

Out of The Box: Reducing Plastic Pollution in Parisian Takeout Economy

I. Problem

Plastic is ubiquitous in all aspects of life. It provides us with great convenience and also aids our technological advancements, such as in medicine, fashion, technology etc. However, it was only introduced to us on a society-wide scale in the 1950s, and its prevalence in our daily lives illustrates its exponential growth rate of production. Approximately half of the plastic ever made was manufactured after 2000 (as cited in Parker, 2018), a phenomenon greatly accelerated by the global shift and proliferation of single-use containers (Geyer et al, 2017). Plastic production is estimated to double further in the next 20 years to over 600 million tons (WEF, 2016). The production of plastic has a significant carbon impact, as over 90% of plastics are made with chemicals from fossil fuels (UN, n.d.). It uses approximately 6% of global oil production, an amount that is projected to increase to 20% by 2050 (WEF, 2016). Given the continued large-scale production of plastic, its greenhouse gas emissions that impact global warming cannot be ignored.

Yet as production grows, management of waste lags behind, with a mere 9% recycled and 12% incinerated out of the 6300 metric tons of cumulative generated plastic waste (Geyer et al., 2017). The remaining 79% end up in landfills or our natural environment, which is highly problematic due to most commonly used plastics being non-biodegradable. This means they will not decompose but rather accumulate, making contamination near permanent with disastrous consequences for ecosystems. Marine plastic pollution is especially dire as 8 million tonnes of plastics are estimated to flow into the ocean each year, an amount that is projected to quadruple by 2050 and surpass the total biomass of fish. This threatens to destroy the ocean's ecosystem and its biodiversity as marine animals get entangled in and ingest plastics.

In the contemporary capitalistic world, the issue of plastic waste has become ever more dire without any significant prospect of improvement due to continuous exponential increases in production motivated by its unrivalled high cost efficiency and wide range of applications. Now at a critical point, plastic pollution threatens ecosystems, biodiversity, and the climate, to the extent it is now considered a 'geological indicator of the Anthropocene era' (UN, n.d.).

In Europe, France is the biggest consumer of plastic and producer of plastic waste. Every year, France dumps 11,200 tonnes into the Mediterranean ocean (Gamberini, 2019), while it only recycles 22% of plastic waste and is second from the bottom in Europe. Furthermore, the take-out market is on the grow globally, using 2025 million disposable takeout containers a year in the EU. It can be assumed, that Parisians significantly contribute to this, as the following estimation shows. Assuming that people eat out once a week and that there are over 2 million inhabitants in Paris, this would correspond to 104 million take-out meals a year. This means at least 104 million plastic bags (5g), containers (10g) and eating utensils, which then makes for over 1,560,000 kg of plastic waste produced in Paris alone, a significant contributor to France's overall high level of plastic waste. We therefore will focus on Paris to kickstart the process to ameliorate the situation.

II. Proposal

Our proposed concept is a reusable meal box service (initially) focused on the Paris region called Out of the Box. Out of the Box is a network of reusable eco-friendly boxes for employees to use when getting takeout. We would eventually aim to partner with major companies based in Paris, such as LVMH, L'Oréal, and BNP Paribas by providing them with our reusable boxes for takeout lunches. Employees would pick up the boxes in office kitchens and take them to restaurants, who would fill the boxes with the meal. After eating their takeout, employees could leave their dirty box in one of our receptacles located near their offices. There is no need for the busy employees to wash their boxes, as our team would collect all boxes

nightly and bring them to our dishwashing facility where they would be sanitized then redistributed to companies the next morning. Our service would also include an app which would show where the receptacles are located and would track how many meals employees purchase takeout food using Out of the Box boxes. When they have 10 consecutive takeout meals using our boxes, we would offer a discounted meal in order to incentivize the use of our boxes. In addition, companies would be motivated to use our service due to CSR initiatives as well as offering the service to their employees as an additional perk. The scope of the project will (at least initially) be limited to Paris. Of course, plastic use in takeout is a global issue, however we thought it best to try the idea in Paris to see whether the idea is effective and scalable.

A 2018 European Commission directive on single-use plastics pushed the replacement of plastics with sustainable materials as well as consumption reduction, and our initiative would help companies fall in line with this. Therefore, our initiative would help companies get a jump on these EU measures. Additionally, reusable to-go boxes have been extremely successful at universities in America. Schools such as Cornell University and Colorado College have added an eco-takeout container option at their dining halls. Students purchase the boxes for a one-time fee, then can use the box over and over again. Furthermore, the city of Freiburg Germany has come up with an innovative solution to the issue of plastic waste caused by coffee cups. The city distributed reusable coffee cups to stores, and customers pay a one euro deposit for the cup, which can then be returned to any participating store in the city. These stores will then wash and reuse the cups.

Our solution is original in that it utilizes an app as an incentive, and focuses on companies in Paris. We would work directly with companies, and we would combat the issue of human laziness by providing convenient receptacles. This idea is feasible since it combines many already effective solutions, such as using app technology like Velib' and product collection systems such as Lime. Large companies are trying to ameliorate their environmental footprint in any way they can, so partnering with a service such as Out of the Box would be a relatively easy way for them to boost CSR and offer employee benefits. We could also feasibly do this given Paris' relatively small size, so placing strategic receptacles would not be too challenging.

To test this idea, we would begin with few small companies in Paris, such as start-ups, who would be open to trying our system. Testing the idea with them would allow us to discover what we need to improve the service and we could then smoothly expand to bigger corporates in the future.

III. Expected positive outcome

The expected positive outcome of the project is to significantly reduce the amount of non-reusable, non-recyclable garbage produced by the takeaway-industry. In addition to this, we want to raise awareness amongst the target group for the effects of waste produced for the packaging of food and create incentives for them to reduce this waste. Although it starts on a small scope, we expect the concept to spread quickly as companies will want to be as eco-friendly as their competitors. Like the reusable coffee cups, we expect the reusable boxes to exponentially spread: as soon as the awareness amongst consumers is higher, other concepts will be developed to compete with our solution and we could eventually expand it to new target groups such as universities. Therefore, on the long term, we aim to replace at least 20% of the single-used food packaging of the takeaway industry with our reusable alternative.

How will the positive outcome be measured?

The app allows Out of the Box to track the exact numbers of lunches for which the reusable box and cutleries were used precisely, which will enable the calculation of kg of plastic garbage saved. An estimated 20g of plastic are substituted each time that Out of the Box

is used. Hence the central KPI of our service would be the kg of plastic saved, that can easily be derived from the number of takeout meals that have been consumed using our service. In addition to this, case studies in participating restaurants could help to see for which percentage of takeaway meals the packaging waste is substituted with reusable boxes.

IV. Major risks / actions to reduce them

There are a wide range of risks associated with our project, yet the majority of them can be associated with two factors: convenience and costs. In this section we will elaborate on these major components and their possible remedies.

On the first hand, we deem it important to focus on the convenience aspect of our product. We believe it has the ability to undermine the adoption of our to-go boxes by the majority of the targeted population and thus impede us from reaching our 20% plastic-reduction goal. The size, material and capacities of the box are essential. People should be able to carry on with their lives unabated by to-go boxes. The box should be that of a normal carry-on meal *Tupperware* and be odour and leak-proof. Ensuring a decent quality is the first guarantee of our success. Making sure that the boxes are durable is similarly essential to limit our capital expenditures.

On the form itself, the risk of having a box that is difficult to manipulate should also be taken into account, it will help minimizing user accidents, such as dropping food or liquids when opening it. A way to solve this is by previously planning and testing the box in real life conditions. Once we have a minimum viable product that does not leak, is reusable and easy to manipulate, will we envisage its commercialization.

On a similar note, given our urban market, we should take into account the busy schedules of our users and the extent to which they value convenience. If we are not able to ensure the existence and activity of a restaurants' network, users may choose to throw-away the boxes or keep them for a long time until they find a drop-point. In any of these situations, the circularity of our business model will be undermined. In order to solve these issues, we have designed two solutions. The first involves asking for a monetary guarantee when the user collects her/his first to-go box, the guarantee will be reimbursed once the user is signed out of the to-go network or if the box is not returned to a drop-off point in a given time-lapse. We thought 48 hours would be a reasonably convenient time for the consumer while allowing us to efficiently manage the stock of clean/dirty boxes in every restaurant. The second aims to tackle the situation in which a consumer would be tempted to keep the box for personal use or throw it away. In order to avoid this behaviour we were inspired by the hotel industry as well as Velib' bike network. In order to ensure that people take care of the boxes we would have a credit card authorization to bill the cost of the to-go box to users who do not return boxes in a 15 days period. We believe a financial guarantee to be the best possible solution to ensure our boxes stay inside the circular system. We also believe in the power of rewards that stimulate the usage of to-go boxes on the longer term. Having the possibility of obtaining a subsidized meal after a number of to-go boxes used is a good incentive that deals with the risk of people switching back to single-use boxes.

On the second hand, goodwill is essential if we want our box to succeed. Although it may seem like a less manageable risk, there are incentives we can use to ensure our users keep using our to-go boxes instead of resorting to the convenient, but detrimental single use boxes. In order to ensure our box is adopted by a sufficient amount of people, image is essential. If the box is perceived as non-hygienic, chances are high that people and restaurants will turn away from them for social and business considerations. We believe our value-added to be the practicality of not having to carry a personal food container with ourselves all day, every day, but instead resorting to a convenient network that allows to enjoy restaurant food sustainably and on-the-go. In order to ensure a good adoption we must control our cleanliness standards in

every step of the process and publicize our box as a cleaner alternative, both for ourselves, a restaurant's customers, for our social or restaurant image and our planet. We indeed wish to influence people to act for the environment and giving them a manner to do so on a daily basis, without compromise and with a positive social image influence, seems the best way to guarantee our success in this venture.

V. Deployment Strategy and Major Milestones

Our deployment strategy is concise: focus on a busy neighbourhood, possibly a business center, analyze what restaurants people in this neighbourhood most use on a daily basis and start the implementation process. Our research phase should consider which companies would be eager to adopt our product. We are very interested in corporate firms because once the first one adopts our to-go boxes others are likely to follow for Corporate Social Responsibility (CSR) reasons. It may be easier to secure small-size businesses first however.

After the research phase, a crucial phase begins: sell-out. Sell-out refers to the moment when we will have to negotiate our terms of use with restaurants and companies. Our first target will be smaller firms because international corporations are more hierarchised and thus may delay the adoption. Similarly, it is difficult to access franchised restaurants and fast-food chains because they have a strict organization chart. Starting small is a necessity. Yet, we will see a much bigger return, both socially and economically, by accessing corporations and food-chains. We should work on it exclusively once we gain our early adopters' support. At the same time, proceeding at a small scale in the first months will allow us to test our cycle of boxes delivery/collect as well as our supply chain for new boxes and the functionality of our box-cleaning facilities. As far as the delivery/collect methods go, we should aim at publicizing our boxes in our vehicles: bike delivery is a powerful vector to show our users we take our values seriously. As we scale-up, we may be able to consider using other carbon-neutral vehicles, yet given the size of the boxes it should not be a problem until we reach maturity, which may take place in a number of years.

Needless to say that marketing should also be deployed on other platforms: social media is interesting because it allows us to interact with the customer and raise awareness for our product. At the same time, having posters in partner restaurants is a method that may generate adoption. Finally, we believe stickers and other goodies will help attract new customers by letting our client-base publicize to-go boxes without added costs.

Securing corporate clients and bigger restaurant chains is a major milestone. We believe that our long-term growth will depend greatly on it. There are several factors, both external and internal, that may help us succeed. Client interaction and backing from our small-size businesses are important. Indeed, a corporation will only listen to our idea if we show it is popular among smaller businesses and that it helps strengthen their CSR. On a similar stance, developing employees' demand for our product in corporations could accelerate adoption.

Having an app that helps users track their progress is also a way of generating interaction and demand for to-go boxes, we should deploy it at the initial phase of the project then as adoption grows, keep interacting with customers by adding functionalities.

VI. Financial Prognosis

Marketing costs, as the costs of customer acquisition is the most important cost-driver in the first quarters (Figure 1) as it will be critical to onboard (corporate) clients. The variable costs of collecting and cleaning the boxes together with the maintenance costs (accounting e.g for defect boxes) and wages then increase in importance, as the business scales up. Box

acquisition costs play a relatively minor role, as the acquisition costs are comparably low one-time fees that are quickly offset within the first quarter of providing the new boxes to clients. Similarly, the installation costs that occur whenever a new corporate client is onboarded are passed on to the corporate clients by charging the installation costs as a fixed set-up fee, as can be seen in Figure 2.

The set-up fee is only charged to new customers, whenever the installation of the proposed box system at a new client occurs. Main driver of revenue for “Out of The Box” however is the service fee that is charged to customers that are provided with the lunchbox service.

Given a conservative estimate of cost and revenue development, “Out of The Box” would break even within the 4th year of launch (Figure 3). Break-even would be reached even quicker, when (very) large corporates can be onboarded, as the proposed business model becomes more profitable, the more boxes an individual client is provided with. The average of 75 boxes per clients, that is assumed for the present calculations could easily be dwarfed by onboarding a large Parisian corporation such as LVMH or BNP Paribas.

VII. Organization

Although we start by pitching to start-ups, we picture large corporations based in Paris, especially companies who already have a strong interest and initiative for sustainability through their CSR efforts, to be optimal for our first partners. We will reach out to LVMH, Kering, BNP Paribas, L’Oreal, and Vivendi. We also see opportunity for synergy with educational institutions, whose students will no doubt be interested in contributing to efforts to preserve the environment. We will approach universities in Paris such as Sciences Po, Sorbonne, USCP, American University of Paris, as well as the CROUS cafeterias. Although we project our initiative to break even within the 4th year, sponsors and partnerships will play an important role in our crucial starting years

Appendix

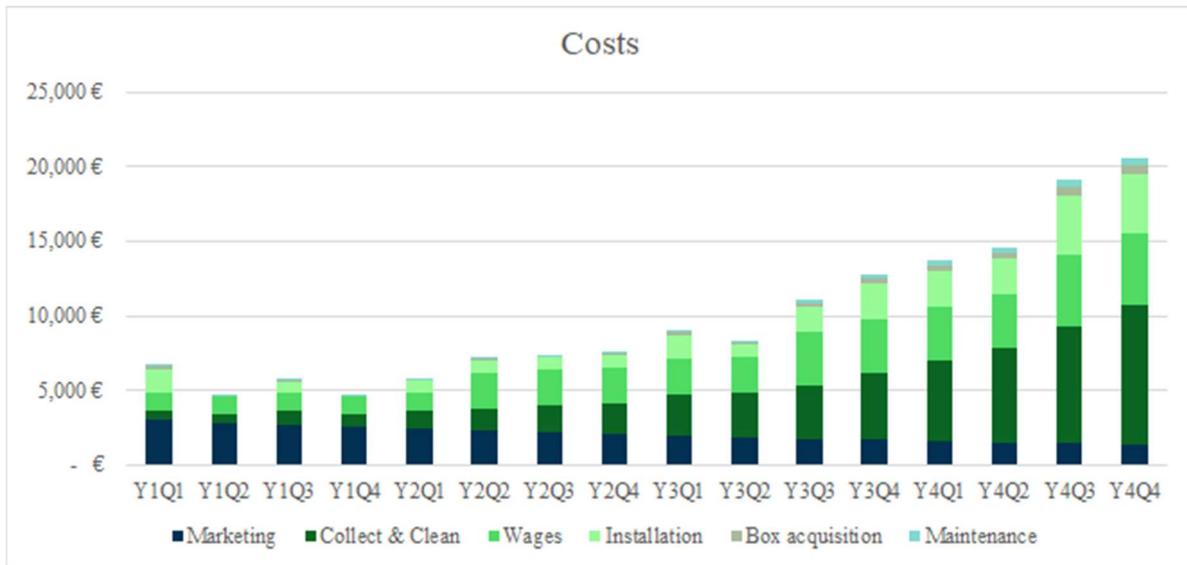


Figure1: Cost projection

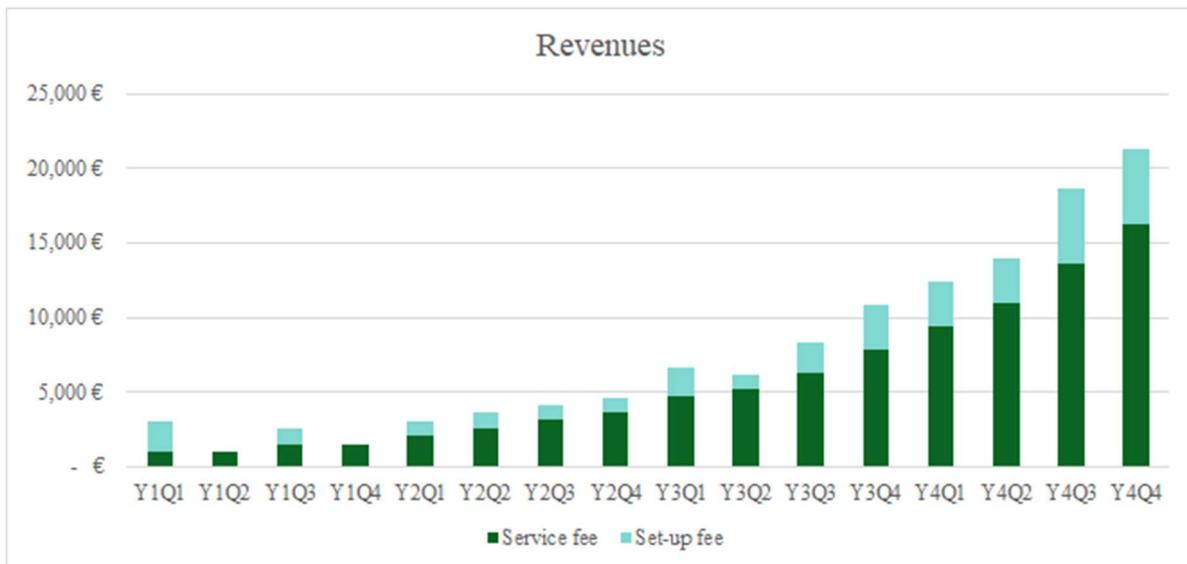


Figure2: Revenue projection



Figure3: Financial overview

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