revenue can be extracted.

Policies & regulations

More and more businesses are talking about policies and regulations for SUP takeaway disposables. While the recently introduced SUP directive covers a ban for plastic products such as plates and cutlery, there are no (concrete) restrictions in place yet for containers. Nonetheless, Ozarka is not waiting for such regulations to be set and is already taking action. In contrast, if Ozarka is willing to use recycled materials in the future, regulations in terms of food grade materials may present a barrier.

Trends

The Covid-19 situation obviously had a big impact on the business and will also change future plans. A big change for Ozarka is that part of the B2B catered events were cancelled (no festivals, conferences or other events). At the same time, however, the takeaway and delivery market was growing. This provided opportunities to further develop the B2C part of the business, rather than only focussing on the B2B model. Due to the increase in takeaway food and delivery, it has become easier than ever to operate such a system.

Another trend is that more and more restaurants and takeaways are getting into the market, which forces them to distinguish themselves from others. Ozarka responds to this trend and offers a solution for reusable containers to make customers stand out from their competition. Customers and consumers are looking for less waste and more responsible products and packaging. They are interested in reducing their waste impact, a trend that is expected to increase in the future. Moreover, the concept of reusing and a sharing economy is getting more attention. Hygiene is on people's minds, but in reality the containers are treated the same way as a cup in a café.

On a technical level, everyone is trying to figure out what is the best way to operate a reusable system. However, most competitors are focussed on a product mind-set rather than a service mind-set or a complete system. This is one of the reasons that Ozarka is offering reusable packaging as a service and focusses on infrastructure and return boxes as part of the whole concept.

"Competitors are focussed on the product as compared to a complete system or service offering."

- *Michael Massa, co-founder of Ozarka*

Positive and negative impacts

The reusability concept largely contributes to zero waste (or as low waste as possible), especially in terms of material waste. Ozarka is striving for no contribution to the volume and weight of waste coming from disposables. While the use of water and energy for cleaning may have a negative impact, both are also needed for manufacturing new products. Moreover, the negative impact of transportation is limited wherever possible. Once the container is delivered to an area they want it to travel as little as possible for each of its uses. Vehicles used for transportation are still running on fossil fuels but electrical vehicles might be an option in the future. According to Ozarka reusable containers have a favourable argument possibly with as few as three to five uses, but certainly when containers are used dozens of times.

Furthermore, a positive impact is made by taking responsibility of processing waste. With disposables it is the case that consumers enjoy a nice meal, but are left with an amount of garbage in the end. It then becomes the responsibility of municipalities to process the waste, but ideally it should be a shared responsibility between manufactures, distributors, users, etc. Hence, Ozarka takes containers back at end-of-life and takes responsibility for properly disposing the container.

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 Ozarka is presented in figure 4. 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. The figure represents flows for each of the three offered solutions: *reusables as a service*, *DeliverZero* and *ARK reusables*.

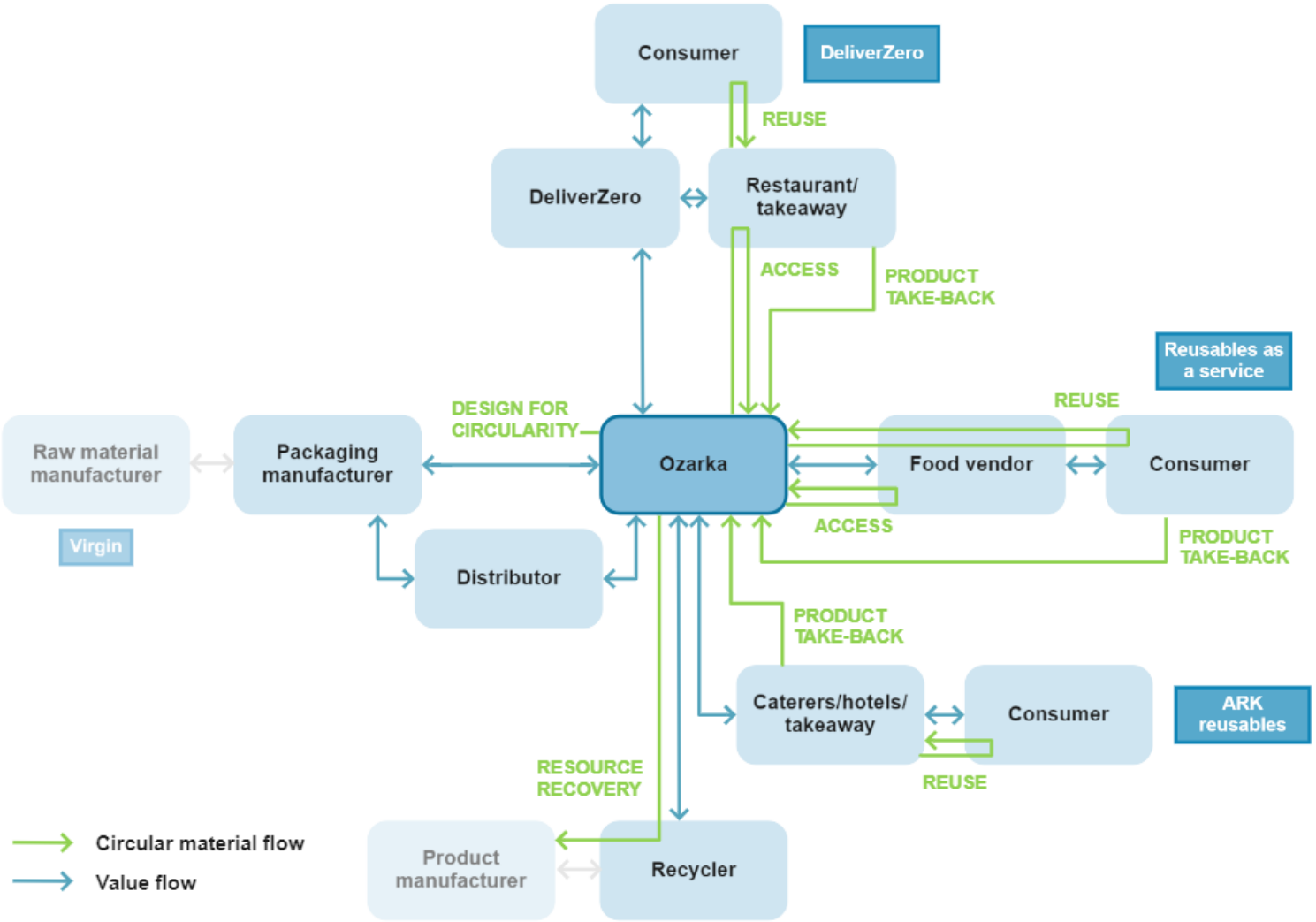

Figure 4: *Material/value flow map of Ozarka*

3.2 Circular strategies

As shown in figure 4, Ozarka applies multiple circular strategies: *reuse* of containers in their originally manufactured state, *access* of the product instead of owning it, *product take-back* at end-of-life, *resource recovery* by recycling broken or damaged containers and *designing products for circularity.*

Reuse

Ozarka's core business is to reuse containers in their originally manufactured state, as many times as possible. As can be seen in the material/value flow map, *reuse* is applied for all three solutions. The biggest difference in this is whether the container returns to Ozarka again between each of its uses. Consumers will bring the container back to the restaurant after consuming the meal. If Ozarka takes care of the washing and sanitising (with *reusables as a service*), the company will collect the containers at the restaurant and will transport them to a cleaning facility, before redistributing them. Otherwise, the restaurant will do the washing before reusing the containers for new food orders (with *DeliverZero* and *ARK reusables*). This difference is illustrated in the figure with bigger or smaller loops of recirculation.

For *DeliverZero*, any participating restaurant is a pick up and drop off location for containers. Hence, restaurants will also take back containers that were originally distributed through another restaurant (e.g. on Tuesday you order from an Indian restaurant and you return the container to a Thai restaurant on Saturday when you order again with *DeliverZero*). In the (near) future, containers may also be returned to a general drop off box, which is currently tested by Ozarka. If this is in a public collection point, Ozarka will collect the containers and will be responsible for washing. If the drop off box is near a certain restaurant, the restaurant may take on the responsibility for cleaning the containers.

Consumers are never charged any upfront costs for usage of the container. Instead, grace periods are granted for returning it to the restaurant. This is done to prevent little transactions going in and out of the consumer's account all the time. If the container is not brought back after a few weeks, Ozarka will send out a friendly reminder to return it and otherwise a replacement fee is charged. This concept is different from the deposit system that consumers are used to, in which they are charged with upfront costs.

"You do not want to constantly have little transactions going in and out of the consumer's account."
- *Beth Massa, co-founder of Ozarka*

The containers can be reused several dozens of times, possibly up to a 1000 times. Getting the containers back from the end-user is regarded to be the greatest challenge and Ozarka is trying to make this as easy as possible. The ARK silicone containers are regarded to stand out in such a way that it is obvious that it is not a disposable container. In contrast, the containers used with *reusables as a service* and *DeliverZero* are still plastic containers, and have a less expensive feel than the *ARK reusables*.

An interesting learning point is that return rates usually increase over time. It was noticed that consumers might want to keep one or two containers for their leftovers at home, but they will not

want dozens of containers. Hence, there is usually a certain threshold when containers will start to come back. Moreover, restaurants that have a more intimate relation with their clients usually have a higher return rate. In contrast, users of containers at a catered event or office lunch do not have an intimate relationship with the person delivering their food. In this case, it should be explicitly mentioned: "please do not throw these containers away, they are reusable". Hence, communication is very important to both users and cleaning staff.

Access

The *access* strategy suggests that access to the container is granted, but Ozarka will always stay the owner of the product. The reusable containers are offered to Ozarka's customers as part of a product-service offering, rather than an individual product sale.

For *reusables as a service*, containers return to Ozarka after each of its uses and Ozarka will handle washing, sanitising and redistribution of the container. With this solution, customers pay per usage of the container.

For *DeliverZero*, the restaurant itself takes care of cleaning the container, but a service is still provided by offering the technology of the food order platform DeliverZero. With this solution, customers are charged a commission on their food order.

In contrast to the other two solutions, the *access* strategy does not directly apply to *ARK reusables*, since this business model is often more of a product-sale rather than a service-offering. Customers pay a fixed price per product and they are responsible for cleaning the containers. However, Ozarka also offers the possibility to offer *reusable as a service* as an add on, if customers are interested in the service offering (collection, cleaning, redistribution). If the latter is the case, the *access* strategy will be applied for this business model as well.

The access strategy also includes replacement of broken, damaged or missing containers. Agreements made with the food vendors cover an expectation of about 2% of containers to break or disappear. Ozarka takes financial responsibility for this amount, unless items are obviously mishandled.

Periodic inventory counts are used to know how many containers are delivered and to check whether the amount of missing or broken containers checks with the agreed expectation. If this exceeds the expectation, Ozarka will charge its customers for the excessive amounts of containers that need to be replaced. This way, product losses become a shared responsibility. Ozarka will accept some of the losses and the food vendor will accept some of the replacement costs. Nevertheless, the food vendor itself is responsible for the return of products by consumers (with *reusables as a service* and *ARK reusables*), which is often a case of properly communicating the reusability of containers.

Product take-back

Because a service is provided, rather than an individual product offering, strategies such as product-take back are implicitly offered by the service of replacing broken containers with new ones. For all three concepts, Ozarka takes back containers at end-of-life and takes full responsibility of how the container is disposed of, rather than putting this responsibility at customers and

consumers (which is regarded to be the reason for pollution). Broken and damaged containers are stored for now, but options to recycle them are explored.

"When you order takeaway and have a wonderful meal but are suddenly left with an amount of garbage. Right now that falls on the consumer and municipalities, but ideally it should be a shared responsibility between manufactures, distributors, the users. Everybody should be responsible."

- *Michael Massa, co-founder of Ozarka*

Resource recovery

The containers that break or get damaged will be input for recycling in the future. Containers are being collected and stashed at end-of-life, but are not recycled yet. An industrial recycling partner still has to be found.

Design for circularity

Design for circularity by Ozarka manifests itself in three ways: *design for recycling*, *design for durability and performance* and *design for standardisation*.

Design for recycling

In theory, used materials by Ozarka can all be recycled (PP, glass and silicone). However, silicone is not a very common material and people may criticise its recycling potential because there is no separate recycling stream for silicone in current plastic packaging waste. This does not mean that the material cannot be recycled, it just suggests that it should be separately collected and should not end up in the plastic packaging waste stream. Moreover, no fillers or additives are used that might hinder recycling of the material.

Design for durability and performance

The containers are all very durable and are designed to be reused up to a 1000 times. The rigid plastics (e.g. PP) have a tendency to scratch and will look more 'used' overtime compared to the silicone containers. Although product losses due to breaking or damaging are currently under 0.25%, they would like to have zero containers breaking. When containers break, they break at the hinges (clamshells) because those are the weakest points. Ozarka is willing to further explore this issue in the future, making sure the containers become even more durable.

Design for standardisation

Ozarka's containers consists of few material types: PP, silicone or glass, with glass fading out as an option. Products either consist of one part (clamshells) or two parts (base and lid). The PP containers consist of six different shapes and there are five different shapes for the ARK containers. Different sizes are also offered but they try to use the same lid whenever possible, with lower or deeper bases in order to be able to differentiate between volumes.

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 5. This steps are divided in two phases: preliminary work and the reusable service offering. Each of the steps will be further explained below. The figure represents flows for each of the three offered solutions: *reusables as a service*, *DeliverZero* and *ARK reusables*.

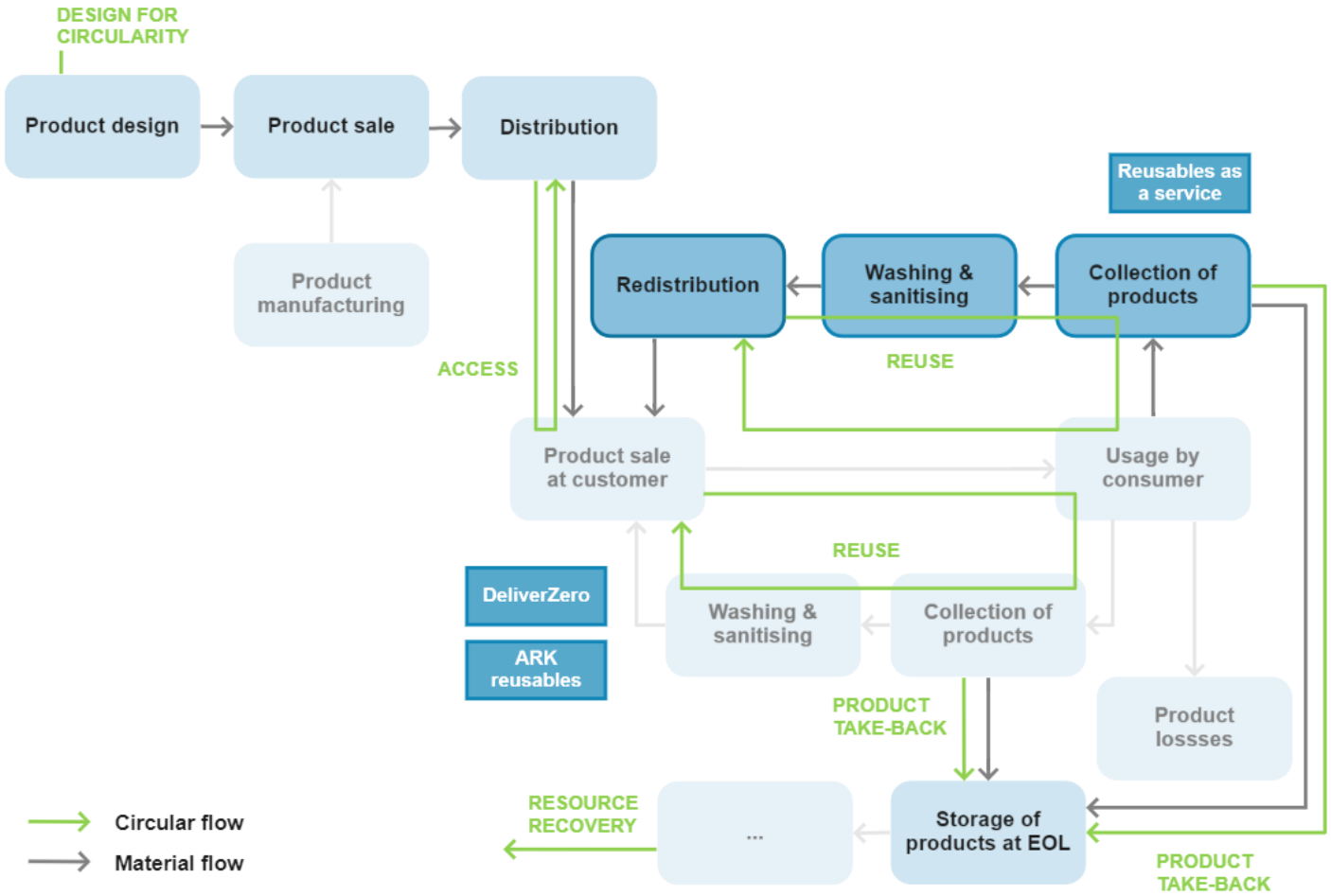

Figure 5: *Operational process map of Ozarka*

4.2 Preliminary work

The preliminary process of Ozarka consists of product design, product sale and distribution of the containers to customers.

Product design

The design of products is done in collaboration with one of the independent contractors and only applies for ARK reusables. The other containers (PP clamshells, Mepal designs and glass containers) are existing variants which are all directly purchased. Ozarka has chosen to minimise the types of materials, and the ARK containers consist of two different materials (silicone and a reinforcement). Although recycling of silicone is theoretically possible, it is more difficult to find recyclers for it.

From a design perspective, Ozarka looks at how complicated the product is (e.g. amount of materials), the influence of the product design and used material on sorting, and the possibility of properly disposing the product or potentially recycling the materials. This includes strategies to design for circularity, as previously described in section 3.2.

Product sale

After purchasing the containers from packaging manufacturers, agreements are made with customers for selling the product and offering it as part of a service. Acquisition of new customers is also included in this step. Sources of revenues for Ozarka differ for each of the three offered solutions.

With *reusables as a service* customers pay a fixed price, per usage of the product. The containers are relatively expensive compared to single-use versions. They cost between 25c and 45c per usage for restaurants, depending on size and material type. Such prices are not directly competitive compared to traditional disposables (e.g. made from polystyrene). However, for restaurants that are willing to have more responsible packaging and are already looking into other options (such as biodegradable or compostable materials), prices become more competitive. This price also includes the collection, cleaning and redistribution of containers.

With *DeliverZero*, customers are charged a commission based on the food order rather than the container. The charged commission is maximum 12.5% of the order price, which is a more competitive price for restaurants compared to other food order platforms (e.g. Thuisbezorgd). The usage of the technology of the food order platform is included in this price.

With *ARK reusables* customers pay a fixed price for each product sale. This business model is therefore different than the other solutions offered, because Ozarka does not offer a service (except for taking products back at end-of-life).

"The idea is to offer something for everybody."

- *Michael Massa, co-founder of Ozarka*

Distribution

Ozarka distributes containers directly to the location where the food product will be sold. To ensure enough quantity of containers for reuse, customers usually need about 3,5 to 4 times as many containers than would be used within a week. For instance, if a customer needs to have 100 containers per week, Ozarka requires 400 containers to have access to for serving their customers (e.g. 100 containers in use, 100 containers as a reserve for Ozarka, 100 containers in stock with customers and another 100 containers that might still be at consumer's houses). Ozarka currently

knows the quantities of containers that are at customers, but they do not have the technology to track each individual container yet. Visibility will become better over time.

4.3 Reusable service offering

With *reusables as a service*, Ozarka offers a service to collect, clean and redistribute containers after they have been used. For the other two business models (*DeliverZero and ARK reusables*), the restaurants takes care of the washing and sanitising themselves, and in that way are effectuating the reuse strategy. The service offering for each individual concept is explained below.

Reusables as a service

Together with the customer, convenient pick up and drop off locations and times are agreed on. Depending on the sales numbers of the customer, this could typically be done ones or twice a week. After collection, Ozarka will transport the containers to their cleaning facility (the 'Sparkle jar'), located in the Amsterdam area. It is often the case that containers are brought back with a lot of food waste. Commercial dishwashers are used for washing and sanitising the containers. A downside is that the machines cannot circulate waste water, because there are too many fatty particles in it and the filters will get clogged with food particles. After cleaning, the containers will be redistributed to customers.

DeliverZero

With *DeliverZero*, customers take care of the cleaning. Any restaurant that processes orders made through the DeliverZero platform is a pick up and drop off location for containers. This means that containers can also be returned to a restaurant where the meal was not originally purchased. Ozarka keeps an eye on the amount of containers at each location, by using the information in the DeliverZero accounts. They regularly check if restaurants are not understocked. If the restaurant has a shortage of a certain container type, they will be resupplied. It could also be the case that a restaurant takes back a container type that they do not use themselves. In that case, Ozarka collects those containers and recirculates them to the right restaurants.

ARK reusables

With *ARK reusables*, the business model is similar to a regular product-sale model. Customers purchase the container and take care of cleaning themselves. Though, there is a possibility to use *reusables as a service* as an add on, in which case Ozarka takes care of the collection, cleaning and redistribution of products. Furthermore, Ozarka offers a buy-back program where they buy back used containers from the restaurant. Ozarka will then redistribute these containers again to other restaurants.

Storage of products at end-of-life

When products are broken, damaged or maybe become too scratched, they reach end-of-life. Ozarka will than take products back and store them in order to have enough quantities for recycling.

5. Conclusion and recommendations

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

5.1 Strengths for circularity

Business model

Ozarka's goal is to replace linear, disposable containers with circular, reusable containers. Where other businesses are focussed on products, Ozarka's focus is placed on providing a complete service offering. They do this by offering three different solutions. Their *reusables as a service* solution includes the distribution, washing and sanitising of containers. With *DeliverZero* consumers can use the DeliverZero technology platform for ordering food from the restaurant in reusable containers. The restaurant will take care of cleaning the containers between their uses. For *ARK reusables*, containers are offered in which semi-prepared food can be sold. The containers can go straight from freezer to oven to microwave to a commercial dishwasher. The three different concepts present a suitable option for various customers.

Instead of doing expensive market research at the beginning, Ozarka simply started their concept and learned on the go how the market was behaving. They believe that in the long run it is probably more cost-efficient to lose a couple of containers, than to pay for expensive market research. Moreover, the Covid-19 situation demonstrated that if one business model is not doing so well, another one can pick up.

Customers are paying for a high quality, premium and durable container experience compared to disposables. This lets them stand out from competition. Ozarka's approach is very customer centric and materials and sizes are tailored to customer needs. Where reusable packaging may often not be economically viable for smaller restaurants or caterers, Ozarka will provide them with the opportunity to use reusable containers on a smaller scale, making it widely available for the whole prepared food industry.

Circular strategies in the value chain and operational process

The containers are all very durable and are designed to be reused up to a 1000 times. Ozarka's containers consists of few material types, which can (theoretically) all be recycled. Different sizes of containers are offered, but the same lid is used whenever possible, with lower or deeper bases to differentiate in volumes.

A striking point of Ozarka's reuse model is that they never ask for any deposits or other upfront costs. Instead consumers are reminded to return the container and a replacement fee will be charged if not returned within a couple of weeks. This concept is different from the deposit system that consumers are used to, in which they are charged with upfront costs. Nevertheless, the food vendor itself is responsible for the return of products by consumers (with *reusables as a service* and *ARK reusables*), which is often a case of properly communicating the reusability of containers. Additionally, using containers that are different enough from disposables (e.g. silicone ARK containers) helps to ensure product returns.

The offered service also includes replacement of broken, damaged or missing containers. A percentage of containers that break or disappear is agreed upon. Ozarka will accept some of the losses and the food vendor will accept some of the replacement costs, so it becomes a shared responsibility. Furthermore, Ozarka takes full responsibility for products at end-of-life for all three concepts. The company takes back broken or damaged containers and stashes them for recycling.

5.2 Barriers and enablers for circularity

To ensure circularity for Ozarka and its value chain, several barriers and enablers can be pointed out. The biggest barrier for Ozarka used to be creating awareness for reusability. This included explaining the problems with SUP disposables and the downsides of biodegradable packaging. However, this situation has turned and now clients find Ozarka when they are looking for responsible packaging. Currently, their biggest barrier is time and money, which are similar barriers to those for setting up a linear system. They need more investors for scaling up. Another key challenge is getting the containers back from the end-user. Their biggest enabler is that they tell a happy story, they get support from others every day, which presents new opportunities. 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 Ozarka*

Barriers	Enablers
• Time and money • Need for more investors for scaling up • More expensive compared to SUP disposables • Hygiene with reusability • No catered events due to Covid-19 • Getting containers back from consumers • Lack of communication on reusability in offices	• Telling a happy story to customers • Support from others • Thinking in systems • Providing a service rather than product offering • Consumer awareness for problems with SUP • Customers and consumers are looking for responsible packaging • Consumer and customer openness for reusability • No minimum order quantity, allowing for use by smaller restaurants • Possibility for customers to stand out • Collaboration with other partners • Buy-in from municipalities or investors • Public collection point for containers • Technology for tracking containers • Communication on reusability to improve product returns • ARK silicone containers are different enough to see it is not disposable • Taking responsibility for product take-back and disposal • Taking shared responsibility for product losses

5.3 Opportunities for circularity

The options offered by Ozarka are completely different from a linear business model. However, there are still some opportunities for the company to further enhance circularity. Ozarka also recognises this and is actively working on further enhancing circularity.

Public collection point

The greatest challenge for Ozarka is to ensure that consumers return containers. At this moment, products can be returned to the food vendor where the product is sold. For *DeliverZero* this is further extended, making it possible for consumers to return containers to all restaurants participating in DeliverZero. To make drop off of containers more convenient for consumers, Ozarka is working on setting up a general collection system for their reusable containers. Collaboration is sought with different municipalities to set up drop off boxes. Ozarka will then collect the containers from the public collection point, clean them and redistribute them to participating restaurants. It could also be the case that such a drop off box is close to a restaurant. They may then take on the responsibility for cleaning the containers and reuse the containers for packaging their food orders. The options for setting up public collection points are further explored and tested by Ozarka.

Resource recovery and use of recycled materials

At this moment, Ozarka collects containers at end-of-life and stashes them for recycling. This may be when containers or broken, damaged or too scratched. Possibilities are seen for recycling these containers when enough quantities are reached. Since this offers a separate collection system, the process can be controlled and the recycled materials may be used as input for new containers used for food purposes.

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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 pilot plants will be set up, one in Almere (NL) and one in the UK. The plants will make use of two innovative technologies – intrusion-extrusion moulding (IEM) and additive manufacturing (AM) – to turn plastic waste into recycled feedstock and new products.

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
Viridor Waste Management Limited

Countries
UK | BE | NL | DE

Timeline
2019-2023

www.nweurope.eu/transform-ce