

FROM GARBAGE PATCH TO OCEAN PRODUCT



A STRATEGY FOR VALUE CREATION
USING OCEAN PLASTICS

THESIS MSC STRATEGIC PRODUCT DESIGN BY ADRIAAN VAN WIJK

TU DELFT



EXECUTIVE SUMMARY

The Ocean Cleanup is an NGO founded in 2013, with the aim to rid the world's oceans of plastic by 2040. Collecting this plastic however begs the question: 'What to do with this waste after it has left the ocean?'

To answer this question, first, it is important to look at the material. In my research, I defined the following tiers of ocean plastic:

Tier 1: Mechanically recyclable plastics and recolourable

Tier 2: Mechanically recyclable plastics, but black and non recolourable

Tier 3: Non-mechanically recyclable plastics

Based on an analysis The Ocean Cleanup and its context I defined three main goals that it should attempt to achieve with the plastic:

Value: To gain as much income as possible from the plastic in order to be less dependent on donations.

Awareness: To use the plastics to generate as much awareness as possible for the ocean plastic issue.

Volume: To find a purpose for the entire volume of the extracted ocean plastic.

No single product made from ocean plastic can satisfy all the goals and tiers at once. By developing a combination of complementary ideas with an underlying strategy, The Ocean Cleanup can maximise the impact on all three goals while ensuring that the different ideas fit with the material tiers.

Through a combination of literature research and interviews (both with consumers and experts) I designed and developed the following strategies:

1: Limited Ocean Plastic Editions

Partner with specific companies to make limited ocean plastic editions of existing products. This creates a win-win-win situation in which the consumers get a special version of a product, the partner company benefits from the positive brand association and The Ocean Cleanup accomplishes all three goals.

2: Interior&Exterior Architecture

Collaborate with processing companies to create building materials from the ocean plastic. In this context the fact that the material cannot be coloured is of lesser importance and the demand for sustainable materials is high.

3: Arts & Experiments

This context allows for the extraction of as much value and awareness out of the non-recyclable plastic as possible by using it in for example: art projects and design competitions.

These three distinct strategies fit together in an overarching brand concept I call: Ocean Product. This brand establishes a single point of recognition for consumers, while at the same time differentiating The Ocean Cleanup's plastic from that of competitors.

Finally, I integrated all findings into a partnership selection tool, which can help The Ocean Cleanup decide which partnerships are worth pursuing and which are not.

I believe that this strategy, with its three tiers and partnership selection tool presents a complete vision of how The Ocean Cleanup can turn 80.000.000 kg of waste into 'Ocean Product'.

FROM GARBAGE PATCH TO OCEAN PRODUCT

A strategy for value creation using ocean plastic, for The Ocean Cleanup

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PREFACE

Dear reader,

This report is the final work of my master in Strategic Product Design. In a way this serves as the conclusion of almost seven years at the TU Delft and marks the end of an important chapter of my life. I feel privileged to have been given so many opportunities during these past years, from studying abroad to working on a Hyperloop prototype and from participating in various committees to building friendships that will last for life. Everything I have experienced has shaped me into the designer I am today and I hope to demonstrate my acquired skills through this thesis.

Writing my thesis in collaboration with The Ocean Cleanup was a dream come true for me. My ideal has always been to have a positive impact on the future and to be able to use my skills and knowledge to help build a better and greener world. I am convinced that new ideas and technologies will be able to stop and replace the current processes that damage our planet. Boyan Slat and his vision were instrumental in convincing me to study at the TU Delft and he is a prime example of someone who is realising the dream I have stated above.

Due to the COVID-19 pandemic, things certainly went differently from how I imagined. Everybody was expecting the situation to get better during the time I was working on this thesis, but it never did. This resulted in me doing all of the work from home and having to do all research and interviews remotely. While this has certainly made the entire process more challenging, I think it also provided me with an opportunity to learn about myself what motivates me.

Another factor that kept me motivated during these (slightly lonely) times was my fantastic supervisory team and I would like to use this preface to thank them. Jeroen, for constantly asking me the question 'Is it really good enough?' and for giving me access to his huge network of incredibly interesting people. He helped me shed the shackles of my own expectations for the planning and results of the project and helped me truly explore the possibilities. Maaïke, for her incredibly sharp feedback and academic viewpoints. She was able to instantly point out weaknesses and come up with new angles, allowing me to improve my work while giving me a huge boost in motivation after every meeting.

And of course Stella, for providing me with the amazing opportunity to graduate at The Ocean Cleanup, for always being available for a phone call and for going above and beyond to help me in my process. I loved that you set up meetings around my thesis and invited me to join the internal materials briefing. This allowed me to get an impression of The Ocean Cleanup, even though I worked from home exclusively.

Furthermore, I would like to thank my parents for encouraging me to seize every opportunity, without their support this wouldn't have been possible.

Finally, I would like to thank my girlfriend, friends and roommates for supporting me in my graduation journey. Not only by serving as sparring partners and guinea pigs for my ideas, but also by for cooking for me in the days before my various deadlines.

Enjoy reading my thesis!
Adriaan

TABLE OF CONTENTS

1. INTRODUCE	1.1 CONTEXT	8
	1.2 PROBLEM DEFINITION	10
	1.3 APPROACH	12
2. DISCOVER	2.1 THE MATERIAL	16
	2.2 RECYCLING	22
	2.3 MANUFACTURING	30
	2.4 THE COMPANY & CONTEXT	34
3. DEFINE	3.1 CRITERIA	50
	3.2 STRATEGY DEFINITION	52
4. DEVELOP	4.1 TESTING TIER 1	68
	4.2 TESTING TIER 2	84
	4.3 TESTING TIER 3	94
5. DELIVER	5.1 FINE-TUNING THE STRATEGY	106
	5.2 PARTNERSHIP FACTORS	112
	5.3 PARTNERSHIP TOOL	126
	5.4 OTHER FACTORS	131
6. CONCLUDE	6.1 CONCLUSION	136
	6.2 DISCUSSION	138
	6.3 REFLECTION	140
	6.4 REFERENCES	144
7. APPENDIX		152

1. INTRODUCE



1.1 CONTEXT

An estimated 8.8 million tonnes of plastic end up in the oceans every year (Jambeck et al., 2015). We are only beginning to understand the negative impact on wildlife and the environment. This plastic does not decompose by itself. On the contrary the longer it is out there, the more it degrades into even more harmful micro-plastics (Andrady, 2011).

CEO and founder of The Ocean Cleanup Boyan Slat was shocked after seeing more plastic than fish on a diving trip in 2011. Two years later, at the age of 18, he founded The Ocean Cleanup with the aim to rid the world's oceans of plastic by 2040. As it turns out, a lot of the plastic is drawn into 'gyres' in the ocean, which leads to hotspots of ocean plastic build-up (figure 1). The biggest of these hotspots is the so-called Great Pacific Garbage Patch (GPGP) (Lebreton et al., 2018). The Ocean Cleanup wants to use the very same ocean currents that create these hotspots to remove this plastic. By placing floating systems in the GPGP that move at a different rate to the ocean plastic (by either being more susceptible or less susceptible to currents and wind) the systems will start to accumulate the plastics within them (figure 2).

In 2019 The Ocean Cleanup captured the first batches of ocean plastic, using the second version of the original design: System 001/B. They are currently working on a second generation cleanup system which will be launched in the summer of 2021. This system will be the first step towards scaling up to a fleet of systems that will clean up the GPGP.

In addition to their ocean operations The Ocean Cleanup also developed a rivers project. 80% of the plastic pollution in the ocean stems from just 1000 rivers. To ensure that new plastic doesn't make the ocean efforts futile, The Ocean Cleanup designed the 'Interceptor™', a device that sits in rivers and filters out plastic pollution before it can reach the ocean. It was revealed in 2019 and the first few interceptors have since successfully been deployed in Malaysia, Indonesia and The Dominican Republic, with The Ocean Cleanup currently preparing for mass production.



Figure 1: The five gyres where ocean plastic accumulates
Image source: The Ocean Cleanup website



Figure 2: The Ocean Cleanup's ocean cleaning system: System 01B
Image source: The Ocean Cleanup website

1.2 PROBLEM DEFINITION

System 001/B has already captured a bunch of ocean plastic and the future systems will catch a lot more. Currently, nobody has the ultimate responsibility for these plastics, as they come from international waters. This means it is up to The Ocean Cleanup to deal with it.

Furthermore, up to now The Ocean Cleanup depended fully on donations, in-kind services and grants to continue operating. The captured ocean plastic presents an opportunity to create value and consequently a more circular and self-sufficient way of funding the operation.

To this end, The Ocean Cleanup has already developed a B2C product made from ocean plastic: The Ocean Cleanup sunglasses. These sunglasses represent one possible solution to the problem of what to do with the recovered plastics.

With my graduation project I aimed to find new and creative concepts/designs/business models to create value from the bulk of the ocean plastic in the next five years, in a way that aligns with the brand and mission of The Ocean Cleanup.

This assignment naturally came with a number of restrictions that limit the possibilities. For example: the plastic is retrieved in batches, so the supply is non-continuous and the consistency might differ between batches. The properties of the captured plastic could also be a limitation, as they might have been degraded by the ocean and sun and might be difficult to recycle.

Furthermore, the designed concepts must align with the brand of The Ocean Cleanup and its goals. This means that potential products cannot be wasteful or end up in the ocean.

However, the plastic also provides a number of opportunities for my assignment. A growing awareness of sustainability is leading to an increased demand for products that are verifiably sustainable. The ocean plastic captured by The Ocean Cleanup went through an incredible journey. It started as a product somewhere the world. It then floated in the ocean for perhaps years and years and was subsequently captured and recycled to clean the oceans. I believe there is a huge opportunity for developing products that not only give these plastics a second life, but also retain and tell this story to the world.

My assignment thus was as follows:

"I will conduct research on the topic of value creation with ocean plastics through brand, technology and consumer perception. Based on this research, I will design one or more directions/concepts/strategies for The Ocean Cleanup."



1.3 APPROACH

The approach chosen for this thesis is based on the double diamond method and this report is structured around its four phases. Figure 3 shows a visual representation of this method, in which the horizontal axis displays the breadth of ideas and knowledge, while the vertical axis shows the timeline of the project.

Using the double diamond method I alternated between phases of divergence and convergence. In the divergent phases I generated and tested as many ideas as possible and conducted a broad range of research. In the convergent phases, I turned this research into insights and criteria, and developed the ideas into concepts and strategies. The phases are as follows:

Discover

In the discover phase, I conducted research on a broad range of topics including: the ocean plastic material, recycling technology and the company and its context.

Define

I used the second phase to turn the outcomes of this research into insights, requirements and criteria. Finally, at the end of this phase, I presented a hypothesis for the solution in the form of a strategy.

Develop

In this phase I developed and tested the strategy presented in the previous phase. I listed the assumptions required for the strategy to work and generated ideas within the strategy. I then visualised and tested these ideas as case studies in both expert and consumer interviews, in order to test the aforementioned assumptions.

Deliver

In the final phase I integrated the results from the interviews into the strategy. Based on these results, I developed an over-arching brand and I made a list of recommendations and best practices. Finally, I further developed a part of the strategy using literature research. In this way the proposed solution hypothesis is turned into a final solution strategy.

In visualisations of double diamond method the timeline looks linear, but in reality the process followed is iterative and sometimes circular. Two steps in the project were especially iterative. First, the parts between 'define' and 'develop', where the proposed strategy is generated. This part consisted of multiple iterations in which a strategy was created, ideated on and evaluated. The learnings from these steps helped in the formulation of the final solution hypothesis.

Secondly, the step between 'develop' and 'define'. In this step I tested and adjusted the prototypes. In some cases these adjusted prototypes were again tested and adjusted in iterations.

In this report, I confined myself to discussing only the information and steps that are relevant for the final solution. Other information and non-essential research/ideation can be found in the appendix.

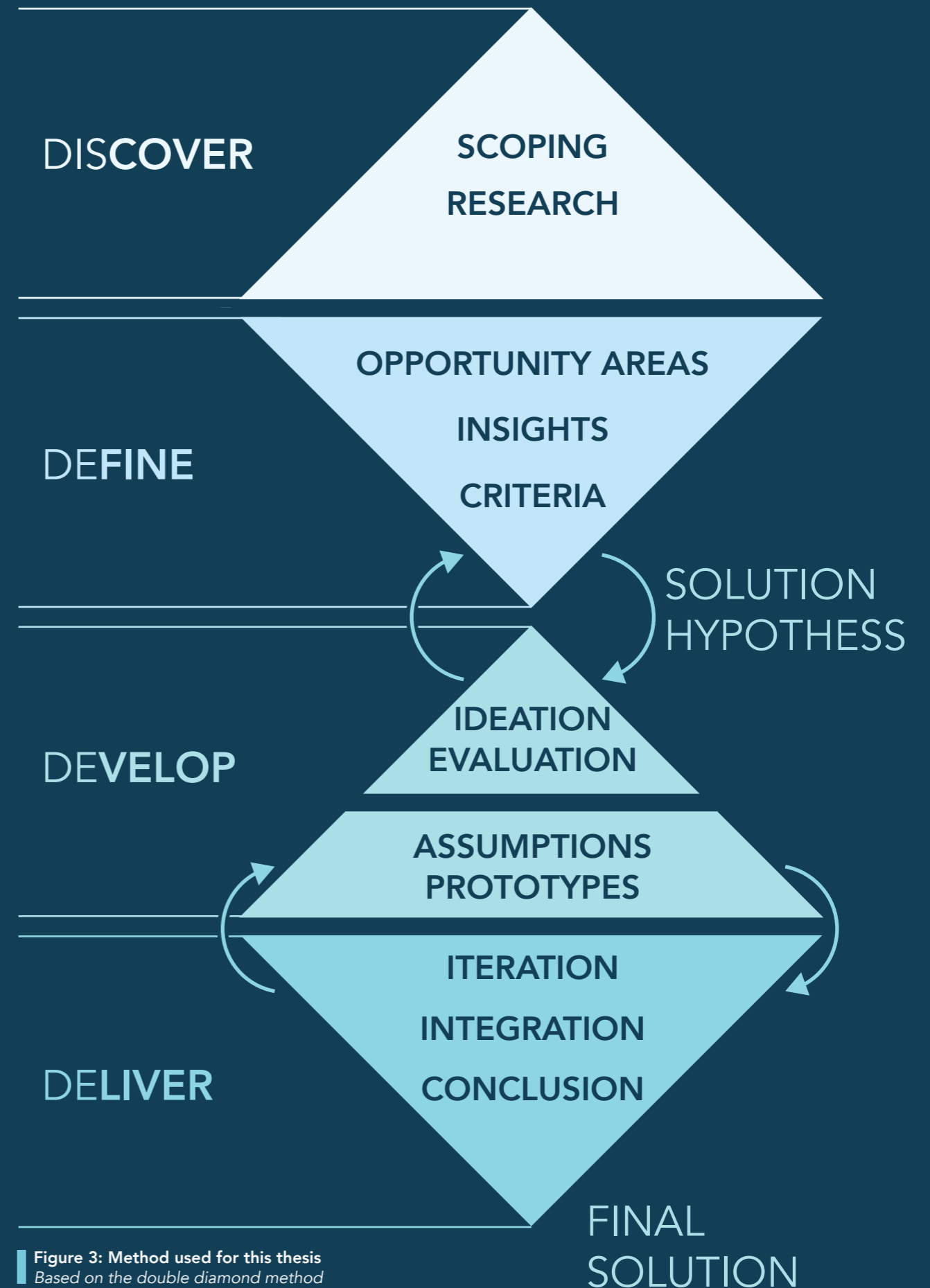


Figure 3: Method used for this thesis
Based on the double diamond method

2. DISCOVER



2.1 THE MATERIAL

The plastic that will be retrieved by The Ocean Cleanup originates from the Great Pacific Garbage Patch (GPGP). In this chapter the consistency and properties of the plastic in the GPGP is researched and analysed.

2.1.1 GARBAGE PATCH

In 2015 the Ocean Cleanup launched a big expedition to map out the GPGP and determine the location and properties of the plastics. By using so-called multi level trawls on 30 different vessels The Ocean Cleanup was able to model the distribution, depth and other properties of the (smaller) plastics (Lebreton et al., 2018). To map out the larger plastics an aerial expedition was conducted, using sensors such as a LiDAR to map out and estimate the size and weight (figure 8).

The collected plastics were analysed in lab. They were divided into four size classes and four material types.

- **Type H:** (Rigid plastic, plastic sheet or film)
- **Type N:** (Fibrous plastics, ropes, and fishing nets)
- **Type P:** (Pre-production plastics)
- **Type F:** (Fragments made of foamed materials)

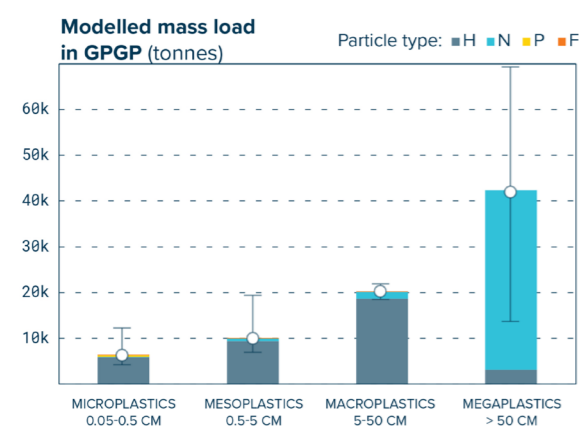


Figure 4: Modelled mass load in GPGP
Source: The Ocean Cleanup research paper

Figure 4 and 5 show that the megaplastics account for the largest percentage of the mass load of the GPGP. The majority of these megaplastics consist of discarded fishing nets. In total these discarded nets account for an estimated 46% of the plastic mass in the GPGP. These fishing nets are most often made from HDPE (High Density PolyEthylene) The next most common type of plastic are the rigid plastics. These range in size from microplastics (small grains) to for example supermarket crates.

One key finding from the research is that practically all rigid plastics found in the GPGP are either polyethylene or polypropylene. It seems that these two types of plastic have the right properties to get caught in the gyres and become trapped in the GPGP. Other types of plastics seem to either get blown ashore or sink. Furthermore, plastic films account for 37% (American Plastics Council, 1997) of the PE and PP waste but are not found in the GPGP. This can be explained by the surface to volume ratio influencing a plastics tendency to float in the GPGP. Factors such as 'biofouling' (Fazey & Ryan, 2016) could lead to plastics with a large surface area sinking.

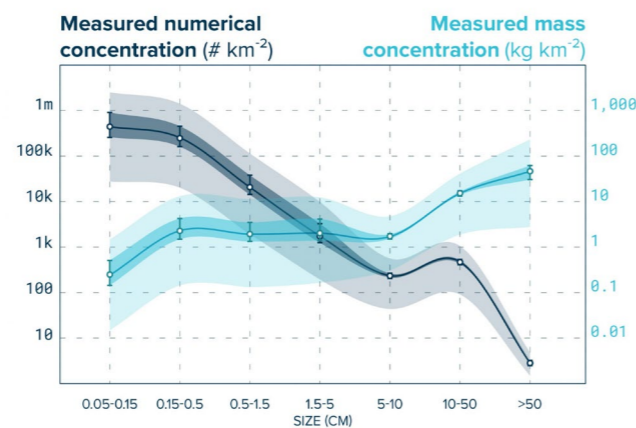


Figure 4: Numerical vs mass concentration
Source: The Ocean Cleanup research paper

2.1.2 AMOUNT OF PLASTIC

The Ocean Cleanup estimates there is around 80000 tonnes of plastic in the great pacific garbage patch. A full scale roll out of cleanup systems is estimated to be able to remove up to 50% of the plastic in the GPGP in five years. The impact of a full scale roll out has been modelled by The Ocean Cleanup in figure 6.

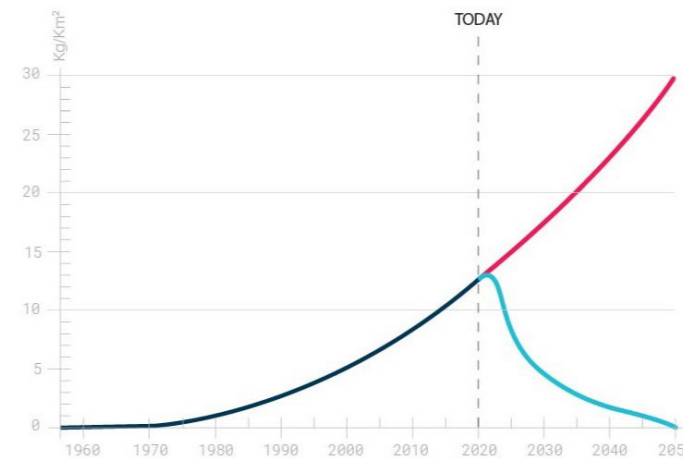


Figure 6: Numerical vs Mass concentration
Source: The Ocean Cleanup research paper

Using this graph for the reduction in ocean plastic we can calculate the estimated plastic captured in kilograms.

The estimate depends on whether the current rate of plastic entering the ocean continues. The top line of figure 7 is based on current projections of plastic entering the ocean, while the bottom line is what would happen if no more plastic accumulated in the GPGP. Based on the rivers project and other initiatives aimed at reducing plastic influx into the ocean, I have made a rough estimate of how much plastic The Ocean Cleanup can expect to collect based on the roll out of cleanup systems as currently planned.

While the estimated plastic amounts seem large, they are quite small compared to global plastic production. For example: Coca Cola alone produces 100 times as much in plastic bottles in a year as The Ocean Cleanup can clean up in five (Farmborough, 2019). On the other hand it does represent a large amount of plastic for a single company. For example, Dopper sells two million water bottles per year (Dopper, 2017). At a weight of around 100 grams each that represents only 200.000 kilograms of plastic. The Ocean Cleanup could at its peak collect 50 times that per year.

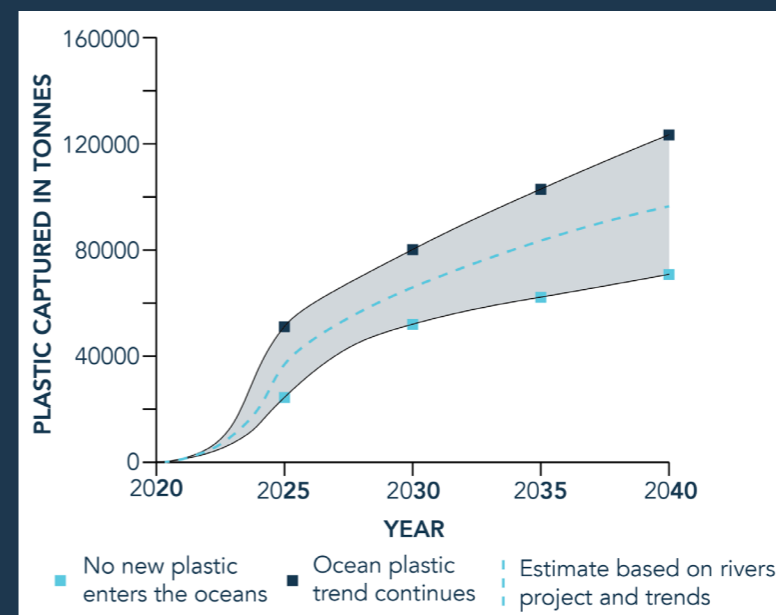


Figure 7: Estimation of plastic catch per year
Data used: found on The Ocean Cleanup website

TOTAL ESTIMATED PLASTIC COLLECTED

2022 (ROUGH ESTIMATE)	2.000.000 kg
2023 (ROUGH ESTIMATE)	8.000.000 kg
2024 (ROUGH ESTIMATE)	18.000.000 kg
2025	32.000.000 kg
2030	62.250.000 kg
2035	80.000.000 kg
2040	95.000.000 kg

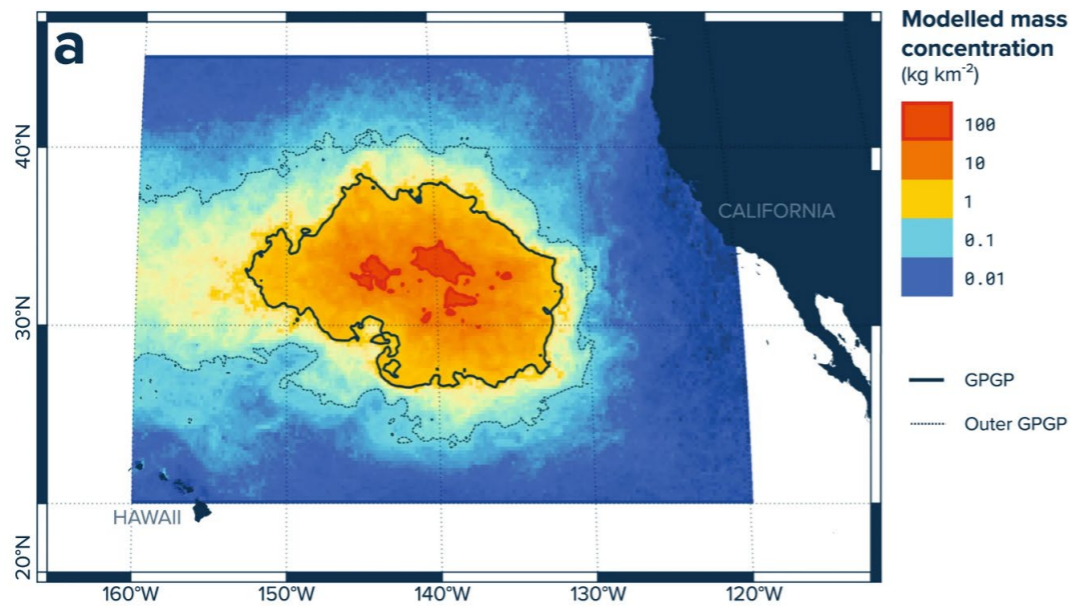


Figure 8: Mass of garbage patch by location
Source: *The Ocean Cleanup research paper*

2.1.3 THE MATERIAL

From the expeditions in the garbage patch we know that the plastics are either PE or PP and do not include plastic films. Within these two plastic types however, there are still some differences. For example: in additives used, in density and in pigments used to colour the plastic. A few factors are key to keep in mind when working with ocean plastic. These are: composition, colour, degradation and pollutants.

2.1.3.1 COMPOSITION

Based on composition and type, the plastics can roughly be divided into fibrous plastics and rigid plastics. Each of these groups is further divided into a black and a non-black fractions (figure 10).

The fibrous plastics (ropes and fishnets, for example) are separated from the rigids, because they require a slightly different recycling process. More on that in chapter 2.2.1.

The reason black plastics are separated is because the black pigment in the black rigids is problematic when one wants to recolour the recycled material. Only a tiny bit of this pigment in the total amount of input plastic used ensures that the output plastic will be black (Dern, 2021). Furthermore, this black pigment protects the black plastics against degradation (see paragraph 2.1.3.2).

It is important to note that at this point in sorting, all groups of plastic are still a mix of HDPE and PP.

These should again be separated (as well as possible), because recycling the two plastic types together has a negative effect on the final mechanical properties (Hopewell et al, 2009).

Finally, for the rigids, the microplastics are too small to be worth sorting and are therefore put in a separate mixed group. The collected rigids will also contain some polymers other than PE and PP in small quantities. These will also be added to the mixed fraction. In the fibrous group, some nets or ropes contain for example metal cores or are too tangled to sort. These are added to the 'other' group.

An overview of the different groups of ocean plastic is visualised in figure 9.

To get a better picture of the properties of the main type of plastic (HDPE) the advantages and disadvantages are listed in figure 11, according to A&C plastics (2020).

The Advantages of HDPE Include

- Affordable
- Operate Harsh Temperatures
- Non-Leaching
- UV Resistant
- Resistant to most Chemicals
- Stiff Material
- Amazing Durability
- Highly Versatile

The Disadvantages of HDPE Include

- Poor Weathering
- Highly Flammable
- Sensitive to Stress Cracking
- Not Biodegradable
- Can't Be Composted
- Not Resistant to Oxidizing Acids
- Not Resistant to Hydrocarbons
- High Thermal Expansion
- Poor Temperature Capability

The Top Uses for HDPE Include

- Shampoo Bottles
- Toys
- Chemical Containers
- Pipe Systems
- Milk Jugs
- Recycling Bins
- Grocery Bags
- Cereal Box Liners

Figure 10: Groups of sorted ocean plastic
Source: *The Ocean Cleanup*



Figure 11: Advantages/disadvantages of HDPE
Source: *The Ocean Cleanup*

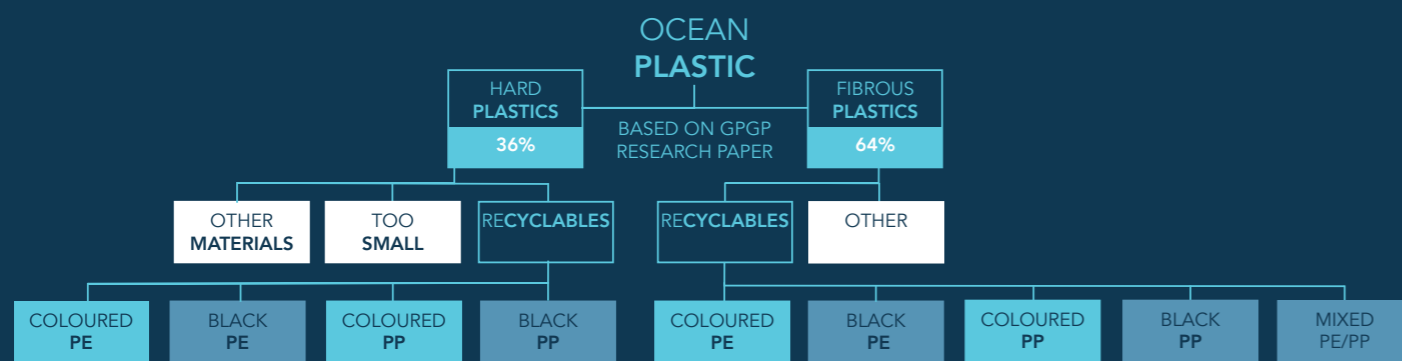


Figure 9: Ocean Plastic material groups



2.1.3.2 DEGRADATION

As time passes, the harsh marine conditions have an impact on the plastics. This is called degradation, which is defined as a chemical change that drastically reduces the mechanical integrity of the polymer and reduces the average molecular weight (Moore, 2008). Degradation can occur either abiotically or biotically, with the former often preceding the latter (Gewert et al., 2015) (Pritchard, G., 1998). Abiotic degradation occurs mainly through exposure to UV light. This exposure causes surface cracking and brittleness, which in turn leads to smaller polymer fragments and an increased surface area. This increased surface area allows for biofouling and biotic degradation to occur (Andrady, 2011) (figure 12).



Figure 12: Degraded plastic with biofouling
Source: The Ocean Cleanup

Degradation occurs on the surface of the plastic. This means that smaller plastics degrade more, as their surface to volume ratio is larger (Gewert et al., 2015).

This degraded layer has properties that are significantly worse than the rest of the material and can therefore be removed through a mechanical process.

Black plastics suffer from degradation far less than coloured plastics. This is because the black pigment offers a natural form of UV protection (Poly-Processing, n.d.). Degradation is also far less present in the fishing nets and ropes, which consist of plastics that are UV treated and designed to withstand the harsh marine conditions.

2.1.3.3 POLLUTION

The pollution found in ocean plastic can be divided into three separate sorts: odours, heavy metals and persistent organic pollutants (POPs).

Ocean Plastic can sometimes have a nasty smell. This is caused by marine organisms producing the compound dimethyl sulfide (DMS). DMS is often associated with fishy or disagreeable smells (Savoca et al., 2016). DMS evaporates, at a temperature of 37 degrees Celsius. This means that the odour can be removed by heating the plastics. Another option would be to use certain additives in recycling, which can neutralise odours.

Heavy metals are another pollutant that are found in ocean plastics. These were (and in some cases still are) often added to plastics to add certain properties. For example: cadmium and lead were used to colour plastic yellow and red respectively (see figure 13). Other heavy metals were used as, for example, flame retardants or UV stabilisers (Miller & Harris, 2015). These heavy metals are toxic to both the environment and the human body (through skin contact and ingestion).

The final pollutants are the so-called POPs. Ocean plastic is hydrophobic, and so are the POPs, which causes the ocean plastic to 'soak up' these pollutants. This results in a concentration of POPs in ocean plastic that can be a lot higher than in the surrounding water (Weber et al., 2010). As with degradation this reaction is dependent on surface area, causing the smaller plastic particles to soak up relatively more POPs (Gewert et al., 2015). Examples of POPs include industrial chemicals, pesticides and byproducts (PlasticsEurope, 2016).

Finally, the plastic could contain unexpected pollutants. One might never know the origin of the initial products, or what they have been in contact with. This means that constant testing of the material will probably be necessary.



Figure 13: Yellow Heineken crates, banned for their cadmium content
Source: AD.nl

2.1 KEY INSIGHTS

- Almost half of GPGP plastic consists of fishing nets and ropes
- Almost all GPGP plastic is either PE or PP
- Plastics need to be sorted in black and non-black fractions
- Due to possible pollutants, the material will have to be tested constantly



2.2 RECYCLING

The properties discussed in the previous chapter have a number of consequences for the recycling process. In this chapter the different options, steps and outcomes are discussed.

2.2.1 MECHANICAL RECYCLING

Virgin plastics are often sold as pellets. Mechanical recycling refers to a process in which a plastic is, through various steps, transformed into pellets, which can again be used in the production of new products. The quality of these recycled pellets can be lower, because waste can be a mixture of different plastics types, of different densities within the same type or can come with degradation and pollution. (Tullo, 2019) The same might be true for ocean plastics.

In order to minimize the quality loss, the input material should be sorted by polymer type, shredded into flakes, cleaned and finally degassed and melt filtrated in an extruder. Figure 16 displays a visual representation of the different steps in the ocean plastic recycling process.

For the sorting step, the plastics should first be sorted into the groups described in figure 9. This can prove especially difficult in black plastics, as the black pigment absorbs the infrared light used to determine polymer type (Mooij, 2019). For the non-black rigids, sorting is easier, but there is still a margin for error.

Once all the plastics been sorted by polymer type, they should be shredded in order to end up with flakes of <12mm (see figure 14).



Figure 14: Shredded ocean plastic flakes
Source: The Ocean Cleanup recycling research

This step is a bit different for the fibrous plastics, as these require different shredders. After shredding fibrous plastics result in a fluffy material instead of flakes (see figure 15). This fluffy material has to go through an adjusted process in order to turn it into pellets. There are companies specialised in the handling of these nets and ropes.

Once the plastics are sorted, they should be washed. As described in the previous chapter, both the POPs and the odour can be removed through hot washing.

Finally, the flakes need to be compounded into pellets in an extruder. For regular recycled plastics the extruder phase is sometimes not required (the flakes from shredding can be used in manufacturing instead of pellets). It can, however, not be guaranteed that ocean plastic flakes are pollutant free (they are not a homogeneous material and not all flakes can be tested individually).



Figure 15: Ocean plastic fluff from fibrous fraction
Source: The Ocean Cleanup recycling research

This means that in the case of ocean plastic the extruder step is necessary to homogenise the material and allow for testing of big batches at once. Extrusion also allows for degassing, melt filtration and the addition of additives. These additives can be, for example, colorants, but also additives that improve the mechanical properties of the material.

I found in the previous chapter that ocean plastic pieces might display different degrees of degradation, contain various types of additives and sometimes pollutants. Furthermore, there is always a margin for error in sorting by polymer type. Even then, the sorted polymer group will contain plastics of different grades and densities within the polymer type. These factors combined mean that the input plastic for the recycling process can be quite unpredictable. This will lead to unpredictable (often worse) results in the mechanical properties of the output plastic (Hopewell et al, 2009). Adding the aforementioned additives might help alleviate some of this unpredictability.

Still, because the plastic has been exposed to the ocean's harsh conditions for so long, ocean plastic is probably more difficult to process into a usable material than regular recycled plastics.



Figure 16: Recycling process
Data source: The Ocean Cleanup

The extra steps in the recycling process to clean and homogenise the material also suggests ocean plastic will be a comparatively expensive to recycle as well.

2.2.2 THERMO-CHEMICAL RECYCLING

Thermo-chemical recycling is a process through which plastic is decomposed into raw basic materials, such as oil or gas (Murray, 2013). Pyrolysis is one such method, especially suitable for PE and PP (figure 17). The output of pyrolysis is pyrolysis oil. This oil is currently mostly used as fuel, however, theoretically it could also be used to create new virgin plastics or other oil-based products (candle wax for example). In this way pyrolysis seems like a great method for recycling the mixed/other fraction of the plastic, however there are some caveats.

First of all, pyrolysis is an emerging technology and there currently is only a small number of operational plants. This number is expected to grow in the future (partially due to the smaller quantities of plastic waste exported to China (Brooks et al., 2018)). The second caveat is that these plants will need adjustments in order to deal with the specific plastic mix, which results in investment requirements. Once these adjustments are made these plants need a constant (large) stream of input plastic (Tullo, 2019). This could prove to be difficult for ocean plastic as the material is collected in unpredictable batches. Finally, pyrolysis is quite sensitive to impurities, which ocean plastic (and especially the mixed/other fraction) might contain. Because of these factors pyrolysis does not seem feasible on the short to medium term.

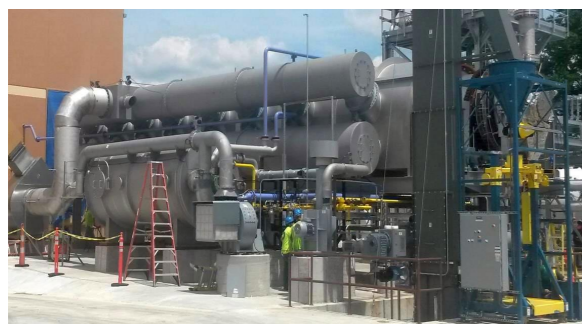


Figure 17: Pyrolysis plant
Source: www.splainex.com

2.2.3 SOLVENT-BASED RECYCLING

Solvent-based recycling refers to a relatively new form of recycling, in which the input plastic is dissolved in an organic solvent. By then separating this solvent and again removing it, one ends up with near virgin quality polymers. (Zhao et al., 2018)

There are currently no full-scale plants that can process HDPE or PP, however. This means that solvent based recycling may be an option in the long term, but can be excluded in the ideation for this project.

2.2.4 OTHERS

There are a few other options for recycling plastics. One would be to stop the mechanical recycling process at the 'clean flakes' step. The multicoloured and inhomogeneous flakes could then be used to press products with, for example. The appearance of these products conveys the origin of the material, which makes this extremely interesting from a marketing point of view (figure 18).



Figure 18: Plate pressed from ocean plastic
Source: *The Ocean Cleanup* research

Such methods could be an option for the mixed/other fraction. This comes with its own share of challenges, however. The mechanical properties of such products will be unpredictable at best. The Ocean Cleanup can also not guarantee that there are no pollutants left in

Testing each product is not only unfeasible, but each product would also have to be tested on every possible location. One way to replicate this look is to sort the flakes by colour, to compound them into different pellets, to extrude simple shapes with the pellets, and finally, to shred the shapes. This way one ends up with flakes of homogeneous (certifiably non-polluted) plastics of different colours which could be used in pressing. Other ways to circumvent the fact that the plastic cannot be tested without homogenisation could be, for example, to cover a product with a sheet of glass.

The final recycling option is biological recycling. Biological recycling works with microbes which can decompose plastics into biomass. This technology shows great promise for the fractions of plastics which can not be sorted, for example. However, the technology has only been proven on a lab scale and it will take a lot of time before it is commercially available on a large scale (Drahl, 2018).

2.2.5 SUNGLASSES

The Ocean Cleanup launched their first product made from recycled ocean plastic in October of 2020 (figure 19). These sunglasses are produced from the fishing nets (HDPE), through mechanical recycling. To simulate the effect of the ocean in injection moulding, it created two different batches of plastic, with two slightly different colours (added in the compounding step). It then used 2K injection moulding to mix the plastics in the mould.



Figure 19: The Ocean Cleanup Sunglasses
Source: *The Ocean Cleanup* website

2.2.6 IMPLICATIONS

From the previous phases follows that mechanical recycling is currently the most likely option for most ocean plastic. To get the best possible results in mechanical recycling, the plastic needs to be sorted into different groups. First, fibrous and rigid plastics should be separated. Next, black and non-black plastics should be separated. Finally, the plastic should be sorted by polymer type.

When looking at the resulting properties of the plastics in each group after recycling, they can roughly be grouped into three tiers:

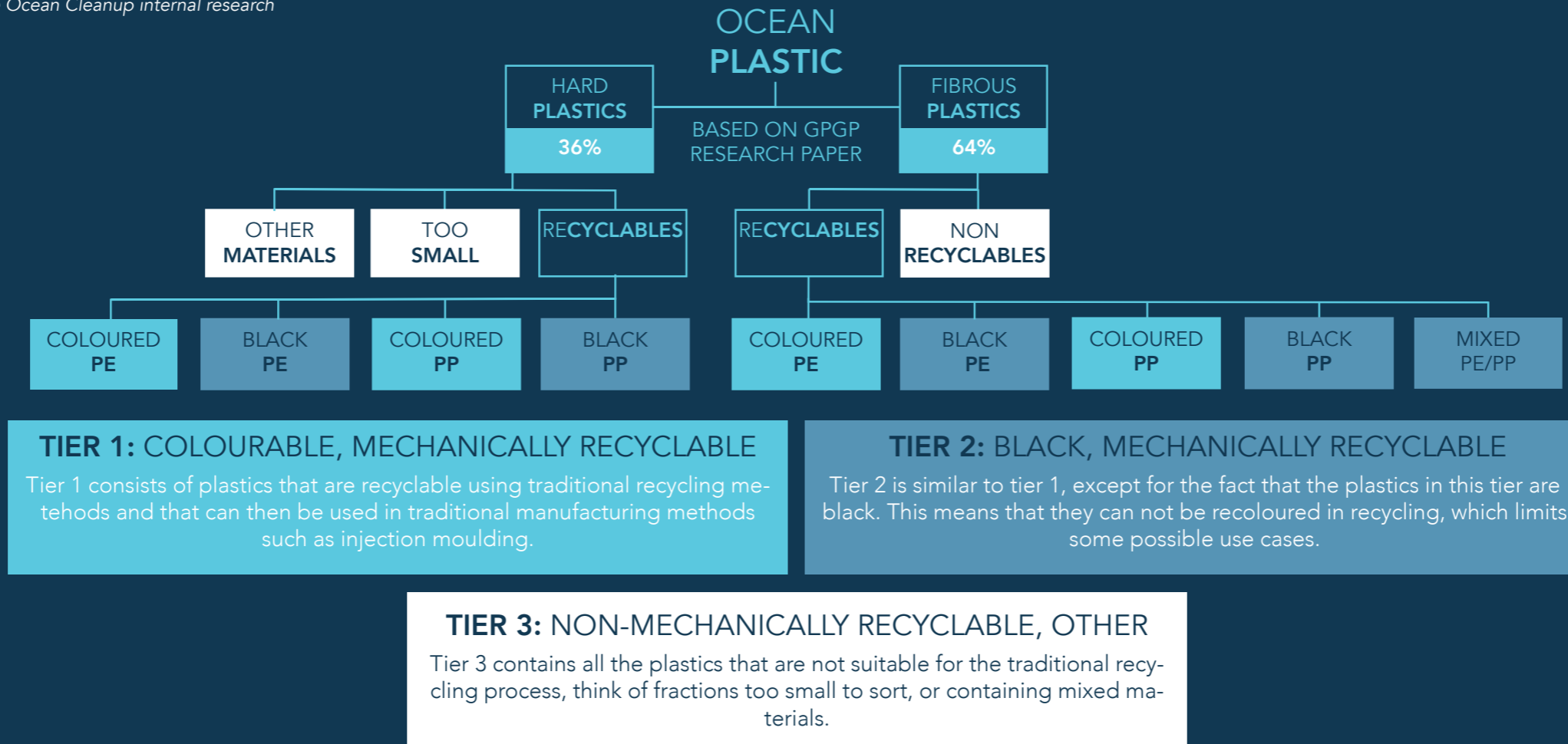
Tier 1: Plastics that can be mechanically recycled and recoloured
(containing all coloured HDPE and PP fractions)

Tier 2: Plastics that can be mechanically recycled but are black
(containing all black HDPE and PP fractions)

Tier 3: Plastics that are non-mechanically recycled
(containing all other/mixed fractions)

The three tiers and how they relate to the sorted material groups are visualised in figure 20.

Figure 20: Preliminary sorting groups
Data used: The Ocean Cleanup internal research




TOTAL ESTIMATED PLASTIC COLLECTED

2022 (ROUGH ESTIMATE)	2.000.000 kg
2023 (ROUGH ESTIMATE)	8.000.000 kg
2024 (ROUGH ESTIMATE)	18.000.000 kg
2025	32.000.000 kg
<hr/>	
2030	62.250.000 kg
2035	80.000.000 kg
2040	95.000.000 kg

Figure 21: Estimation of plastic catch per year
Data used: found on The Ocean Cleanup website

TO GET A FEELING FOR VOLUMES:

 Heineken has 4.6 million beer crates in circulation, at 2kg per crate that equals:
9.200.000 KG (Distrifood, 2019)

Coca Cola's yearly plastic packaging production equals:
30.200.000.000 KG, of which
The volume of the entire GPGP is mismanaged in Mexico alone (Ellen MacArthur Foundation, 2019)



IKEA IKEA sells a Billy bookcase every five seconds, amounting to a yearly weight of:
189.216.000 KG (IKEA, n.d.)

LEGO produces 36 billion pieces yearly, amounting to a total weight of:
90.000.000 KG (Reuters, 2020)

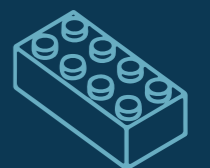


Figure 22: Examples of plastics volumes for scale
Source: See figure



2.2 KEY INSIGHTS

- Ocean Plastic can be divided into **three main material tiers**
- **Mechanical recycling** is the most likely option, other options are not yet viable
- The **mechanical properties** of recycled ocean plastic might be **unpredictable**
- **Additives** can be used to **compensate** this unpredictability
- Various steps are required to **remove degradation and odours**
- **Fibrous plastics** require a **slightly adjusted process**



2.3 MANUFACTURING

This chapter discusses the possibilities in manufacturing methods in order to gain a better understanding of how the recycled plastics can be used in the creation of new products.

2.3.1 MECHANICALLY RECYCLED

From the recycling chapter (2.2) follows, that mechanical recycling is currently the most feasible option for most of the ocean plastics recovered from the GPGP. After mechanical recycling, one ends up with so-called pellets. These can be used in a number of production methods. The Ocean Cleanup sunglasses were made by injection moulding, one of the most common methods.

Injection moulding

In injection moulding, the plastic is injected into a mould at high temperature and pressure (figure 23). The advantages of injection moulding include: high precision and repeatability, a low cost per part for high volumes and a fast production time. The moulds used, however, are expensive and each part/product needs its own particular mould. This results in a high initial investment and low customisability. There is also a limitation in the size of the products and certain shapes may require more complex (and thus more expensive) moulds. (Toolcraft, n.d.). When designing a mould for products made from GPGP plastic, the specific properties of the batch of plastic will have to be taken into account (for example the Melt Flow Index, or MFI). The MFI might be different for each batch of ocean plastic as it depends on the grade of plastic. This means that injection moulding products from GPGP plastic is not simply a matter of swapping the input material.

Most likely, custom moulds need to be designed and manufactured to cope with the differing MFI and other properties of the material, therefore requiring some extra investments.

Extrusion

Extrusion is another suitable manufacturing method (it is commonly used for HDPE and PP). In extrusion the plastic pellets are heated and forced through a die, which creates a long tube in a certain shape (figure 24). This means that only products with a constant cross section can be created using extrusion. It is most commonly used for pipes, wires and products such as straws.

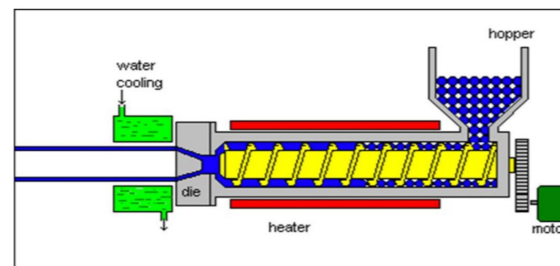


Figure 24: Plastic extrusion process
Source: Kristina Garrett

The extruded 'tube' can also directly be used in a process called extrusion blow moulding (figure 25). This production method is used to make hollow products, such as bottles and containers. Similarly to injection moulding, this method requires a mould, but because the pressures are lower the mould is cheaper to produce.

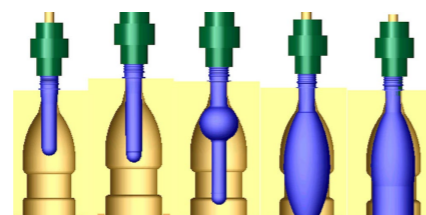


Figure 25: Extrusion Blow Moulding
Source: Vishal Gulati

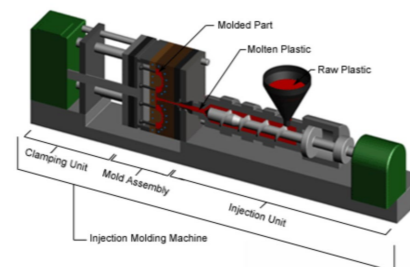


Figure 23: Injection Moulding
Source: Custom Part Net

Blow moulding is also a fast manufacturing method that comes with a low cost per part for high volumes. Disadvantages are mainly found in the design of the final product, as wall thickness is hard to control and complex shapes create issues in tolerances (Westerncase, n.d.).

Vacuum forming

Another relevant production methods is vacuum forming. In vacuum forming, a heated sheet of the plastic is sucked onto the surface of a 3D mould (figure 26). This mould can be made from multiple materials, including for example high density foam. This means that the investment required for vacuum forming is quite low, making it suitable for small scale production and prototyping.



Figure 26: Vacuum forming
Source: Formechs

It is less suitable for high production output, however, with methods such as injection moulding overtaking it in cost-effectiveness at around 10,000 pieces (Formlabs, n.d.) (figure 28). Another limitation lies in the design of the product, as the sheet will follow the exterior of the mould. This means that the final product will be a panel/plate and that the local thickness is difficult to manipulate. (Formech, 2021)

Roto-moulding

A production method that might also be possible is roto-moulding (figure 27). Similarly to blow moulding, roto-moulding is used to produce hollow products (for instance a kayak). It works by filling a mould with plastic powder, heating the mould and then spinning the mould.



Figure 27: Rotomoulding
Source: Elkoplast

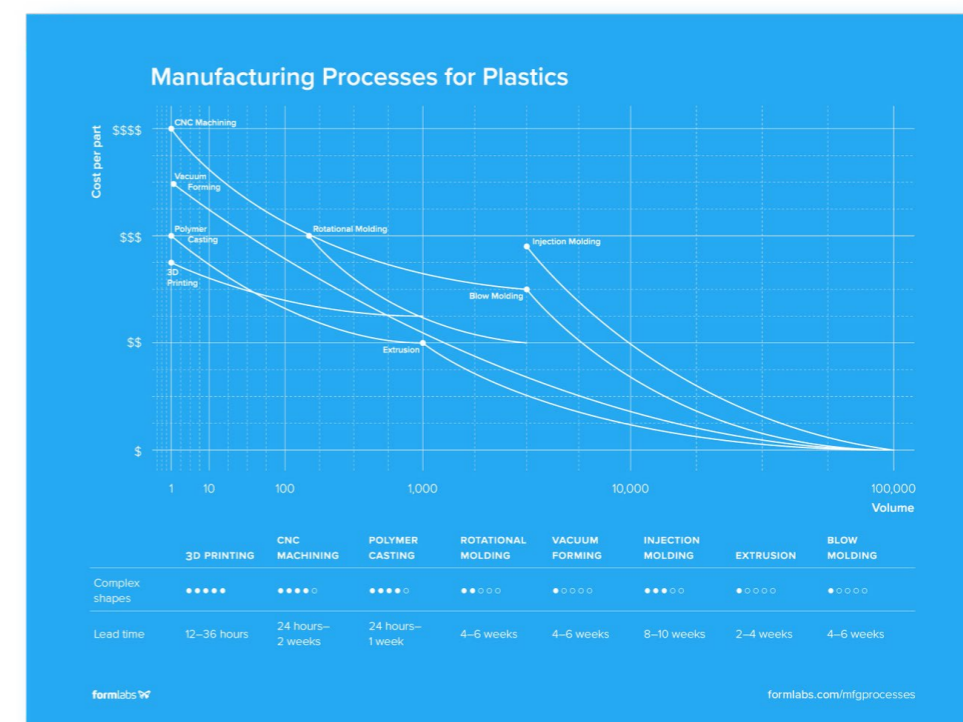


Figure 28: Plastic manufacturing methods by volume, costs and complexity
Source: Formlabs

As the plastic melts, it is distributed across the mould, with a uniform thickness. Roto moulding is suitable for products of any size. Due to there not being any pressure involved, the mould costs are lower compared to blow moulding.

These molds also wear out faster, however. Combined with the fact that the time required per part is on the high side, this makes roto molding more suitable for smaller production runs (<3000) (Gemini group, n.d.).

2.3.2 ALTERNATIVE METHODS

Next to the previously mentioned industrial methods, there are a few novel ways to handle HDPE/PP pellets. If they are colour sorted by The Ocean Cleanup, they could be melted and pressed to create a block with a natural stone-like appearance (Brothers Make, 2020)



Figure 29: Recycled HDPE stool
Source: Brothers Make

These blocks can then be handled in ways similar to other materials. They can for example be milled, turned, welded or pressed into thin sheets. The result of such production methods is quite appealing visually and displays the origin of the material (figure 29) (more on that in chapter 2.4.4.1).



Figure 30: Ram based injection moulding
Source: Techkits

These production methods are quite labour intensive and slow compared to the industrial ones though, making them less suited for bigger batches. It might be possible to replicate the natural stone-like appearance through injection moulding with a ram-type extruder instead of a screw. This way, the material is not mixed into a uniform colour before injection (Techkits, 2015) (figure 30). However, this is not commonly done and will require more research to be applied successfully.

A more unorthodox way to use GPGP plastic is epoxy encasing. By putting pieces of ocean plastic in a mould and pouring epoxy resin over them, one can create the effect of plastic floating in frozen water (Wisebond, n.d.) (figure 31).



Figure 31: Guitar made using epoxy encased fish
Source: Wisebond

This method is also suited for the groups of plastic that cannot be mechanically recycled. The epoxy covers the plastic, shielding users from skin contact with the potential pollutants in the plastic. This method is not suitable as a main solution for ocean plastic, as it is both labour intensive and requires a lot of virgin epoxy resin to be added in (making further recycling even more difficult). It could, however, be used to create a few awareness raising items (such as art pieces). It could also be a solution for plastics that are too polluted.

As seen in chapter 2.2.1 fibrous materials turn into fluff when shredded. Perhaps this fluff could be used as an end product. Think for example of pillow filling or insulation material.

Finally, it seems unlikely that GPGP plastic could currently be used in other mainstream manufacturing methods that are not listed here.

2.3 KEY INSIGHTS

- Tier 1 and 2 plastics can be used in most industrial manufacturing processes
- Tier 3 plastics can be used in novel ways, such as pressing or epoxy casting
- Manufacturing methods such as 3D printing are not suitable
- The process chosen depends on the product and the volume to be produced



2.4 COMPANY & CONTEXT

Any product designed with ocean plastic will have to align with The Ocean Cleanup as a brand and as a company. In this chapter a 4C analysis is done, followed by a brand analysis. In this 4C analysis, I first analysed The Ocean Cleanup as a company (what are the capabilities, what is its budget). I then analysed the position of The Ocean Cleanup amongst other players in similar fields. Next I studied the context of the problem of (ocean) plastic pollution. Finally, I analysed the 'consumers', meaning I studied sustainable consumption and the followers of The Ocean Cleanup.

2.4.1 COMPANY

The Ocean Cleanup was founded in 2013 by Boyan Slat, who had only just graduated high school the year before. The mission of the Ocean Cleanup was initially only focused on cleaning the Oceans using natural currents. To this end, The Ocean Cleanup released a 528 page feasibility study in 2014. In 2015 and 2016 an operation was launched to map out the GPGP.

After 273 scale model tests, the first system (001) was launched in 2018 (figure 32). This system failed to retain the plastic for a sufficient amount of time, however, and suffered a structural failure. System 001/B was launched soon after and was designed in a modular way, to allow for the testing of different technologies. This system succeeded in capturing the first ocean plastics and is now back on land. The Ocean Cleanup is currently designing system 002, which will be scalable if proven successful.



Figure 32: System 01 'Wilson'
Source: The Ocean Cleanup

In addition to cleaning the ocean, The Ocean Cleanup had been working on a side project for rivers behind the scenes. After all, what use is cleaning the ocean when new plastic is still entering it? As it turns out, 80% of ocean plastic comes from only 1000 rivers (The Ocean Cleanup, 2019). To solve this problem, The Ocean Cleanup designed 'The Interceptor™' (figure 33). This device sits in a river at a point where the current pulls together the plastic and, using a barrier, navigates the plastic onto a conveyor belt. The plastic is then loaded into dumpsters for waste management. These plastics are outside the scope of this thesis, but the rivers side of The Ocean Cleanup is nevertheless essential in understanding the company and brand. There are currently four interceptors up and running, with mass production just starting on the third-generation design.

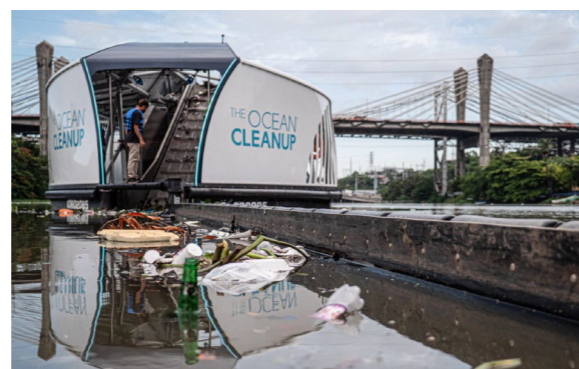


Figure 33: Interceptor 004, Dominican Republic
Source: The Ocean Cleanup

The Ocean Cleanup is headquartered in the city centre of Rotterdam, near the Central Station (figure 34).



Figure 34: The Ocean Cleanup offices
Source: The Ocean Cleanup, Google

Currently, The Ocean Cleanup directly employs 79 people (according to their website). If you look at their LinkedIn profile this number grows to around 150, but this includes volunteers, interns and board members. The employees are divided over different departments: Management, Oceans, Rivers, Research, Service, Funding, Communication and Valorisation. The Valorisation team is tasked with finding a purpose for the plastic that will generate additional revenues at the same time. The sunglasses are its first result.

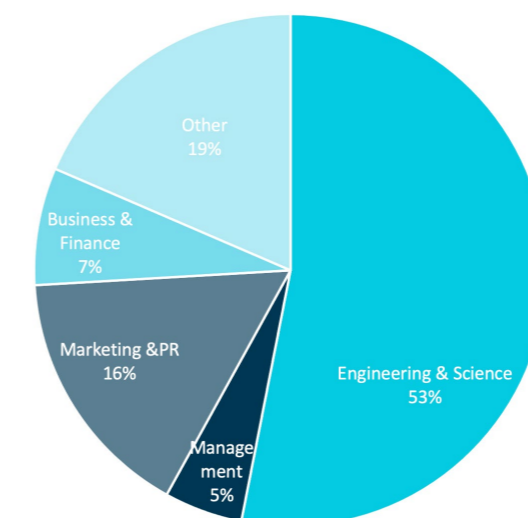


Figure 35: The Ocean Cleanup staff by function
Data used: LinkedIn, The Ocean Cleanup website

By counting the employees and dividing them per department, one can see that The Ocean Cleanup is primarily an engineering company, with the marketing and PR division being the second largest (figure 35). I believe this engineering focus is relatively unique for such an environmental organisation.

The Ocean Cleanup is structured as a foundation, meaning it is a non-profit organisation. This helps its credibility as an organisation that aims to do good, as it ensures that the financials are transparent and that profit is not its main goal. Looking at the annual report (The Ocean Cleanup, 2019) one can see that it costs around €20 million per year to run The Ocean Cleanup in its current form, out of which €6 million is composed of salaries and other human resource costs. The rest is spent on operational costs. The Ocean Cleanup currently invests the largest portion of its budget into the Oceans department (figure 36).

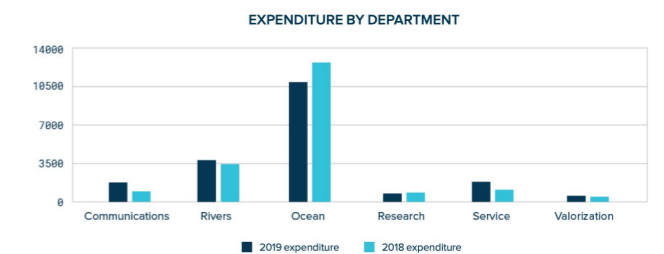


Figure 36: Expenditure by department
Source: The Ocean Cleanup Annual report 2019

When looking at the income of The Ocean Cleanup, it is seen that by far the largest amount originates from donations by the general public (in 2019): €25.6 million out of €32.8 million (figure 37).

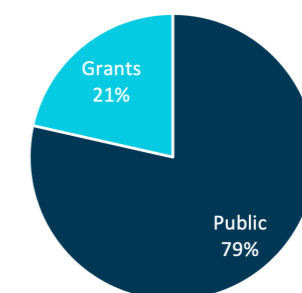


Figure 37: Income by source
Data used: The Ocean Cleanup Annual report 2019

This number was up in 2019 due to a temporary boost by Facebook birthday fundraisers, which do not seem to be as popular anymore. Furthermore, grant funding was down around €8 million compared to 2018. A further decrease in income could be expected due to COVID-19.

The Ocean Cleanup does have a cash reserve of €34,6 million, however, enough to fund the organisation for at least a year and a half. The Ocean Cleanup has also started selling the first product this year. According to numbers from the website it can be estimated that almost 9000 sunglasses have been sold so far. With a margin of €132 per pair that would put the income from the sunglasses at around €1.2 million so far, around 3% of the total income.

2.4.2 COMPETITION

To get a better overview of the position of The Ocean Cleanup in its context I performed a competitor analysis on three separate levels: direct competitors, partial competitors and indirect competitors (figure 38). I have defined competitors as organisations that work with or raise awareness for ocean plastic. (Note: these competitors are a selection and do not represent all competitors)

The first circle (direct competitors) comprises of companies that, similarly to The Ocean Cleanup, collect 'ocean' plastic, recycle it and turn it into products. Parley, for example, is an organisation that seeks to raise awareness for plastic pollution in the oceans. One of the ways they do this is through collecting plastic from shore areas, helping to recycle it and then use partners to make and market products. The way they operate is very collaborative (partnering up for basically all their initiatives) and their tone of voice is quite activist and pessimistic ('No Oceans = no life').



Figure 38: Competitor analysis with three levels of competitors

Another direct competitor is 4Ocean. 4Oceans started by selling bracelets and guaranteeing that each bracelet sold leads to them cleaning up two pounds of ocean or ocean-bound plastics. They do not sell recycled products yet, but they are working on recycling the plastic they have collected. Because they collect mostly ocean-bound plastic, some of their plastics (e.g. PET) are easier to work with compared to the plastics The Ocean Cleanup collects. It is also interesting to note that 4Oceans also develops its own cleaning technology, in the skimmer. This machine is basically a mobile interceptor that can harvest plastics from the water surface. So far 4Ocean has cleaned 12 million pounds of plastic from the environment. The 4Ocean brand is quite optimistic and slightly playful, focusing on being a solution and projecting a surfer-ish vibe through their love of the ocean.

A third direct competitor is Ocean Waste Plastics. Ocean Waste Plastics is a subsidiary of a Danish packaging manufacturer. They pay local fishermen in emerging markets to catch ocean and ocean-bound plastics. Through their parent company, they recycle these plastics and offer 'ocean plastic packaging' to companies. Many new start-ups in the cosmetic industry advertise with such ocean plastic packaging. Compared to others, Ocean Waste plastics also has a quite activist image, but also focusses on the benefits for companies adopting their packaging.

Finally, Waste2Wear is a company that focusses on creating fabrics from recycled plastics. They mostly supply these fabrics/plastics to other brands, but they also produce clothing in-house. Waste2Wear has recently started an ocean line, for which they work with local fishermen to remove plastics from rivers/waters near the shore. Partners Waste2Wear works with include De Bijenkorf, Joolz and Aldi. The brand image of Waste2Wear could be described as sustainable, optimistic and transparent.

The second circle (partial competitors) contains companies that use or advertise with ocean plastics. For example, Oceanworks offers a marketplace where different suppliers of recycled plastic pellets from ocean (bound) plastics can sell their plastic to interested parties.

Similarly, Econyl is a brand of Aquafil that recycles ocean waste (mainly nylon) into fabrics that have a wide variety of uses.

Many other brand use 'ocean plastics' in their branding, such as Patagonia or Adidas. They often use plastics sourced from one of these other companies, such as Econyl or Parley.

The third circle consists of indirect competitors. These are other NGO's that have a similar goal of protecting the environment. These include, for example, Greenpeace and the WWF, which might compete with The Ocean Cleanup for attention and donations. Two interesting ones are: Plastic Oceans and Plastic soup. Plastic Oceans has a similar goal to The Ocean Cleanup, reducing plastic pollution in the seas and oceans. Their approach is different, however, as they focus only on reducing plastic use and plastic waste, not cleaning it. Similarly, Plastic Soup aims to tackle the overuse of plastic, but with a focus on the health and microplastics side.

When comparing The Ocean Cleanup to the competition, two main differences become apparent: The focus on engineering and the origin of the plastics. The Ocean Cleanup is the only organisation focused on engineering new solutions for cleaning up the oceans and this high-tech image separates them from the competition.

Secondly, the source of the plastic is a differentiating factor. The Ocean Cleanup is the only company to capture actual ocean plastics, the others only capture 'ocean-bound'/near shore plastics. This is quite a big difference as GPGP plastic is far more difficult to capture, arguably making it a more special material. This could be stressed in the marketing of products to differentiate the material from the competition.

2.4.3 CONTEXT

Plastic pollution is currently one of the top concerns world-wide, beating other issues such as deforestation (Kantar, 2019) (figure 42). In one Australian study, 'ocean plastic' was found to be the most serious issue among 3200 survey respondents (Dikes-Hoffman et al, 2019).

The severity of the problem is expected to increase, as the total amount of plastic is projected to increase 3-4 times before 2050 (figure 41). Even though the recycling rate is steadily increasing, these same projections estimate that the amount of plastic waste will double in the same time frame (Geyer et al, 2017).

Even though up to 80% of respondents in the Australian study (Dikes-Hoffmann et al, 2019) stated they wanted to help with the plastic pollution problem, the research showed that this does not translate to actual behaviour. In literature this is often referred to as the green intention behaviour gap (Park & Lin, 2018)(Frank and Brock, 2018)(Groening et al., 2018) (White et al., 2019).

Between generations there does not seem to be much of a difference, both in green intentions and in green behaviour (Squire, 2019). I expected the younger generations to be much more environmentally aware, but this is not reflected in the science. The MIT age lab found that, although the majority of millennials (in this case born between 1980-2000) thought of themselves as much more environmentally aware than the older generation (born between 1965-1979), the actual differences in behaviour were not that large (Coughlin, J., 2018). On the contrary, a study among 642 respondents in Romania found generation X to be most aware and active around sustainable production and plastic waste, followed by millennials and generation Z coming in last (Lakatos et al., 2018).

Looking at the search popularity of related terms on Google trends (figure 43), one can see that awareness around ocean plastic and plastic pollution took off in late 2017. The popularity of The Ocean Cleanup on Google seems very much linked to the issue of plastic pollution itself. Over the last months the popularity of the issue has decreased on Google.

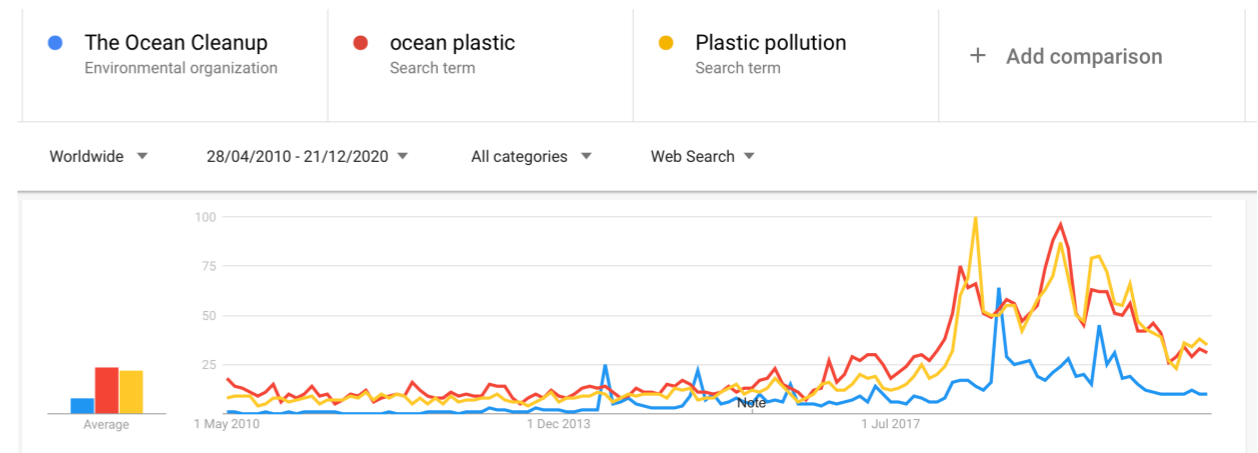


Figure 43: Google trends comparison
Source: Google

This can be explained by the ongoing COVID-19 pandemic being a more pressing issue, as other solutions for current problems (for example the search term 'meat analogue') follow a similar pattern.

The fact that the terms ocean plastic and The Ocean Cleanup follow a similar graph in terms of popularity suggests that The Ocean Cleanup can gain from its competitors. If competitors raise awareness for ocean plastic, The Ocean Cleanup can step into the spotlight. This means that, while they might be competitors from a revenue/product standpoint, these competitors can be regarded as colleagues trying to solve a similar problem.

Since The Ocean Cleanup is a non-profit organisation, it is also relevant to look at trends in the philanthropy sector. According to research by Fidelity Charitable (2016), the three main trends and future needs in individual donations are: transparency, technology and democratisation of giving. Donors believe, more and more that other forms of charity, such as public/private partnerships and social enterprises, are also effective. Within the group of donors to charities, there is a distinction between older baby boomers and younger millennials.

Millennials are more optimistic and more likely to donate to global initiatives (as opposed to domestic). Millennials are also more drawn to technology and appreciate opportunities to connect with their peers about giving.

Finally, millennials are more likely to donate through buying products from social enterprises, but baby boomers donate almost twice as much.

These trends support the valorisation of ocean plastic into products by The Ocean Cleanup. Millennials seem the best target for such products, as they are more likely to buy them (as a social enterprise type product) and also more likely to be drawn to global initiatives such as The Ocean Cleanup. To further strengthen the appeal to such a target group, a way to connect with peers using such products or a community feature should be added.

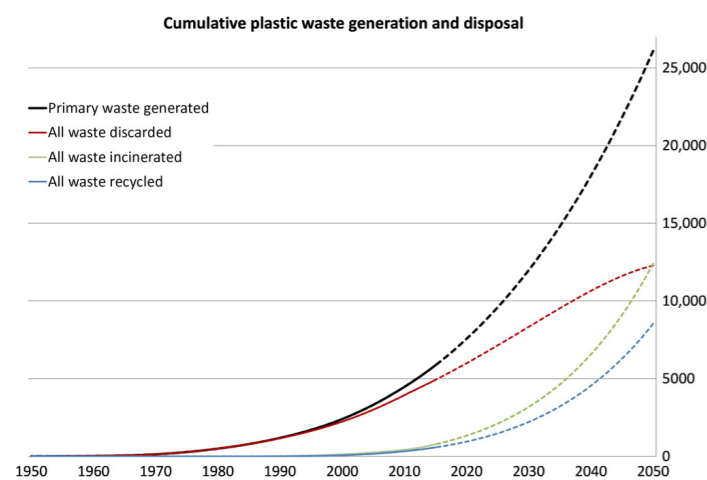


Figure 41: Cumulative plastic waste generation
Source: Geyer et al, 2017

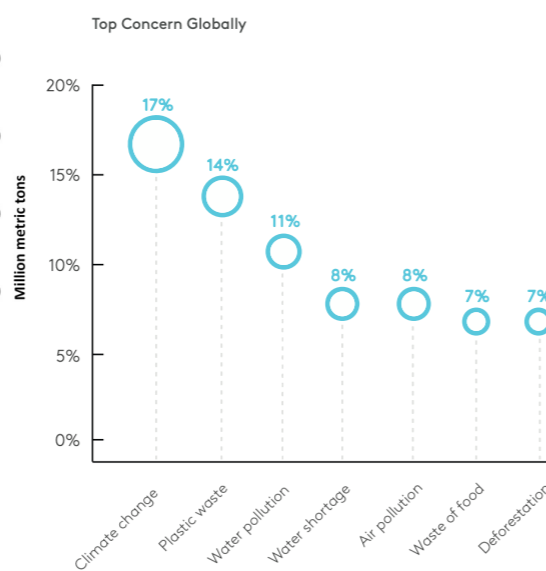


Figure 42: Top Concerns globally
Source: Kantar

2.4.4 CONSUMERS

For the consumer section of the 4C analysis, three different aspects are relevant. First, I analysed green consumption in general, to see what aspects influence the decision for, for example, a recycled product. Second, I studied current perception of consumers towards recycled plastics and ocean plastics specifically. Third, I studied the followers of The Ocean Cleanup, as these people can be regarded as its current consumers or initial target market.

2.4.4.1 GREEN CONSUMPTION

Lots of studies have been done on the influence of sustainable aspects (such as recycled plastics) in products on consumer behaviour. In general, attitudes to sustainable/recycled products are positive (Mobley et al., 1995).

In many cases, however, advertising a product as sustainable has negative connotations for consumers, such as lower perceived quality, or lesser performance (Achabou and Dekhili, 2013) (Anstine, 2000) (Hamzaoui Essoussi and Linton, 2010). Sustainable products are also often seen as less fashionable (Visser et al., 2015) and more expensive (van Doorn and Verhoef, 2011).

It turns out the choice for a product depends on many variables. It may be the fulfilment of a wish/need or a trade-off between, for example, cost and performance. Research reveals that the environmental factor is often one of the last taken into consideration, when other factors have not led to a decision (Vogtländer et al., 2002). The exact importance of all these factors depends heavily on the specific product.

There are some factors that positively influence sustainable buying behaviour. A very interesting one is the visibility of sustainable products. People like to identify as environmentally conscious, thus displaying a product made of recycled (ocean) plastic can be a social marker (Griskevicius et al., 2010). Research explains that this is likely due to green products costing more or being of lower quality compared to their counterparts. Showing off such green products signals one is willing to sacrifice for the greater good, thus displaying altruism, a desirable trait. Interestingly, as a consequence, this behaviour only manifests in green products that are displayed or bought publicly and only in products that are more expensive than their regular counterparts.

A similar effect is that of social influence. The information that other people are using sustainable products can influence a consumer to adopt the same behaviour (White et al., 2019). For example, giving consumers transparent shopping bags (enabling others to see their product choices) lead to a 65% increase in making at least one sustainable purchase (Demarquee et al., 2015).

Rationality and emotions both play a role in the purchase of sustainable products (Koenig-Lewis et al., 2014). On the emotional side, pride and hope are considered the most effective emotions to drive sustainable consumption. One study compared public praise versus monetary compensation as a reward for energy conservation and found the public praise (pride) to be more effective (Handgraaf et al., 2013).

On the rational side, consumers should have a sense of self-efficacy, the knowledge that their choices have a meaningful impact. (White et al., 2019).

When communicating the impact consumers have with their choices, the framing of the information is key. Consumers are more likely to respond to a loss framed message (for example a picture of a receded glacier, or a turtle entangled in plastic) and metrics should be converted to something consumers care about (for example: show the amount of euros saved after 10 years of usage instead of the energy savings in watt).

The marketing of a sustainable product should therefore include both rational benefits (for example: every product helps remove x kg of ocean plastic) and emotional benefits (for example: help save the turtles) (White et al., 2019)

Consumers also like to be able to recognise the origin of the material in sustainable products. This can have a positive influence on the perceived environmental benefits (Steenis et al., 2017). It further supports the decision of The Ocean Cleanup to give the sunglasses the appearance of being made from ocean plastic.

Furthermore, there are a number of individual factors/traits/beliefs that influence sustainable behaviour (Schweper and Cornwell, 1991). The first one is one's environmental concern. A product that is perceived as highly sustainable will be more attractive to consumers with a higher level of environmental concern, compared to consumers who possess little environmental concern (Kilbourne & Pickett, 2008).

Green product utility is a similar individual factor which influences sustainable behaviour (Chang, 2011). Green product utility refers to the extent to which a consumer believes the purchase of a green product will actually help the specific environmental issue. Consumers can, for example, be concerned by ocean plastic, but if they don't believe that a product from The Ocean Cleanup will help, they will not buy it.

The awareness of the consumer of the issue a green product addresses (in this case ocean plastic) is also a factor that influences behaviour. If one is not aware that ocean plastic is an issue, one is not likely to buy a product that promises to help solve the issue.

Finally, there is the individuals' tendency to signal green consumption (relating to showing off sustainability as discussed before). Some people care more about expressing their sustainability while others are content keeping it to themselves (Griskevicius et al., 2010). This can also influence one's decision when buying a sustainable product.

2.4.4.2 CONSUMER PERCEPTION

There is not much research on how users react to ocean plastic specifically. In 2019 a study was conducted on consumer perception of products made from ocean plastic. This study used the individual differences described in the previous paragraph to make clusters of consumers with similar reactions to products of ocean plastics (Magnier et al., 2019).

These clusters consisted of sustainability experts, sustainability passives, sustainability benevolents and sustainability indifferent. I have summarised the most interesting data in figure 44. As expected, the experts have the best scoring attitudes towards ocean plastic products and the highest willingness to pay. Awareness of the possibility to recycle ocean plastic did not seem to have an impact on consumer attitudes towards such products and awareness of the problem in general is quite high. This indicates that education on the issue of ocean plastic is not necessarily a barrier when marketing ocean plastic products.

This aforementioned study also contains research on the differences in perception of products made from ocean, depending on the product category. The categories compared are: textile products, durables and fast-moving consumer goods. Interestingly, consumers thought textiles made from ocean plastics would be of lower quality, and fast-moving consumer goods of the highest quality. Regarding textiles and fast-moving consumer goods, consumers rated it more important that the material was recognisably ocean plastic, whilst in respect to durables, consumers did not consider this as important. This could be explained by the fact that durables are mostly used at home and privately, which negates the effect of signaling. Interestingly, while purchase intention was lowest for textile products, the willingness to pay was nevertheless quite high (15%).

Also, consumer concern for pollution in ocean plastic products tends to be low and the general attitude is positive. This research and also other similar studies demonstrate that women, generally, are slightly more environmentally conscious (Magnier et al., 2019).

Aspects followers appreciate most about The Ocean Cleanup are: Innovative technology, Boyan Slat as an inspiration, the purpose and mission of The Ocean Cleanup, the focus on solutions and the positivity and transparency of the organisation.

2.4.4.3 FOLLOWERS OF THE OCEAN CLEANUP

The Ocean Cleanup conducted a study amongst their social media followers in 2020. Respondents to the survey were slightly more often female, relatively equally spread in age. Around two thirds of the respondents work either full-time or part-time and only 13% are students.

On average, followers of The Ocean Cleanup try to lead a sustainable life compared to the general population. For example, they recycle more and try to reduce their plastic use more. Interestingly, they do not seem to want to fly less for the environment. They are, however, much more open to recycled products than the general population. They buy from sustainable brands and are willing to pay premium prices for those brands. This indicates a potentially higher willingness to pay for recycled ocean products in followers of The Ocean Cleanup.

The followers can mostly be found on Facebook and Instagram. The Youtube channel is not subscribed to as often. The followers report to donate around 200-400 euros per year to various charities.

2.4.4.3 IMPLICATIONS

When creating products from ocean plastic, I recommend The Ocean Cleanup to make products that are used or bought in social contexts. This will maximise the green signalling and altruism effects. Furthermore, these products should have a distinct appearance in which the origin of the material can easily be seen. The quality of the products cannot be inferior compared to less sustainable versions of such products, as sustainability is often not one of the first factors considered in a purchase.

When marketing ocean plastic products, the positive impact of the purchase of on the environment should be emphasised, framed as directly/concretely as possible and include both rational and emotional benefits.

Concerns about pollution or the quality of the material are not that significant in consumers, meaning such concerns are not likely to present a barrier for The Ocean Cleanup in marketing its products. Finally, it seems The Ocean Cleanup is appreciated for its optimism, transparency and focus on solutions. These values should be emphasized in the marketing and design of ocean plastic products.

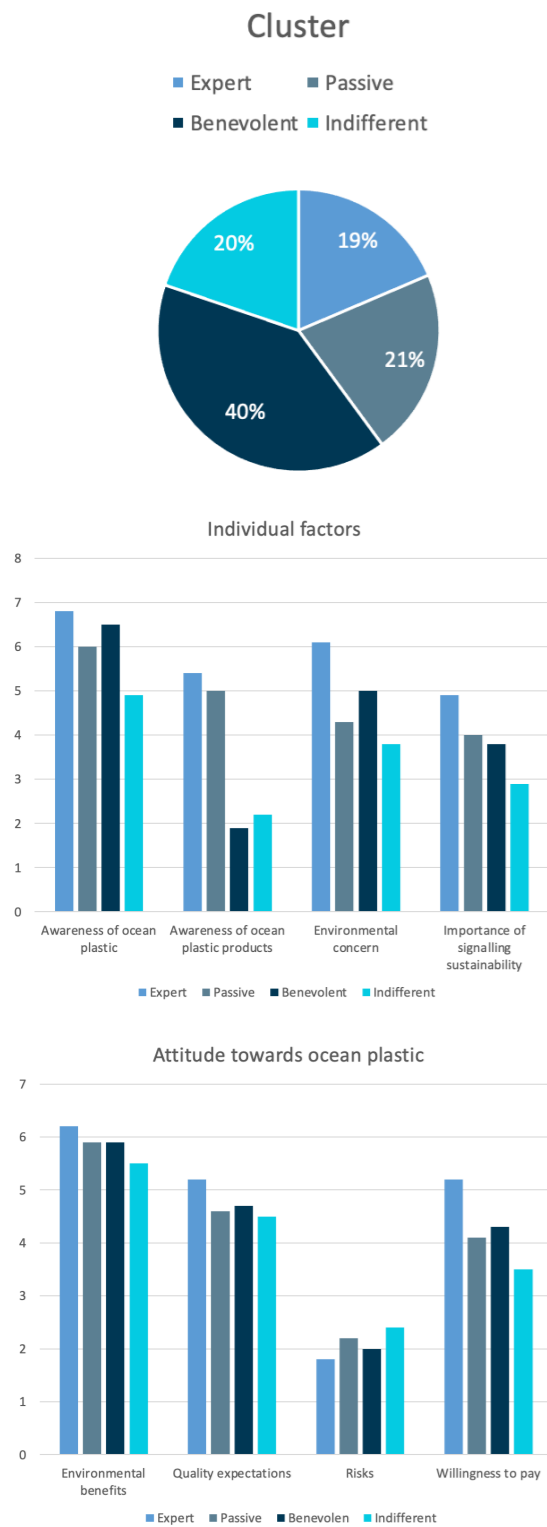


Figure 44: Perception of ocean plastic products
Data used: Magnier et al., 2019



2.4.5 BRAND ANALYSIS

It is important to have a thorough understanding of the brand of The Ocean Cleanup, because any new products must be congruent with its brand DNA.

To analyse the brand of The Ocean Cleanup, the brand DNA framework was used as described by Micheal Beverland (2018) and in the lectures on Brand Product Commercialisation at the TU Delft by Roland van der Vorst (2019). This framework consists of a triangle, with each end representing a different aspect of the brand DNA: Purpose, Positioning and Personality.

For The Ocean Cleanup, the purpose is very clear: to rid the world's oceans of plastic. This is their principal raison d'être and it is always communicated clearly. The Ocean Cleanup is always true to this purpose. For example, Boyan has stated multiple times in interviews that the ultimate goal is to put themselves out of business, even when the interviewer suggested they could have a circular business model. This means that whatever products The Ocean Cleanup creates, they shouldn't end up polluting the environment.

For the personality part of the brand DNA, I first looked at brand archetypes. These archetypes help to group brands into certain personality groups and explain their driving force (Mark & Pearson, 2001). The Ocean Cleanup most closely aligns with the 'Magician' archetype. The magician archetype has a strong sense of responsibility and uses cutting edge technology to 'realise dreams'. They work by strong principles and see the organisation as a learning system. Further traits of the magician archetype can be found in figure 45.

Magician

'It can happen'

Desire: knowledge of fundamental laws

Goal: make dreams come true

Fear: unanticipated negative consequences

Strategy: develop vision and live it

Trap: becoming manipulative

Gift: finding win-win outcomes

Figure 45: Magician brand archetype
Source: Lecture Roland van der Vorst, 2019

The Ocean Cleanup also shows some signs of the 'Hero' archetype. This archetype seeks to prove itself through a very difficult task and is good at motivating people. Other personality traits I think align with The Ocean Cleanup are: optimistic, high-tech, scientific, clean and honest.

Finally, for the positioning part, The Ocean Cleanup is very much linked to the ocean. Not only because of their purpose, but also through their use of colour and through their marketing material/visuals. The model used for advertising the sunglasses is holding a surfboard (figure 46) for example and the sunglasses are shown in the waves on a beach.



Figure 46: Promo for The Ocean Cleanup Sunglasses
Source: The Ocean Cleanup website

The Ocean Cleanup is inherently positioned towards people who care about the oceans. This is still a quite varied group, as it can be comprised of, for example, surfers and sailors, but also anyone else who happened to read about ocean pollution. Also, The Ocean Cleanup doesn't target a specific age group (see also the diversity in age of its followers).

For people that care about the oceans, The Ocean Cleanup offers a practical solution with its cleanup systems, empowering people to make a difference and giving them the fulfilment of doing their part. The brand DNA is summarised in figure 47.



Figure 47: Brand DNA Framework
Framework by: Michael Beverland (2018)

The visual language The Ocean Cleanup uses further reinforces this brand DNA (figure 48). It uses a very modern, sleek sans serif font. Even the logo consists of only this font. Its use of colour is mostly limited to two shades of blue and these colours also reappear in the design of the sunglasses. A combination of pictures and minimalist illustrations explain the mission of The Ocean Cleanup. Gradients aren't used. A combination of low and high weight fonts is used to place emphasis, but also to further express the design language established in the logo. This combination gives the overall brand a very consistent, recognisable, modern and clean impression.

THE OCEAN CLEANUP

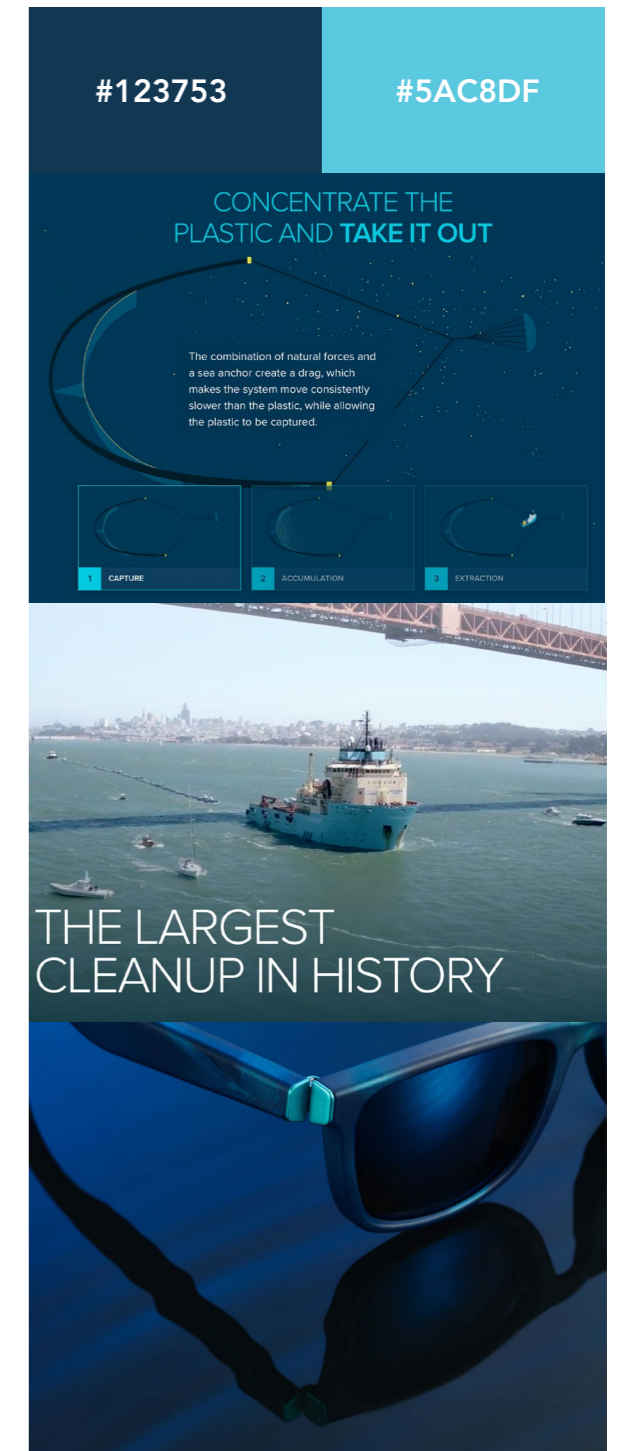
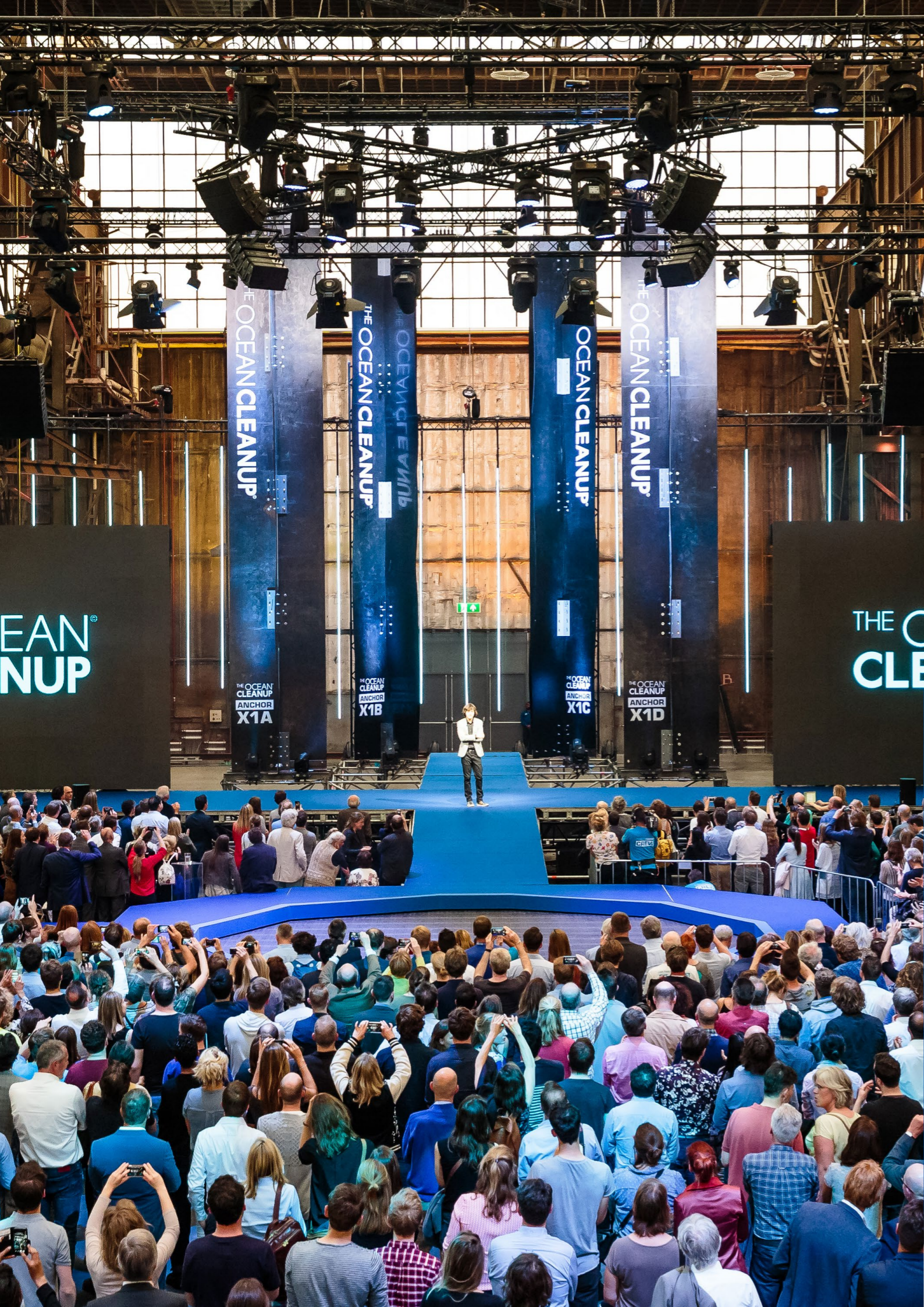


Figure 48: Brand DNA Framework
Framework by: Michael Beverland (2018)



2.4 KEY INSIGHTS

- Ocean plastic is one of the **top concerns** globally and the problem is **growing**
- The Ocean Cleanup **benefits** from increased **awareness** on ocean plastic
- **GPGP plastic** is **more difficult** to obtain and recycle compared to other ocean plastic on the market.
 - ↳ The Ocean Cleanup should **differentiate** its material to **consumers**
- The **communication** of the **environmental benefits** is key when promoting sustainable products
 - ↳ These should be communicated in **clear and easy to understand metrics**
- Consumers like to signal their sustainable buying behaviour, this is called **green signalling**
 - ↳ To **maximise** this effect ocean plastic products should be used in **social contexts**
- **Millenials** are most likely to support **global initiatives** and buy products from **social enterprises**
 - ↳ They, therefore, represent a good **target group** for ocean plastic products
- Research suggests there are **no big concerns** in consumers for **pollution** in ocean plastic products
- The Ocean Cleanup has a **strong and consistent brand image** and **recognisable** colour scheme
 - ↳ This represents a starting point for a **visual language** in potential ocean plastic products



3. DEFINE



3.1 CRITERIA

This chapter combines the research findings of the analysis phase into boundary conditions and other criteria, that a product made out of GPGP plastic should meet. These are then divided into 'need to haves', 'nice to haves' and extras. Furthermore, from the analysis of The Ocean Cleanup and its context, I defined three goals that products made by The Ocean Cleanup should accomplish. These goals can be used to measure the potential of product ideas.

3.1.1 NEED TO HAVES

'Need to haves' criteria are essential requirements in products made of GPGP plastic. These requirements are either a consequence of the material properties, the recycling technology, the brand of The Ocean Cleanup, or of consumer psychology.

1. Using GPGP plastic in a product must not impact its main function negatively.

Since GPGP plastic lead to unpredictable mechanical properties, it is not the best choice for products where these properties play an essential role in the product's function.

2. The solution must be sustainable and should pollute the environment as little as possible.

The Ocean Cleanup's purpose is to rid the oceans of plastic. It could damage its reputation if its products end up polluting the environment.

3. The solution can be made from at least one of the plastic groups using an eligible manufacturing method.

I found in chapter 2.3 that not all manufacturing methods work with ocean plastic. Furthermore, the different groups of plastic after sorting will have different properties. The proposed solution must work with at least one of these groups.

4. The solution must be able to compete with similar products in terms of value/functionality.

Sustainability is often a secondary factor when consumers are evaluating a product. This means that for a sustainable product to be successful it has to be able to compete in terms of functionality first.

3.1.2 NICE TO HAVES

'Nice to haves' are aspects that are beneficial to products made from ocean plastic or sustainable products in general, but are not strictly required for a solution.

5. The solution allows for 'green signalling' / it is used in social contexts

I found consumers are willing to pay a premium for sustainable products only if they can show them off to others.

6. The solution displays the origin of the ocean plastic material.

Whether it is through colour, texture, or some other way, consumers like to be able to perceive that a product is recycled.

7. The solution fits with the brand of The Ocean Cleanup.

The Ocean Cleanup has a very consistent and powerful brand. Ideally, the envisioned solution aligns with or even strengthens this image.

8. The solution allows for the branding of GPGP plastic as a premium material.

GPGP plastic is much more difficult to obtain compared to 'regular' ocean plastic. If the solution allows for the differentiation of GPGP plastic as an exotic or premium material, the material could become more valuable in the eyes of consumers.

9. The solution allows for the communication of the benefits of using GPGP plastics.

Consumers care about the green utility of a product, or in other words, to what extent they believe the product will help with the environmental issue it targets. To achieve this, the benefits must be communicated very clearly and concretely.

3.1.3 EXTRAS

Extras are defined as factors that could positively influence the solution, but can be omitted without too large an impact.

10. The solution has a connection with the ocean or water.

It was found the brand of The Ocean Cleanup has a strong connection with water and the ocean. It would therefore be beneficial if the proposed product also has this connection.

11. The solution has a connection to cleaning up.

Same as above, think, for example, of garbage bins.

12. The solution helps solve the problem in some way.

If the proposed solution were to somehow remove plastic from the ocean or stop plastic from entering the ocean, the Ocean Cleanup could make its own job easier and kill two birds with one stone. Think, for example, of a product that discourages fishermen from dumping their gear in the ocean.

3.1.4 GOALS

Based on my research I defined three main goals that proposed products made from GPGP plastic should fulfil for The Ocean Cleanup.

These are: to find a purpose for the entire volume of the plastic, to extract as much value from the plastics as possible and to generate as much awareness for the ocean plastic problem.

Volume

As the plastic comes from international waters it is up to The Ocean Cleanup to deal with it. Ideally, a purpose can be found for all the plastic in order to prevent it from ending up in a landfill and polluting the environment again.

Value

The Ocean Cleanup has stated that part of the reason they want to launch products is to generate sustainable income. The foundation is currently fully dependent on donations (see chapter 2.4.1), so a more sustainable source of income could provide a stable base for the future.

Awareness

As The Ocean Cleanup is dependent on donations or product purchases, it benefits greatly from increased awareness and exposure. Furthermore, The Ocean Cleanup also benefits from awareness on the issue of ocean plastic (see chapter 2.4.3). The solution could help generate this awareness and introduce people to The Ocean Cleanup that had not heard of it before. These consumers might then donate or buy products (increasing value) or talk about the organisation with their peers.

These three goals defined for The Ocean Cleanup could be seen as dimensions/scales by which the impact or benefits for The Ocean Cleanup of products ideas can be judged.

3.2 STRATEGY DEFINITION

In this chapter I introduce a framework that enables me to assess the different initial solution spaces along the three defined goals. Finally, I use the framework to define a distinct strategy for each of the three material groups.

3.2.1 A STRATEGIC PORTFOLIO

To see how different products and solution spaces relate to each other in terms of impact, I designed a framework. This framework is shaped like a triangle with one of the defined goals on each end. Product ideas or solution spaces can then be plotted as 'blobs', similar to a radar chart. This facilitates and visualises the assessment of product ideas on multiple goals at the same time (figure 49). The blobs can vary in size and overlap.

During the ideation phase of the project I brainstormed many product ideas (see appendix 7.2) and grouped these into potential solution categories (see appendix 7.3). After plotting these solution categories in the framework, I realised no single solution would achieve maximum impact in all three of the defined goals. Most ideas performed well in one, maybe two goals, but never all three (see figure 49).

For example, plotting the solution category of accessoires in the framework shows that the solution space offers a lot of potential value, and while it could generate some awareness through marketing or word of mouth, it is unlikely to ever have a big impact on the volume of the GPGP plastic. Similarly, reusable B2B packaging could be a solution for a lot of the volume, but it will not generate much income or awareness for The Ocean Cleanup.

Another challenge lies in the material. The different material groups obtained after sorting the plastics have differing properties. It is unlikely a single solution fits with all different material groups.

A combination of products could maximise the impact on all three defined goals, and, at the same time, encompass the different material categories and criteria.

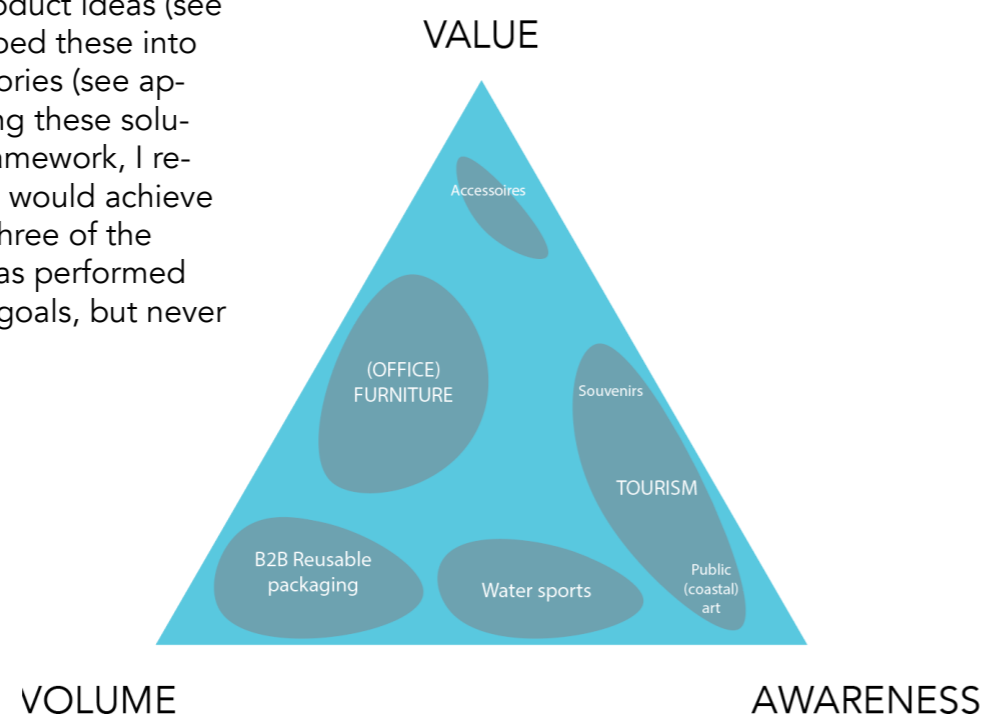


Figure 49: Framework for evaluating solution spaces

Consequently it makes sense to focus on a portfolio of complementary products. Picking a random combination of products will seem unfocused, however, and not much synergy will exist between the products.

A coherent strategy is needed for the combination of products. This will unite the different products behind a single vision, focus The Ocean Cleanup's efforts, allow for synergy between products and rationalise the product choices to consumers.

3.2.2 MATERIAL GROUPS

To find a suitable strategy for a product portfolio I took a step back and revisited the analysis of the ocean plastic material. After all, the different products do not only have to align with the three defined goals, but it is just as important they align with the different fractions of the material.

In chapter 2.2.6 I divided the material in three main tiers. These tiers were as follows:

Tier 1: Plastics that can be mechanically recycled and recoloured (containing all coloured HDPE and PP fractions)

Tier 2: Plastics that can be mechanically recycled but are black (containing all black HDPE and PP fractions)

Tier 3: Plastics that are non-mechanically recycled (containing all other/mixed fractions)

The reason I chose the word 'tier' is because the grouping is based on the versatility of the plastic. The tier 1 plastic can be used together with the tier 2 plastics to create black products, for example, but not the other way around. In this way, plastic can be moved down a tier, but not up (figure 50).

Because of this fact, I decided to formulate my strategy around the material tiers. Keeping the limitations of all three tiers in mind at once might disqualify a strategy that would be optimal for one of the tiers of plastic.

On the other hand, by starting with only the tier 1 plastics in mind, I ensure that the lower tiers of plastic are not holding back the higher tiers of plastic.



Figure 50: The three tiers of plastics

3.2.3 TIER 1

As stated, the tier 1 plastic consists of both HDPE and PP plastics. It can be mechanically recycled into pellets, which can be used in most traditional manufacturing processes. It can also be recoloured using additives.

The Ocean Cleanup will collect the plastic using cleanup systems. These systems will be emptied periodically by a vessel, meaning the plastic will be collected in batches. The unpredictability of the size of these batches, combined with the variation in the contents of said batches makes the entire plastic supply quite unpredictable. One must also consider additional factors such as the possibility of a system failure or a delayed roll out. Consequently, it will be difficult for The Ocean Cleanup to design a product or enter a partnership that requires a steady flow of a specific subgroup of plastic. Furthermore, I found in chapter 2.2.1 that the properties of GPGP plastic can be unpredictable. These properties have an impact on, for example, the design of a mould. This means a proposed strategy must work with a relatively unpredictable supply of plastic with unpredictable properties. An example of an approach that could work with such an unpredictable material input would be to collect the plastic first and then design one-off products or enter limited partnerships based on the material available. This way it is easier to match the plastic supply to the demand.

Another challenge is the fact that there already is ocean plastic on the market, being sold by the organisations analysed in chapter 2.4.2. Because this plastic is not collected at sea, it is much cheaper and more predictable compared to the plastic The Ocean Cleanup will collect.

Because of this, The Ocean Cleanup will have to differentiate its plastics compared to other 'ocean plastics'. When looking at the differences between regular ocean plastic and GPGP plastic three things stand out (figure 51).

REGULAR OCEAN PLASTIC	GPGP PLASTIC	
Collected from local trash, shorelines, beaches	Extracted from the ocean, thousands of miles off shore, using state of the art technology	EXOTIC MATERIAL
Thrown away a few weeks ago	Has survived floating in the ocean for up to 50 years	
Potentially limitless kg	'Only 80.000 tonnes, Collected in distinct batches	SCARCE/LIMITED

Figure 51: Regular Ocean Plastic vs GPGP plastic

First, the story the material tells. Regular ocean plastic, as sold by other brands, is often collected from local trash in areas such as the Maldives, while GPGP plastic is extracted thousands of miles from the shore using state of the art technology. Another way this story differs is the fact that regular ocean plastic may have only been thrown away a few weeks ago, while GPGP plastic has been floating in the ocean for up to 50 years. This means that GPGP plastic can be seen as a much more special and exotic material. This should be communicated in the branding or marketing of any solutions using GPGP plastic.

Consumers are likely to respond well to the branding of such a story. By making the material visually distinct from other recycled plastics, The Ocean Cleanup will be able to play into this story, activating the 'green signalling' and 'material origin' effects found in chapter 2.4.4.1.

The third way GPGP plastic fundamentally differs from other ocean plastic lies in the supply.

The supply of 'regular' ocean plastic is virtually limitless as it is tied to plastic consumption in developing countries. If collectors ever run out, they could simply start collecting plastic in another country. GPGP plastic, on the other hand, is scarce in a way. There is currently only around 80.000 tons of plastic in the ocean that The Ocean Cleanup can collect. While this amount does grow over time as more plastic enters the ocean, it is not comparable to the amount of plastic waste found on land. Furthermore, The Ocean Cleanup hopes to curb this growth with the rivers project and the Interceptors. This means that GPGP plastic is fundamentally a much scarcer and more limited product. Consumers respond well to scarce or limited products, as also stated by Wu & Lee (2016):

"The four experimental studies provide consistent results that people respond more favorably to scarcity cues such as "limited edition" when purchasing products for themselves"

Differentiating GPGP plastic as an exotic, limited material with a story is thus likely to increase demand from consumers.

The final challenge is the fact that, while The Ocean Cleanup is well known in The Netherlands, its reputation has room to grow in other countries. This can be seen using Google Trends.

When comparing search volumes for 'The Ocean Cleanup' against search volumes for 'Great Pacific Garbage Patch' one can estimate how well-known The Ocean Cleanup is compared to the awareness of ocean plastic in every country. As shown in figure 52, interest in The Ocean Cleanup is highest in The Netherlands, followed by its neighbouring countries. In other coastal countries where one would expect a high level of interest in The Ocean Cleanup (such as Australia and Spain) however, The Ocean Cleanup is relatively unknown.

On the one hand, this presents a challenge, as The Netherlands and its surrounding countries might not be a sufficiently large market to find a purpose for all the ocean plastic (every citizen of The Netherlands would have to buy more than four kg of ocean plastic in that case).

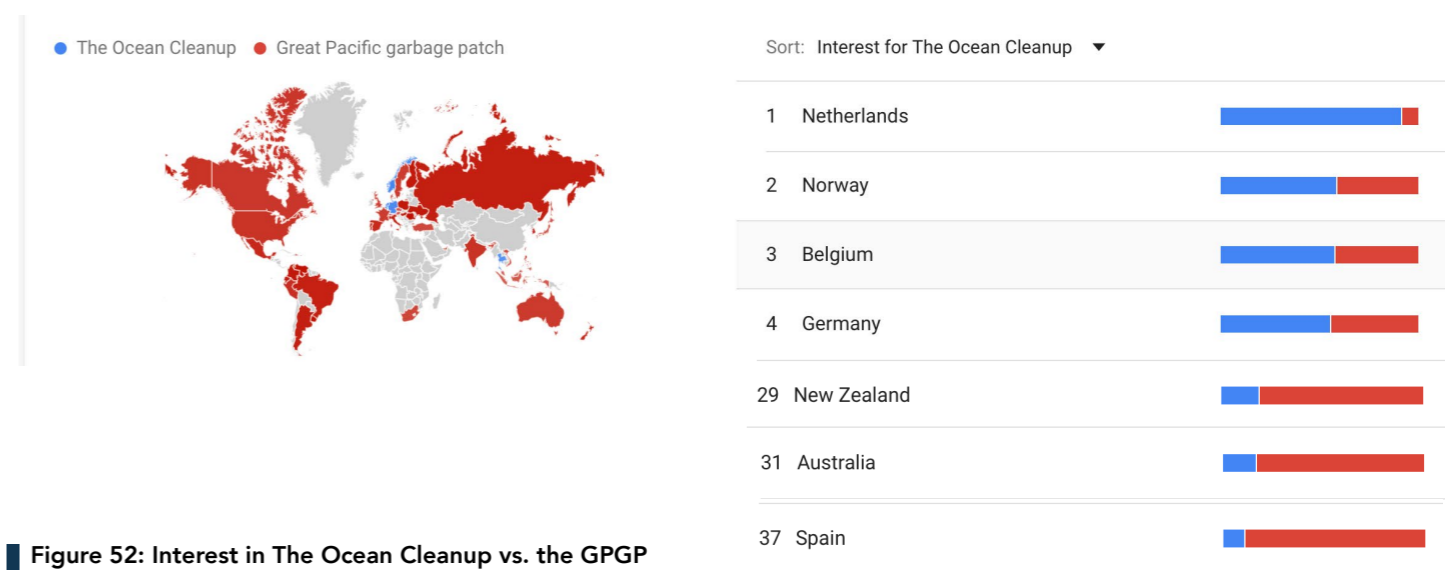


Figure 52: Interest in The Ocean Cleanup vs. the GPGP
Source: Google Trends

On the other hand, this presents a huge opportunity as there is a lot of room to grow for The Ocean Cleanup. Exposure in other countries could lead to large numbers of new fans, followers and donors. One way The Ocean Cleanup could reach this exposure is by partnering with different brands to create ocean plastic products. This creates a win-win situation, as the partner brand will be happy to associate with the brand of The Ocean Cleanup, while The Ocean Cleanup has a lot to gain from the exposure generated by the partnership. Each partnership presents an opportunity to expand the awareness of The Ocean Cleanup and create value by selling GPGP plastic products.

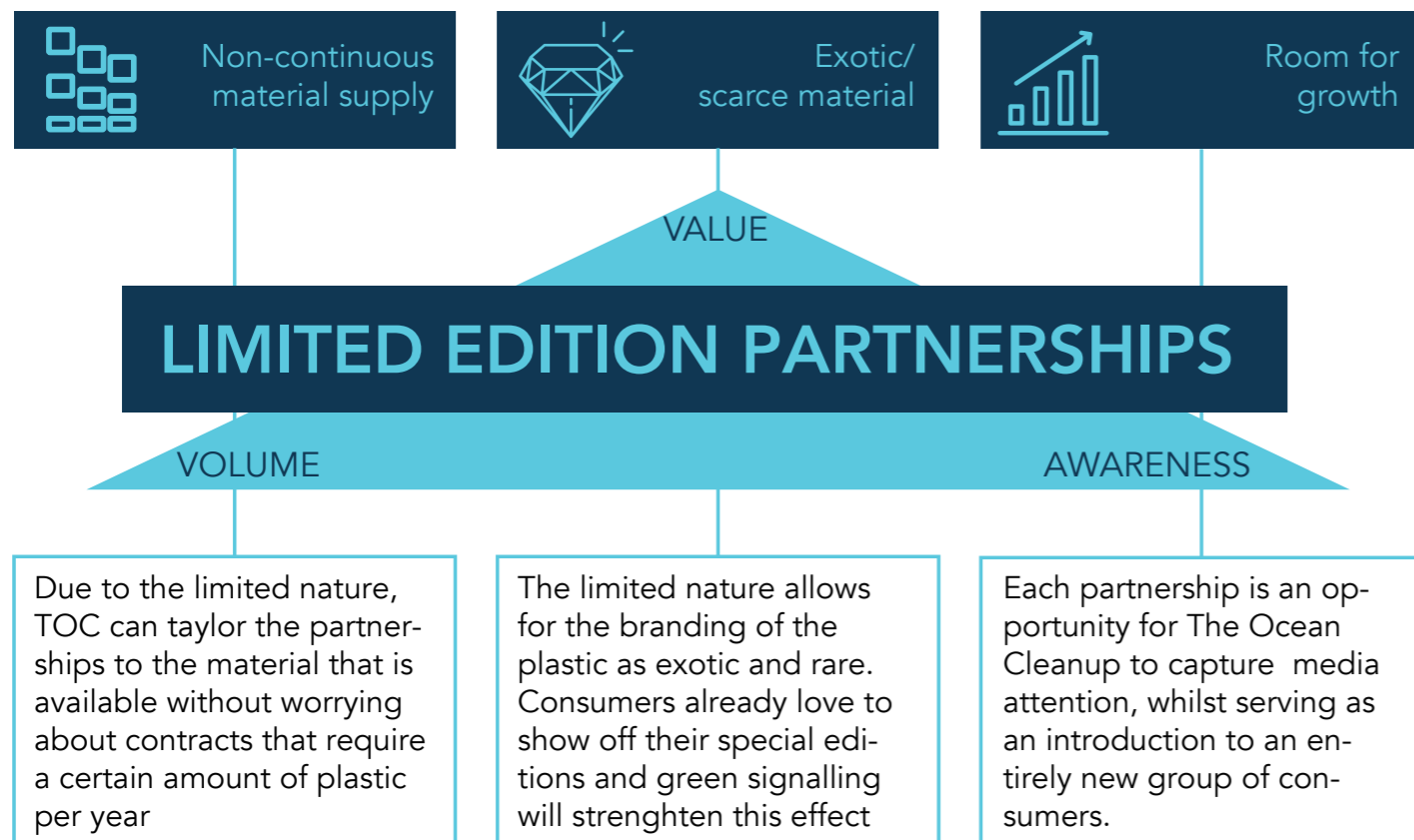
Combining these factors, I chose limited edition partnerships as the strategy for the tier 1 plastics (figure 53). This strategy involves The Ocean Cleanup partnering up with various companies to create limited edition ocean plastic versions of existing products. The one-off nature of such partnerships compensates for the unpredictable supply and properties of ocean plastic.

In this case, The Ocean Cleanup can collect batches of plastic and sort them into the different material groups first. When sufficient material for a partnership is obtained in a group, the material can be homogenised and tested. The Ocean Cleanup can then supply partners with a fixed amount of predictable material, to produce a specific limited edition.

It also matches with the exotic/scarc material by branding the products as limited/exotic versions of existing products. This effect can be strengthened by giving GPGP plastic a distinct appearance or by using a recognisable brand mark.

This strategy also matches with the existing room for growth because each partnership is a new opportunity for exposure to a new group of customers.

Finally, these limited editions allow for The Ocean Cleanup to outsource design, manufacturing and distribution. In this way The Ocean Cleanup can stay focused on its core mission of cleaning the ocean.



TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS

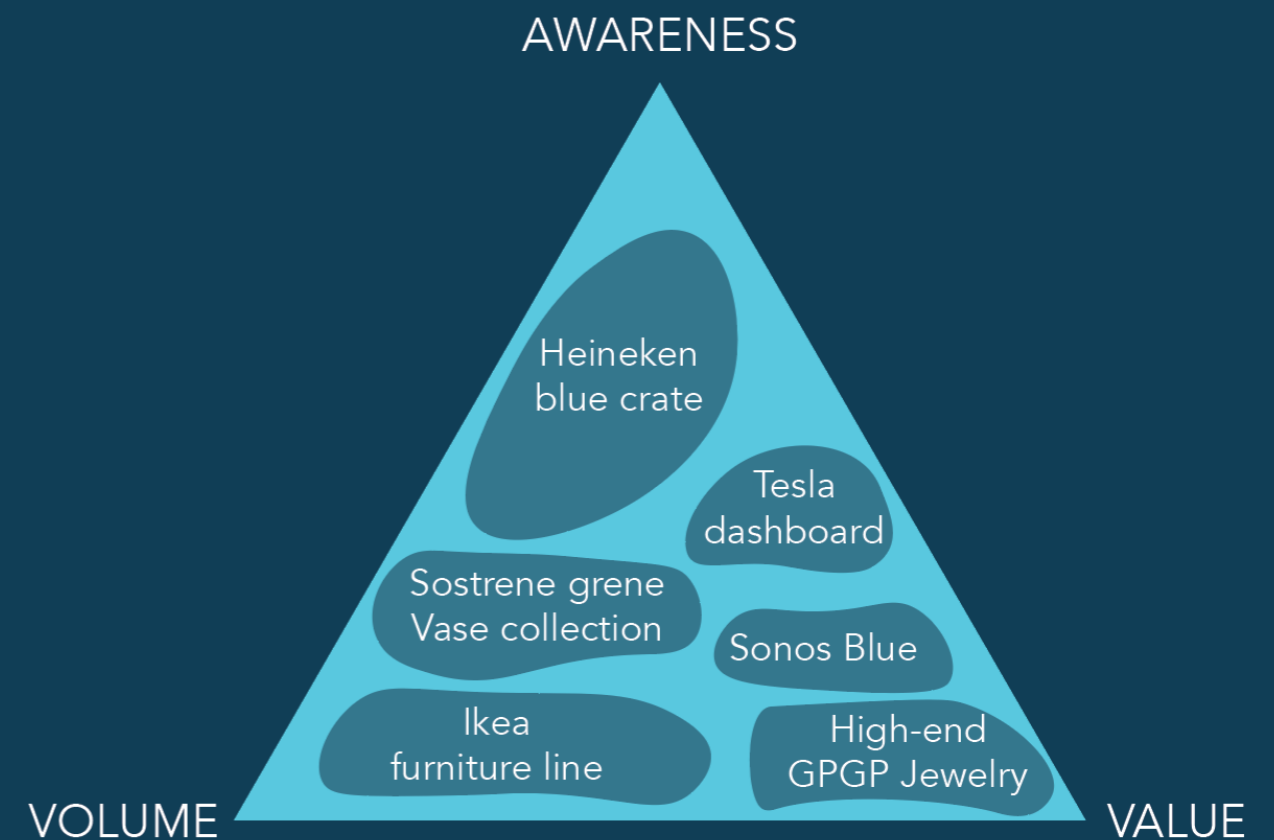


Figure 54: The Design framework for tier 1: Limited Edition Partnerships
Initial ideas plotted as an illustration of what a tier 1 portfolio might look like

Brainstorming ideas in groups together with the initial ideas obtained in the ideation phase (see appendix 7.2 & 7.3) led to a breadth of possible partnerships. In figure 54 some example ideas are plotted. In the develop section of this thesis, I further study and develop these possible partnerships..

3.2.4 TIER 2

The tier 2 plastic consists of both HDPE and PP from rigid and fibrous sources. Similarly to the tier 1 plastics, these plastics are relatively easy to recycle using traditional methods.

The main difference compared to the tier 1 plastic, is the fact that tier 2 plastic cannot be recoloured when recycling. This means that the output plastics will always be black. While this might not seem like much of a disadvantage at first, it does make the plastics less suitable for the 'limited edition partnerships' strategy for two reasons.

First, it is difficult to make visually distinct versions of products using black plastics. The products will end up looking like the original product unless an entirely new design is chosen. This is a disadvantage for The Ocean Cleanup from an awareness and branding perspective, as the products will not be as recognisable.

Second, it also negatively impacts the green signalling effect. For consumers, the social aspect plays a huge role in their purchase of products made from recycled materials. If the material is not distinct and others cannot immediately recognise it as sustainable, this effect is diminished (Griskevicius et al., 2010).

In chapter 2.4.4.1 I found, that once effects such as green signalling and the visible origin of the material are taken out of the equation, sustainability is often one of the last factors considered by users in the purchase of a product.

This means, that for the tier 2 plastics, a strategy should be designed in which end consumers are not the ones purchasing the product.

The fact that the plastic is black, while disadvantageous for consumers, means the plastic is suited for use in places where a more subtle look is desirable, compared to, for example, a striking, distinct blue colour.

Finally, the plastic still has a story to tell and is still a hugely sustainable material, as it is made from trash. That means the plastic should still be applied in a context in which the buyer of the plastic cares about sustainability and the origin of their material.

To this end, I have chosen the context of indoor and outdoor architecture for the tier 2 plastics (figure 55). In this context, the buyer of the plastic is not an end consumer, but rather a commissioner of a building project, a construction company or an architect. These stakeholders have a higher motivation to be sustainable compared to the average consumer due to either regulations or PR considerations. This also translates to a growing demand for recycled and sustainable building materials (Chegut & Kok, 2013).

Finally, more subtle colours are often preferred in this context (Sluneko, 2017). Not many architects would want to work with bright blue roofing tiles for example. Black also has the advantage of not showing dirt or wear as easily, making it slightly lower maintenance.

Brainstorming ideas in this context in groups, combined with the initial ideas generated in the exploration phase (see appendix 7.2 & 7.3) led to a variety of ideas ranging from construction materials to indoor decoration.

By plotting ideas in the triangle framework, the fact that different ideas accomplish different goals for The Ocean Cleanup emerges. For example: on the value side The Ocean Cleanup could create premium acoustic panels or office cubicles which could be sold to clients that want to support a good cause or signal their sustainability to visitors of their building.

On the awareness side, The Ocean Cleanup could consider creating facade panels or roof tiles and cooperate with municipalities to use them in visible locations. Another idea on the awareness side is to create building materials from the plastic. These can then be give away for free in places where they are needed. Uses for such building materials could include emergency shelters or refugee camps. This concept I called plastic for good.

An example of a possible combination of ideas and concepts is shown in figure 56. In chapter 4.2 I further investigate the possibilities in this context.



Figure 55: Arguments for Interior & Exterior Architecture as the strategy for tier 2

TIER 2 PLASTIC (BLACK) INTERIOR & EXTERIOR ARCHITECTURE

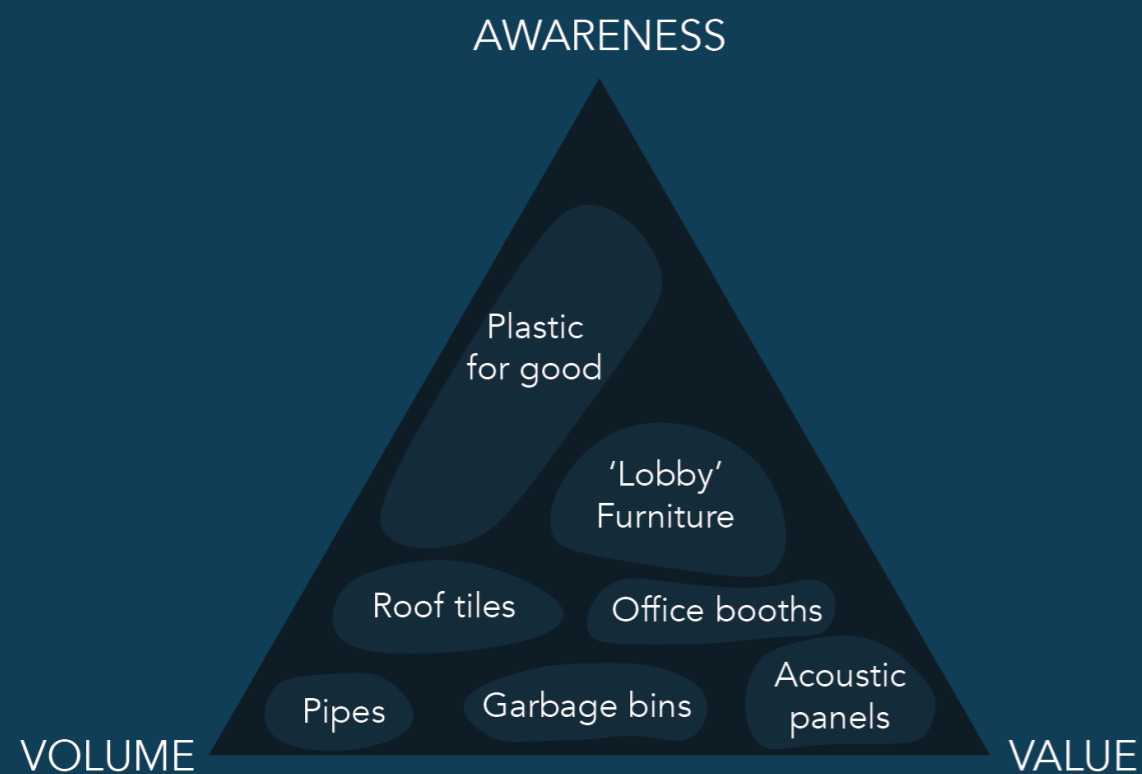


Figure 56: The Design framework for tier 2: Interior & Exterior architecture
Initial ideas plotted as an illustration of what a tier 2 portfolio might look like

3.2.5 TIER 3

Tier 3 consists of the plastics that are not suited for mechanical recycling. This includes the bits of plastic that are too small to sort by polymer type, but also, for example, fishing nets with metal cores that cannot be separated.

There are several options for this plastic tier (figure 57). First, the plastic could be incinerated for energy. This works with all types of plastic. The downside is that incineration produces smoke that is toxic to the environment and can even be carcinogenic (Conserve Energy Future, n.d.). Furthermore, after incineration one ends up with toxic ashes, which still need to be disposed of. While this is smaller in volume than the original plastics, it is still a problem that needs to be dealt with. Dumping it in a landfill could cause the toxins to leak into the ground water for example (Conserve Energy Future, n.d.).

Because of this and because of the fact that, with incineration the 'story' of the ocean plastic is lost, incineration should be seen as a waste of resources and thus a last resort for the fraction of plastic for which no other purpose can be found.

The second option is chemical (or even biological recycling). However, in chapters 2.2.2 to 2.2.4 I found that these techniques are still in their infancy. There are currently no plants capable of handling larger volumes of HDPE or PP. Furthermore, the tier 3 plastics are quite polluted and contain a mix of polymers. The existing chemical recycling methods require pure materials and are sensitive to pollution. This means that in the short term, these methods will not be available for tier 3 plastics.

The third option for tier 3 plastics is to use novel methods. Think of pressing the small bits of plastic into a plate. This plate could then be used as, for example, a tabletop or a piece of art for on the wall. A unique piece of ocean plastic could also be cast in epoxy to create a paperweight or something bigger such as a table.

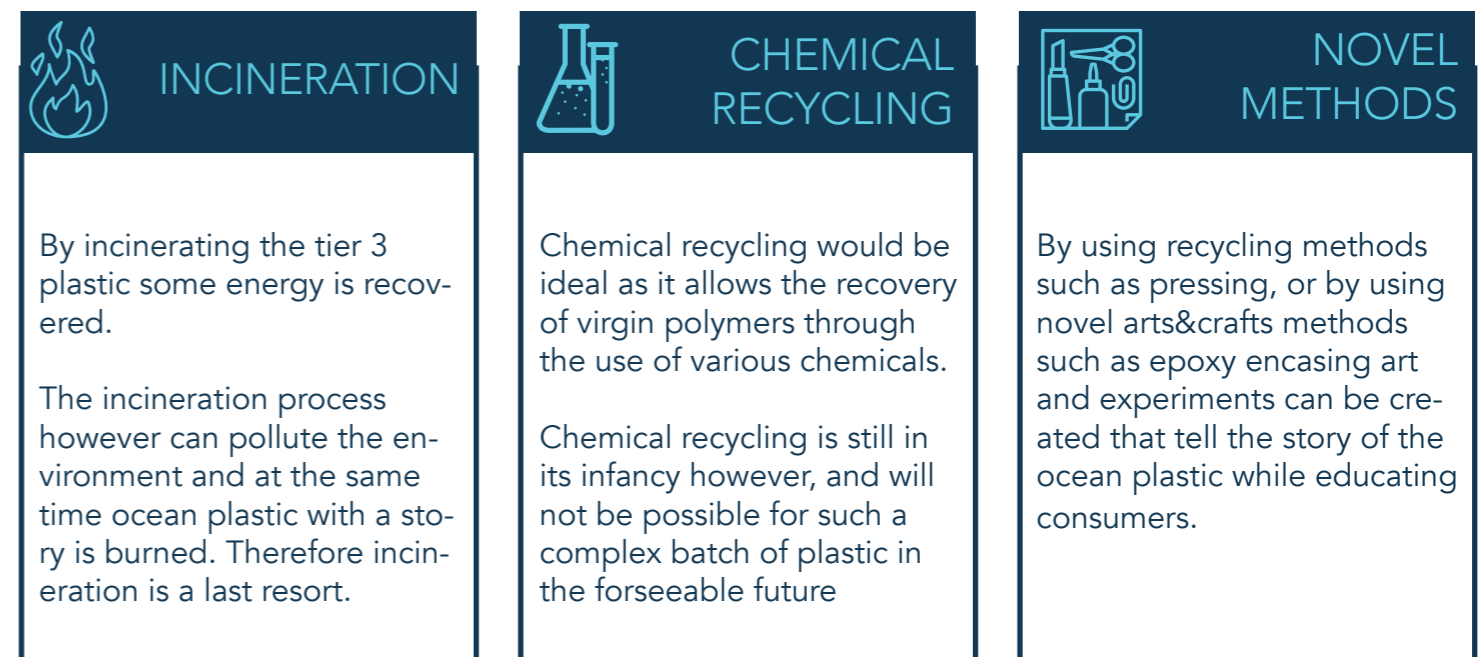


Figure 57: Processing options for tier 3 plastics

In short, tier 3 plastics cannot be traditionally recycled. They still possess a 'story' though, which in a way has educational value. Through methods such as epoxy encasing a clear link to the original material is preserved. Such products could show the effects of ocean plastic to people in a way that is more direct and concrete than imagery on television. These products could, therefore, help raise awareness for The Ocean Cleanup. Another advantage of such novel methods is that every end product will be unique.

However, these methods are quite limited in application and labour intensive. Consequently, it is unlikely that The Ocean Cleanup will be able to use all of the tier 3 plastics in this way. It does, however, allow for the extraction of as much value and awareness as possible out of the material.

That is why I have chosen Arts & Experiments as the strategy for the tier 3 plastics (figure 58). More utilitarian use cases are not ideal, because plastics processed in the aforementioned novel ways will have extremely unpredictable mechanical qualities. Furthermore, the fact that every piece will be unique matches very well with the context of art and experiments.

Brainstorming ideas in this context in groups, combined with the initial ideas generated in the exploration phase of the project (see appendix 7.2 & 7.3) led to a variety of ideas ranging from creating big art pieces for the public domain, to hosting a design competition (figure 59). In chapter 4.3 I investigate the possibilities within this context.

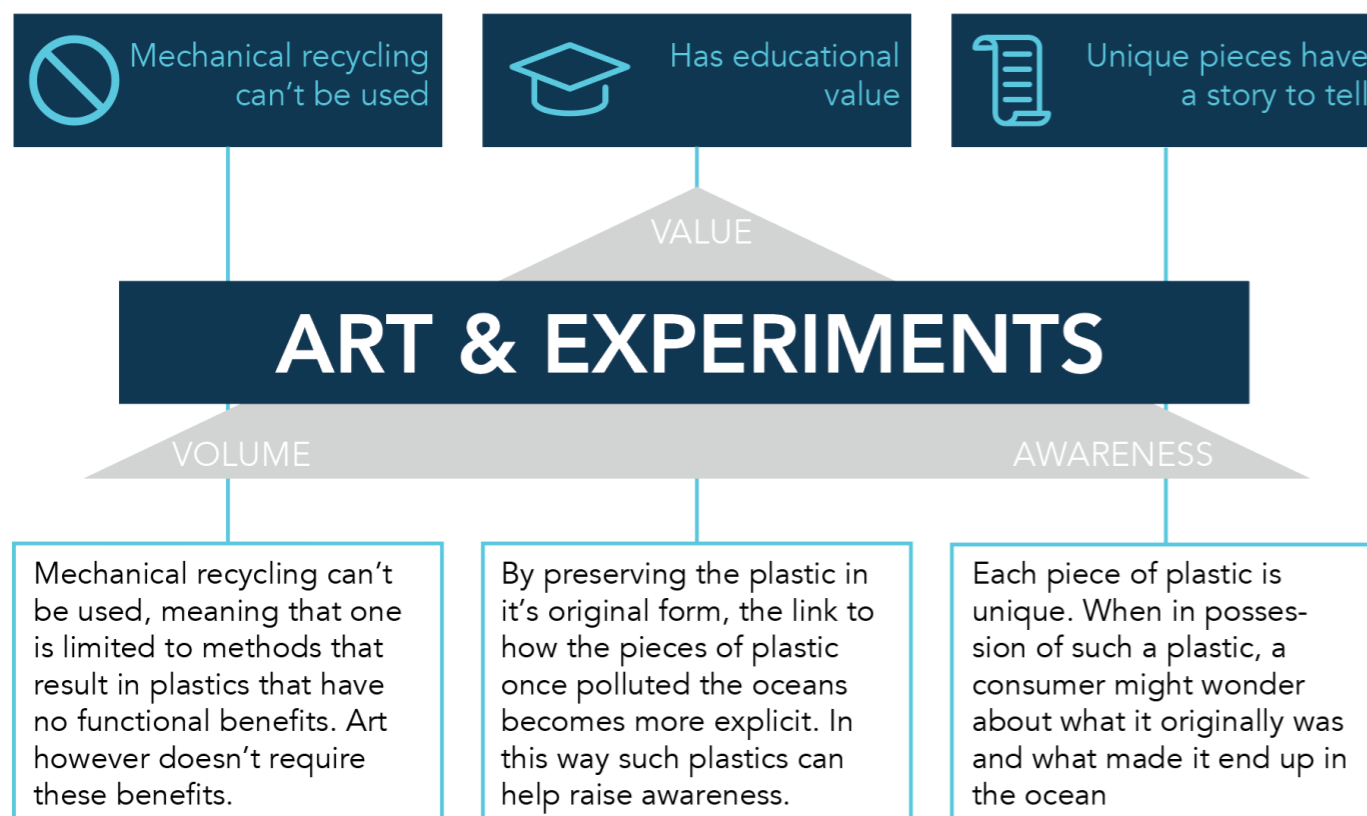


Figure 58: Arguments for Arts & Experiments as the strategy for Tier 3

TIER 3 PLASTIC (OTHER) ART & EXPERIMENTS

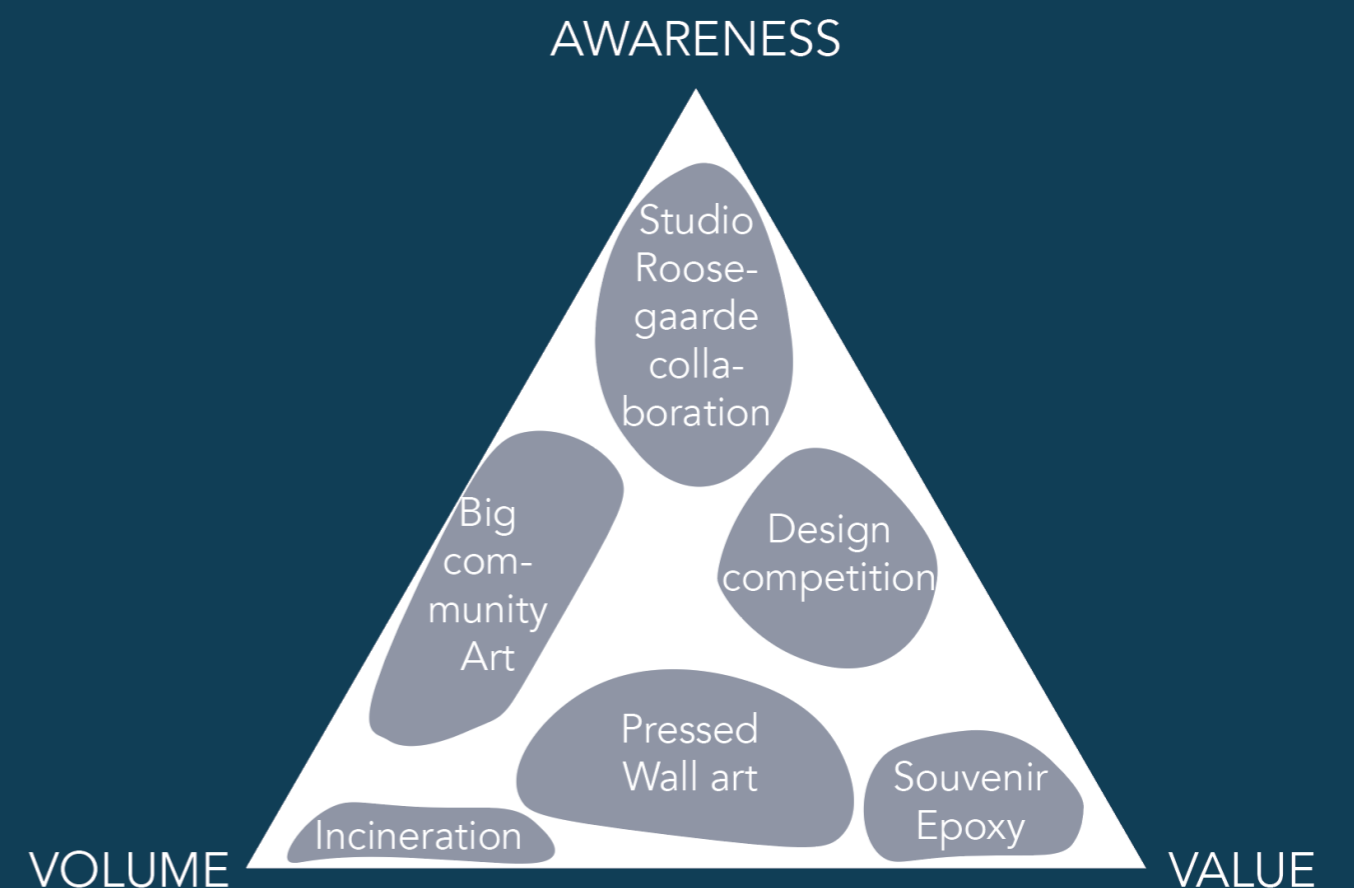


Figure 59: The Design framework for tier 3: Arts & Experiments
Initial ideas plotted as an illustration of what a tier 3 portfolio might look like

3.1 & 3.2 KEY INSIGHTS

- The Ocean Cleanup should try to accomplish the following **three goals** with ocean plastic products
 - ↳ Find a purpose for all of the **volume**
 - ↳ Extract as much **value** as possible
 - ↳ Generate as much **awareness** as possible for ocean plastic
- **No single product** can accomplish **all three goals** defined for The Ocean Cleanup
 - ↳ A **complementary portfolio** of products together can
 - ↳ A **strategy** that unites the products will **allow for synergy**
- The **material tiers** represent the **flexibility** of the material
 - ↳ To ensure a good fit with the material, I designed a **separate strategy** for each tier
- The tier 1 material strategy is: **Limited edition partnerships**
 - ↳ Allows for the **branding** of the material as **exotic and special**
 - ↳ One-off nature fits with the **unpredictable supply and qualities**
 - ↳ Each new partnership **exposes** The Ocean Cleanup to **new consumers**
- The tier 2 material strategy is: **Interior & exterior architecture**
 - ↳ Black material is **not suitable** for limited editions
 - ↳ There is a **growing demand for sustainable materials** in this context
 - ↳ More **subtle colours** are preferred in this context
- The tier 3 material strategy is: **Arts & experiments**
 - ↳ Mechanical recycling **can not** be used for the tier 3 plastics
 - ↳ The plastic still has **educational value** and a story to tell
 - ↳ This context allows for the extraction of **as much value** and **awareness** as possible

3.2.5 CONCLUSION

By looking at the plastic from a recycling perspective, I divided the material into three tiers. Each of these tiers has its own strengths and limitations, meaning each tier requires its own strategy.

By taking into account the unique possibilities and limitations of each tier I defined three distinct strategies were defined that take advantage of the properties of the material while keeping in account the brand and resources of The Ocean Cleanup and maximising the three goals: value, awareness and volume (figure 60).

For the specific products within these strategies, the criteria defined in chapter 3.1 still apply.

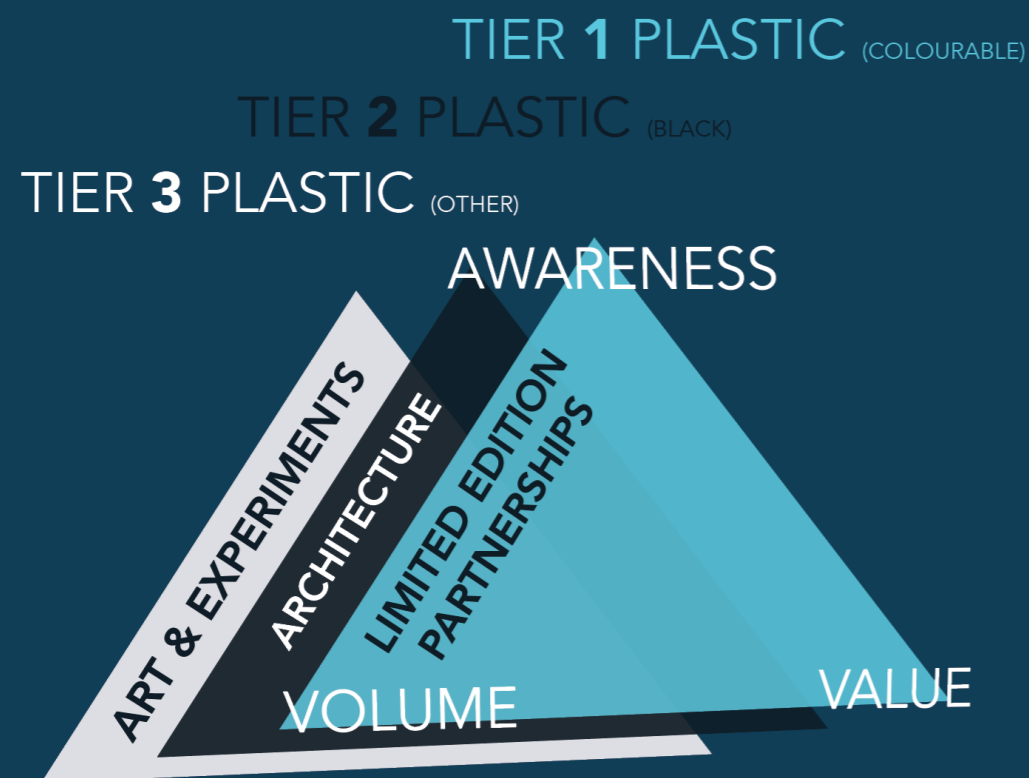


Figure 60: The chosen strategies of the three tiers integrated into a single image
This framework allows for the creation of a portfolio that maximises volume, value and awareness, while keeping the different material groups in mind



4. DEVELOP



4.1 TESTING TIER 1

In this chapter I test the limited edition partnerships framework for tier 1 plastic. First, I listed the assumptions for the strategy to work. I then established a method to test assumptions using case studies and interviews. Finally the results of said interviews are discussed.

4.1.1 TIER 1 ASSUMPTIONS

01: Limited ocean plastic editions lead to increased demand from consumers.

The first assumption I had to test is whether limited ocean plastic products lead to increased demand from consumers. For example: would a consumer pick an ocean plastic edition over the regular product, if both were available at the same price? This assumption was tested through consumer interviews using visualisations.

02: Consumers are willing to pay extra for ocean plastic limited editions.

To extract more value from the plastics it would be beneficial if there is a willingness to pay in consumers for ocean plastic limited editions. This would also validate the effect found in chapter 2.4.4.1, in which consumers prefer to show off green products only in case they are more expensive. It is extremely difficult and often unreliable to test the exact willingness to pay without a real prototype/real purchase. Nevertheless, I attempted to test a preliminary willingness to pay through consumer interviews and scenarios.

03: Partner companies are willing to pay extra for ocean plastic and are willing to put in the development and marketing effort.

This assumption is aimed at judging demand from the other side, the partner companies. How valuable is the association with the brand of The Ocean Cleanup to them and are they willing to spend the money and use the resources required for a partnership. This assumption was tested by interviewing potential partner companies and through desk research. In this way I hoped to gain a better understanding of the vision of such companies on sustainability and if, or how, The Ocean Cleanup fits in.

04: Partnering with The Ocean Cleanup adds value to the host brand.

This assumption relates to how the consumer perception of the host brand changes as a result of a partnership with The Ocean Cleanup. This also depends on the type of partnership, as some partnerships may seem more genuine or fitting than others. I tested this by discussing different partnerships and product proposals with consumers in interviews.

05: The proposed partnerships do not harm the brand image of The Ocean Cleanup.

A bad partnership could possibly harm the reputation of The Ocean Cleanup. Think for example of companies that have a bad environmental track record and lack ambition to improve. Such a partnership could come off as inauthentic and commercial. To find out if certain partnerships could harm the brand of The Ocean Cleanup I discussed many possible partnerships with consumers.

4.1.2 TIER 1 METHOD

To test the assumptions stated in 4.1.1, a combination of consumer interviews and expert interviews was used.

For the consumer interviews, I visualised four partnership ideas to serve as case studies. These were chosen based on their ability to help validate the assumptions and represent a mix of ideas focusing on value, volume and awareness. They were all given a distinct blue colour with an ocean like appearance, similarly to The Ocean Cleanup's own sunglasses. This displays the origin of the material and allows for the perception of the material as exotic, as recommended in chapter 3.2.3.

With a semi-structured interview guide, I used the case studies as vehicles to judge consumer perception, and as center points for a more general discussion around partnerships with The Ocean Cleanup. Before showing the partnership concepts I first asked which brands the consumers think The Ocean Cleanup should partner with. This provided me with insights on how consumers perceive certain brands and on what defines a good fit with The Ocean Cleanup to them. The interview guide can be found in appendix 7.4. The case studies are as follows:

01: JBL Ocean edition



Figure 61: JBL Charge 3 Ocean edition
Original image source: JBL website

The JBL Ocean edition is a version of the well-known Bluetooth speaker, the JBL Charge 3 (figure 61).

The speaker has distinct ocean plastic blue bumpers. The rest of the speaker is also coloured blue to communicate the fact that it is an ocean plastic limited edition. I chose a JBL speaker because they are often used in social contexts, meaning this example can also be used to test the 'green signalling' effect. In the interviews, questions such as 'What if it was a Sonos speaker (less visible) or a pair of headphones (always visible)?' were asked to test this effect in different ways.

By playing around with the extent of the 'limitedness' of the speaker and by adjusting the price point during the interviews I aimed to gain a better understanding of how scarcity and price influence a consumer's perception of the product and their willingness to pay. Furthermore, I asked consumers about a black ocean plastic JBL speaker, to test the importance of visual differentiation and the visibility of the origin of the material.

02: Heineken Crate



Figure 62: Heineken x The Ocean Cleanup crate
Original image source: Dirk van den Broek

This case study involves a limited blue version of the well-known Heineken beer crate (figure 62). These crates will slowly enter supermarkets and have a distinct appearance and The Ocean Cleanup branding. At the peak, around one in ten beer crates will be ocean plastic edition crates. The crates will cost the same as regular beer crates and (at this point) serve no additional purpose.

The benefit of this idea is that the plastic enters a circular system as beer crates are recycled 100%. Furthermore, this circular nature means the concept could generate long-term publicity for both Heineken and The Ocean Cleanup. By showing this concept to consumers I tested if ocean plastic limited editions increase consumer demands and why. For example, would consumers pick a blue crate over a regular one? And what motivates them to pick the blue crate?



Figure 63: Rare Heineken crate in the supermarket
Original image source: Mario Kock

The Heineken case study presented another fun possibility, to test to what the extent is of this increased demand. For example: imagine there is a regular crate on top of the blue crate? Would a consumer move it to get to the blue one? What if the blue one is at the bottom of the stack? (figure 63)



Figure 64: Tesla Ocean Edition interior
Original image source: Tesla website

03: Tesla Dashboard

In this case study, Tesla would produce 500 model 3 cars with an ocean plastic dashboard (figure 64). For this dashboard, GPGP plastic is used in a place where traditionally a premium or special material would be used (think for example of a leather interior). This allowed me to test if consumers can perceive GPGP plastic as such an exotic or special material. As such interior options are usually quite expensive, it also allowed me to test a preliminary willingness to pay in a completely different context and price range.



Figure 65: Tesla Ocean Edition exterior
Original image source: Tesla website

A car is also an extremely visible product and often a status symbol. Would consumers like to be able to see the fact that it is an ocean edition on the outside of the car as well? Perhaps small details (figure 65), but what if the entire car were to be bright blue? Asking such questions allowed me to test the limits of 'green signalling'.

04: IKEA Furniture Range



Figure 66: Ikea Ocean Furniture range
Original images source: Ikea website

The final tier 1 case study consists of a range of IKEA Products. These would be editions of existing products in the IKEA lineup (figure 66). IKEA would create an ocean plastic aisle in some of their stores, with a blue theme and containing all of these products and some information about The Ocean Cleanup. As with the other case studies, discussing this concept in interviews allowed me to judge the perception of partnerships in a different context. However, with this specific case study I focused on the awareness side. Do people think such an IKEA aisle will help new people discover The Ocean Cleanup? And what if one owns such a product, would it serve as a conversation starter with guests?

Plotted in the framework, the chosen case studies complement each other nicely on all three goals, see figure 67.

For the expert interviews, I created a separate list of topics to discuss based on the expert in question. There were two main categories of experts I interviewed: industry experts working at companies The Ocean Cleanup could potentially partner with and research experts.

TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS

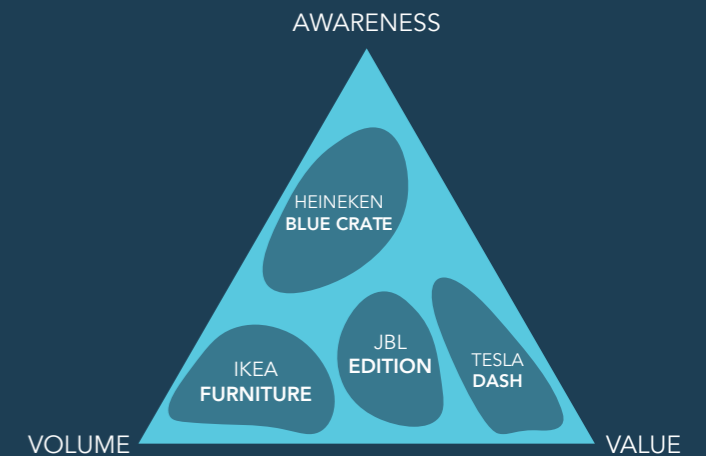


Figure 67: The chosen cases plotted in the strategy framework

As regards industry experts my aim was to learn more about their visions on sustainability, the process behind adopting new sustainable materials and their perception on co-branding.

As regards research experts I was interested in their vision on my strategy and the case studies. I aimed to validate my research approach and case studies using their expertise in similar research.

For the consumer interviews I performed 7 in-depth interviews using my case study-based interview guide, lasting for 1 to 1.5 hours each.

For my expert interviews I interviewed the following experts:

Robin Foolen

(Lead of sustainability at Secrid)

Lise Magnier

(TU Delft prof. specialised in sustainable consumer behaviour)

Ruth Mugge

(TU Delft prof. specialised in sustainable consumer behaviour)

Sam Ninaber van Eijben

(Member of the leadership team, Studio Ninaber)

Mark van Iterson

(Head of Design & Sustainability, Heineken Global)

4.1.3 RESULTS ANALYSIS

The analysis of the interviews was performed in the same way across all three tiers, meaning this chapter is applicable to all of the result chapters.

To analyse the qualitative data from the interviews I used a rudimentary combination of deductive and inductive analysis. I recorded all my interviews with the permission of the interviewees.

For the deductive part, I listened to each recording looking for questions I asked that were specifically related to assumptions or key points and I would then write down the answers. I compared the answers between interviews, looking for either contrasts or similarities, as both of these would be interesting to investigate.

For the inductive part, I listened to all of the recordings again, this time not looking for anything specific. I would write down interesting remarks and opinions and I looked for similar or contrasting remarks in other interviews. This way, I discovered new factors relating to consumer perception of ocean plastic products.

In the results chapter for each tier, these findings are described and illustrated with quotes. Whether or not these quotes represent common opinions, contrasting opinions or unique remarks is described in the accompanying text. The quotes included in the right (dark blue) pages are always considered to represent more general or common opinions.

The reason I picked a more rudimentary qualitative analysis approach is three-fold. First, I interviewed many different types of people for different strategies and with different interview guides.

Performing a full qualitative analysis, as for example described in the grounded theory method, for each category of interview would not only have been extremely time consuming, but I also think the variety in the interviews would have made it impractical and of little extra value.

Second, the scope of the project. As stated, performing a full qualitative analysis on all of the different types of interviews would be extremely time consuming and given the limited time frame of this project could be detrimental to further research. Because of this a more limited type of analysis was chosen, to allow for iterations and the further development of the strategies.

Third, the interview questions were sometimes iterated on. Especially for the expert interviews. For example: one expert would connect me to another one with more in-depth knowledge and I would ask slightly different questions.

The same was true for consumer interviews. If I got an interesting answer or opinion from one of the interviews, I sometimes would ask a questions relating to that in following interviews. An extreme example of this is that one of my interviewees remarked he would like to see something on the outside of the car (when talking about the Tesla dashboard), leading me to create a visualisation that I used in later interviews.

In the results chapters for each of the tiers, I first described findings relating to the strategy in its entirety and some consequences/alterations for the concepts or sub-strategies within it. Then, findings for each concept or sub-strategy are described in depth.

4.1.4 TIER 1 GENERAL RESULTS

Brand perception

Before showing the actual case studies, I asked what brands The Ocean Cleanup should partner with, both in general and in specific contexts such as audio equipment or beer crates. This was done to test what brands consumers associate with The Ocean Cleanup and why.

It was found, in general, consumers prefer The Ocean Cleanup to work together with well known brands. These should also be brands people already like to identify with.

Consumers perceived The Ocean Cleanup as a brand with a strong mission, a brand that is 'chasing a dream'. Many thought a partnership with a brand that has a similar mission would be suitable. Tesla often came up as an example.

Some interviewees also associated colourful and 'friendly' brands with The Ocean Cleanup, think of, for example, Mini Cooper.

Brands that are known for causing pollution or environmental damage were a big no for all interviewees. Aside obvious culprits such as Shell, however, consumers didn't easily perceive a partnership with The Ocean Cleanup as potential green washing.

It seems that I was on the right track with the brand choices for the case studies as all of the interviewees mentioned the brands I chose as their first or second choice within the specific product category.

General conclusions

In general, all interviewees were prepared to pay something extra for a limited ocean plastic edition of a product. One interviewee even noted he would be less interested if the limited editions were the same price, because then it would not be a 'statement'. This matches with the altruism effect found in chapter 2.4.4.1. On the other hand, it was often noted that it should be clearly communicated that the extra cost is a donation to The Ocean Cleanup. Otherwise, the products might feel like cash grabs.

All interviewees thought it was very important that the limited editions were visually distinct, going as far as saying they would not be interested in a black version. This validated my choice of picking a different strategy for the black plastics.

Multiple consumers added that they would like to see some type of logo to make the editions more identifiable in addition to the colour and texture. Another interesting insight I found is that there seems to be a balance between showing off a cool limited edition to friends versus displaying it in public. This balance will be further analysed in the next chapters.

Finally, one expert noted that the employee branding benefits should not be underrated in this strategy. Employee morale might increase as a consequence of a company contributing to a cause. This finding is further confirmed in chapter 5.2.2.

4.1.4 KEY INSIGHTS



- The Ocean Cleanup should partner with big well-known brands that people like to identify with



- Ocean plastic limited editions should be slightly more expensive compared to the regular version of the product



- It should be made very clear that this extra cost is a donation to The Ocean Cleanup in order for it not to feel like a cash grab



- Ocean plastic limited editions should be very visually distinct compared to the regular product



- There is a balance in how visible the product should be, consumers liked products that are used socially and that they can show to others willingly, but wouldn't want to for example wear blue headphones or drive around in a blue car

BRAND FIT RELATED

'The Ocean Cleanup limited editions would fit best with big, strong brands, brands people already like to identify with'
-Tobias van Sabben

'JBL is a good fit because you use the speaker in social settings, I would like to show it of to friends'
- Coby Nieuwpoort

'JBL is a good fit because it uses a lot of colours, however Sonos is also cool because of its high quality reputation'
-Thomas Bots

'Heineken comes to mind because it is the only beer brand I know that really project a lifestyle. They also already do a lot of sponsorships.'
-Annemieke de Veld

'I think Tesla would be a good fit because it wants to break with the 'old world' of pollution, as does The Ocean Cleanup'
-Willem Jan van Wijk

'I think Ikea would be a good fit for furniture as it already makes a lot of plastic products, plastic might not fit as well in more premium brands'
- Annemieke de Veld

STRATEGY RELATED

'Products should be more expensive than regular counterparts, otherwise it is not a statement. Like Product (red), almost nobody buys that to support the charity, 90% doesn't even know'
- Willem Jan van Wijk

'It should very clearly be communicated that the extra cost is a donation in order for it not to feel like a cash grab'
-Jan Geleijnse

'It is very important that that the limited editions are very visually distinct, if the ocean cleanup editions were black I wouldn't be as interested.'
-Annemieke de Veld

'There is a balance in showing off your ocean edition product and displaying it in public. For example I think the speaker is awesome but I wouldn't wear blue headphones.'
-Tobias van Sabben

'Maybe the products could come with something extra, like a Ocean club membership, or maybe they could show where exactly the material came from'
-Willem Jan van Wijk

4.1.5 TIER 1 JBL RESULTS

The general reception of the JBL speaker case study was quite positive. Most consumers noted that they would often use a Bluetooth speaker with friends, thus allowing them to show off their limited edition. They thought it could serve as a conversation starter when pulling it out at a party, for example. Interviewees also remarked that the fact that so many people already own a standard JBL speaker, combined with the fact that there aren't many limited edition versions yet, make it an extra interesting proposition. This product would allow owners to stand out from their peers.

All of these positive effects only manifest if the speaker is visually distinct as pictured. Some consumers even noted that they would prefer to see an 'ocean plastic certificate' logo or something similar, to differentiate the limited edition even more.

'I think it would be awesome if there was a special ocean plastic logo. It could be stamped on or maybe even seared/burned into the product. That would make the speaker recognisable even to people who don't know about the blue colour.'
- Jan Geleijnse

Another interesting aspect was the sensitivity to the scarcity of the product. Some consumers couldn't care less if JBL made 100 or 100.000 ocean edition speakers, while others said it would heavily influence their willingness to pay.

'The fewer speakers that would be made the more I would want one... I am a sucker for limited editions as they allow me to feel special. I like owning special things.'
- Annemieke de Veld

The average stated willingness to pay was between 10-25 euros, with some people going up to 50 euros (normal market price being 130 euros). Again it must be noted that this serves as a first indication and is in no way reliable data.

While all consumers liked the idea of showing off such an eye-catching speaker to friends, there were limits. When asked whether they would like a similar limited edition set of headphones, some people responded that they would not want to wear them if they were as distinct. They noted that it would feel too activist, or that they would not want to associate themselves with The Ocean Cleanup to that extent. One of them stated they would like to choose the moments to show off such a limited edition, instead of wearing it in public. On the other hand, some consumers wouldn't mind wearing ocean plastic products.

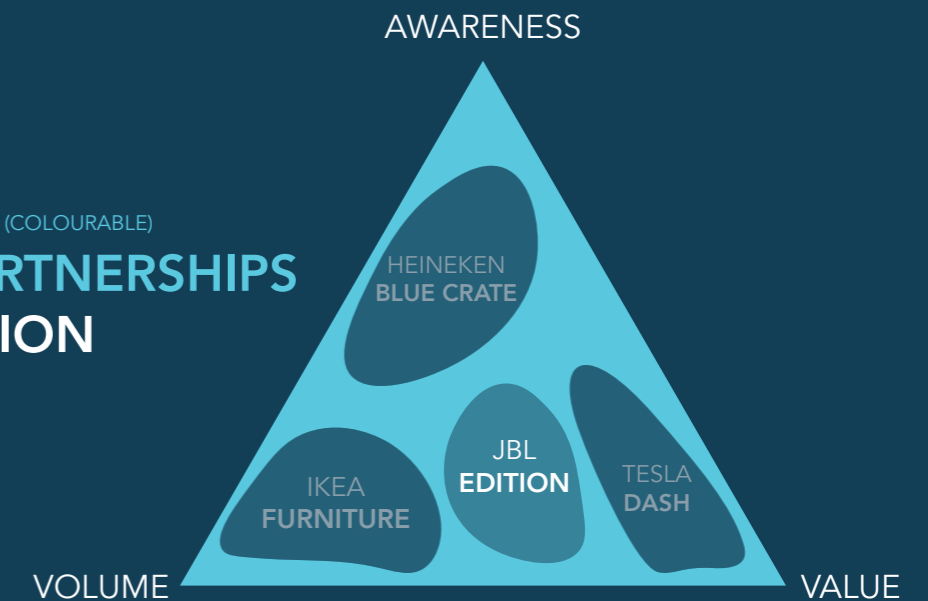
'I would also love headphones, I am not scared of supporting The Ocean Cleanup publicly as long as they don't do something I don't agree with. I used to have Greenpeace stickers on my car when I was younger so that is not a problem for me'
- Coby Nieuwpoort

'I love the speaker, but I would never wear blue The Ocean Cleanup headphones. While I like the brand it is not something I want to associate myself with to that extent and in public.'
- Tobias van Sabben

Finally, some consumers shared concerns that Bluetooth speakers are a technology product, which age quickly. One interviewee noted that The Ocean Cleanup should have a plan for the end of life of the speaker.

'Maybe it could be sent back for recycling, or turned into something else by the consumer?'

TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS 1.1 JBL EDITION



- Interviewees would prefer to own this speaker over a regular edition and would on average be willing to spend 10-30 euros extra, but only if it is visually distinct



- The fact that a JBL speaker is used in a social context is very important to interviewees



- The limited aspect is very important for some consumers, but not at all for others



- The fact that bluetooth speakers age and can become obsolete was a concern to some, an end of life strategy is required



'I like this a lot, everybody already has the normal version and this is a great way to be different and make a statement'



Tobias van Sabben
(24, male)

'I don't think I would be willing to pay anything extra if the ocean plastic was not visually distinct. What is the point if nobody can see I have an ocean plastic version?'



Thomas Bots
(25, male)

4.1.6 TIER 1 HEINEKEN RESULTS

For the Heineken crate, I had a hunch that most consumers would pick the blue crate over the regular crate when given the choice (even though it does not offer any functional benefits) and would even be willing to move a crate in the process. This hunch proved correct and all interviewees stated they would pick the blue crate over a regular one if both were available. Most consumers were willing to move between two and three crates to get to the Heineken crate, stating that moving more would be a bit embarrassing. Some consumers compared the effect of the limited edition crate to finding Willy Wonka's golden wrapper, or to the Coca Cola bottles with names that were introduced a while ago. Some stated that the crates should not be too common for them to remain interesting.

'If I were to be in the supermarket with one of two housemates, then I would quickly be able to move more crates to get to the blue one. In that case I might get it even if it was at the bottom of the stack.'

- Annemieke de Veld

All interviewees thought the limited edition crates would be great marketing for both Heineken and The Ocean Cleanup as crates are very visible in the supermarket. The fact that crates also last for a long time means the effects of this partnership could have long term impact. Some consumers even stated that they would want to keep the crate at home.

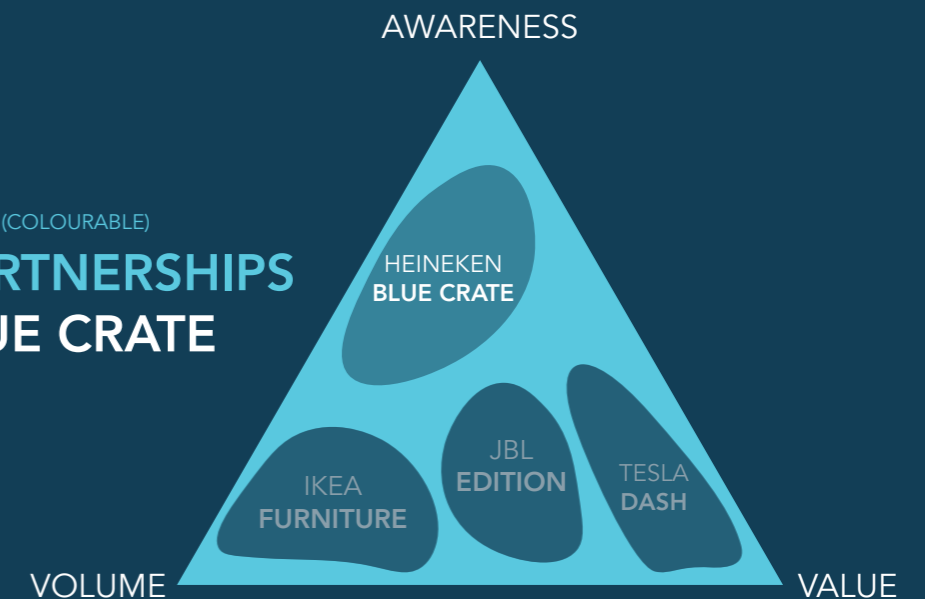
'If I were to buy this crate it would definitely start a conversation with my housemates or family.'

- Jan Geleijnse

Some interviewees mentioned that they liked the idea that, in this case study, the ocean plastic enters a circular system, because crates are returned, reused and recycled.

Finally, some consumers thought it would be cool if there was something extra added to the crates, for example: maybe the cardboard cover could display the story of the plastic and include a QR code that could be used to subscribe to The Ocean Cleanup. Another idea someone suggested was that perhaps the crate could be 10 cents more expensive or that Heineken could donate 10 cents to The Ocean Cleanup for every crate sold.

TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS 1.2 HEINEKEN BLUE CRATE



- Interviewees loved the idea and would always pick the blue crate over a regular crate if both were available



- Interviewees would on average be willing to move 2-3 crates to get the blue crate



- Most interviewees stated that they would want it even more if there were less blue crates in the stack



- Some interviewees thought something should be added to the idea, such as a cardboard cover with a QR code, or a donation element every time a crate gets bought



- All interviewees thought that the blue crate idea would be great marketing for both Heineken and The Ocean Cleanup



'Especially if there is only 1 or 2 in the entire supermarket, I would be willing to move 3, 4 or more crates to get it. Not all of them however as I would be too embarrassed!'



Annemieke de Veld
(25, female)

'It really triggers me that in this concept the ocean plastic enters a circular system, where it is constantly reused. I think that makes this a very powerful idea'



Tobias van Sabben
(24, male)

4.1.7 TIER 1 TESLA RESULTS

I started the interviews showing only the interior concept. Most interviewees liked the idea of the interior. Some would prefer for it to be a bit more subtle while others would like it to be more distinct. It was also noted by two interviewees that The Ocean Cleanup name was too big on the interior. They would either want it smaller, or preferably, have it changed to a recognisable, stylish logo.

All interviewees perceived ocean plastic as a premium material in this case, comparable to wood. They indicated that their willingness to pay would be similar to the price premium of a comparable interior option in another car.

'I definitely would be interested in such an option for a new car. I think it is similar to an option I often saw in other cars: walnut wood interior. I think I would be willing to pay a similar price for an ocean plastic interior.'
- Coby Nieuwpoort

The exterior was a more divisive subject. I presented my interviewees with multiple scenarios: one in which the entire car was blue, one in which the car had blue plastic accents, one in which the car had a small The Ocean Cleanup badge and one in which the car was no different on the outside compared to a regular Tesla.

'I would prefer to have only a badge, in that way I am not constantly showing off to the entire world that I have a special car. With a badge only the people who know about the limited edition existing will notice.'
- Annemieke de Veld

'I would like either a special colour to complement the limited nature of the car, or the blue accents. In that way everybody can see it is not just a regular Tesla.'
-Tobias van Sabben

Some consumers preferred not to show off the car, often because they thought cars should be understated and functional (also relates to hedonic versus utilitarian consumption, more on that in chapter 5.2.2). It is interesting to note that some interviewees that really liked the blue accents on the car are the same ones that said they wouldn't like ocean plastic headphones. This demonstrates that this balance in the visibility of the ocean plastic is subjective and depends on the specific products. Most interviewees chose either the accents or the badge, with only one picking either the blue car or nothing at all each.

Some consumers did note that by picking a popular brand such as Tesla and by keeping the production limited, these cars might turn into collector's items. One interviewee even stated that it could be a good investment to buy the ocean version if it were rare enough.



- Interviewees think this Tesla edition could become a collector's item because of Tesla's popularity and reputation



- Interviewees see the GPGP plastic interior as a premium or special material similar to walnut and would be willing to pay a similar amount for such an option



- The opinion of having The Ocean Cleanup visible on the exterior of the car varied considerably. Some people preferred only a badge while others would want the entire car to be blue



'I like this dashboard, however I would love to have something distinct on the outside of the car, I think that would make it a real collector's item'



Thomas Bots
(25, male)

'I think this could be a bit more subtle. If Tesla were to put something on the outside of the car it shouldn't be more visual than a badge or a subtle detail, I don't like showy cars.'



Annemieke de Veld
(25, female)

4.1.8 TIER 1 IKEA RESULTS

To the Ikea case study, the response was again positive. Interviewees thought Ikea was a good brand fit:

'I think Ikea fits well with the ocean plastic material. Ikea uses a lot of plastic, yet at the same time, they are doing a lot to become more sustainable'
- Tobias van Sabben

Most people would also be open to buying such items, although their favourite item varied a lot. Some consumers noted they liked the trash can or the plant pot because of the connection with cleaning:

'I like the plant pot specifically, because The Ocean Cleanup contributes to clean water, and plants contribute to clean air'
- Annemieke de Veld

Some indicated however that they didn't think the products would fit in their home, either due to the colour or due to the modern Ikea design. Most of these specific consumers indicated, however, that they still like the idea of such a product as a gift:

'These products would definitely not fit in my interior, my home is decorated in a very old fashioned way. I would love to give the plant pot as a gift however, it would make for a really nice present for friends with more modern interiors'
- Coby Nieuwpoort

As for willingness to pay, most consumers indicated a price premium somewhere between 5-20 euro's depending on the product.

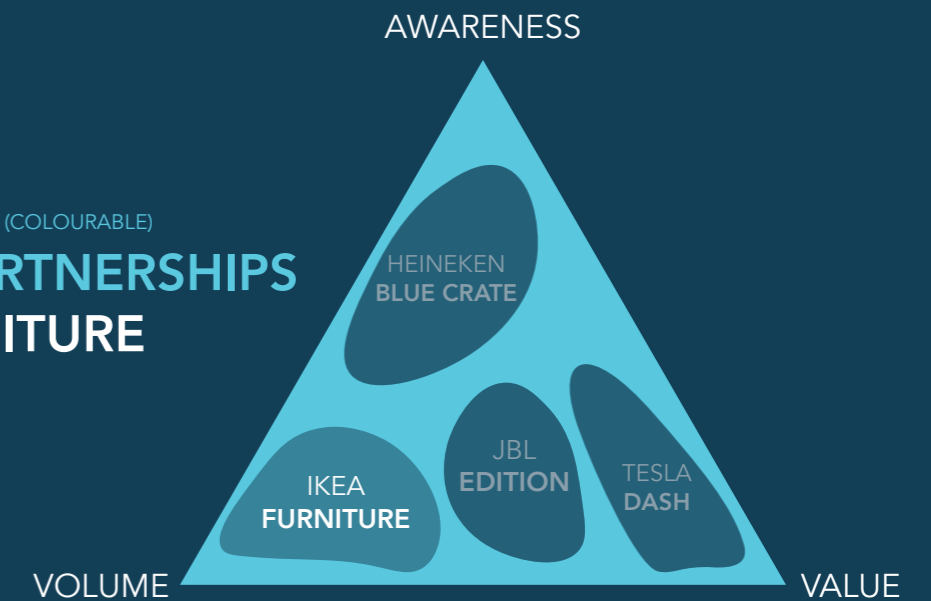
Multiple interviewees remarked that, in the case of the Ikea products, the limited edition aspect would be more important to them. The reasons given for this were that Ikea items are quite common and that the ocean plastic items are quite striking in appearance. It seems that, just like with fashion products, people prefer not to own the same interior items as their peers, especially if those items are eye-catching or attention grabbing.

'I would only be interested in these products if their numbers were sufficiently limited. I guess I can compare it to shopping at H&M. I buy basics at H&M, but never any flashy or striking items because I know I will see a lot of other people wearing them. I think the same is true for Ikea.'
- Jan Geleijnse

Finally, all interviewees indicated that these products could serve as a conversation starter:

'If I were to own one of these products I would definitely talk about it with any guests I were to invite to my place. I would be proud to own the product and tell the story of The Ocean Cleanup.'
-Coby Nieuwpoort

TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS 1.4 IKEA FURNITURE



- Interviewees liked the idea of a range of Ikea products and would be open to buying them



- Not all of them thought these objects would fit in their interior, but these specific consumers still liked the idea of the products as gifts



- The limited aspect appears to be more important for these products, as people find Ikea a bit ubiquitous and would hate to own the same 'special furniture piece' as their neighbours



- Interviewees think these products could serve as conversation starters when inviting guests to their homes



'I like the idea of this TOC aisle, with some information, it makes it a real part of the Ikea experience, like a themed area in a theme park.'



Jan Geleijnse
(23, male)

'I especially like the trash can, it is kind of symbolic. Throwing away your trash in a trashcan made of trash, keeping your house clean using the product of a clean-up.'



Willem Jan van Wijk
(60, male)

4.2 TESTING TIER 2

In this chapter, I tested the strategy defined for tier 2. As with tier 1, I made a list of assumptions that need to be valid for the strategy to work and designed a method in order to test these assumptions using interviews. Finally, the results of these interviews are discussed.

4.2.1 TIER 2 ASSUMPTIONS

01: There is a demand from construction companies/architects/commissioners for recycled (ocean) plastics. For The Ocean Cleanup to use its plastics in architecture, a demand for the material is essential. This demand for sustainable materials can partially be validated through desk research. However, most papers don't specify which stakeholders in a building project are responsible for this demand for sustainability and I could not find any research relating to ocean plastic specifically. Expert interviews were used to validate this assumption.

02: Stakeholders in this context see value in using GPGP plastic (even though it cannot be recoloured). Since GPGP plastic will likely be more unpredictable and might not be as well suited for the intended application, it is essential that stakeholders in this sector see the value in the ocean part of the ocean plastic. To validate this assumption, expert interviews were conducted.

03: People have a positive attitude towards ocean plastic in buildings. If the people have a positive attitude towards ocean plastic in buildings it will not only indirectly help increase demand, but also help to raise awareness for The Ocean Cleanup through word of mouth.

When positively perceived by consumers, ocean plastic in buildings could serve as a conversation starter and a prestigious feature of a building. To validate this assumption, I used consumer interviews, combined with visualisations of possible uses of ocean plastic in buildings.

04: There is demand for plastics for good.

As discussed in chapter 3.2.4, a possible concept for plastics in tier 2 is giving the plastic away for free. Possibilities include, amongst others, building shelters after a natural disaster and helping refugees. To test whether there is a demand for such plastic, expert interviews were used.

05: The general public has a positive attitude towards this plastic for good concept.

For The Ocean Cleanup to gain awareness and goodwill from the plastic for good concept, the general public needs to have a positive perception of the initiative. This was tested through consumer interviews combined with visualisations of possible use cases.

06: The GPGP plastic (HDPE and PP) are suitable for application in architecture.

From a technical standpoint, there are some requirements attached to using products in architecture. Think for example of resistance to corrosion, resistance to storms or resistance to UV light. To test to what extent GPGP plastic is a suitable material for such uses I conducted a combination of desk research and expert interviews.

4.2.2 TIER 2 METHOD

As stated in 4.2.1, testing the assumptions required a combination of consumers and expert interviews. Because of the fact that consumers are not the ones buying the product in the tier 2 strategy, their demand for such products or willingness to pay does not have to be tested. Only their perception of the ideas is relevant. In initial discussions with peers, people found it quite difficult to imagine ocean plastic being used as a building material. To aid them, a few visualisations of possible ocean plastic uses were created as mini case studies. I used a semi structured interview guide to judge consumer perception of the ideas and to generate a discussion around them. The interview guide can be found in appendix 7.4. The case studies were as follows:

01: Ocean tiles

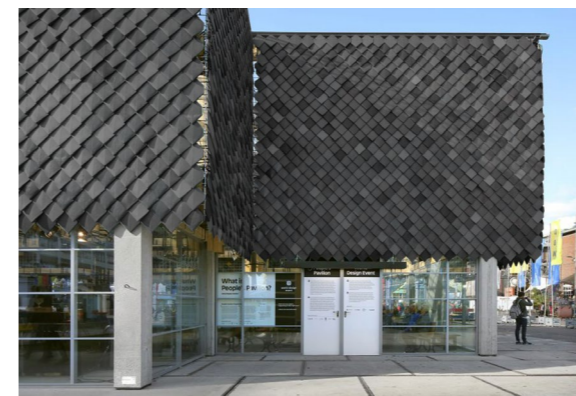


Figure 68: Ocean Plastic roofing tiles
Original image source: Pretty Plastics

This visualisation is based on an existing initiative by the company 'Precious Plastics' (figure 68). They produce roof tiles made from recycled plastics. This visualisation helps test people's perception of the material and triggers their imagination to think of other applications. By asking questions such as: 'in what type of buildings would you expect such materials?' or 'Do you think such buildings will help raise awareness for the ocean plastic problem?' I gained more insights in people's perception of such uses of ocean plastic.

02: Acoustic Panels

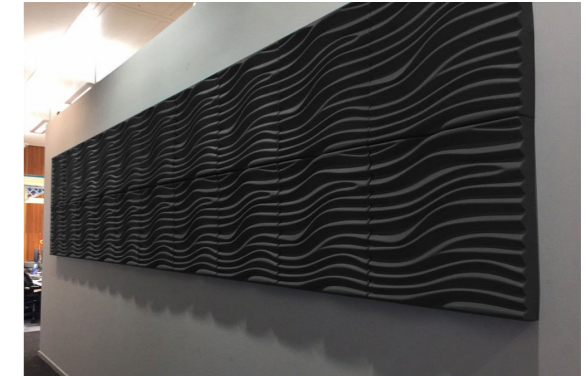


Figure 69: Ocean Plastic acoustic panels
Original image source: Soundtect

This visualisation is based on an existing product by the company Soundtect (figure 69). By showing this visualisation to interviewees, I hoped to help them imagine ways the plastic could be used indoors, while at the same time being black and having a distinct appearance. I used similar questions as with the ocean tiles case study to judge consumer's perception of such use of the material.

03: Plastic for good



Figure 70: Ocean Plastic shelter
Original image source: Conceptos Plásticos

As stated, one of the ideas that came out of brainstorming for tier 2, was plastic for good. This visualisation is based on a concept by the Colombian company 'Conceptos Plásticos' (figure 70). By showing this visualisation to consumers, I hoped to make them susceptible to the possibilities of the use of plastic in this way.

Questions such as: ‘How would this influence your perception of The Ocean Cleanup as a company?’ or ‘Is this a good use of ocean plastic?’ were posed to judge consumer perception of such uses of ocean plastic.

On the expert side, I interviewed someone in the construction project sector to gain a better understanding of the stakeholders in such projects. I interviewed three architects to learn more about their vision on sustainable materials and on how a sustainable product should be marketed. Furthermore, I interviewed the CEO of Save Plastics, a company that already uses recycled HDPE and PP in various construction projects, from lamp posts to entire houses. Finally, I interviewed an innovation lead at The Red Cross to learn more about the possibilities of using plastic for good. The experts interviewed are as follows:

Koen Harbers

(Project Manager DVP & Royal Schiphol Group)

Francesco Veenstra

(CEO Vakwerk Architecten & Future Chief Government Architect)

Maarten van Bremen

(Founder & Partner Group A Architects)

Jeroen Geurst

(Founder & Partner Geurst & Schulze Architecten)

Bram Peters

(CEO & Founder Save Plastics)

Michel Becks

(Humanitarian Innovation Lead at The Red Cross)

Willem Jan van Wijk

(Former CFO at Cordaid)

4.2.3 TIER 2 GENERAL RESULTS

Consumers were generally positive in their response to the use of GPGP plastic in building materials. The specific reactions to the different visualisations are discussed in the next chapters. One thing all consumers noted, was that they would prefer the end result more recognisably linked to The Ocean Cleanup. A point of recognition such as a logo would be great in their opinion. This would allow them to point it out when, for example, walking by the building with friends, and ‘prove’ that it is really made from GPGP plastic.

The interviews with experts led me to the conclusion that all my ideas in the architecture sector can roughly be divided in three groups: two concerning architecture and building projects and one concerning plastic for good.

In building projects, the main stakeholders in relation to material choice are the commissioning party and the architect. The commission party has the final say in the budget and sets the sustainability goals and general requirements for the project. For example, the commissioner of a building might want to achieve a sustainability certification for the building and want a red roof as a requirement. The architect is tasked with coming up with a design that will accomplish this certification and have a red roof. The architect will pick materials and products that suit the requirements and goals of the client. For ocean plastic products to be included in a building project, either the commissioner will have to demand it, or the architect will have to recommend it.

In the first case, certain clients/commissioners might have affinity with sustainability or ocean plastic, or they could be convinced by The Ocean Cleanup to use such materials.

These clients will push ocean plastic into their building projects from the top down. In this case we will call such projects: ‘Prestige Projects’.

The second case (in which the architect recommends the material) is more difficult, as first the architects must know and trust the material. They must then recommend it to the clients which have final say. This method will be called ‘Large scale building materials’ from now on.

Finally, plastic for good is defined as a third category, as it was found in the interviews that multiple ideas fit in this space, and that these ideas have very little in common with ‘Prestige projects’ and ‘Large scale building materials’.

The framework for tier 2 was adjusted to reflect these three new categories (figure 71).

In the next chapters I explain the reasoning behind these three main categories in depth and discuss my findings.

TIER 2 PLASTIC (BLACK) INTERIOR & EXTERIOR ARCHITECTURE

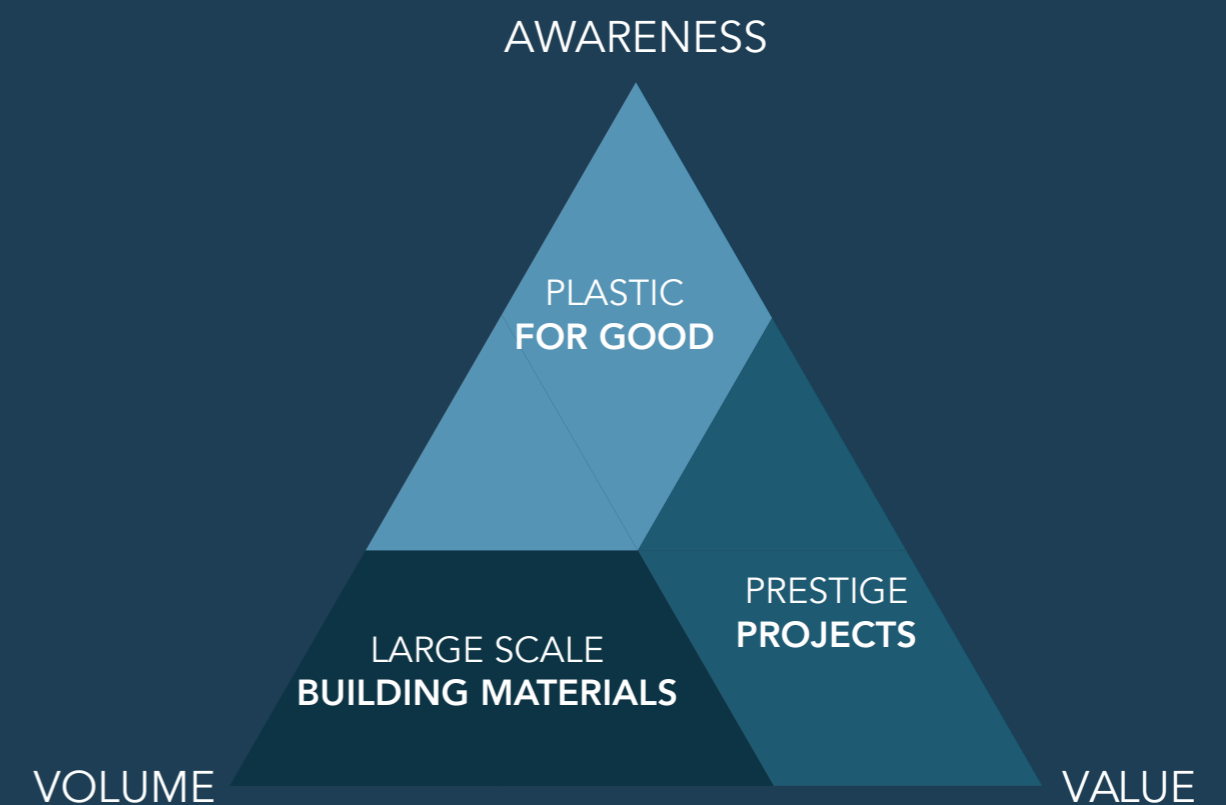


Figure 71: The Design framework for tier 2: Interior & Exterior architecture
The framework has been adjusted to reflect interview findings

4.2.4 TIER 2 PRESTIGE PROJECTS RESULTS

As described in the previous chapter, I defined the first category as 'prestige projects'. These are projects in which the demand for ocean plastic building material comes from the client.

'Certain clients may want to use ocean plastic in their buildings because they like The Ocean Cleanup or for PR reasons. These clients are probably less price sensitive, think big tech companies or municipalities.'
- Francesco Veenstra

In the interviews with architects, it became clear that the group of clients open to working with such material will be rather small, because the material will likely be more expensive. The vast majority of clients in building projects are very price sensitive.

For this strategy to work The Ocean Cleanup will have to spread the word that it can provide the plastic as a building material. Furthermore, The Ocean Cleanup may have to approach many of the clients personally.

'It is likely that on small scale a bunch of municipalities and companies would be open to using the material in such a way, however I don't see this strategy working for large scale'
-Maarten van Bremen

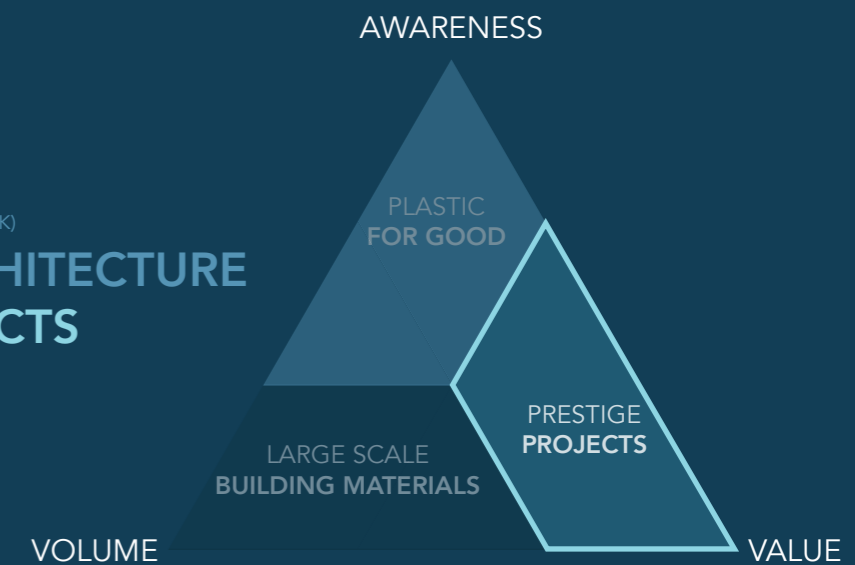
Such projects do raise awareness in two big ways, however. First, they show the world that using ocean plastic as a sustainable building material is possible. This could inspire architects elsewhere, which then become more open to using the material. This awareness would then prove extremely helpful in the second sub-strategy, the large scale building materials (chapter 4.2.5).

'You have to show architects the possibilities, that is what designers are for. I was sceptical but the visualisation of the roof tiles I was incredibly inspired. I guess such projects on a small scale could warm the architecture world up to the possibilities.'
-Jeroen Geurst

The second way in which such prestige projects raise awareness is through consumers. Almost all consumers interviewed thought using ocean plastic in buildings was a good idea. They also thought it would serve as a conversation starter if the plastic was recognisable.

'For example, if a building in Delft were to be made with ocean plastics, I would definitely talk about it with visiting friends, for example.'
- Thomas Bots

TIER 2 PLASTIC ^(BLACK) INTERIOR & EXTERIOR ARCHITECTURE 2.1 PRESTIGE PROJECTS



- Co-initiate a project together with for example a municipality and an architect



- The products should be used in the exterior of a prominent building that has a lot of visibility/visitors (city halls, museums, office buildings etc.)



- Clients need to have affinity with The Ocean Cleanup and be willing to pay extra to support The Ocean Cleanup and carry out the brand



- Attention and awareness from this project will not only help The Ocean Cleanup in general, but will also increase demand for the large scale building materials



'Municipalities and certain big companies might want to use ocean plastic in a visible way as a showpiece, to show to the world they support the cleaning of the environment. This will however happen in small scale only, the market for large scale cares about price first and foremost.'



Jeroen Geurst
Partner Geurst & Schulze

'You could try to regain the momentum of The Ocean Cleanup and make it well-known you supply building materials. In this case certain clients in high positions in companies might push for the use of ocean plastic in a next project'



Francesco Veenstra
CEO Vakwerkhuis Architecten

4.2.5 TIER 2 LARGE SCALE RESULTS

When aiming to apply the material on a larger scale, the prestige projects strategy would be inefficient, as The Ocean Cleanup would have to approach many clients individually. To accomplish larger scale application of the material, architects must recommend the use of the material to clients. I found that in general these clients are very price sensitive.

'For large scale construction such as housing, sustainability is one of the last factors that is considered. Cost is far more important, but also other factors such as ease of maintenance come first.'
- Jeroen Geurst

For architects to be able to recommend the material to these clients, it will have to be competitive in either function or price. There are already a few companies specialising in applications of recycled plastic in places where this material is superior in terms of function compared to the traditional material:

'Think for example of the sleepers used in railroad construction. Plastic is often cheaper because it requires less maintenance. There are already companies using recycled plastic for such purposes'
- Maarten van Bremen

As GPGP plastic has no functional benefits over regular (cheaper) recycled plastic, however, the prices will have to be low. This means that, while large scale building materials will help The Ocean Cleanup in achieving the volume goal, it is not the best solution for value.

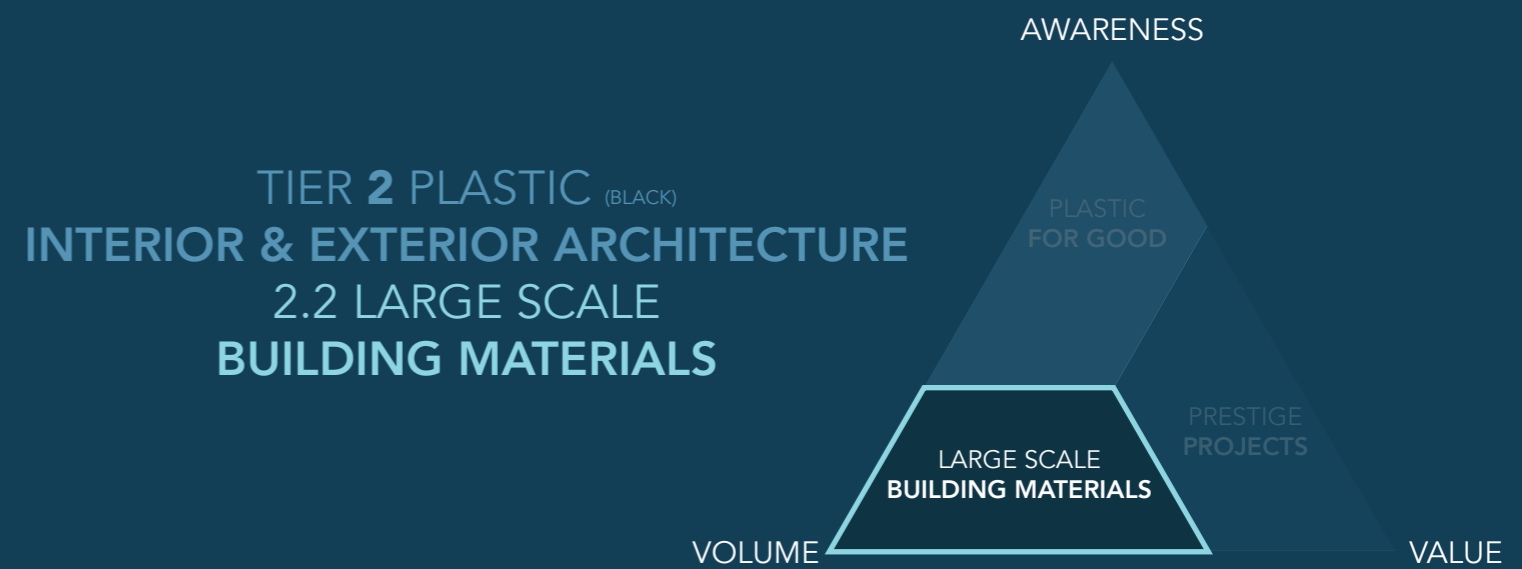
By competing in function and price, however, a pull effect can be created from the market for ocean plastic building materials. Another way to create such a pull effect is via certifications.

'New buildings often have to adhere to sustainability certifications. There are multiple different certifications that rate the sustainability of different materials used. The thing is, the requirements to achieve such a certification are often quite low and people never go over the minimum. These requirements are slowly being raised however'
- Jeroen Geurst

One such certification in The Netherlands is the MPG certification. Each building material is given an MPG score, based on the environmental impact of the entire life cycle of the material (Rijksoverheid, 2021). By convincing regulators to include GPGP plastic in such certifications (with a high rating) the material will be made more attractive to architects.

The geographical context where the large scale material is applied is also important. For example: in Bonaire wood is expensive and often imported. By creating a product with ocean plastic that can replace wood (such as fencing) the business proposition can be made easier. As the GPGP plastic is not collected locally (and far from land in any case), the geographical location where the plastic is to be used is still flexible.

Finally, there are several companies that already specialise in recycling HDPE and PP for the built environment, such as Lankhorst recycling and Save Plastics. This validates the assumption that it is technically possible to use the material in the tier 2 context. By partnering with such companies, The Ocean Cleanup can use their expertise in recycling plastics and designing building materials. These companies are already in contact with architects and municipalities, increasing the likelihood of adoption.



- For large scale application ocean plastic products need to be competitive in terms of price, including: purchase, installation and maintenance



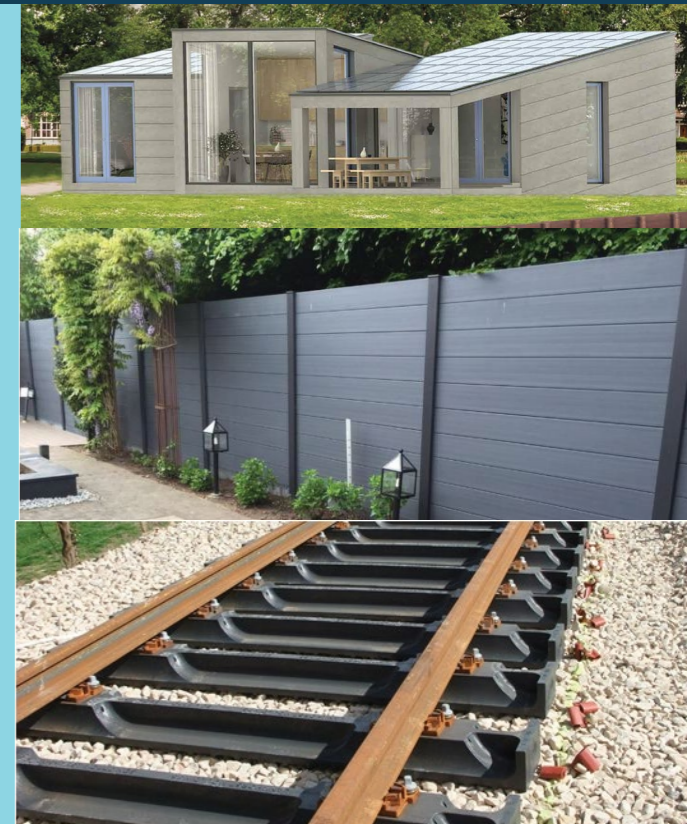
- Building projects often have to adhere to ever stricter environmental certification (for example MPG). By including ocean plastics in such certifications demand could be created



- The Ocean Cleanup can also look at areas where alternative materials are more expensive to be competitive



- Partner companies such as Save Plastics can help with design, production and sales of building materials



'The story of The Ocean Cleanup will only carry the material to prestige projects for a couple of years. For the long term and larger scale you need to prove the material is competitive and sustainable.'



Bram Peters
CEO Save Plastics

'While some companies might be willing to pay for ocean plastic for PR reasons, for the large scale you will have to compete either in terms of price or in terms of function.'



Maarten van Bremen
Founder Group A Architects

4.2.6 TIER 2 PLASTIC FOR GOOD RESULTS

The final category of tier 2 plastic that I studied is: plastic for good. This involves giving away the plastic in places where building materials are needed. During my interviews I found that these contexts are quite complex. In emerging markets, one must be extremely careful when giving away materials for free, as this might put local craftsmen out of a job.

One way to mitigate such potentially harmful effects, is to not aim to build entire buildings out of the plastic. In the interview with Michel Becks from the Red Cross I found that wood is often a bottleneck when building shelter or rebuilding houses. Wood in this case is used in the skeleton structure of the buildings. The walls are then filled in with bricks or other materials. This wood is often not available locally and has to be imported. If ocean plastic could be used to replace wood in such cases, there would be a use case, according to Michel.

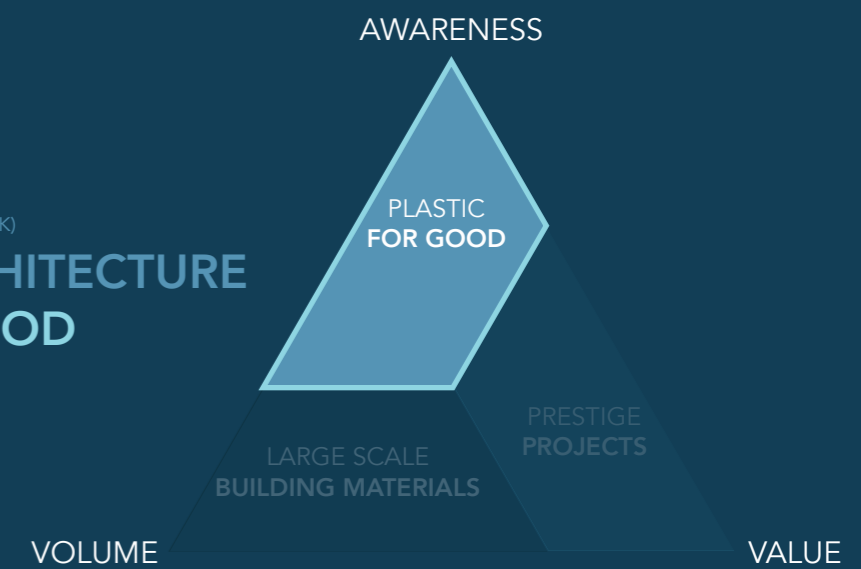
One context where is a need for such materials, is formed by the islands in the South Pacific. These islands lie in an area frequented by typhoons and the creation of shelter is often required. Furthermore, these islands suffer a shortage of wood and alternatives such as coconut fibers.

To get the material to this context, a few stakeholders are important. In the context of the South Pacific, the Australian government is a big player. It has a large interest in the development of the area due to both export and migration issues. This means it is often the prime investor in similar projects. The Red Cross Australia is the primary NGO operational in this area and has the expertise to run such projects. Finally, the governments of these island states need to be involved for the project to gain support locally. By partnering with all these organisations, The Ocean Cleanup will, in time, be able to outsource most of the work and will only be responsible for the delivery of the material.

'By working with a combination of local governments and NGO's such as The Red Cross, The Ocean Cleanup could set up local production of building materials in this context. In this way, if the ocean plastic ever runs out, the plants could also recycle local waste and serve as a sustainable job creator.'
-Michel Becks

By setting up such local production, one does not only create local jobs. Such a plant would first create a so called 'contingency stock' of building materials, that can then be used in case of a natural disaster such as a typhoon. A surplus of material could be sold on the local markets, creating a new local economy of building materials as well.

TIER 2 PLASTIC (BLACK) INTERIOR & EXTERIOR ARCHITECTURE 2.3 PLASTIC FOR GOOD



- Use plastic in the construction of the skeleton structure of buildings



- Pick a location where the normal material (often wood) for such beams is imported and/or expensive



- In this way the free/cheap ocean plastic materials do not outcompete local suppliers and local brickmakers can finish the buildings



- Island nations in South East Asia are suitable markets as they often have a need for shelter (due to hurricanes) and do not have alternative materials available locally



- Through a consortium with local governments and NGO's The Ocean Cleanup could fund such a mission



'Often times in areas struck by natural disasters, wood is the bottleneck. It is often scarce, expensive or has to be imported. If you could replace wooden beams with recycled plastic beams there could be a real demand for that, especially in places where there are no other alternatives.'



Michel Becks
Humanitarian Innovation Lead at
The Red Cross

'You have to be very careful when giving away things for free in such emerging markets. When you're not careful you can do more harm than good by for example putting local craftsmen out of business'



Willem Jan van Wijk
Former CFO Cordaid

4.3 TESTING TIER 3

In this chapter, I tested the proposed strategy for the tier 3 plastic: Arts and Experiments. To this end, I again created a list of assumptions that need to be valid for the strategy to work. I then designed a method for testing these assumptions using interviews. Finally, I discussed the results of said interviews.

4.3.1 TIER 3 ASSUMPTIONS

01: There is consumer demand for ocean plastic art.

One of the ideas in the tier 3 arts & experiments space was to sell art pieces made of ocean plastic. For this to work, consumers need to appreciate the idea of ocean plastic art and they need to be open to buying it. To test this I used a combination of consumer interviews and visualisations.

02: Creating art for sale with The Ocean Cleanup is something artists are interested in.

Next to consumer demand for the art, artists themselves also must be interested in working with The Ocean Cleanup and its recovered plastic materials. Interviews with multiple artists enabled me to validate this assumption.

03: A design competition with tier 3 plastics will attract designers.

To find more solutions for the tier 3 space, a design competition could be hosted. To test the viability of such a competition I conducted expert interviews, both with designers and with an experienced event host.

04: Displaying community art is something municipalities or other organisations are open to.

Another idea in the tier 3 space was to create public art pieces, to be displayed in cities for example. For ocean art to be displayed in public it must be approved by the governing body of the context where it is to be displayed. I tested the willingness of these bodies to display ocean art in multiple expert interviews.

05: Ocean plastic art helps raise awareness for the ocean plastic problem.

For ocean art (both art for consumers and for the community) to be worth pursuing it must help raise awareness for The Ocean Cleanup. To test this, I used consumer interviews with visualisations.

4.3.2 TIER 3 METHOD

For the consumer interviews, I created a few visualisations of ideas I had for art and I also used images of similar projects, as examples to illustrate the possibilities. These visualisations served as discussion points in the semi-structured interviews. The visualisations are as follows:

01: Ocean 'painting'

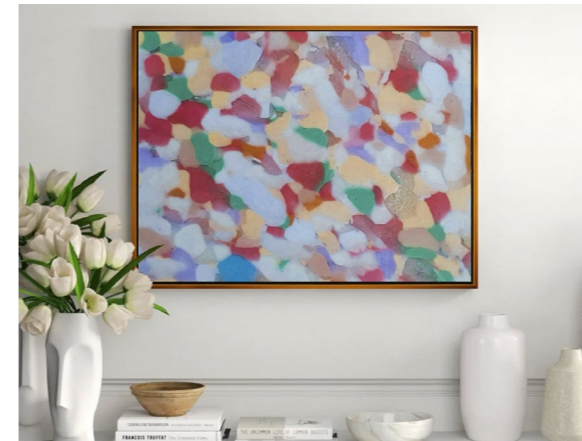


Figure 72: Pressed ocean wall art
Original image source: *Plasticiet*

In this concept, ocean plastic (for example the fraction that is too small to sort) is pressed into a plate (figure 72). Each plate is unique because the plastic pieces used are unique. Because the plastic is not turned into a homogeneous material, the link to the origin of the material is clearer. Using this visualisation, I tested if there is demand for such art, if it helps raise awareness and if it can serve as a conversation starter.

02: Epoxy Souvenir



Figure 73: Ocean Epoxy Art
Source: *Adam Savage*

In a similar fashion, more distinctive pieces of ocean plastic could be cast in transparent epoxy, creating unique paperweights (figure 73). These could be sold as souvenirs or could, for example, be given to loyal donors as a loyalty gift. This visualisation helps test the same assumptions as the plate art, but by using this image, I show consumers other possibilities of what form tier 3 could take.

03: Community art



Figure 74: Ocean Plastic Community Art
Source: *Utrecht Central*

This image shows the Skyscraper project by studio KCA (figure 74). Skyscraper is a four-story tall whale from of ocean plastic, which was designed as a community art project. Its purpose is to generate attention for the ocean plastic problem. The goal of showing this image is to illustrate the possibilities of community art to consumers. Once they have an idea of what is possible, questions such as 'Do you think this is a good way of raising awareness for ocean plastic?' or 'What would you think if The Ocean Cleanup were to be involved in the creation of something similar to this?' helped me judge consumer perception of such art.

For the expert interviews, I interviewed artists and designers to learn more about their perception of using a material such as ocean plastic. I also interviewed experts on art in the public domain, both on the municipality side and on the artist side. Finally, I have also interviewed a leading organiser of design competitions. The experts I interviewed are:

Floris Schoonderbeek
(Founder *Studio Schoonderbeek*)

Annemarie van den Berg
(Co-founder *Pink Pony Express*)

Siebe Thissen

(Head of art in the public domain, Rotterdam)

Dagan Cohen

(Head of R&D at What Design Can Do)

Sam Ninaber van Eijben

(Member of the leadership team, Studio Ninaber)

4.3.3 TIER 3 GENERAL RESULTS

Three main sub-strategies emerged for the tier 3 space from the interviews. It turned out community art was not scalable enough to achieve a high impact in multiple locations. The same was true for the artist collaborations. I therefore created an altered concept that includes community art and artist collaborations, called 'ocean art festivals'. These ocean art festivals cover the awareness side of the framework for tier 3 and are elaborated on in chapter 4.3.4.

I found design competitions to be a feasible strategy, and gained insights in how they should be planned and set up. Design competitions can be aimed at finding solutions for all three of the goals I defined for The Ocean Cleanup, which is why it is plotted in the middle of the framework.

Finally, I learned that many of my interviewees have a positive attitude towards owning ocean plastic art. Both the pressed plate art as the epoxy souvenir visualisation garnered positive reactions. Such concepts have been bundled in a third strategy: Art for sale/ souvenirs. This sub-strategy fills the value side of the tier 3 framework.

These three sub-strategies and further results from the interviews are discussed in detail in the following chapters.

Most likely, the three strategies together do not require and can not accommodate all the plastic volume that will be available in tier 3. That is why waste management, such as incineration or storage might be needed to complete the framework on the volume side. It must be noted that incineration is a last resort.

Furthermore, the potential to gain awareness or value is lost after the incineration of the plastic.

Another option for the volume of the plastic is storage. The Ocean Cleanup could store the tier 3 plastics it has no use for until a purpose is found in the future, or until other recycling options are developed. This waste management rounds out the framework on the volume side.

The adjusted framework is displayed in figure 75.

TIER 3 PLASTIC (OTHER) ART & EXPERIMENTS



Figure 75: The Design framework for tier 3: Arts & Experiments
The framework has been adjusted to reflect interview findings

4.3.4 TIER 3 OCEAN ART FESTIVAL

Reception to art in the public domain was quite positive in the interviews.

'I especially think the example of the whale is awesome. I would love if The Ocean Cleanup were to display something like that in my city, it would definitely get people talking.'

- Annemieke de Veld

Artists and designers also reacted positively towards working with ocean plastic for works in the public domain.

'I have worked on multiple projects in the public domain, with the purpose of, for example, raising awareness or reframing people's thoughts. I think works made from ocean plastic could have a similar effect.'

- Annemarie van den Berg

However, when learning about all the stakeholders involved in such projects (by, amongst others, talking to the head of art in the public space in Rotterdam) I concluded that such art is not easily scalable. Each piece of art must go through a unique process. An artist must be found to create the art, a location must be found, permits from multiple different governmental bodies must be obtained, et cetera. To go through this process for every single piece of art would be extremely time consuming. Furthermore, the placement of art in the public domain does not gather much attention by itself.

'What we often try to do is to couple the reveal of a piece of art in the public domain with an event, such as a 100 year anniversary. This gives the art an additional reason to exist and generates far more exposure.'

- Siebe Thissen

The creation of an ocean art festival solves most of these problems. In this scenario, The Ocean Cleanup would host an event in a city. A few local artists would be invited to create art from ocean plastic material provided by The Ocean Cleanup. These works of art would then temporarily be displayed in a public place (think for example het Doelenplein in Rotterdam). This temporary exhibition would come with some additional elements. People could for example buy ocean plastic souvenirs at the exhibition, learn about the story of The Ocean Cleanup through interactive screens and have drinks. Perhaps people could even vote on the best work of art, to be given a permanent place in the city. This would serve as a permanent reminder to the festival in the city.

This concept would create buzz around the art, which would increase both the awareness generated and the impact of the art. Furthermore, once the festival is over this concept could easily be applied to a different city/context, with its own local artists. The more well known the ocean art festival becomes, the more other cities will want to host one in the future and the more artists will want to participate.

'I think an ocean art festival would be a good way to go about it. The impermanent nature of the event makes it much easier to get permission, it allows for displaying multiple works of art at the same time and will work in many different contexts.'

-Siebe Thissen

TIER 3 PLASTIC ^(OTHER) ART & EXPERIMENTS 3.1 OCEAN ART FESTIVAL



- Initial research shows a positive attitude towards ocean plastic art from citizens, artists and municipalities

- The Ocean Cleanup should partner with (local) artists to create the art

- The art should be placed in cities/areas near the shore to keep the connection with the ocean

- Creating an Ocean Cleanup art festival concept would allow for easier scaling to new locations and will generate more buzz around the art

- The public could vote on the best piece of art of the festival, which could be given a permanent place in the city



'Art in the public space should never be just utilitarian, we always work with a local artist. It often centered around events as well, think of an anniversary or other big happening.'



Siebe Thissen
Head of art in the public space Rotterdam

'Art in the public space is a great way to raise awareness, put issues to light or reframe people's thought.'



Annemarie van den Berg
Co-Founder Pink Pony Collective

4.3.5 TIER 3 DESIGN COMPETITION

Hosting a design competition is not as simple as it sounds. A lot of effort goes into designing the brief, including a year of research or more. The problem is divided into sub problems and boundary conditions are established. The brief is carefully designed to steer the submissions and results into the right direction.

I recommend The Ocean Cleanup to center a potential design competition around the three defined goals. By selecting a winner for each goal, a diversity of concepts is encouraged.

'I think a design competition around this tier 3 plastic could definitely work. The Ocean Cleanup would have to think about what their goal is with such a competition. By playing with factors such as the prize the entrants and thus the results of such a design competition can be influenced.'

-Dagan Cohen

Dagan explained that there are various types of entrants in design competitions. These can range from students submitting a design to scale-ups with a proven solution. Depending on the incentives for participating and the prizes, the type of entrants is influenced. For example, while students might prefer a monetary prize, for scale-ups it might be too insignificant for them to care. They might prefer media exposure or an accelerator programme instead. From Dagan's experiences, such scale-ups and start-ups have the highest success rate for developing a working solution.

To host the competition I recommend The Ocean Cleanup to partner with an organisation such as 'What Design Can Do'. What Design Can Do has experience with setting up and promoting such competitions. Furthermore, they could provide their IT systems for submitting and evaluating submissions or help with setting up well defined criteria.

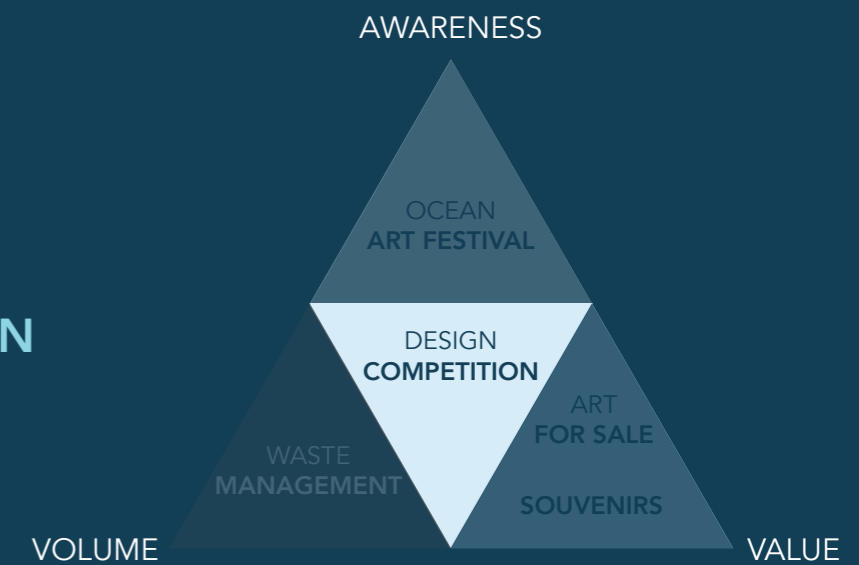
The Ocean Cleanup could also partner with, for example, WWF Plastic Smart Cities. This initiative is aimed at sharing knowledge on solutions that help with plastic waste and pollution. By working together, the reach and exposure of such a challenge is increased.

Finally, a company could be found that sponsors the prizes of the competition. In the case of the challenges hosted by What Design Can Do, that is often Ikea. This keeps costs low for The Ocean Cleanup while creating additional exposure from the marketing that this sponsor will put into the event.

'Through involving companies and organisations such as Ikea and WWF Smart Plastic cities, the impact and reach of the design competition is maximised.'

- Dagan Cohen

TIER 3 PLASTIC ^(OTHER) ART & EXPERIMENTS 3.2 DESIGN COMPETITION



- The design competition should be rated on the goals of The Ocean Cleanup, Value, Volume and Awareness



- By not only selecting an overall winner, but also a winner for each goal a diversity of ideas is guaranteed



- By starting a consortium around the competition with for example What Design Can Do and WWF Plastic Smart Cities, The Ocean Cleanup can use the expertise and systems of these companies and increase the exposure.



- By offering a monetary prize, exposure and a chance to cooperate with The Ocean Cleanup the design competition will attract diverse entrants, from students to established companies



'Running a design competition should not be underestimated, a lot of research goes into creating a brief that produces the desired results. When done right however, the results be extremely valuable.'



Dagan Cohen
Head of R&D at
What Design Can Do

'I think many people would be open to a design challenge around this waste. I think the material is quite interesting and inspiring and I would definitely be open to working with it.'



Floris Schoonderbeek
Founder Studio Schoonderbeek

4.3.6 TIER 3 ART FOR SALE

From the consumer side, my visualisation of the plate art was slightly divisive. Some consumers loved it and would definitely want to own and display one, while others didn't like the colours or didn't think it would fit in their interiors. Perception of this type of art seems very personal. Some consumers also noted that if they were to hang the art on their wall, it would need to be limited or special in a way:

'I would like to own something like this, but only if they were to be made by a specific artist, or in very limited fashion. I don't want art on my wall that everyone can buy.'
- Willem Jan van Wijk

All consumers liked that fact that the novel methods used to create such art keep the origin of the material intact and visible and believe this art will serve as a conversation starter.

From the side of the experts, the artists I interviewed would love to work with the material:

'I love ocean plastic as a recycled material. It has not been tainted by the shady garbage industry yet, making it very pure. I would be very open to creating something using this material'
- Floris Schoonderbeek

It was noted by both artists and some consumers that they would prefer if The Ocean Cleanup collaborated with artists for the art, as this would make the art more authentic and less commercial.

By collaborating with different artists for different types of art, The Ocean Cleanup could create an evolving range of products made with tier 3 plastics. This would also help with the personal preference of consumers and the subjective nature of art, as after a while there would be something for everyone in the collection.

Regarding the epoxy casting, the perception was slightly different. Many people liked the idea of them as a paperweight and thought they should be sold as a souvenir. Perhaps they could be sold at the ocean art festival.

'I would also like to own this and display it on my desk for example. You have to be careful with something like this, however, as it can be something you throw away easily.'
- Jan Geleijnse

Something else interviewees mentioned is that such a paperweight could make for an ideal loyalty gift. They could be given to loyal donors of The Ocean Cleanup, or perhaps a larger version for the lobby of companies who donate a large amount.

'I think it would be really cool if The Ocean Cleanup were to send one of these out to donors that for example have been donating monthly for over a year.'
- Tobias van Sabben

TIER 3 PLASTIC ^(OTHER) ART & EXPERIMENTS 3.3 ART & SOUVENIRS



- For high value art The Ocean Cleanup should always cooperate with artists, one possibility would be for example to have artists arrange plastic before it is pressed into a plate



- By collaborating with different artists an evolving portfolio of art products can be created



- Initial research shows that most consumers see the value in the story the artwork tells and would be willing to pay for such art



- By casting an ocean plastic item in epoxy, a paperweight can be created. Consumers think this could serve as a great souvenir or loyalty gift for long-term donors



'I would love to own this, I like the abstractness and the fact that every painting is unique. I also like that it still keeps a relation to its origin material. If I had the money I would be willing to pay over a thousand euros for this!'



Coby Nieuwpoort
(59, female)

'If The Ocean Cleanup were to make something like this it would have to be in collaboration with artists. They should let artists use the ocean plastic in their own unique ways'



Floris Schoonderbeek
Founder Studio Schoonderbeek

5. DELIVER



5.1 FINE-TUNING THE STRATEGY

I used this chapter to fine-tune the overarching strategy based findings from chapter 4. I propose an overarching brand to connect the sub-strategies and the three tiers. Furthermore, I distilled a list of recommendations from the findings from the interviews.

5.1.1 OCEAN PRODUCT BRAND

Both the interviews with consumers for the three tiers and the interviews with experts for tier 2 demonstrate that it is preferable to make the ocean plastic as recognisable as possible. Interviewees often suggested that The Ocean Cleanup should design a logo for ocean plastic products that is more easily recognisable than the current logo.

To this end, I recommend developing a new brand that unites all products and initiatives, with the same easily recognisable logo. This has two main advantages: recognisability and differentiation (figure 78).

For recognisability: a consumer that has once seen an ocean plastic Heineken crate in a supermarket, will then recognise the logo on a building, or on a piece of art. With this uniform brand, the exposure and reputation of different initiatives will all feed into each other. The more well known the brand gets, the more valuable it will be to consumers, the more companies will want to work with The Ocean Cleanup in all three tiers and, finally, the more awareness is generated for The Ocean Cleanup.

For differentiation: regular 'ocean plastic' is not protected. I found in chapter 2.4.2 that many companies sell 'ocean plastic' products made from plastic that has never been in the ocean. By giving The Ocean Cleanup's material its own name and brand it will be differentiated from other types of ocean plastic.

In this chapter I present a suggestion of what a possible brand could look like, called Ocean Product (figure 76). I recommend The Ocean Cleanup to work with a branding agency for the final version of this brand and to further develop the details.

This 'Ocean Product' branding should be applied to all manifestations of all three strategies in visible ways. It should be visible in places where consumers run into Ocean Product products, such as in stores or perhaps on the cardboard cover of a Heineken crate in a supermarket. In places where information about the initiative can not easily be communicated, for example in facade panels on a prestig project building, the logo should be accompanied by a QR code (figure 77). In this way curious consumers can learn more about The Ocean Cleanup and the product range.

By connecting all manifestations to this Ocean Product initiative, The Ocean Cleanup can create a website that would serves a single touchpoint for communicating all efforts related to the valorisation of ocean plastic (figure 78 & 79). This website could then be used to announce new product releases. Perhaps later on a community feature, an Ocean Product Club could be developed.

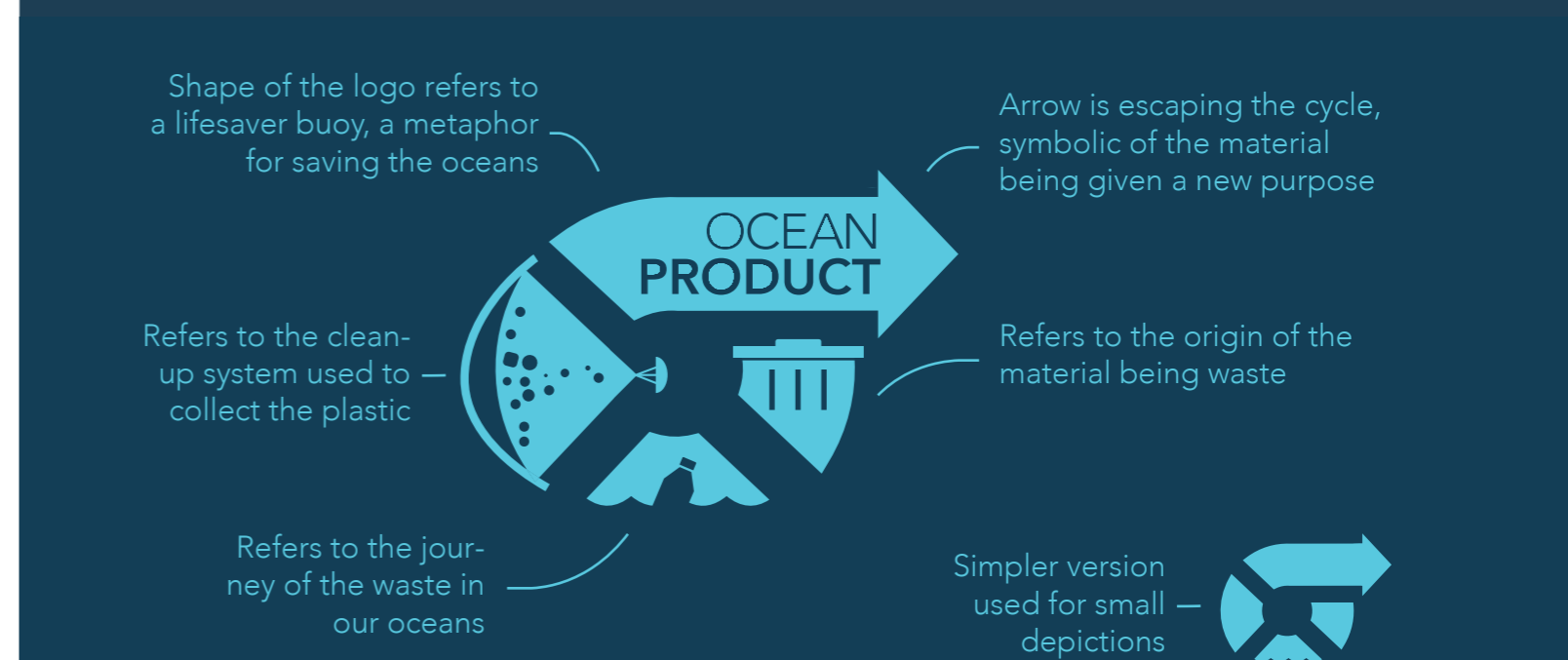


Figure 76: Ocean Product Brand



DIFFERENTIATION

The name 'ocean plastic' is **not protected** and many companies sell ocean plastic products made of plastic that has never been in the ocean.

By calling Great Pacific Garbage Plastic 'Ocean Product', The Ocean Cleanup can **differentiate** the material from 'regular' ocean plastic that is offered by other companies.

RECOGNITION

Having the same logo on for example a building and a product will cause consumers to start to **recognise** the logo.

The more well known the brand gets, the more **valuable** it will be to consumers, the **more companies** will want to work with The Ocean Cleanup in all three tiers and the more **awareness** is generated for The Ocean Cleanup.

Figure 78: Reasons for new brand

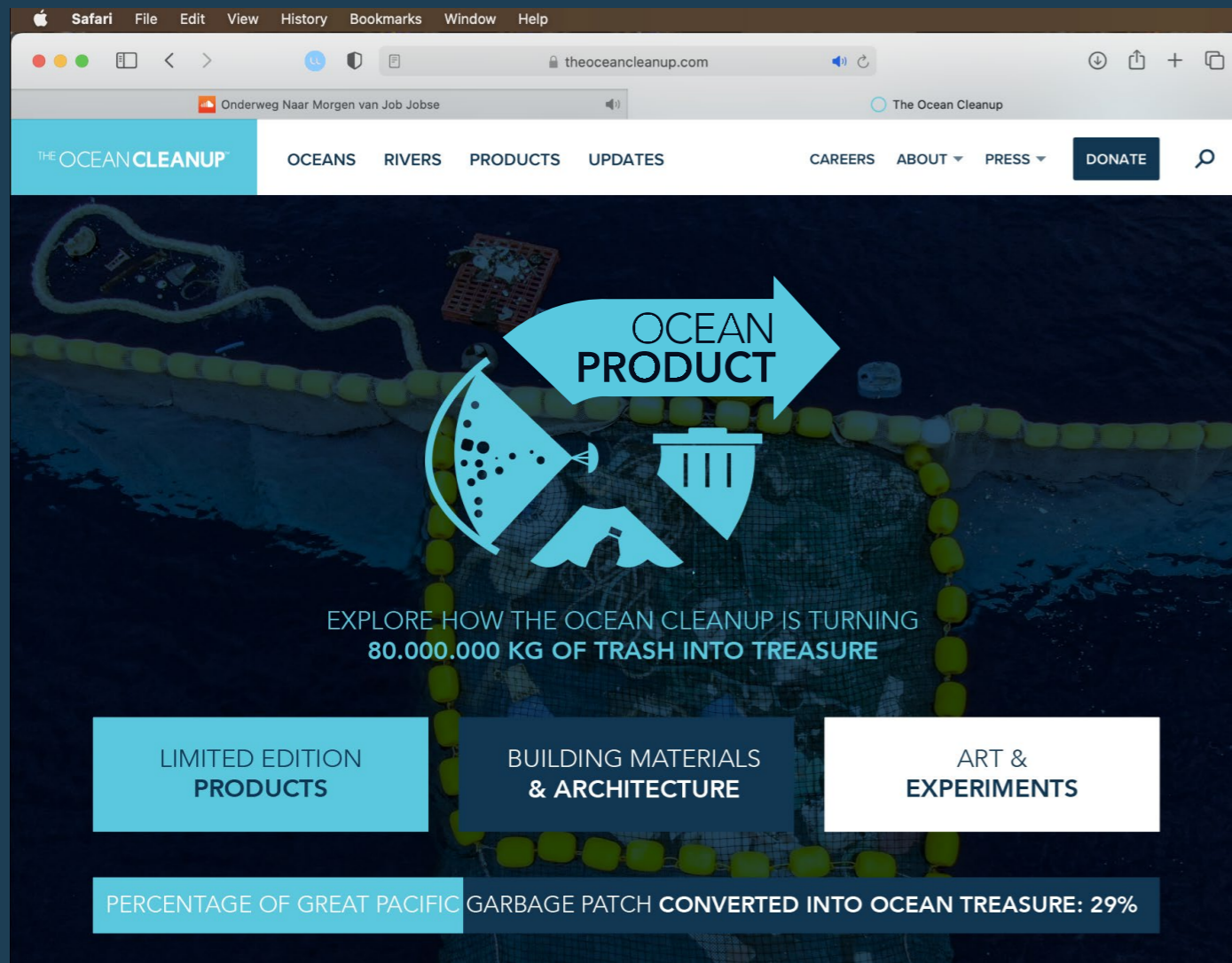


Figure 78: Mockup website for the Ocean Product initiative
 Displaying the products in the 3 tiers and showing a progress bar towards the ultimate goal

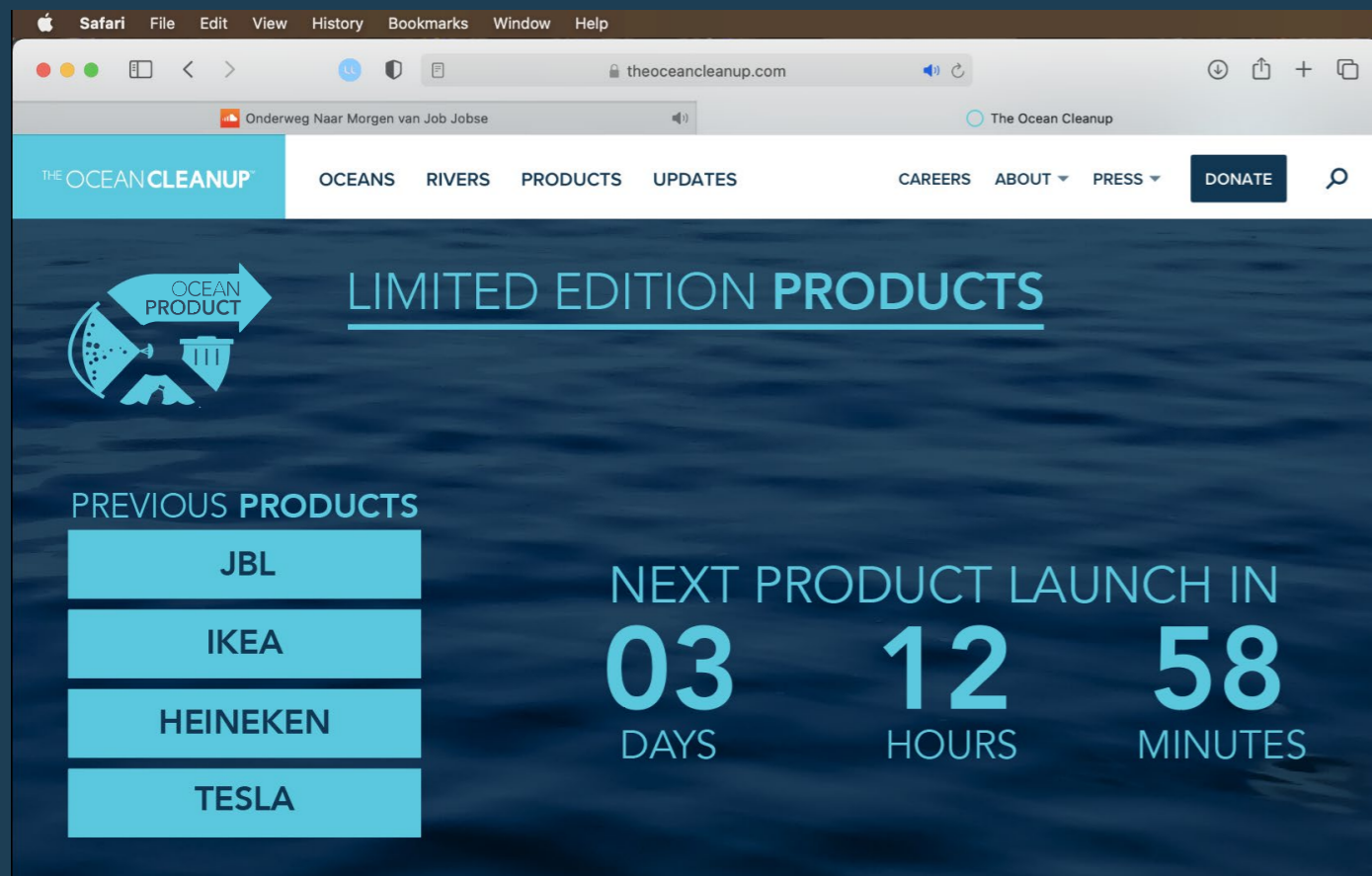


Figure 79: Mockup website for the Ocean Product limited editions page
 Displaying the time until next product release and previous product releases

By signing up for the Ocean Product Club consumers could, for example, stay up to date on all Ocean Product efforts through a newsletter, interact with other users on a forum and get early news on new product launches. Allowing consumers to connect with their peers through this platform fits with the demands of millennials in the philanthropy sector, as found in chapter 2.4.3.

The end goal of the Ocean Product initiative would be to convert 100% of the GPGP plastic into Ocean Product. For the further development of this Ocean Product brand I conducted an interview with Roland van der Vorst (Branding expert and head of innovation at Rabobank). This interview led to a few recommendations, which are discussed in chapter 6.3.

5.1.2 FLUIDITY OF THE TIERS

In the interview with Bram Peters from Save Plastics, I found that their company can not only work with pure HDPE and PP, but also with more polluted fractions and mixed plastics.

This means that they might be able to process some of the tier 3 fractions.

'We work with mixed and polluted plastics as well and are able to turn a lot of these into very usable building materials. In fact, we especially like to try things with the plastics other people do not want.'
 - Bram Peters

On the other hand, it might not be possible to use all tier 1 plastic fractions in limited editions, perhaps due to there being too much volume, or perhaps due to some fractions being of insufficient quality for consumer products.

The large scale building materials might be able to process a lot of volume. Because of this, leftover tier 1 plastic could also be used in tier 2.

This means that the material tiers will not be entirely rigid, and material can move between tiers depending on demand, material properties and new findings (figure 80).

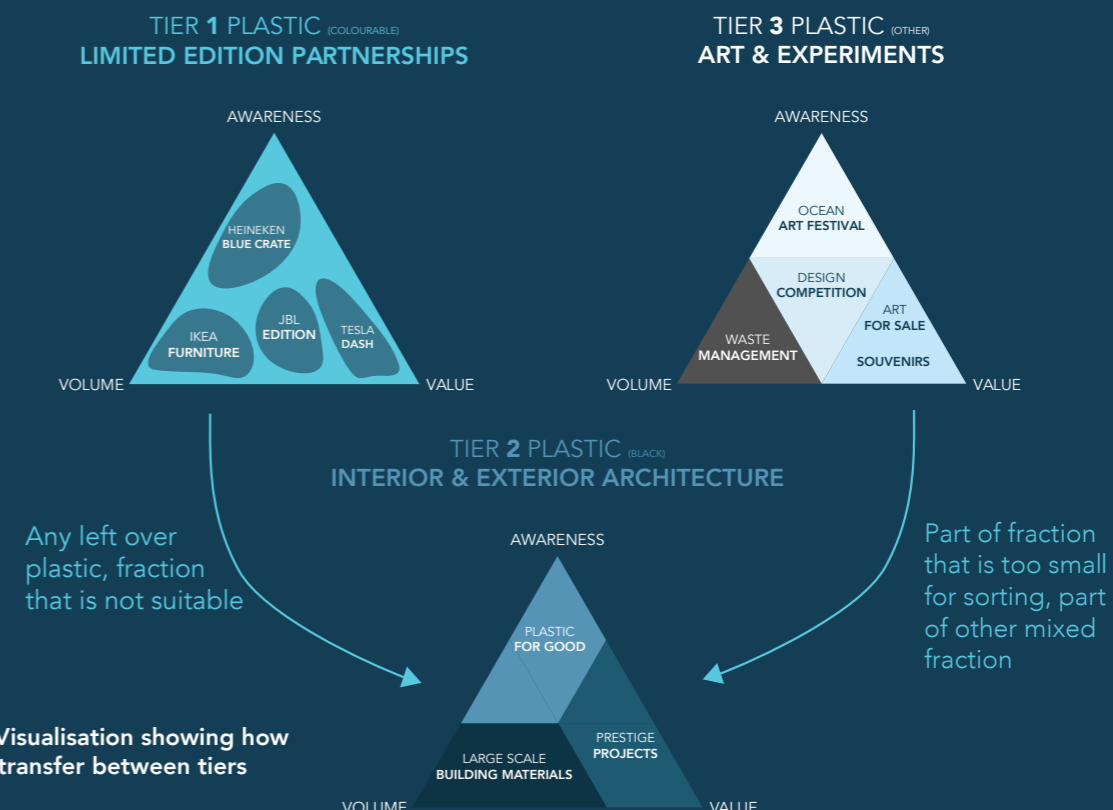
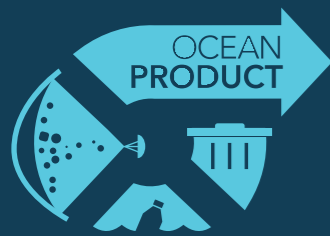


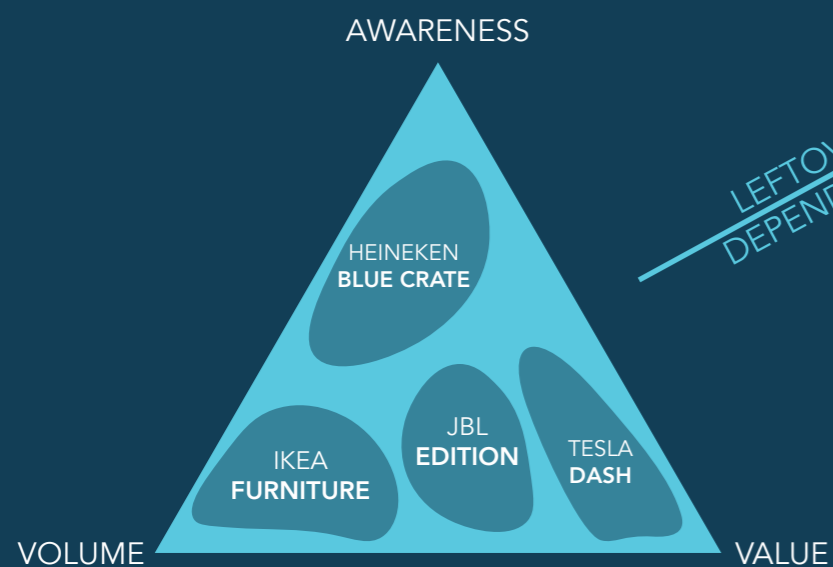
Figure 80: Visualisation showing how plastic can transfer between tiers



5.1.3 RECOMMENDATIONS

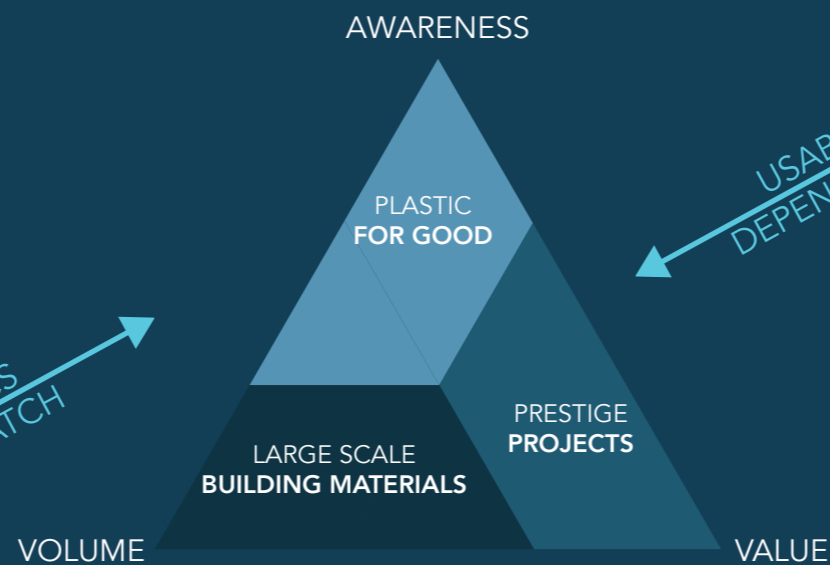
The **Ocean Product** brand unites all products made from Great Pacific Garbage Patch plastic. A consumer who once bought an Ocean Product Heineken crate will **recognise the logo** on a building for example. In this way the **exposure** of each product feeds into the **brand recognition** of the entire concept, **increasing the value** to consumers, the **increasing the demand for partnerships** from other companies and **increasing the awareness** generated for The Ocean Cleanup.

TIER 1 PLASTIC (COLOURABLE) LIMITED EDITION PARTNERSHIPS



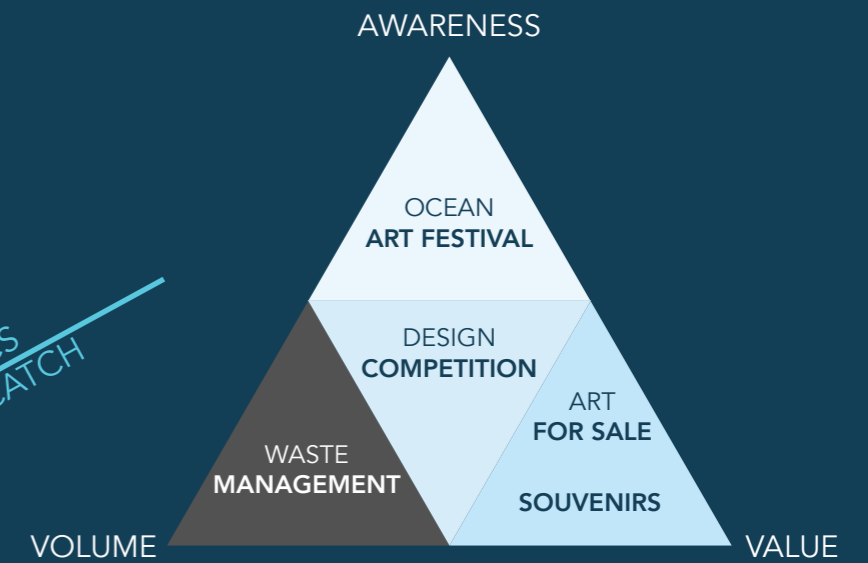
- Engage in brand partnerships with big brands that consumers love to associate with, but avoid companies with a bad reputation in terms of the environment.
- Make Ocean Product versions of products slightly more expensive, but communicate clearly that the extra cost is a donation to The Ocean Cleanup.
- Ocean Product editions of products should be visually distinct from the regular product. This should be done through both a distinct material appearance as well as through the Ocean Treasure brand.
- Pick products that are visible or used in social settings, so people can show off their Ocean Product editions to their peers. There is a balance however, don't make the product too striking or visible.
- Pick products that are inherently sustainable or that are used for a longer time. Make sure to consider the end of life as well.
- Try to find a sweetpot in scarcity where the product sells out, but enough people can get their hands on one.
- Engage consumers through the Ocean Treasure brand. Hype up new product launches and create an Ocean Treasure Club.

TIER 2 PLASTIC (BLACK) INTERIOR & EXTERIOR ARCHITECTURE



- LARGE SCALE BUILDING MATERIALS**
 - Partner with a recycling company such as Lankhorst or Save Plastics to design and produce the building products.
 - Promote the products with architects, because they pick the materials that are used.
 - Work with institutions such as 'Milieudatabase' to get a positive environmental impact score for using ocean plastic, creating demand from the market.
 - Alternatively, use the plastic in locations where materials such as wood are imported and expensive (Bonaire for example).
- PRESTIGE PROJECTS**
 - Co-initiate a project together with for example a client and an architect.
 - Look for a use in a prominent building that has a lot of visibility/visitors (city halls, museums etc.).
 - Attention and awareness from this project will not only help The Ocean Cleanup in general, but also increase demand for the large scale building materials.
 - Look for clients that are not very sensitive to costs and want to associate with The Ocean Cleanup, for example: big corporations, governments.
- PLASTIC FOR GOOD**
 - Use the material as a wood replacement.
 - Ship the plastic to areas where wood is imported, this prevents outcompeting local material suppliers and craftsmen.
 - Islands in the Pacific are ideal candidates due to a high demand for emergency shelter and a connection to the ocean.
 - Setup local production of beams in order to kickstart the local economy, Save Plastics is a possible partner.
 - Start a consortium with local governments and international charities, for example the Australian Red Cross.

TIER 3 PLASTIC (OTHER) ART & EXPERIMENTS



- | ART FOR SALE | DESIGN COMPETITION | OCEAN ART FESTIVAL |
|--|---|--|
| <ul style="list-style-type: none"> - Partner up with a variety of artists to create individually unique art pieces (for example by pressing plates). - Consumers like the limited and unique aspects of the art. - These pieces can serve as conversation starters in the houses of consumers/in the offices where they hang. | <ul style="list-style-type: none"> - Host a design competition for the tier 3 plastics based on the three goals of The Ocean Cleanup: Value, Awareness and Volume. - To entice designers of all kinds to participate, the winners get exposure (at for example the Dutch Design Week) + a monetary price. - The conditions of the competition should be relatively open, to stimulate creative solutions and to attract participants of all kinds (from students to start-ups). - Partner up with organisations such as What Design Can Do, WWF Plastic Smart cities and a sponsor, use their expertise in hosting the competition. | <ul style="list-style-type: none"> - Work with a municipality to host a temporary ocean plastic art festival in a prominent location. - Invite local artists to create artworks for the city with tier 3 ocean plastics. - Display miniature cleanup systems and interceptors at the event, tell the story of The Ocean Cleanup using video screens. - Let citizens vote on their favorite art piece, the winner is given a permanent location in the city. - This concept can easily be exported to other cities with a connection to the ocean. |
| WASTE MANAGEMENT <ul style="list-style-type: none"> If no other purpose can be found for a fraction of plastic it ends up in this group. Plastic in this group can either be stored in the hope a purpose is found in the future, or incinerated for energy. Incineration is a last resort. | | |

5.2 PARTNERSHIP FACTORS

The final part of this thesis focuses on the further development of the tier 1 strategy: limited edition partnerships. To accomplish this, I looked at existing literature on similar branding strategies. I also looked for other factors that play a role when selecting potential partners for The Ocean Cleanup, such as technical requirements and organisational factors. In the next chapter these factors are combined with previous research into a partnership selection tool.

5.2.1 TIER 1 BRANDING STRATEGY

When comparing the tier 1 strategy concept to existing marketing and branding approaches, I found that the tier 1 strategy is a combination of three existing strategies: Co-branding (ingredient), limited editions and cause-related marketing (figure 83).

Co-branding/ingredient branding

Co-branding is a branding strategy in which multiple brands are marketed together. It is based on information integration theory, which describes a process in which two stimuli (in this case brands) come together to form an attitude towards a product (Simonin & Ruth, 1998). This attitude is then influential in the purchasing behaviour of the consumer.

Literature on co-branding first of all distinguished between two types: product co-branding and communication co-branding (Jobber, 1995) (figure 81).

As the tier 1 strategy is focused on making products, product co-branding is applicable.

Product co-branding is further divided into ingredient branding and composite co-branding (Management Study Guide, 2008). Ingredient branding involves the branding of an ingredient (that is part of an end product) in the end product (e.g. Gore Tex), while composite branding uses two renowned brand names in a way that they collectively offer a unique service (e.g. Senseo). Ingredient branding is the relevant co-branding strategy, as the limited edition partnerships strategy revolves around branding an ingredient (GPPG plastic) in a partner's end product.

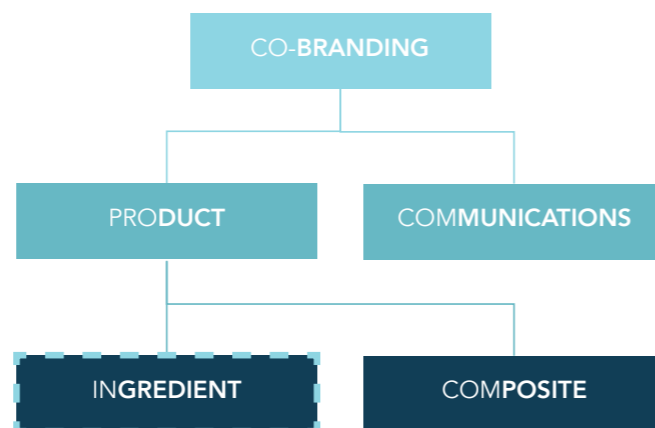


Figure 81: Different co-branding sub-categories
Source: Jobber, Management Study Guide

Ingredient branding was most famously used by Intel in their 'Intel Inside' strategy. Ingredient branding aims to overcome the interchangeability of a supplier's product by making it explicit on the end product (Kotler & Pfoertsch, 2010)

In the tier 1 strategy this manifests through the 'Ocean Product' logo on the final products.

Figure 82 shows which competitive conditions are suitable for ingredient branding. As there are no other suppliers of GPPG plastic and a lot of manufacturers that could use the plastic, ingredient branding is a suitable strategy.

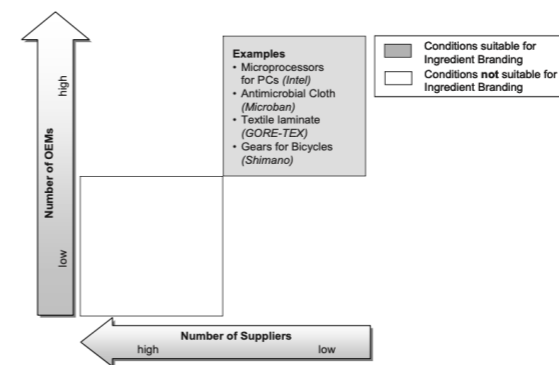


Figure 82: Conditions suitable for Ingredient branding
Source: Kotler & Pfoertsch, 2010

Ingredient branding can work through a push strategy, a pull strategy or a combination of both. In a push strategy, the supplier gives the next brands in the supply chain a discount or other bonus in exchange for communicating the brand in the final product. This is especially necessary if the ingredient brand is not yet well known in the eyes of consumers.

In the pull strategy, the ingredient brand focusses its marketing efforts directly towards consumers. This increases demand from consumers for the ingredient, thus stimulating 'host' brands to switch to the particular ingredient.

Research demonstrates that a combination of both strategies is optimal for setting up a successful ingredient brand. However, the exact balance depends heavily on the brands and products involved.

The Ocean Cleanup already has a well-known brand and host brands can gain goodwill by being associated with The Ocean Cleanup. This means a focus on a pull strategy could be optimal.

As a consequence, The Ocean Cleanup should keep focusing all their marketing efforts on consumers. Once a few partnerships have been launched, companies will learn about the possibility for an 'Ocean Product' edition and hopefully approach The Ocean Cleanup themselves. This way, The Ocean Cleanup will not have to divide its marketing efforts between consumers and business to business.

Limited editions

I quickly discussed limited editions in chapter 3.2.3 and they were found to increase consumer demand when consumers are purchasing products for themselves. This was confirmed in the consumer interviews, which demonstrated that almost all consumers prefer to own the limited edition ocean plastic version of a product over a regular version. The extent to which they prefer the product to be limited depended not only on personal preference, but also on the product in question. Especially in products that are worn or displayed in public, consumers found the scarcity of the product important.

The demand for a particular limited edition depends partially on how well a partner is willing to promote and market the specific product. For a limited edition to work, the demand has to be greater than the supply, meaning it must sell out at some point. This supply is dependent on the willingness of the partner to produce and distribute the product.

The Ocean Cleanup will have to agree with each partner company individually how many 'Ocean Product' versions to produce and how to market them, in order to strike the right balance between availability and scarcity.

Cause-related marketing

Cause-related marketing or CRM refers to a branding strategy in which a for-profit company partners with a charity or cause. The for-profit company donates to the cause and uses the cause in its marketing. In the following chapter, CRM will be explored in depth.



Figure 83: Different strategies that make up Tier 1

5.2.2 CRM

As stated, CRM is the practice of a for-profit company partnering with a charity or cause. In this case the following definition of cause-related marketing is used: 'Marketing activities in which company donations to a specified cause are based upon sales of specified goods or services' (Larson et al., 2008).

Famous examples include The Body Shop donating cleansing supplies (such as soap) to homeless shelters or Product (RED) raising funds for The Global Fund through its partnerships.

Partnering a cause with a product has numerous benefits in three different dimensions:

First, for the brand of the company. Consumers are more likely to perceive brands participating in CRM as generous and/or altruistic (Hoeffler & Keller, 2002). This matches the findings from my interviews in chapter 4.1.4, as most consumers would indeed like the host brand better if they were to partner with The Ocean Cleanup.

Secondly, for the company and other stakeholders. Participating in CRM is likely to improve the relationship the company has with various external stakeholders, including shareholders and public figures (Smith, 1990). Furthermore, CRM is likely to increase employee morale because employees will feel like they are contributing to a good cause and because the company will attract positive public attention (Bennett, 1997; File & Prince, 1998).

I found a similar notion in some interviews in chapter 4.1.4.

Finally, for consumer demand for the product in question. When exposed to CRM advertising in relation to a product, consumers showed an increased intention of purchasing said product (Lee et al., Ross et al, 1992). This increase is also found to influence market share (Pracejus & Olsen, 2004). This effect is moderated, however, by the fit between the brand and the cause, called brand-cause fit or brand fit in short.

Brand fit

The quality of the brand fit is an important factor in the success of a CRM campaign. (Lafferty, 2007, Pracejus & Olsen, 2004). Literature on CRM brand fit defines two types of fit: consistent and complementary.

Consistent brand-fit is the traditional type within CRM research and refers to a partnership in which the product, brand and cause are directly related and the connection is logical (Barone et al, 2007). Think, for example, of a bra company donating to a breast cancer research charity for every bra sold or a food company donating to the World Food Programme. Conventional wisdom dictates that a consistent fit should provide the best brand fit, but a consistent fit comes with some downsides. It is for example easy for consumers to see the initiative as profit driven or self-centered, because the initiative is often aimed at improving the sector the company is active in (Szykman, 2004).

A complementary fit is a fit that is still somewhat related to an aspect of the product but can be more far-fetched, this is also called an 'arms-length' relationship (Szykman, 2004). An example would be KFC donating to breast cancer research for every chicken breast bucket sold (see figure 84).



Figure 84: KFC Pink Bucket
Image source: www.campaignbrief.com



Figure 85: Ben & Jerry's 'Use your vote' campaign
Image source: www.marketingweek.com

Another example is Ben & Jerry's support for democracy-based charities on their ice cream containers (see figure 85). Such complementary brand fits might come off as more genuine, as the company has nothing to gain by supporting said charity, however, one must be careful of these fits not being too far-fetched. If that is the case, they might seem tacked on and insincere.

The Ocean Cleanup can only engage in a consistent brand fit with companies that have a direct link to clean oceans or trash removal. As this is the case for a small minority of ideas and concepts presented so far, a complementary brand fit is far more likely.

In their research, Chang and Liu (2012) found that a complementary brand fit works best with products that focus on hedonic values (while a consistent fit works best with products that focus on utilitarian values). Hedonic product values in this case are defined as values of a product of which the consumers derive sensual pleasure and feelings of indulgence, desire and fun. When a hedonic product is consumed, this instils a feeling of guilt within consumers (Strahilevitz, 1999). This guilt is partially alleviated by the complementary brand fit. Furthermore, this complementary fit subverts consumers' previous expectation on the motives of the company (Chang & Liu, 2012). Examples of hedonic product values include: the ability to play video games or watch video on a smartphone (versus for example a big battery, which is a utilitarian feature).

These findings suggest that products with hedonic product values will work best in the Ocean Product strategy. At the very least, the focus of the marketing should be on the hedonic product values.

As Chang and Liu put it (2012):

'Highlighting the perceived hedonic value of a product over its utilitarian value can be an important re-positioning strategy for a company using CRM, especially when a product contains a balance of both hedonic and utilitarian values.'

Donation level

Another factor that influences the perception of a brand-fit in CRM is the donation level. This donation level refers to the amount the company donates per product sold and was found to have a moderating effect on the consumer perception of a CRM campaign. Especially hedonic products and complementary fits are sensitive to this donation level (Chang & Liu, 2012). A low donation combined with a complementary fit may increase scepticism in consumers, who will then start questioning the motives of the company. On the other hand, a high donation level appears to counteract this scepticism:

'A high donation level actually enables a company to overcome potential adverse consumer reactions to their choice of complementary-fit causes.' (Chang & Liu, 2012)

The previous factors imply that The Ocean Cleanup can indeed partner with many brands for Ocean Product products, as long as a complementary fit can be found. Such complementary fits could be, for example: product use on the beach (as in the JBL case study), use of sustainable materials (Ikea case study) and sustainability (Tesla case study). In my ideation for partnerships, I often asked myself the question: 'what is the boundary for a good enough brand fit?' For example, a brand producing throw-away products will never be a good fit, but what if The Ocean Cleanup were to partner with Shell to make Ocean Product electric car chargers?

In this case the band-fit can still be considered poor (as Shell is a company that pollutes), but the product-fit is not. This research seems to indicate that in such cases a higher donation level can compensate for this poor brand-fit and offset consumer scepticism.

Donation level is most often described in literature as a monetary contribution. However one could consider it as a contribution to the charity in the broadest sense. In this case a 'donation' could be made in all three defined goals (value, awareness and volume) as they all contribute to the charity that is The Ocean Cleanup. This means that consumers might be less likely to be sceptical of Ocean Product partnerships, as the partner companies are not only helping The Ocean Cleanup with money and awareness (as in traditional CRM) but also with volume (by using the plastic in products).

This also means that brands with a worse brand fit could not only offset this by donating more money to The Ocean Cleanup, but also via additional marketing or by adopting more volume.

5.2.3 PRODUCT (RED)

The CRM campaign Product (RED) is the most similar thing to Ocean Product to exist. As much has been written about this campaign and its strengths and weaknesses, studying it provides some helpful insights for the Ocean Product concept.

Product (RED) was founded in 2006 by Bono and Bobby Schriver to raise funds for The Global Fund's fight against AIDS. To accomplish this, Product (RED) partners with companies to create red versions of existing products, that include Product (RED) branding (Product (RED), n.d.). These goods are manufactured, distributed and sold by the partner company and this partner company pays a licensing fee to Product (RED). Next to this licensing fee, the company also donates a part of the profits made from the products to The Global Fund. A part of the deal is that the products sold under the Product (RED) label must be sold for the same price as the regular versions of the product. Product (RED) in this way aims to create a win-win situation in which the brand wins because it benefits from the positive brand association with Product (RED), while Product (RED) wins by raising money for The Global Fund. (Dadush, 2010)

The effectivity of the Product (RED) campaign has been debated and studied for a long time. While Product (RED) has managed to raise a lot of money for The Global Fund, a lot of criticism is raised towards the initiative. These criticisms and identified flaws are especially valuable as learning points for the further development of the Ocean Product concept.

From research and articles three weaknesses and criticisms were identified (Bendell et al., 2009; Dadush, 2010; Easterly, 2010, Kim & Ambrogio, 2008)

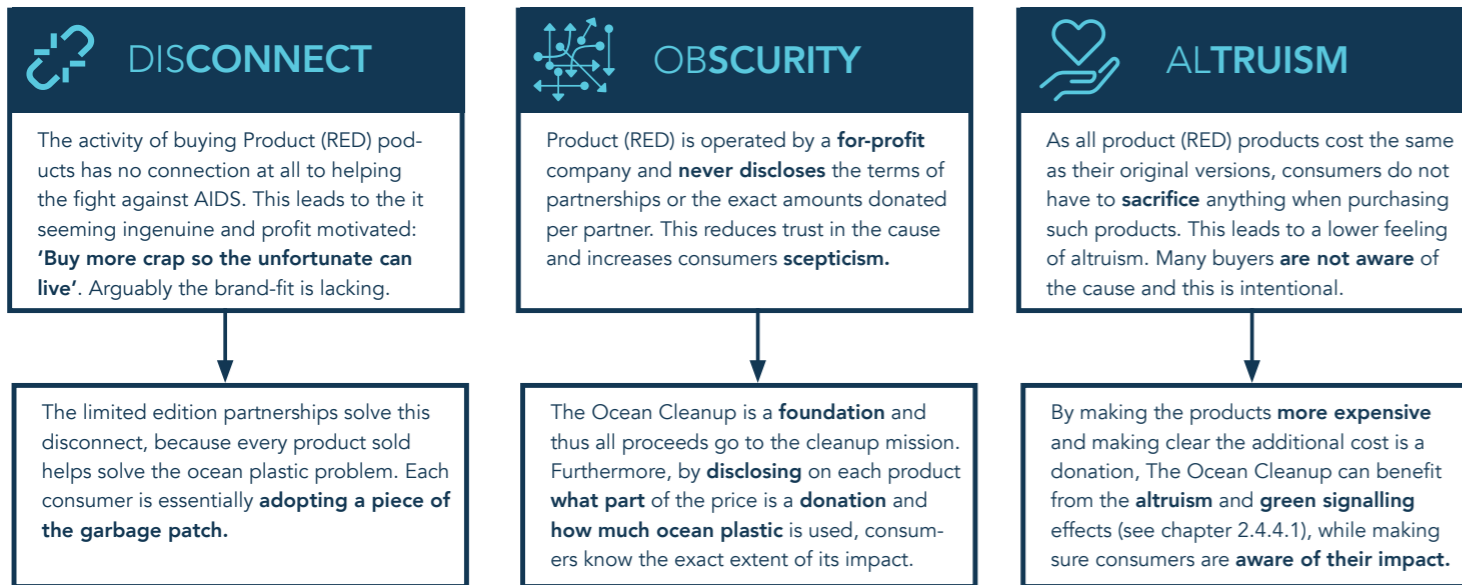


Figure 86: Main problems with the Product (RED) concept, with corresponding solutions
 Source: (Bendell et al., 2009; Dadush, 2010; Easterly, 2010; Kim & Ambrogio, 2008)

These criticisms and the ways the Ocean Product concept can overcome them are displayed in figure 86.

Another criticism often thrown at Product (RED) is that consumers who buy a (RED) product feel like they have done something charitable recently and are, therefore, less likely to make an actual donation in the near future (Lichtenstein et al., 2004; Flaherty & Diamond, 1999). This effect is compounded by the intransparency and marketing of Product (RED), as they use slogans such as 'Buy (RED), save lives', while never disclosing the impact of an individual purchase. By making the impact of each Ocean Product purchase clear from the start, The Ocean Cleanup can sidestep this issue. In that case, consumers can no longer hide behind idealistic marketing slogans and know exactly how much impact their purchase had.

Besides these criticisms, the (RED) campaign has been extremely successful in practice. Partnerships include prominent companies such as Apple and Converse and total funds raised for The Global Fund exceed \$650.000.000.

In a way, all that was needed to kickstart the (RED) campaign was the stardom and fame of Bono, combined with the pressing cause of AIDS medication. I think these are extremely good signs for the Ocean Product concept, as:

1. Product (RED) has proven it can work,
2. The Ocean Cleanup is a well-known brand and has a stellar reputation,
3. The ocean plastic problem is currently one of the top concerns globally, see chapter 2.4.3.

5.2.5 COMPANY-SIDE BRAND FACTORS

In order to discover what factors play a role from the viewpoint of the companies that are looking to participate in a brand partnership, I conducted interviews within Heineken. Heineken partners with multiple of organisations (F1, UEFA, Plastic Whale) and, thanks to connections provided by my chair, I was able to speak to their brand team, including the Global Design Manager and Global Sustainability Manager.

From a partnerships perspective, I was told that Heineken tries to strike a balance between not focusing too much on one partnership and not participating in too many partnerships. The reasons for this are that they do not want to become known for a specific partnership, while they also want to maximise the impact of each partnership. As for which partnerships they participate in, I was told it is all about framing and storytelling. For example, when framing the partnership as 'Heineken is helping clean up our oceans' the design manager told me he was unsure he wanted to create the association between Heineken and polluted oceans if it did not exist in consumers' minds before. He told me that the brands Corona and Desperados in that case would be a more suitable fit, as these brands have a link to the beach and the sea.

Reframing this to 'Heineken runs the largest circular HDPE plastic system in the country and could give some of this ocean plastic a circular home', alleviates this issue, however. In this example it can be seen how the 'complementary fit' explained in the previous chapter can come from multiple angles and is a crucial part of the partnership (figure 87).

The main complementary fit angles are: a relation to beach life, a search for sustainable materials or a mission to keep something clean. It is possible to find more out of the box creative fits, however it should be kept in mind that the more indirect the fit is, the more sceptic consumers are likely to be (which can then be compensated for by donation level).

5.2.6 INTERNAL BRAND FACTORS

Finally, it is important to look at the brand fit from the perspective of The Ocean Cleanup. I found in chapter 3.1, that any potential partnership should not harm the brand of The Ocean Cleanup. From the consumer interviews in chapter 4.1.4 I learned that this does not happen easily and in chapter 5.2.2 I discovered that consumer scepticism can be countered somewhat by increasing the donation level. Still, it would not make sense if The Ocean Cleanup were to partner with a company that has little sustainable ambition at all.

I therefore recommend taking the sustainable/environmental ambition of a company into account when judging a possible partnership. To accomplish this, I recommend looking at the sector the company is active in and asking questions such as: How do the company's sustainability ambitions compare to those of its competitors?

HEINEKEN INTERVIEWS

'I think it could be possible, but crates have quite demanding properties and tolerances and you have to consider small things like: how is it going to work with the scanner that scans for faulty crates.'

'One simple difficulty, Oceans are blue and Heineken is green. This already poses a challenge for for example visuals in the marketing. However the 0.0 brand is blue.'

'For partnerships Heineken is always trying to maintain a balancing act. We don't want to focus too much on one cause or one partnership to avoid becoming too associated, becoming for example 'that formula 1 beer brand.'

'Heineken Australia has partnered with a charity to help regrow the great barrier reef, so this is something we could do. It would most likely be initiated by a country branch of Heineken though, not the global brand.'

'Why try to pick our partners strategically, we don't want to partner with just anyone, then we seem unfocused and nothing comes of it.'

'Can you make a bar out of it? I think that could also be very interesting'

'I think a brand like Corona would be a great fit, as they are the beer of the beach. In that case the link is more direct. We are the beer of the city'

'I'm not sure however if I want to have people make the association between Heineken and the Great Pacific Garbage Patch, because Heineken is not necessarily the cause of that'

We use extremely high grade HDPE for our crates, filled to the brim with UV stabilisers. This is partially because they should last as long as possible. We don't want them to break after a few uses when a consumer is carrying them on a bicycle for example.'

BRAND CONCLUSIONS

BRAND BASED CRITERIA FOR PARTNERSHIPS

Quality of complementary fit

How strong is the complementary fit between the company and The Ocean Cleanup?
Is it based on beach life, cleaning up or sustainable material? Or on something less direct?
Can be compensated somewhat by donation level

Sustainability ambition of the company

How do the company's sustainability goals compare to competitors? How is the environmental reputation of this company compared to competitors?
Can be compensated somewhat by donation level

OTHER FACTORS

Donation level

Donation level can be measured in either value (monetary donation to The Ocean Cleanup or price paid for the material), awareness (how much exposure will The Ocean Cleanup get from the partnership) and volume (how much plastic will the company use). The donation level can compensate somewhat for the consumer skepticism created by a poor brand fit or sustainable reputation.

Exclusivity

The Ocean Cleanup can use the extent to which category exclusivity is given and the duration of this exclusivity as leverage to negotiate better deals with potential partners.

Figure 87: Quotes obtained in interviews with Heineken

5.2.7 TECHNICAL PRODUCT FACTORS

When evaluating a possible partnership, technical factors in the specific product also play a role.

First, it must be possible to make the product (or parts of the product) in question from one of the material groups found in chapter 2.2.6. This also means that it must be producible using one of the production methods found in chapter 2.3.

Furthermore, I found in chapter 3.1 that a criterion for products made from GPGP plastic is that implementing the plastic does not negatively impact main function of the product. In a case where there are some mechanical requirements for the part, the unpredictable nature of GPGP can be mitigated somewhat by using additives, (as seen in chapter 2.2.1) by mixing with virgin plastic, or by using structural solutions. For example, the sunglasses were strengthened with metal wires. For every product, The Ocean Cleanup should carefully evaluate, with the partner company, if the material is suitable for the proposed application and what specific properties are required.

The third important factor has to do with the lifespan of the product. I found in chapter 3.1 that products made from GPGP plastics should end up polluting the environment as little as possible. This means that any Ocean Product edition product should not be a throw-away product. These products should have an above average lifespan in order not to contradict the mission of The Ocean Cleanup. Furthermore, the use of GPGP plastic in the product should not shorten this lifespan, as in that case the Ocean Product version would be inferior compared to the regular product. Add to this that products breaking earlier than expected will reflect negatively on both The Ocean Cleanup and the partner brand.

This sentiment was also echoed in the interviews with Heineken (see figure 87), where Heineken stated they would be unwilling to compromise the lifespan of a product by making it from GPGP plastic.

The final product-technical factor that plays a role is that the GPGP plastic must be visible in the end product and that it must allow for visual differentiation through for example the unique colour of Ocean Product editions. This is necessary to activate the green signalling and altruism effects.

5.2.8 CONTEXT OF USE FACTORS

The context of use of the proposed Ocean Product product is also of importance for the success of the partnership. I found in chapter 2.4.4.1 that green signalling and altruism are two important factors for consumers when buying sustainable products. These effects only come into play when products are visible or used socially. This means that any Ocean Product products should be products that can either be worn or that are (at least sometimes) used in social settings. Next to increasing the value for consumers, this has another benefit. The more visible the products are, the more people see them and become aware of the Ocean Product initiative, increasing awareness for The Ocean Cleanup as a consequence.

The second 'context of use' factor has to do with the product values. It was found in chapter 5.2.2 that the complementary fit that will probably be used in (most) Ocean Product partnerships works best with products that focus on their hedonic product values.

The JBL speaker is a good example of this, as having fun with your friends and listening to music is hedonic consumption. The Tesla example has both hedonic (fast, luxurious, high-tech, comfort) and utilitarian (transport, storage space). I found in my interviews that people who viewed their car as utilitarian were less likely to want a distinct Ocean Product version. From chapter 5.2.2 follows that, for the Ocean Product editions that include both hedonic and utilitarian values, it would be best to focus on the hedonic values in marketing.

TECHNICAL CRITERIA

Mechanical properties

Can be made from GPGP plastic, Material is suitable for the part or design is adjusted to accommodate the material.

Lifespan

Product is not a throw-away product, Product lasts as long as possible, Lifespan is not shortened significantly by the use of GPGP plastic.

Appearance

Product allows for visual differentiation through the look of the GPGP plastic.

CONTEXT CRITERIA

Social context-of-use

Is the product used in social settings?
Is the product visible when not in use?

Hedonic product values

Is the product intended for hedonic consumption?
Does the product have hedonic features?
Can these hedonic features be focused on in marketing?

5.2.9 ORGANISATIONAL FACTORS

When a possible partnership arises, it is important to look at the organisational factors. The three relevant organisational factors are: production, distribution and marketing.

First, I looked at the production. The Ocean Cleanup should already have sorted the plastic into different batches (see chapter 3.2.3) and have done initial testing on mechanical properties. The Ocean Cleanup will then match a proposed product to a suitable batch of plastic. The partner company will then still have to develop a mould and invest in the production capacity for the Ocean Product product. This mould development also comes with some R&D as the shrinkage and melt flow index of the GPGP plastic might be different compared to what the company is used to. This cost can vary depending on the complexity of the part and the amount to be produced. Finally, quality control is important. Some companies might have robust quality control practices and standards, while others do not. To guarantee that all Ocean Product products adhere to a high standard of quality, it is important to take quality control into account. Questions that should be asked for the production stage are: 'Does the company have the resources in house to develop the plastic mix and the mould, or are they willing to spend the resources to develop it externally?'

'Is the company willing to invest in the necessary tooling and production capacity?' 'What is the quality control like?'

For the distribution of the product, it is relevant to look at the channels the partner company can use to sell the product. Relevant questions include: 'Does the partner company have its own stores, or does it work with external retailers?' 'What about online platforms?' and 'If the company uses external retailers, are all of them going to stock the product?' Furthermore, the company must decide how broadly they want to launch the product, for example: in how many and in which markets.

Finally, the marketing and advertising of the product. 'Does the company have its own channels (such as social media accounts) that can be used to reach consumers?' How much is the company willing to spend to advertise the Ocean Product edition?. Of course, the more the company is willing to spend in marketing Ocean Product products, the better for the awareness goal I defined. On the other hand, when the company spends too little or produces too many products, the edition might not sell out. This could harm the desirability of the 'limited' editions, as consumers start to see them as readily available. In this way the required marketing budget is directly related to the volume of products produced. Most B2C product related companies spend between 10-15% of their sales revenue on marketing (Deloitte, 2017). As a minimum, I recommend The Ocean Cleanup requires partner companies to spend an equivalent of 10% of the expected sales revenue from the Ocean Product editions on marketing.

ORGANISATIONAL CRITERIA

Production

Does the company have the resources in house to develop the plastic mix and the mould?
Will it spend the funds to develop it externally?
Will it invest in the tooling and production capacity?
What is the quality control like at the company?

Distribution

Does the partner company have its own stores?
Does the partner company have a well-functioning webshop?
If the company uses external retailers, how many of them will stock the product?
How broadly will the company distribute and launch the product?

Marketing

Does the company have its own channels (such as social media accounts) that can be used to reach consumers?
How much is the company willing to spend to advertise the Ocean Product edition?

5.2.10 INTERNAL FACTORS

The final factors to look at for partnerships are the internal factors in The Ocean Cleanup.

To what extent does the partnership help The Ocean Cleanup complete the three defined goals? Asking the following questions should help in getting a feeling for the results.

INTERNAL CRITERIA

Volume

How much plastic is the company going to use in its products?
Does the combination of required mechanical properties and volume fit with one of the sorted plastic groups found by The Ocean Cleanup?

Awareness

How many people will be exposed to Ocean Product and The Ocean Cleanup through this partnership?
How many followers does the company have?
How many of the people reached have not heard of The Ocean Cleanup before?
How much is the partner company willing to spend on marketing?
What channels will be used?

Value

How much value will the partnership achieve?

5.3 PARTNERSHIP TOOL



5.3.1 CLARIFICATION

The partnership tool shown in 5.3 can help The Ocean Cleanup evaluate potential partnerships to see if they are worth pursuing, while also integrating the criteria defined in chapter 3.1. It is intended as an initial tool to get an impression of the potential value of a partnership and its strengths and weaknesses and should be used when a new partnership presents itself. The circle contains multiple categories of factors that are relevant in partnership selection, as found in the previous chapter. These factors can then be rated on a 0-4 scale. Some factors have a minimum score, as these were found to be requirements for the partnership to function at all. This chapter serves as clarification for the categories and minima

Brand based factors

I found in chapters 5.2.2 and 5.2.6 that both the quality of the complementary brand fit and the sustainable reputation of the partner company are important when considering a partnership. That is why I have attached a minimum score to both of 2. 2 is defined in the graphic as a somewhat logical brand fit and an average sustainability reputation. As it was found that donation level can reduce consumer scepticism in these two factors, I have attached it as a moderating element. Donation level in this case is defined in volume, value or awareness for The Ocean Cleanup.

Technical factors

The technical factors relate to the product to be produced for the partnership.

First, I found in chapter 5.2.7 that implementing GPGP plastic should not impact the main function of the product (after possible adjustments to the design or material). That is why a minimum score of 2 is required, defined as: the properties of the GPGP plastic are mostly suitable, but they might impact secondary functions.

Second, I found that the lifespan of the product should not be shortened by using GPGP plastic instead of virgin plastic. Furthermore, the product should preferably be a long lasting, sustainable product with an end-of-life strategy. In this case the minimum score is also 2, defined as: 'A lifespan of >3 years and/or the product is easily recyclable.'. The wording and/or was chosen to allow for room for, for example, short lasting products that are returned and fully recycled. A minimum score is attached to these criteria, because they were defined as 'need to haves' in chapter 3.1. Finally, appearance. I found in chapter 2.4.4.1, that it is important that sustainable products are visually distinct, in order to activate the green signalling and altruism effects. This means that any product in the Ocean Product line needs to be designed in a way that it is at least somewhat recognisable. This is why I have attached a minimum score of 2, defined as: 'Product is somewhat visually distinct on the outside, people who know about Ocean Product will recognise it.'

Context based factors

In chapter 2.4.4.1 I found the context of use of the product to be a relevant factor. For the green signalling effect to come into play, a product must be used in a way that can be seen by others. That is why a social context of use will be beneficial to the desirability of the product (while also helping The Ocean Cleanup with the awareness goal) Furthermore, hedonic product values were shown to enhance the brand fit and consumer perception of the partnership in chapter 5.2.2.

Organisational factors

Organisational factors relate to the capabilities of the partner in question. First, production relates to the ability of the partner to produce the parts from GPGP plastic and its quality control standards. A minimum score of 2 is required, defined as: 'Can develop and produce the parts internally, has average quality control.'

Second, the distribution. This relates to the distribution channels the partner can or will use. A minimum score of 2 is required, defined as: 'The partner has a functional distribution network consisting of both web shops and retail locations.'

Finally, the marketing that the partner company can and will use. This relates to both the channels available to the partner company (e.g. a large following on social media) as the quality of the marketing materials the company usually produces.

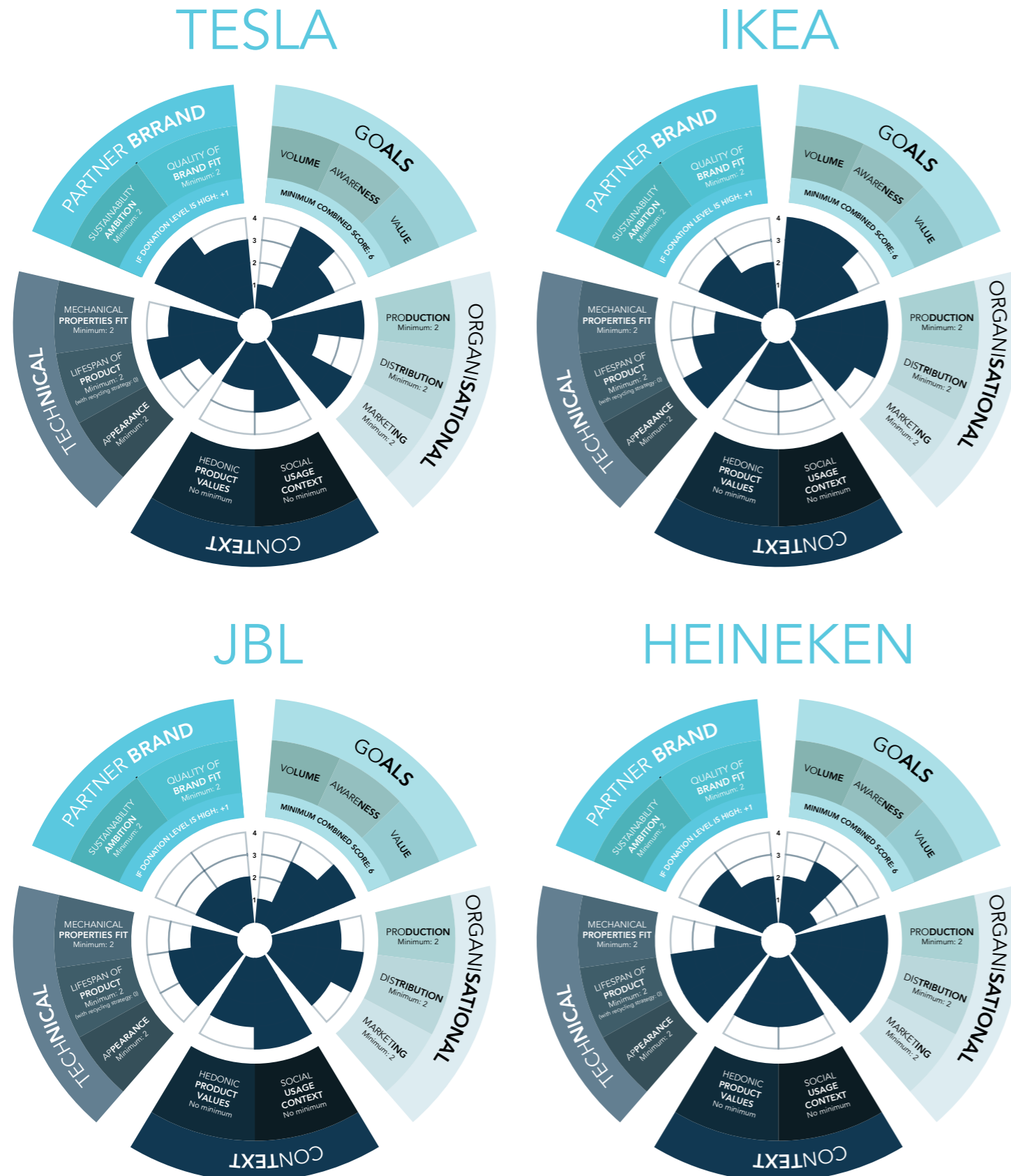
Internal factors

The last group of factors is the internal factors. These relate to how valuable the partnership will be for The Ocean Cleanup, based on the three defined goals: volume, value and awareness.

As more partnerships present themselves, The Ocean Cleanup will get a better feeling for how to fill in the tool.

5.3.2 EXAMPLES

To illustrate how the tool works I filled it in for the partnerships I used as illustrations in chapter 4, according to my interpretations of what such a partnership could look like.



5.4 OTHER CONCLUSIONS

This chapter concludes the tier 1 strategy with some general factors that were found to have an impact on consumer perception of the products.

5.4.1 FRAMING OF THE EFFECT

In chapter 2.4.4.1, I found consumers respond best to loss framed messages in the marketing of sustainable products. I also found that hope and pride are the best emotions to elicit in this marketing. Consequently, images of a polluted ocean should not be avoided, but they should be displayed together with striking images of cleanup systems, to counteract the negativity and encourage this emotion of hope. 'The oceans are polluted but with your help we can do something about it.'. This shows consumers what is at stake.

In the same chapter, I found that the impact of the product should be translated into metrics that are easy to understand for consumers and that focus on the aspects consumers genuinely care about. In many cases, existing literature advocated for a conversion of the impact of sustainable products into euros saved for the consumer, but this metric does not apply to Ocean Product editions.

The metric The Ocean Cleanup uses for the sunglasses, however, seems to tick the boxes well. In the marketing of the sunglasses The Ocean Cleanup states: 'We estimate that we can clean an area equivalent to 24 football fields of the Great Pacific Garbage Patch' (The Ocean Cleanup, 2020). This message beautifully combines a slightly loss framed magic (there is a garbage patch in the ocean) with a hopeful message (we can clean it up).

Furthermore, the metric of football fields cleaned is easier for consumers to understand and picture, especially compared to for example an abstract number of meters squared. This way, the football fields metric makes the impact of the single product purchase seem as large as possible. This also helps increase the perceived green utility (as found in chapter 2.4.4.1).

Because of this, I recommend that The Ocean Cleanup continues using this metric for all Ocean Product products.

5.4.2 AMOUNT OF PARTNERSHIPS

I stated in chapter 5.2.9 that The Ocean Cleanup should negotiate the number of products to be produced with each partner. It should be made explicit that this number is directly related to the marketing effort the partner is willing to put in. To keep the Ocean Product editions limited and sought-after, a balance needs to be struck between supply and demand. The general popularity and success of the Ocean Product initiative also plays a big role here. For example, a series of successful and sought-after limited editions might create a lot of demand for the next Ocean Product product, even without a big marketing expenditure. On the other hand, if previous limited editions performed poorly, extra marketing might be required.

Next to the effect of previous partnerships, the number of partnerships is important. If too many Ocean Product products are available, it becomes difficult to keep track of new releases for consumers and it will be more difficult for The Ocean Cleanup to highlight new launches.

As a consequence of these two factors, The Ocean Cleanup should focus on the quality of the partnerships over the quantity of the partnerships. After all, a series of high-quality partnerships can increase the reputation of the entire Ocean Product initiative, while too many partnerships will dilute the brand and exclusivity of the initiative.

5.4.3 NEGOTIATION STRATEGY

When a new partnership opportunity presents itself, The Ocean Cleanup should use the partnership tool to see if it meets the requirements. If the potential partnership does not meet the requirements, The Ocean Cleanup should check if this can be mitigated in any way, for example by increasing donation level or picking a different product. If not, The Ocean Cleanup should not pursue the partnership.

If the partnership does meet the minimum requirements, it can be compared to other partnerships The Ocean Cleanup is currently participating in. If the partnership is active in a similar market or fulfils similar goals to another active partnership (for example a lot of volume but no awareness), then perhaps the partnership should be delayed until the previous one has ended

5.4.4 PRICE FOR CONSUMERS

I found in chapter (the sustainable buying behaviour) and in some interviews that it is essential the consumer feels like they are contributing to the cause through the price of the project. This effect activates the altruistic feeling in consumers, as they feel they are sacrificing something for a good cause. Furthermore, I found through the criticism on Product(REDD) that it is essential for The Ocean Cleanup to be completely transparent about what part of the price constitutes a donation to The Ocean Cleanup.

These factors combined explain why the Ocean Product editions should be more expensive compared to their regular counterparts, while also clearly displaying the part of the price that is a donation in all marketing material (for example the JBL speaker could be 130 euros, 110 for the speaker with a 20 euro donation). This is similar to what The Ocean Cleanup already does with its sunglasses and I recommend making this display of transparency even more explicit for any future partnerships.

I observed in my interviews that the exact willingness to pay seems dependent on the product in question and the original price of the product in question. The most common answers landed around a 20% premium in my interviews, but while this initial estimate could serve as a starting point, my interviews were in no way designed to find a specific willingness to pay. I suggest that The Ocean Cleanup draws upon the pricing knowledge of the partner in question, as it probably knows its own consumers best. Further studies could also be performed to learn more about consumers' willingness to pay for a cause when buying a limited edition.

5.4.5 STORYTELLING

In the interviews with Heineken (see chapter 5.2.5) I found that storytelling is important in creating a good brand fit or in strengthening an already great fit. In the initial example, the direct link between Heineken and the GPGP wasn't there. However, by focusing on the fact that Heineken has one of the largest circular systems for HDPE plastic in its crates, a stronger complementary link is created. Such stories can be communicated through words (for example: Ikea is replacing all virgin plastic with recycled material and Ocean Product will help this goal) but also through pictures (for example: showing the Ocean Product JBL speaker being used on a clean beach)

This type of storytelling should be focused on when working out the details of a partnership and should be communicated through the marketing material. The stronger this story, the better the brand fit, the less consumer scepticism and the more positive consumer perception of the initiative.

5.4 KEY INSIGHTS

TO CONSUMERS



Use **football fields of garbage patch cleaned** as a **metric** to make the impact of the purchase **understandable** and **clear**



Make the product **more expensive** than the regular edition, but communicate **very clearly** the extra cost is a **donation**



Use **storytelling** to **strengthen** the **brand fit** between the partner and The Ocean Cleanup

FOR PARTNERS



Quality over quantity in the number of partnerships, a track record of good partnerships increases the demand for Ocean Treasure in general

6. CONCLUDE



6.1 CONCLUSION

My assignment at the start was as follows:

“By means of research on the topic of value creation with ocean plastics, through brand, technology and consumer perception, I will design one or more directions/concepts/strategies for The Ocean Cleanup.”

By researching the material from a technical perspective, I found three main material tiers and by analysing The Ocean Cleanup and its context, I defined three main goals for the valorisation of the GPGP plastic. Finally, by researching sustainable consumption, I found a number of insights that have a big influence on the consumer perception of sustainable products. By combining all this research in a long iterative creative phase, I designed three distinct strategies. These strategies are as follows:

Tier 1: Limited edition partnerships

Tier 2: Interior & exterior architecture

Tier 3: Arts & experiments

The overarching ‘Ocean Product’ brand I developed ties all the ideas and sub-strategies back into a coherent vision and provides a distinct point of recognition and differentiation for consumers.

Through a combination of consumer and expert interviews and through case studies of chosen ideas within the designed strategies, these strategies were tested and adjusted.

I finished tier 2 and 3 with a list of sub-strategies, recommendations and best practices and focused on developing tier 1 for the final part of this thesis.

A combination of interviews and desk research led me to distinguish a number of factors that will influence the perception of ‘Ocean Product’ products. By integrating these factors, I designed a partnership tool that The Ocean Cleanup can use to quickly judge if a potential partnership is worth pursuing. I ended my research into tier 1 with a few ‘other factors’ that are important to keep in mind if The Ocean Cleanup were to pursue the proposed limited edition strategy.

This report fulfils my assignment by displaying a coherent vision of how The Ocean Cleanup can turn the 80 million kilograms of garbage patch into ‘Ocean Product’, while achieving as much value, awareness and volume as possible and, at the same time, taking into account the different material types.

6.2 DISCUSSION & LIMITATIONS

To assess the strategies I designed in this thesis and find potential limitations, I took a step back and viewed the project through the lenses of desirability, feasibility and viability, the three ingredients that make up the sweep spot of innovation (Orton, 2017) (See figure 88).

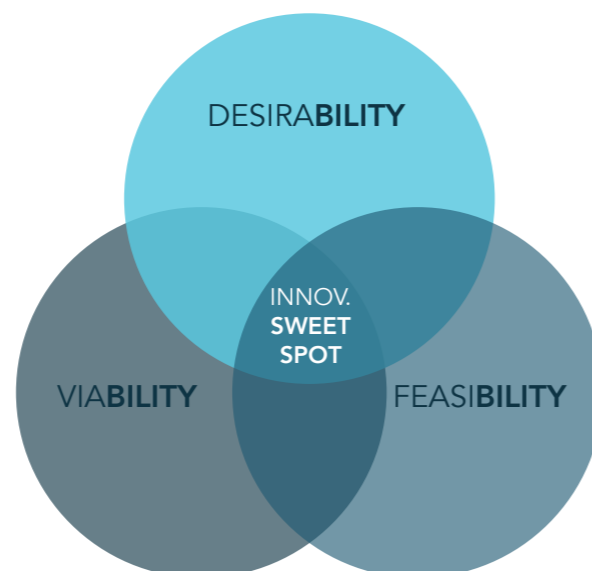


Figure 88: The innovation sweet spot
Source: based on research by IDEO

Desirability

During the development of the tier 1 strategy I tested the desirability through desk research and interviews with consumers and experts. I found ample literature on the consumer perception of sustainable products and I integrated factors that increased the perception of such products into my strategy and concepts. I interviewed two professors which are expert on the subject to deepen my knowledge and I interviewed a number of consumers using case studies.

A few limitations must be taken into account. First, diversity in the consumer interviews. Due to the ongoing pandemic I was limited to mostly digital interviews with people in my own network. These participants were all academically educated, predominantly under 30 years old and, therefore, not representative of the general population. More and more diverse research is required to further cement my findings.

A second limitation is that my research and interviews were based on proving that there is increased consumer demand for ocean plastic limited editions and my thesis focuses on the early stages of the design process. My research is not in-depth enough and I wasn't able to develop prototypes to assess, for example, the exact willingness to pay. Furthermore, much of this information might be dependent on the specific product in question, so potential partners could help The Ocean Cleanup learn more about these factors. Again, further research is required here in order to develop the strategy.

As regards tier 2 and 3, the desirability is a bit more complex as there are multiple stakeholders. Next to the consumer (who views the art or building), the owner of the art or building is also of importance as they are the ones who actually buy the product.

To test the desirability amongst these stakeholders, I was able to interview a good variety of experts in each sector, thanks to my supervisory team's network. Here, again, a limitation is that I wasn't able to test things such as exact willingness to pay.

Feasibility

Feasibility was the starting point of my project and the first few chapters describe the possibilities with ocean plastic in terms of feasibility. While my desk research confirms that all of my proposed ideas and products can theoretically be made from ocean plastic, much is still unknown about the material. For example, the extent to which degradation impacts the material properties or the extent to which additives can be used to counteract this. Furthermore, the quality and consistency of the plastics will vary batch by batch.

Combine this with the findings from the Heineken and Secrid interviews, in which it was stated that both companies put their products up to incredibly high standards and that they would be unwilling to compromise even a bit in terms of quality or longevity and it becomes clear a lot more research on the material properties is required. This is not as important for the tier 2 and 3 plastics, as the thick-walled products in tier 2 can already be made by poor mixes of plastic (Interview with Bram Peeters) and the art & experiment context does not require much in the way of mechanical properties.

Viability

Finally, to assess viability, I conducted expert interviews. The tier 2 strategy was proven (initially) viable through interviews with architects and plastic recycling experts and the tier 3 strategy through interviews with artists, municipalities and other stakeholders. To further prove viability in tier 2, The Ocean Cleanup should partner up with a company such as Save Plastics.

Such a company can help The Ocean Cleanup estimate the costs to design and manufacture the products and the expected value it could sell them for. For the tier 1 interviews, I was able to speak to experts from Secrid and Heineken. While these did provide interesting insights, I was not able to go sufficiently in depth in these interviews to really test the viability. For example, it would be interesting to propose different business models or minimum investments to such companies, in order to judge what the partnership is worth to them. Only then can a business model really be made and only then, the true value of the tier 1 strategy can be judged.

6.3 RECOMMENDATIONS

TIER 1

1. Develop the Ocean Product brand.

As I stated in chapter 5.1.1, I recommend The Ocean Cleanup to partner with a branding agency, to improve on (or change) The Ocean Product brand. As a starting point I conducted an interview with Roland van der Vorst (brand expert and head of innovation at Rabobank). He recommended to research brand values. He stated that the new brand provides The Ocean Cleanup with an opportunity to decouple the products from its own brand and to pick new brand values (an example he gave is that The Coca-Cola Company has different brand values from Coca-Cola). As I found in chapter 4.1.5, some consumers didn't want to wear The Ocean Cleanup headphones, as they did not want to associate with that brand to that extent. The Ocean Product brand is an opportunity to create a brand with values that consumers do want to associate with. An example Roland gave, is that The Ocean Cleanup is associated with trash, which might not be ideal in a consumer product context.

Perhaps the Ocean Product brand could be associated with clean oceans only. I recommend The Ocean Cleanup to perform further research into possible brand values, to develop Ocean Product into a brand that consumers want to associate themselves with.

2. Once the first batches of material come in, sort them and do further material testing.

Not enough is known yet about the qualities of the different material groups. These qualities of the different groups will need to be understood before the groups can be matched to different potential partners and products.

3. Initiate talks with different potential partners.

To further research viability and learn what companies think a partnership is worth, I recommend The Ocean Cleanup to start talking to different potential partners. Perhaps talks with partners that are not the first choice for a certain category could be used to in order to gain experience. The Ocean Cleanup could then apply these learning in drafting a sharper offer for first choice partners.

4. Start with a small-scale partnership

I recommend The Ocean Cleanup to start with a smaller scale partnership to further validate findings from my study. This small-scale partnership can serve as a test for various factors such as willingness to pay.

5. Conduct further consumer research.

As stated in the previous chapter, my research comes with some limitations. In addition to these limitations, my research on, for example, willingness to pay was preliminary. I recommend The Ocean Cleanup to conduct further consumer research in order to build on the foundation laid by this thesis.

TIER 2

1. Partner up with a company such as Save Plastic or Pretty Plastics.

A company such as Save Plastics has the knowledge on how to recycle difficult mixed HDPE and PP fractions. In the interview with Bram Peters (CEO of Save Plastics) he stated that he could help The Ocean Cleanup with not only the processing of the plastic, but also with the design of building materials and its manufacturing. He has connections with architects and municipalities and has expertise in what kind of products work well and in how to sell such products.

2. Initiate talks with The Red Cross Australia.

According to Michel Becks, The Red Cross Australia was the most likely partner for plastic for good. By initiating talks with them, The Ocean Cleanup can gain a better understanding of what the requirements and challenges are for the plastic for good sub-strategy.

3. Initiate talks with the municipality of Rotterdam about a potential prestige project.

The municipality of Rotterdam seems to be the most likely candidate for a potential first prestige project, as it is both a prominent harbour city and the home of The Ocean Cleanup. By involving a company such as Save Plastics and an architect, this first project could serve as a case study for future prestige projects.

TIER 3

1. Do material tests in order to find out how much plastic can still be used in tier 2

I found in my research for tier 2 that a lot of building products can be made with relatively mixed and impure plastic, by for example making the product thicker. The Ocean Cleanup should conduct more research in order to find out how much tier 3 plastic could still be used in this way, as this will reduce the need for incineration.

2. Research other art festivals and create a concept Ocean Product festival.

Through research on other public art festivals, I recommend The Ocean Cleanup further develop the concept of an Ocean Product art festival. This concept could then be pitched to a municipality, to judge interest.

3. Start talks with BKOR Rotterdam and the municipality of Rotterdam.

Siebe Thissen from the BKOR oversees art in the public domain in Rotterdam and serves as a link between artists and the municipality. He was quite enthusiastic about the prospect of an Ocean Product festival. By initiating talks with him and the BKOR, The Ocean Cleanup can assess the interest amongst artists and the willingness of the municipality. Early signs in my research were very promising.

4. Reach out to What Design Can Do

This will enable The Ocean Cleanup to assess the possibilities for different types of design competitions. As the process of defining and setting up such a competition can be quite long, these the first steps should be taken sooner rather than later.

5. Conduct further consumer research for art for sale.

My consumer research in the art for sale category is very preliminary. A further understanding of the way consumers perceive such art is required to judge the viability and desirability of the concept. I suggest The Ocean Cleanup to partner up with an artist, to create a small test run of art pieces for sale. By using these prototypes in research or by offering these at various locations for differing prices, a better understanding of factors that play a role in the art sector can be reached. For tier 1, the partner companies can help The Ocean Cleanup with understanding the target consumer for each product, but this is more difficult for tier 3. This is why more in-depth consumer research is required.

6.4 REFLECTION

The journey of writing this thesis has had its fair share of ups and downs. I started full of energy and dove headfirst into the research phase of the project. This resulted in a lot of progress very quickly and the nice thing about this progress was that it was measurable. The COVID-19 pandemic and having to work from home made that I sometimes found it difficult to stay productive and to keep a rhythm. Planning well and doing a bit of work every day has never been my strong point. I have always been more of a 'last minute' type of person, very much requiring a form of stress or pressure to stay motivated. As regards my thesis, I told myself I would need to plan well and work at a steady pace in order to achieve the best result possible. To counteract my 'last minute' nature I thought that if I did a certain (measureable) amount of work every day, I would stay on track.

In the first phase of the project, I could easily measure my progress in, for example, articles read or in pages of research written. However, once the initial research phase was over I started to struggle. I entered the creative stage of the process and could no longer explicitly measure my progress. This led to a feeling of being stuck, which killed a lot of my initial energy. I no longer had a grasp of where I was going and I sometimes felt like I was wasting whole days doing nothing particularly productive.

It was during this time, I desperately tried to grasp for structure. I looked for brainstorming methods, design tools or any other way to structure my process. This did not help, leaving me even more lost. During this phase, I shared my frustrations with my supervisory team.

I was then assured that this uncertainty is very much part of the process and that I should embrace it instead of fight it. Or in the words of Jeroen: 'Take a walk, lie upside down on the couch, go to the beach with some friends, don't force it.'

Once I embraced the uncertainty, I felt less pressured to benchmark the work I did and I allowed myself to let go of my rigid initial planning. This enabled me to break out of the thought patterns I was stuck in and to look at the things I had done so far from different perspectives.

Then, one day, it clicked and I found the three tiers and strategies. I was quite nervous to present this for my midterm, meeting, because I thought: 'What if this still isn't good enough? Surely I can't find anything better any time soon.' To my relief I succeeded in convincing my supervisory team. This led to another phase where progress was easily measured. I could do interviews, desk research and other concrete things. This increased my motivation a lot and my energy was back at the initial level.

A few weeks before my green light meeting a similar thing happened. I was uncertain what to do with the huge number of findings from the second research phase and entered a second creative phase. Only this time, I did not force myself to make progress and applied Jeroen's feedback immediately. Surely enough, after a while I had a eureka moment in finding the Ocean Product concept to unite the three strategies.

I think this has been one of my main learnings from writing this thesis: dealing with uncertainty. By not forcing myself to make progress, by not forcing a structure upon an inherently unstructured process and by taking a step back, I was much better equipped to find the solution to the problem.

Another important learning happened when I read Jeroen's book 'Is it good enough?'. In early meetings with my supervisory team I found the way I approached these meetings to be inefficient. In a way, I felt like I wasn't doing enough to convince my supervisory team of the quality of my ideas and I was easily taken off track. Then when reading Jeroen's book, I found the following quote:

'I really like the notion of assessing students not just on their design itself or the process they followed, but also on the quality of their debating skills. And I am convinced that intensive debate will lead to better answers to the question "Is it good enough?" (van Erp, 2020)

Upon reading this quote I decided to change the way I prepared my bi-weekly meetings with my supervisory team. Instead of just talking about what I did the previous two weeks and what directions I was thinking about, I decided I would prepare a convincing presentation every time. In this presentation, I would structure my key findings into an argument for a direction I had chosen. This way I would not present any irrelevant information and the focus would be on presenting my direction in the strongest and most convincing way possible. This proved to be an incredibly important learning, as all meetings after this were much more efficiently and it was much easier to stay on topic and get specific feedback on the direction I wanted to take the project in. This taught me that, even in the intermediate stages of a project, it is of great importance to focus on the communication of the reasoning and arguments behind the direction chosen. Not only does this help test if other people can follow said reasoning, but it also vastly improves the quality of the feedback.

One of the main competences I sought to prove in my project brief was to take a huge amount of (imperfect) information and to turn it into insights that can be combined into a strategy (similarly to a consultancy project). I stated in my project brief that I was going to aim to combine consultancy related skills with more 'designerly' methods and skills. My entire thesis ended up feeling a bit like a consultancy project, with a heavy focus on strategy. The case studies used to test the tiers allowed me to combine consultancy-like hypotheses testing methods with visions of future product (created with design methods). This learning goal was also important in the development of the partnership selection tool. When considering the factors that influence whether The Ocean Cleanup should partner with a company, I looked up old projects I participated in at 'De Kleine Consultant'. In one of them, I had developed a brand funnel. The learnings from developing said funnel served as the basis for the partnership selection tool. Combining these learnings with my own insights and visualisation skills, I was able to develop a tool that The Ocean Cleanup can use for partnership selection. This way, I think I have succeeded in this learning goal.

I also aimed to learn more about new aspects of sustainability, and I can truly say that I have. Researching the ocean plastic material has taught me a lot about the plastic problem in general and I now understand why recycling is so difficult and why so much plastic ends up in landfills.

Another learning goal established in my project brief was to put into practice the skills and tools learned in elective courses, such as 'Sustainable business models'. While I did do quite a bit of desk research on these topics, I was unable to apply the tools properly due to the nature of the project. My thesis focused on the front end of design, on a general strategy and it was therefore not relevant to use methods such as the value mapping tool. I did try to apply such methods in the hope they would bring me some structure during the creative phases of the project. As stated. However, I deemed the results irrelevant for the end result of the project (some of this research can be found in appendix 7.1). This relates back to the 'dealing with uncertainty', it taught me that forcing structures or methods does not allow me to skip the uncertainty and that it should instead be embraced.

My final learning goal was to learn more about sustainable buying behaviour. I was already extremely interested in this topic and I stated in my project brief that I currently see a huge shift around me in people switching to sustainable products. I think this will translate into a multitude of design opportunities and I therefore wanted to learn more about the factors involved in this shift. Questions such as: what motivates people to make sustainable decisions and spend the extra money?

I am glad to say that, as I hoped, this topic turned out to be a big part of my research. Both in desk research on sustainable consumption, as well as in the consumer interviews with the case studies. I can honestly say I have learned a lot about the factors that influence sustainable buying behaviour, such as green signalling and altruism.

The COVID situation has made the entire graduation project more difficult for me, my professors and The Ocean Cleanup. Back when I started in December, we were quite optimistic that the situation would be much better by now. As it turned out however, it only got worse. This sadly had a number of consequences for my project. I haven't been able to visit The Ocean Cleanup's offices, working from home has deprived me of much of the organic discussion about my project with peers and my supervisors have been busy dealing with their own fallout of this crisis.

This has made it more difficult to get to know my team on a more personal level. I managed to deal with this somewhat by arranging walking sessions with each member of my supervisory team and these proved to be incredibly helpful. It was great fun, allowed for a less formal discussion and made subsequent (online) meetings less distant and more friendly.

My supervisors themselves have been extremely helpful. Each one brings their own unique perspectives and input. While at first, it seemed somewhat difficult as I was being pulled in different directions, I now realise it is incredibly valuable to get input from -and have my project judged from multiple different angles. For example, Maaïke provided a more re-search/academic based view, while Jeroen offered a very practical, yet also very visionary viewpoint ('Is it really good enough/is it inspiring enough'). Stella has also been incredibly helpful, always quick to respond and to help out.

Overall, my thesis has been a great learning experience. Usually, I strongly prefer to work in teams. I love the interaction and the ability to constantly improve each other's work. Brainstorming together and building on each other's ideas is where a lot of the fun in design comes from for me. Sadly, a graduation project (especially during this pandemic) is mostly a solitary affair. This did mean I learned a lot about what keeps me motivated and what my personal strengths and weaknesses are. I think I now finally have a convincing answer to the age-old interview question: 'What kind of content would a project team, consisting of five times you, produce?'. I found that I love strategic problems, doing research and creating infographics and digital visualisations. On the other hand, I found that I tend to avoid drawing and illustrating and that I sometimes found it difficult to deal with the extremely open-ended nature of the project.

That said, I am incredibly grateful for being given the opportunity to write my thesis for The Ocean Cleanup. As stated in the preface, Boyan Slat's dream was instrumental in convincing me to study at the TU Delft in the first place. The fact that the subject matter of the project matched so well with my personal interests and passions kept me motivated through the more difficult phases of the project.

But, due to my preference lying in teamwork, I am also happy this graduation journey is almost over and I can't wait to apply everything I have learned in my future job.

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7. APPENDIX



7.1 VALUE CREATION & BUSINESS MODELS

To get a better understanding of the possibilities, it is essential to gain more knowledge on the topics of value creation and (sustainable) business models. In this chapter I analyse relevant literature.

7.1.1 VALUE CREATION

Value is a quite complex term and the concept of value creation is studied in multiple fields. (Bos-de Vos et al., 2015). A commonly made distinction in the realm of value is between use value and exchange value and this distinction was first made by Aristotle in the 4th century B.C. (Vargo et al., 2008). Use value is defined as the subjective perception or appreciation of qualities/utilities of products/services. Some people, for example, might value a sporty car, while others prefer a utility vehicle. This means use value depends heavily on the individual consumer and is highly subjective. When buying a product, consumers make a decision based on 'what they expect will give them the most satisfaction' (Bach et al., 1987).

This expectation/judgement is made in advance of the actual consumption of the product. This means that consumers base this perceived use-value of products off of beliefs, wants, needs, wishes and expectations (Zeithaml, 1991).

Exchange value is defined as the price that is paid when a consumer purchases a good (Bowman and Ambrosini, 2000).

The difference between the price (exchange value) of a product and the perceived use value is called the consumer surplus.

When making a decision between products, consumers will pick the product that gives them the highest consumer surplus (Whitehead, 1996). This is what is referred to as value for money. Consumer surplus can be increased by either lowering the price (use value stays the same and exchange value drops, thus increasing the ratio of consumer surplus), by increasing use value or by doing both. This is illustrated in figure 89.

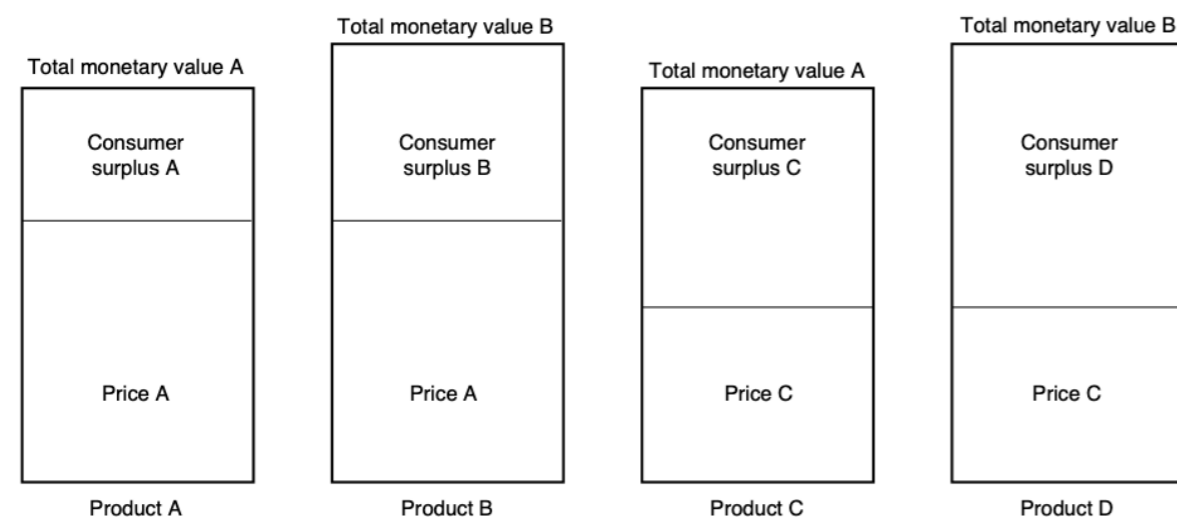


Figure 89: Total monetary value, price and consumer surplus
Source: Bowman & Ambrosini (2000)

Profit is then defined as the difference between the exchange value and the total cost of all the inputs for the product (including wages and marketing).

Value in firms is defined by three terms: *value proposition*, *value creation* and *value capture*

Value proposition refers to the promise of value from the firm to the consumer, for instance: in the case of a car company: providing personal transport.

Value creation in this case happens through labour (Bowman and Ambrosini, 2000). Input use value can also be transformed through labour into a new type of use value (transforming steel pellets into car doors for example).

Value capture is defined as 'the realisation of exchange value [...] determined by the bargaining relationships between buyers and sellers' (Bowman and Ambrosini, 2000). Extending the car company metaphor, value capture refers to the company selling the car to a consumer for the exchange value. These three terms together form a business model, more on that in chapter 7.1.2

Often, before a product reaches an end consumer, it goes through multiple firms, each with their own value proposition and methods of value creation and capture. This is called a value chain. Each firm creates use value and exchanges this use value with the next firm. This next firm then combines this input use value with labour to create new use value, which is then captured as exchange value with the firm after that. (see figure 90)

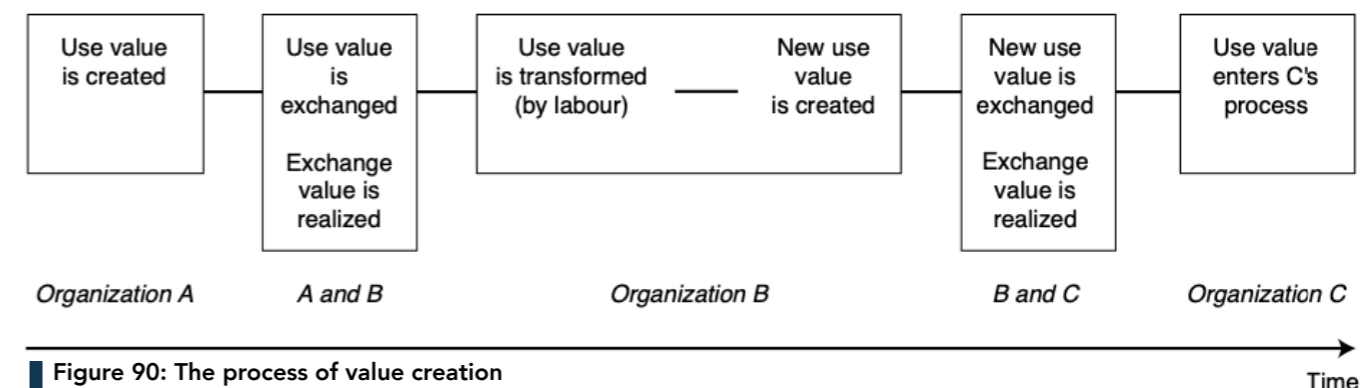


Figure 90: The process of value creation
Source: Bowman & Ambrosini (2000)

For example, a mining company creates use value by extracting ore from the earth. This is realised as exchange value by selling it to a steel producer. This steel producer transforms the use value by adding labour and creating steel ingots (new use value). This new use value is captured as exchange value with a car manufacturer, who then adds labour to create new use value by turning the steel into a car.

For products made with ocean plastic, there is a similar value chain. For example The Ocean Cleanup creates use value by extracting the plastic from the ocean. Currently for the sunglasses The Ocean Cleanup pays other companies to do the processing and finally captures exchange value in the sale of the sunglasses.

Different positions in the value chain are possible for The Ocean Cleanup. For example, one could imagine The Ocean Cleanup in a similar position as the mining company: as an extractor which sells valuable materials for others to use as they wish. The ideal position of The Ocean Cleanup in the value chain is dependent on their resources. As Porter (1991) states: 'Firms are successful because they have unique resources. They should nurture these resources to be successful'

As stated before, value capture is defined as 'the realization of exchange value [...] determined by the bargaining relationships between buyers and sellers' (Bowman and Ambrosini, 2000). This is true for all exchanges within the value chain. In the case of a consumer buying a product, the consumer will compare close substitutes to find the product with the highest consumer surplus. The presence of close substitutes in combination with low switching costs drives prices down and increases the bargaining power of the consumer (Porter, 1980).

Similarly, in the case of resources, the exchange value captured also depends on the bargaining relationship between buyer and seller. Take, for example, the steel production company. If the car manufacturer requires a special type of steel which only this company can make (and the company is aware of this), the steel company can hold up the car company and drive up the price of the resource. However, if there are multiple suppliers of this steel the car company will simply pick the provider which offers them the best consumer surplus (lowest price, highest quality, best reliability), thus driving prices down and increasing the bargaining power of the buyer.

In the case of The Ocean Cleanup, the sunglasses are currently competing against other sunglasses (close substitutes). Normally, the bargaining power of the consumer would be quite high as there are lots of substitutes, however sunglasses are a highly diversified market. The use value of specific sunglasses depends on which factors consumers find important. In the case of The Ocean Cleanup sunglasses, there is an emphasis on the environmental factors, which were found to be highest in green consumers (see chapter 2.4.4.2).

If The Ocean Cleanup were to sell ocean plastic as a material, they would be competing against providers of other recycled plastics. The bargaining power of The Ocean Cleanup would depend on their ability to communicate the uniqueness of their ocean plastic. Especially as there are other companies providing 'ocean plastic' as a material (see chapter 2.4.2) that can be obtained much more cheaply, The Ocean Cleanup will have to find a way to differentiate their type of ocean plastic.

This traditional way of looking at value is the Goods-Central (GD) logic (Vargo & Lusch, 2004). This logic centers around a good that is produced by a firm and sold to a consumer. In this context, the consumer and producer are very defined. For example, a car manufacturer takes raw materials such as steel and plastic and turns it into a mode of transportation. The consumer wants a mode of transportation, which the raw materials by themselves do not provide. This way, the producer creates value for the consumer.

A more recent model of value is the Service-Dominant (SD) logic. In this context, the roles of consumers and producers are more fluid. Vargo (2008) uses the car manufacturer example to illustrate that a car has no value if nobody knows how to drive, or if there are no gas stations. Similarly, the consumers also add value to the car manufacturer by providing them with money and by using the car in certain social circles, increasing its reputation of the brand for example. In SD logic, value is co-created in a mutually beneficial relationship between producer and consumer, in a process of acquisition, usage and disposal (Holbrook, 1987)

Grönroos & Voima (2013) have built a model further elaborating on SD logic, with a different definition of value. According to their model, firms do not create actual value. Value creation by firms and the value chains described previously are actually the creation of 'potential value', which still needs to be realised by a consumer in accordance with the SD logic. Firms are value facilitators and this facilitation happens in what they call the provider sphere.

Consequently, consumers are the only creators of actual value by turning this potential value into value-in-use, which happens in the customer sphere. This value creation by the customer can be highly individual and complex; it can contain many different types of value. For example, in the case of buying a car, one consumer might experience value from driving a certain distance, while the next might experience value from the social status the car brings, or from being able to bring their kids to school. One might even experience value in the build-up and anticipation towards the purchase of the car. This can be called independent value creation, which can take place in multiple social, physical and temporal contexts, both on collective and individual levels and is facilitated by potential value output from firms (Voima, 2010).

In this perception the consumer creates value-in-use (real value).

There is also overlap between these two spheres, where direct dialogue happens between firm and consumer. In this overlapping 'joint sphere', firms can engage in the customer's value creation process and thus co-create value through interactions. Examples of such interactions can be anything from a hotel lobby and a customer support call center to a website where consumers can customise their own products. By offering such tools this joint sphere can be enlarged, giving firms more influence in the actual value creation. This is what is referred to as value co-creation by Grönroos & Voima (2013) (figure 91).

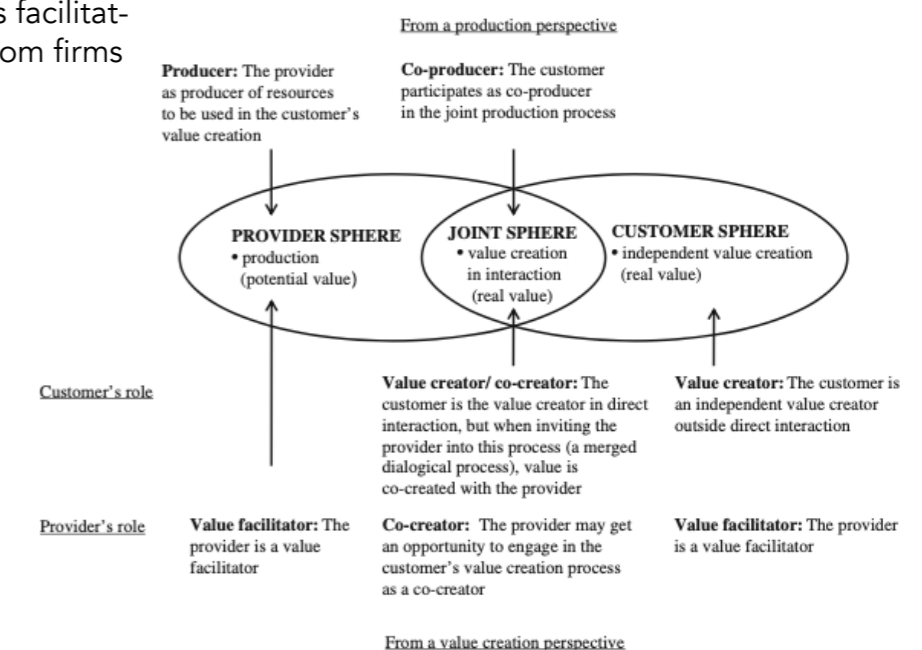


Figure 91: Value co-creation process
Source: Grönroos & Voima (2013)

7.1.2 BUSINESS MODELS

The Oxford dictionary defines a business model as: 'a plan for the successful operation of a business, identifying sources of revenue, the intended customer base, products, and details of financing'. Business models can be seen as stories that tell how firms work, who their customers are and how they can deliver value to these customers at appropriate costs (Magretta, 2002). It contains on the one hand all activities of a firm in the value chain (such as designing a product, purchasing materials) as well as, on the other hand, all activities associated with selling (product/service delivery, marketing). This way the business model consists of a value proposition (what a firm offers and to whom), value creation (how the firm makes/delivers the value proposition) and value capture (how the firm generates money/other value from the proposition) (Bocken & Short, 2016). To link these value terms to the design discipline, they can be related to desirability, feasibility and viability, see figure 92 (Kotnietzko et al., 2020). Introducing a better business model into an existing market is the definition of disruptive innovation (Ovans, 2015). Similarly, in design literature the sweet spot for innovation contains desirability, viability and feasibility (Orton, 2017).

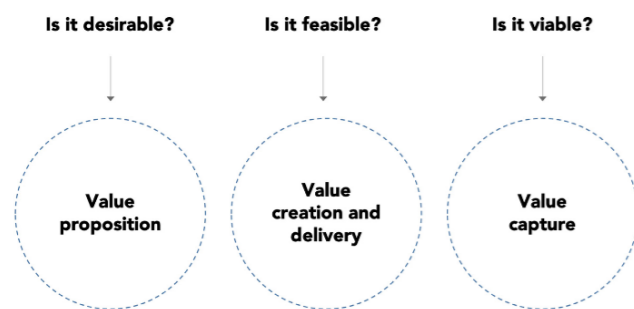


Figure 92: The Business Model
Source: Kotnietzko et al. (2020)

One of the most comprehensive ways of describing a business model is the well-known 'Business Model Canvas' (BMC). It is a template including nine different areas which describe factors such as revenue streams, partners, customers etc.. This template provides a useful tool, not only for checking all aspects of a proposed business model, but also for comparing business models. Business models describe the way a firm works and comparing different business models is the realm of strategy (Ovans, 2015).

7.1.3 SUSTAINABLE BUSINESS MODELS

One of the problems with current templates for business models (and the IDEO Venn diagram) is that it only takes the needs, wishes and resources of both consumers and the firm into account. Sustainability and the environment are not included in many of the most mainstream tools for creating business models and innovation, even though business model innovation is more and more seen as a key to increasing sustainability in firms (Lüdeke-Freund, 2010).

This is where the triple bottom line comes in: People, Planet, Profit. The triple bottom line is a tool used to measure the impact or performance of developments, not only in terms of profit, but also in terms of social impact and environmental impact (Slaper & Hall, 2011). By expanding the value proposition in a business model to not only focus on value for the consumer and firm, but also value for the other two P's (people and planet) one can integrate sustainability into the model. These new types of value, social and environmental value, can be expressed either in improvement or reduced negative impact (Bocken et al., 2014) (Boons & Lüdeke-Freund, 2013).

These new types of value are diverse and difficult to quantify, but so is use-value. There are many different metrics available for measuring social (for example: unemployment rate, average commute time) and environmental (CO2 emissions, waste management) value, the most relevant ones have to be chosen for the context (Slaper & Hall, 2011). The environmental metric The Ocean Cleanup currently uses in the sunglasses, for example, is the amount of football fields worth of ocean cleaned.

A wider approach should also be used by extending the business model beyond the firm. Instead of just mapping value captured for the firm, customers and shareholders it should also include value captured for other stakeholders such as suppliers. Again, this can also be environmental or social value.

In conclusion, a sustainable business model should use both a systems and a firm level perspective, build upon the triple bottom line to define and measure a firm's purpose, include a wide range of stakeholders and include the environment and society as key stakeholders. (Stubbs & Cocklin, 2008)

In a large analysis of available literature, articles and other resources, Bocken et al. (2014) created a categorisation of current sustainable business models by archetype (see figure 93). These archetypes can serve as inspirations for sustainable business models and they can be used in isolation or be combined.

Groupings	Technological			Social			Organisational	
	Maximise material and energy efficiency	Create value from waste	Substitute with renewables and natural processes	Deliver functionality rather than ownership	Adopt a stewardship role	Encourage sufficiency	Repurpose for society/environment	Develop scale up solutions
Examples	Low carbon manufacturing/solutions	Circular economy, closed loop	Move from non-renewable to renewable energy sources	Product-oriented PSS - maintenance, extended warranty	Biodiversity protection	Consumer Education (models); communication and awareness	Not for profit	Collaborative approaches (sourcing, production, lobbying)
	Lean manufacturing	Cradle-2-Cradle	Solar and wind-power based energy innovations	Use oriented PSS- Rental, lease, shared	Consumer care - promote consumer health and well-being	Demand management (including cap & trade)	Hybrid businesses, Social enterprise (for profit)	Incubators and Entrepreneur support models
Additive manufacturing	Industrial symbiosis	Zero emissions initiative	Result-oriented PSS- Pay per use	Ethical trade (fair trade)	Choice editing by retailers	Alternative ownership: cooperative, mutual, (farmers) collectives	Licensing, Franchising	
De-materialisation (of products/packaging)	Reuse, recycle, re-manufacture	Blue Economy	Private Finance Initiative (PFI)	Radical transparency about environmental/societal impacts	Product longevity	Social and biodiversity regeneration initiatives ('net positive')	Open innovation (platforms)	
Increased functionality (to reduce total number of products required)	Take back management	Biomimicry	Design, Build, Finance, Operate (DBFO)	Resource stewardship	Premium branding/ limited availability	Base of pyramid solutions	Crowd sourcing/funding	
	Use excess capacity	The Natural Step	Chemical Management Services (CMS)		Frugal business	Localisation	"Patient / slow capital" collaborations	
	Sharing assets (shared ownership and collaborative consumption)	Slow manufacturing			Responsible product distribution/promotion	Home based, flexible working		
	Extended producer responsibility	Green chemistry						

Figure 93: Sustainable business model archetypes
Source: Bocken et al. (2014)

One way to describe a sustainable business model is through adapting the business model canvas by simply adding the triple bottom line in the value proposition. (Bocken et al., 2018). In previous projects, I found this canvas to be somewhat limiting and constrained however. A more comprehensive method is the triple layers business model canvas by Joyce and Paquin (TLBMC) (2016). The TLBMC consists of three separate business model canvases, in three different layers (figure 94). The first layer is the same as the traditional business model canvas. The second layer approaches the business model from an environmental perspective, including factors such as use phase and end-of-life. The third level is concerned with the social aspects, including factors such as social value, employees and governance. This approach guarantees a larger emphasis on the sustainability part of the business model and thus appears more suitable for an environmental organisation such as The Ocean Cleanup. I have filled in a TLBMC for The Ocean Cleanup and its sunglasses project in figure 96.

Another useful tool for sustainable business models is the value mapping tool (figure 95). Value Mapping is an approach for ideation and analysis for sustainable business model innovation. It involves mapping the value captured, missed, destroyed and new opportunities for a range of stakeholders. It is an approach to identify failed value exchanges to develop new opportunities (Bocken, 2015), it is particularly relevant when designing businesses that want to achieve sustainable goals because here the environment and society are consid-

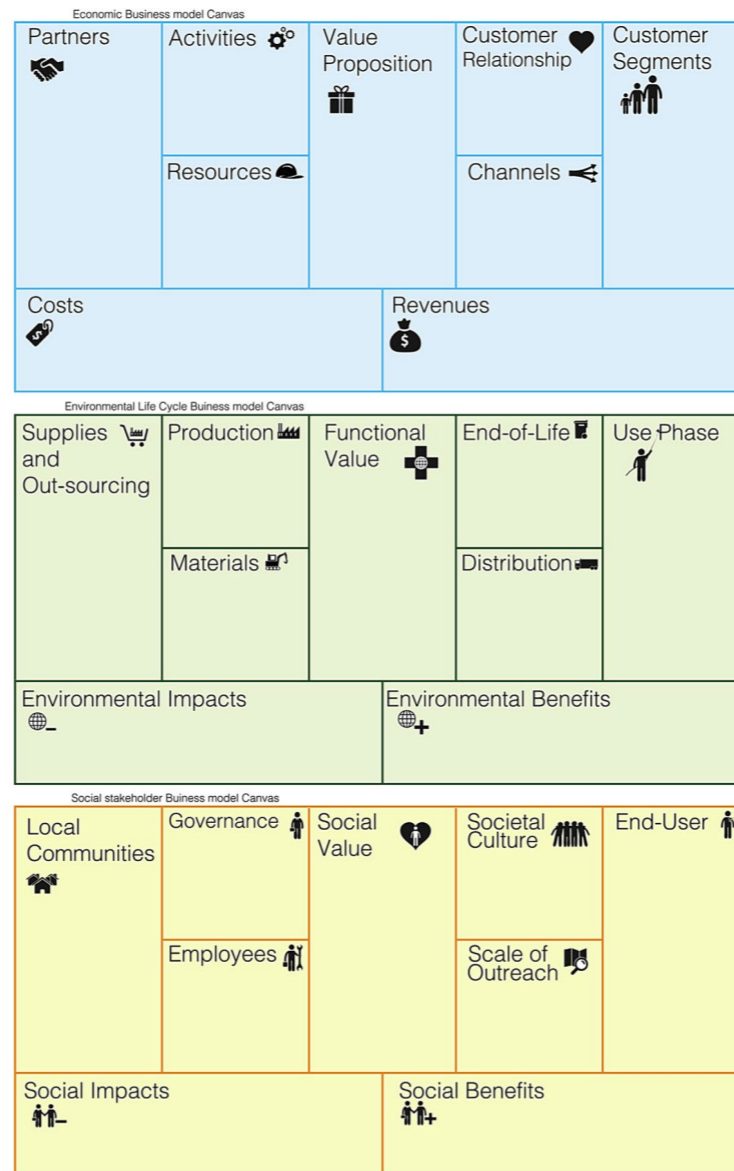


Figure 94: Triple layered business model canvas
Source: Joyce & Paquin (2016)

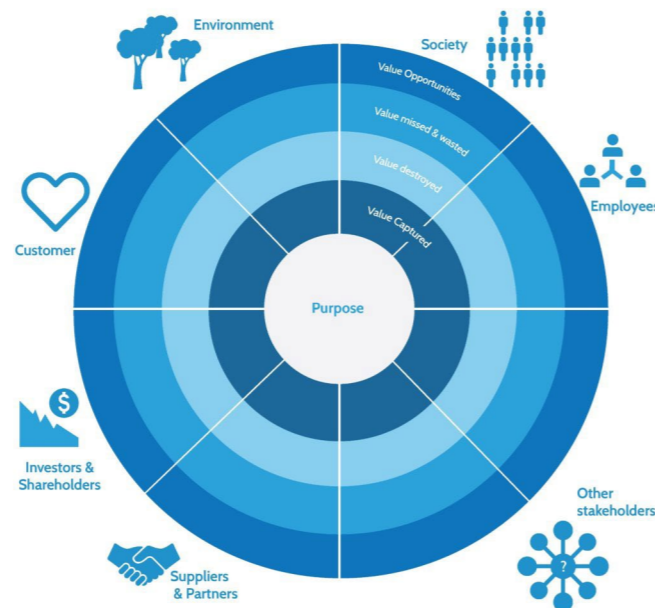


Figure 95: Value mapping tool
Source: Bocken, 2015

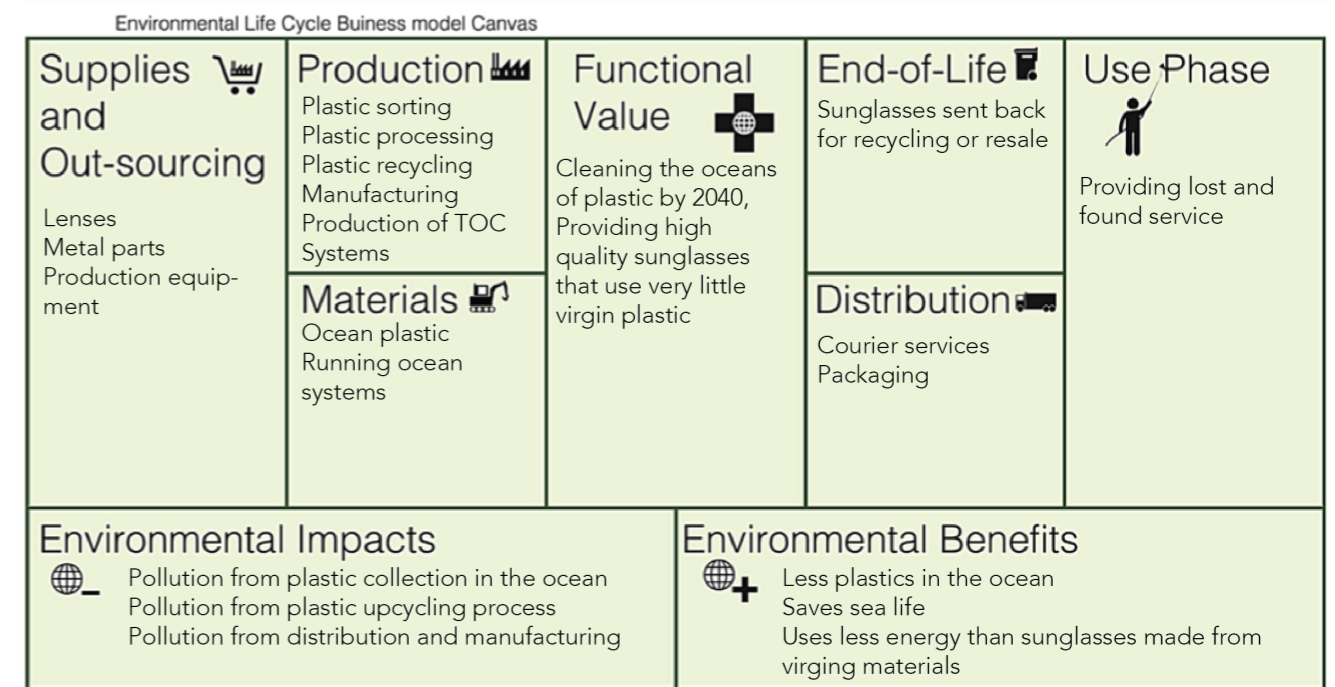
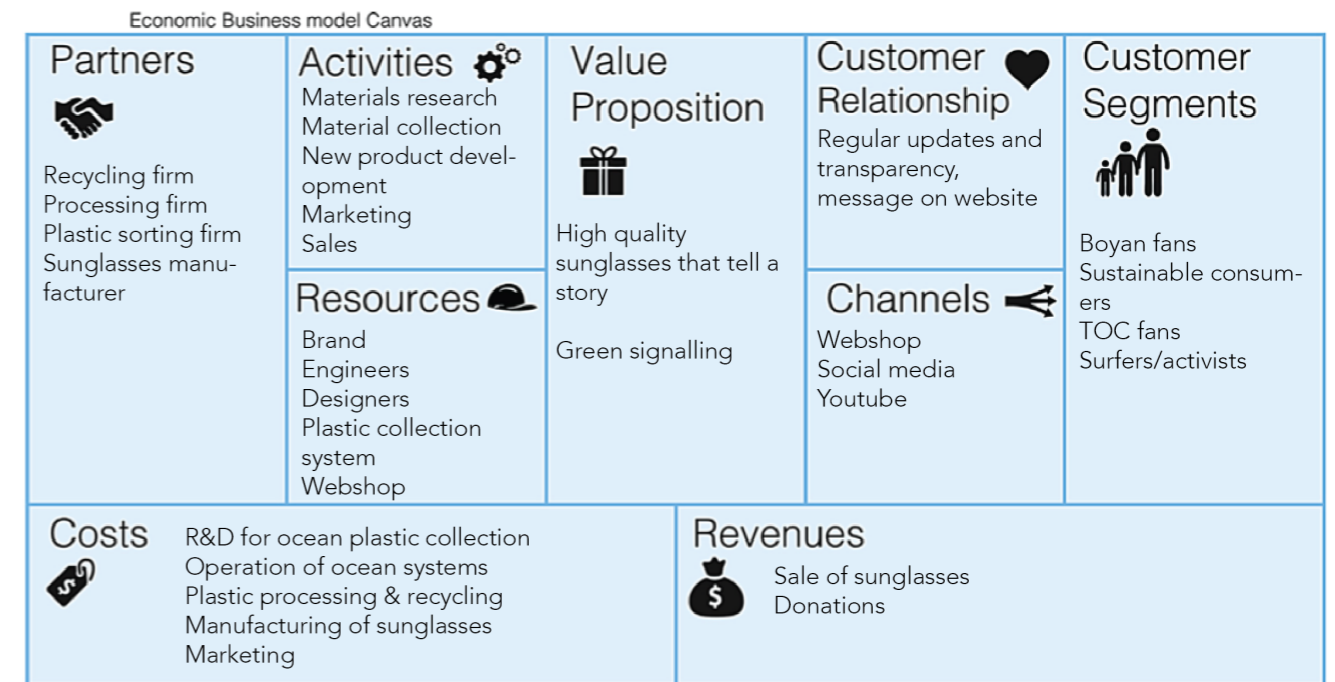


Figure 96: TLBMC filled in for The Ocean Cleanup
Source: Bocken (2015)



7.1 KEY INSIGHTS

- Value consists out of use value and exchange value, the difference is called consumer surplus
 - Consumers tend to pick the product with the highest level of consumer surplus
- Firms have a value proposition, a means of value creation, and a way to capture that value
 - These three factors combined make a business model
- Often, multiple firms participate in a value chain
 - The ideal position of a firm in the value chain depends on the unique resources of the firm
- There is also a more complex service dominant logic of value
 - In this logic the consumer is the creator of value in a highly personalised process, the firm is merely a value facilitator
 - The firm can become a value co-creator through direct interaction with the consumer
- Business models describe a firm's value proposition, creation and capture
 - This is similar to desirability, feasibility and viability
 - The business model canvas is a comprehensive way to analyse and compare business models
- There are multiple template and methods for analysing, designing and comparing sustainable business models
 - Including the sustainable business model canvas, the triple layer business model canvas and the value mapping tool.

7.2 EXPLORATION

Using the information obtained in the previous chapters I started an open exploration phase. In this phase as many ideas as possible are generated and some directions are explored.

7.2.1 BRAINSTORMS

To generate insights or interesting 'hooks' to ideate from, I first went through the previous pages with a marker in hand. I highlighted any words or phrases that could prove interesting for ideation. This resulted in the 'hooks' listed in figure 96. I used multiple brainstorm methods, including: mind maps, HKJs, and group brainstorms to ideate as many ideas as possible from these hooks. The results of these brainstorms are partially visualised in figure 99. Some of the ideas lead to directions which were analysed more in depth.

- How can The Ocean Cleanup get rid of a large volume of plastic?
- How to prevent fishing gear from ending up in the ocean?
- What products do not require good material properties?
- What can be made using production methods suitable for ocean plastic?
- What other things 'care' about the ocean like The Ocean Cleanup?
- How can one signal green consumption?
- What resources define The Ocean Cleanup and how could they be used?
- How to differentiate GPGP plastic from generic ocean plastic?
- In what personal ways do consumers create value-in-use from ocean plastic?
- In what ways can TOC co-create value with consumers?
- What ways of value capture exist?
- What other stakeholders could be involved?
- What sustainable business model archetypes are interesting for TOC?
- What value is currently missed or destroyed by the ocean cleanup?
- In what sort of products do people like exotic/expensive materials?
- What products are also part of a 'cleanup'?
- What types of partnerships can The Ocean Cleanup engage in?
- In what ways can GPGP plastic products convey the origin of the material?

Figure 96: 'Hooks' for brainstorming

7.2.2 PREVENTING GHOST GEAR

One of the most attractive angles of ideation was the prevention of more ghost gear (fishing gear lost at sea). As it was found that over half of the plastic drifting in the GPGP originated from the fishing industry, a product that would slow the inflow of ghost gear into the ocean could make the clean up a lot easier.

Luckily some research into the problem of ghost gear was done by Ghost Nets Australia. This is an organisation that collects ghost nets from the seas near Australia in order to protect endangered turtle species. These ghost nets are then given to aboriginal tribes, who turn them into art, which is auctioned off for the benefit of these tribes. In this way they turn the ghost net problem into something positive for the local community.

The research of Ghost Nets Australia into the ghost nets found in the Australian seas showed that most of the nets originate from trawl fishing (62.2%), followed by gill nets (14.4%). The remaining nets were from unknown origin (Ghost Nets Australia, 2012). Trawl fishing involves dragging a net through the water behind a boat (figure 97). A more damaging form of trawl fishing is bottom trawling, in which the net is dragged along the seabed, often damaging the seabed as a habitat. Gill fishing is another form of fishing in which a net is suspended in the water column. Fish swim into the net and become entangled. After a while the net is retrieved and emptied by the fishermen. If the net is lost, it can float around and continue catching fish until the weight of the catch causes it to sink. In that case the catch slowly decomposes or gets eaten, causing the net to float up again, repeating the cycle. Next to ghost nets, ghost gear also consists of other lost or discarded fishing gear. For example: discarded crab traps can become self-activating and trap or kill many crabs autonomously. A lot of the 'black rigids' found by The Ocean Cleanup also consisted of eel traps.

This fishing gear is probably either lost or discarded at sea for the following reasons:

Economic:

Disposal of worn fishing nets can be expensive; it is probably easier to 'lose' them at sea. If a boat is full after an unexpectedly good catch, fishermen might dispose of fishing gear to create extra space.

Environmental:

Nets used in bottom trawling can get caught on rocks or other objects in the seabed, causing the nets to tear. Nets could get lost by accident, due to, for example, rough seas

Illegal fishing:

If illegal fishermen are paranoid about being caught, they might dump their nets. (Butler et al, 2013).

So where does ghost gear come from? The items found by Ghost Nets Australia were traced back to the Arafura Sea in Indonesia, the only sea in the region where trawling is not banned. (Ghost Nets Australia, 2012)) A combination of trawl and gill fishermen were invited to workshops hosted by Ghost Nets Australia. It was found that all skippers had lost nets at sea, but not frequently. 70% of fishermen claimed to lose a net less frequently than once every five years. All of fishermen said they would return damaged nets to land instead of discarding them. The two reasons most often stated for losing nets were: gear conflicts and being forced into sub-optimal terrain or uncharted waters due to over crowdedness. In these uncharted waters, trawl fishers might encounter rough terrain on which their nets can snag. A final cause could be illegal fishing boats as these were not involved in the workshop but are quite numerous in the area (Butler et al, 2013).



Figure 97: Trawling boat
Source: Ghost Gear Australia

After finding out the source of the ghost gear I brainstormed possible solutions. It was quickly found, however, that practically all solutions are either regulatory or involve for example inventing new technologies for fishing nets that decompose. While the origin of the ghost gear had been relevant research, these ideas are considered outside the scope of this project.

SWOT THE OCEAN CLEANUP

Figure 98 provides an overview of the strengths and weaknesses of, and opportunities and threats for The Ocean Cleanup based on the previous research.

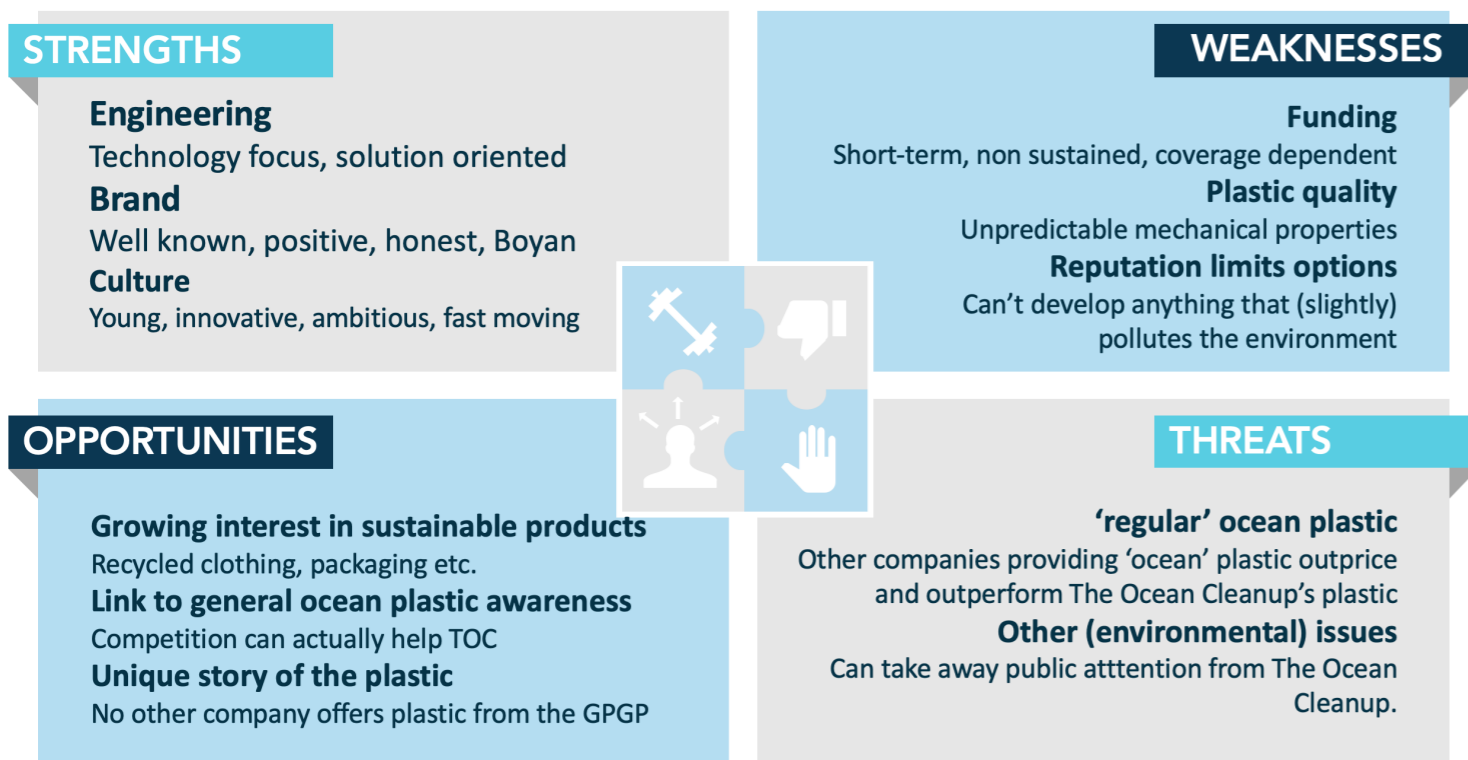


Figure 98: SWOT analysis

Ideas

Cufflinks	Crates for storage (B2B, hello fresh)	Sonos case	Desk	SUP board	table	Buoy
Kayak	Beer crates partnership	Pedalo	Dugout	Festival tokens	Lifebuoy	Office Furniture (partnership)
Yakuzi tub	Festival decoration/	Fairphone	Sun beds	Plant pots	Poles	Jewelry
Display stands	Outdoor furniture	Lobbying for subsidies	Community forum	Poker chips	Leaderboard	Packaging
Pen	Phone case	Fenders	Art for city/harbor	Garbage bins (in office)	Epoxy art	Water bottle
Earrings	Ring	Fountains	Bin bags	Garbage bins in coastal areas	Souvenirs (Shop in shop)	Community benches
Necklace	Referral programme	Car interior	Home art	Pillow filling	Dyson air purifier case	Desktop computer case
Router	Radio	USB stick	Radio	Seabin	Hotel interior	Scarf
Computer mouse	Board game for education	Lamp	Flashlight (Boat)	Hotel decorations	Credit card	TV case
Special water bottle	Dyson air purifier					

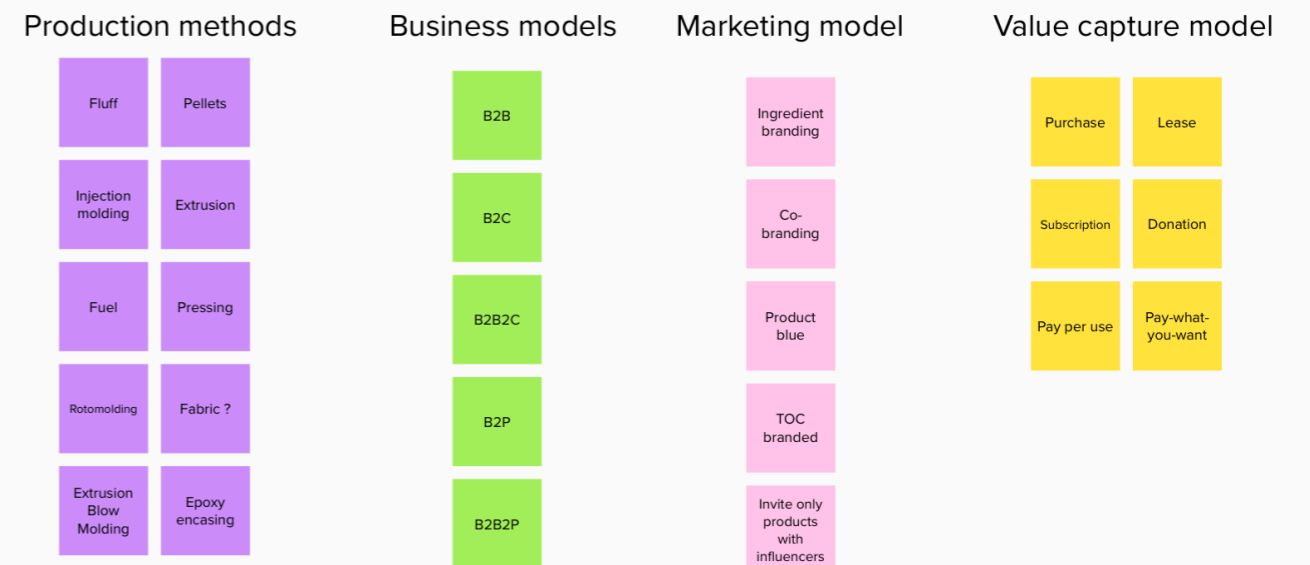


Figure 99: Results from a brainstorming session

7.3 SOLUTION SPACES

In this chapter, the multitude of ideas from the exploration phase are grouped into solution spaces (see figure 100).

7.3.1 HOME FURNITURE

Home furniture as a category is defined as everything one can expect to buy at a home furniture store. This can range, for example, from tables to plant pots to a decoration for on the wall. Products in this category will be displayed publicly in the homes of consumers and thus allow for green signalling. By branding the material in the home furniture as premium and exotic consumers may be prepared to pay a premium for The Ocean Cleanup branded products. Many different production methods are also suitable for the products in this category, for example: a table made from epoxy encasing pieces of Ocean Plastic, or a vacuum formed plant pot.

7.3.2 OFFICE FURNITURE

The category office furniture comprises of all products that could be found in an office context. Think of: desks, lockers, plant pots, decorations, lobby art, benches and cubicles. One of the advantages of office furniture is that it is paid for by the company. This means consumers are not the ones who have to pay the price premium. Companies are often willing to spend money on sustainability, especially if they can then show it off to, for example, visitors. Like home furniture this category fits a lot of different product ideas and production methods.

7.3.3 ACCESSORIES

This category encompasses all small 'non-essential' products that can be sold at a higher value because of their material. Think of jewelry, for example. The Ocean Cleanup sunglasses also fall into this category. There are many opportunities to create value in this category as the production costs are relatively low and the prices can be very high, especially per kilogram of plastic. It is important, for this category, that the origin of the material is clearly visible, as one of their main uses will be green signalling.

7.3.4 WATER SPORTS

The water sports category encapsulates products such as kayaks and pedalos, but also buoys or dock materials. The relationship with water fits well with the brand of The Ocean Cleanup and people practicing water sports are more inclined to care about the state of the ocean. Products in this category often already come with premium prices and the average consumer is quite wealthy, allowing for more value to be extracted.

7.3.5 ELECTRONICS

Electronics often come in plastic casing. This casing does not have very robust mechanical requirements and is partially there for aesthetics. This makes these cases a great fit for GPGP plastic. Ideas include the exterior of Sonos speakers, a computer mouse or even a television. One novel idea is the exterior of a Dyson air purifier. In the same way that The Ocean Cleanup cleans the ocean this product could then clean the air. One downside of this category is that the casing is normally not a large part of the cost of the product, so manufacturers might be reluctant in adopting a more expensive material.

7.3.6 TOURISM

The products in this category all have in common that they have something to do with tourism/destinations people visit. They can range from souvenirs to community benches to decorations in restaurants. These could be especially interesting if they were located near the sea, in line with extra criterium 8 (chapter 3.1). Garbage bins in ports or beach cities made from GPGP plastic is the most inspiring idea here as it both relates to the ocean and cleaning up. In a way it could be seen as preventing ocean plastic.

7.3.7 B2B RE-USABLE PACKAGING

Re-usable packaging such as beer crates might provide an opportunity to find a purpose for large amounts of ocean plastic. These crates are already commonly made from HDPE and are re-used and recycled, so they do not end up polluting the environment. Other possibilities include crates for subscription services such as HelloFresh. Currently cardboard boxes are used for such services, however the weekly delivery provides an opportunity for the collection and re-use of a more durable material.

7.3.8 NOVELTIES

A more diverse category of product ideas is what I have called novelties. These include ideas that have an interesting angle or twist, but do not fit in one of the other categories. Think, for example, of a credit card made from ocean plastic that donates a small percentage of spending to The Ocean Cleanup. Other ideas include artwork for events or tokens for festivals.

7.3.9 BUILDING MATERIALS

The final category of product ideas is building materials. The plastic could be turned into all sorts of materials used in architecture or construction. Think, for example, of acoustic panels, roofing tiles, facade panels or perhaps office cubicles. This is an interesting solution space, as consumers are not the ones purchasing the products in this case. The materials will be bought by construction companies, architects or other stakeholders. I assume there is a demand for sustainably sourced materials in this sector (more on that in chapter 3.2.4), which GPGP plastic could help meet.

HOME FURNITURE

Stool	Display stands
Desk	Outdoor furniture
Plant pots	Table
Home art	Yakuzi tub
Cupboard	Closet
Garbage bin	Lamps
Pillows	

OFFICE FURNITURE

Desk	Garbage bin
Plant pot	Lobby seats
Art for lobby	Wall decorations
Cubicles	Lockers
Lamps	

ACCESORIES

Earrings	Cufflinks
Rings	Necklace
Bracelet	Watchband
Water bottle	Pen
Phone case	USB stick
Keychains	

WATER SPORTS

Pedalo	Kayak
SUP board	Fenders
Buoys	Dock material
Lifebuoy	Flashlight

ELECTRONICS

Dyson air purifier	Sonos case
Computer mouse	Computer keyboard
Router	Fairphone exterior
Usb stick	Flashlight
Radio	

TOURISM

Community benches	Sun beds
Community art	Fountain
Seabin	Dugout
Community garbage bins	Souvenirs
Hotel decoration	

REUSABLE PACKAGING

Crate partnership (Heineken)	Packaging for subscription services (Hellofresh)
Display stands for retail	

NOVELTIES

Festival tokens	Art for events
Sun beds at beaches	Credit card
For every ... we	Board game for education
Seabin	Car interior
Poker chips	Festival decoration

7.4 CONSUMER INTERVIEW GUIDE

The Ocean Cleanup in general

Have you heard about The Ocean Cleanup?

What do you think of the organisation?

The Ocean Cleanup is an organisation that aims to rid the world's oceans of plastic by the year 2040. This year The Ocean Cleanup aims to return to the Great Pacific garbage patch for the next step in the development and rollout of its cleanup systems. This means that starting this year The Ocean Cleanup will begin catching the first big batches of ocean plastic. As this plastic does not have a sustainable purpose yet, it is up to The Ocean Cleanup to find a sustainable purpose for it. This is the brief of my graduation project.

This plastic has floated thousands of miles off shore for up to 30 years, which brings with it various challenges, but also opportunities. For example the plastic can be degraded and consists of multiple different polymers, but also is quite rare and has a story to tell. Some parts of this plastic are properly recyclable and can be recoloured, while others can not be recycled using traditional methods. This means multiple different strategies will be necessary to find a sustainable destination for all of the plastic. The purpose of this survey is to test and evaluate multiple of these strategies.

Perception of ocean plastics

How sustainability-minded would you describe yourself as being?

How aware are you of the ocean plastic problem?

- Do you make any conscious effort to reduce your plastic waste?

What do you think should be done with the plastic once it has been recovered?

Limited editions in general

One possible strategy for the higher quality plastics is to use limited edition partnerships. In this case The Ocean Cleanup would partner up with a company to release a limited ocean plastic edition of a previously existing product. Think of for example a tech product, a fashion product or a piece of home furniture.

Do you think such limited editions would be a good purpose for ocean plastic?

-Why or why not?

What types of products and brands come to mind?

- Why specifically?

Figure 100: Ideas grouped into solution spaces

If The Ocean Cleanup's plastic were to be used in a limited edition speaker, which speaker brands come to mind as a good fit?

- Why specifically?

If The Ocean Cleanup's plastic were to be used in limited edition beer crates, what beer brands come to mind as a good fit?

- Why specially?

If The Ocean Cleanup's plastic were to be used in limited edition home furniture products, which brands come to mind as a good fit?

- Why specifically?

If The Ocean Cleanup's plastic were to be used to make a limited edition car interior, which car manufacturers come to mind as a good fit?

- Why specifically?

Product 1 Limited edition waterproof JBL The Ocean Cleanup speaker (Limited to 10.000)

Imagine JBL would create a version of its iconic Charge 3 speaker, in which the plastic sides are made from ocean plastic.

(Show pictures of visualisation)

What do you think of this concept?

Would you prefer to own this product compared to the same JBL speaker made from regular plastic?

- Why or why not?

Would you be willing to pay a premium for such a speaker?

-Why or why not?

-Does the limited nature of the product play any role in this?

- Would you be willing to pay more if it was even more rare?

- Does the fact that the ocean plastic material is visible on the outside play a factor in this?

- Would you be willing to pay more if it wasn't?

Do you think such a product would fit the brand and mission of The Ocean Cleanup?

-Why or why not?

- Would your opinion of The Ocean Cleanup change based on this product?

Do you think such a product would fit the brand of JBL?

- Why or Why not?

- Would your opinion of JBL change based on this product?

Do you think this product will raise extra awareness on the issue of ocean plastic?

- Why or why not?

Product 2: Limited edition Heineken crate

Imagine Heineken would buy a certain amount of ocean plastic from The Ocean Cleanup. This would be used to make sustainable plastic beer crates. These beer crates would cost exactly the same as a regular beer crate and would enter the same circular system.

(Show pictures of visualisation)

What do you think of this concept?

If both crates were available (show picture) would you pick the ocean plastic crate?

- Why or why not?

Would you go out of your way to pick the ocean plastic crate (for example by moving other crates)?

- Why or why not?

Do you think this concept fits the brand of The Ocean Cleanup?

- Why or why not?

Do you think such a product would fit the brand of Heineken?

- Why or Why not?

- Would your opinion of Heineken change based on this product?

Do you think this product will raise extra awareness on the issue of ocean plastic?

- Why or why not?

Product 3: Limited edition Ikea furniture

Imagine if Ikea were to create a line of limited edition home furniture products.

(Show pictures of visualisation)

What do you think of this concept?

Which ones of these products is your favourite and why?

Would you be willing to buy one of these products for in your own home?

-Why or why not?

Do you think these products could serve as conversation starters?

-Why or why not?

Would you be willing to pay a premium for such products compared to their regular plastic counter parts?

- How much?

- Does that change with the visibility of the material?

Do you think this concept fits the brand of The Ocean Cleanup?

- Why or why not?

Do you think such a product would fit the brand of IKEA?

- Why or Why not?
- Would your opinion of IKEA change based on this product?

Do you think this product will raise extra awareness on the issue of ocean plastic?

- Why or why not?

Product 4: Tesla interior (limited to 1000 cars)

Imagine Tesla would provide an ocean plastic interior as an option on the new model S (limited to 500 cars).

(Show image of visualisation)

What do you think of this use of Ocean plastic?

Do you think ocean plastic could be used as an exclusive/exotic material in such contexts?

- Why or why not?

If you were in the market for a Tesla car, would you get this option?

- Why or why not?

How much extra would you be willing to pay for this option, assuming the original car costs €50.000

- Does the scarcity of the car have anything to do with this?
- Or the visibility of the material on the dashboard

What if the car had a recognisable ocean plastic logo on the outside, would you like that?

- Why or why not?
- What if the car has light blue fenders?
- What if the entire car is blue

Do you think this concept fits the brand of The Ocean Cleanup?

- Why or why not?

Do you think such a product would fit the brand of Tesla?

- Why or Why not?
- Would your opinion of Tesla change based on this product?

Do you think this product will raise extra awareness on the issue of ocean plastic?

- Why or why not?

Tier 2 materials: Exterior and interior architecture

The second category of plastics that The Ocean Cleanup will extract from the ocean is of a slightly lesser quality and often can not be recoloured. A strategy for finding sustainable destinations for this plastic would be to use it in interior and exterior architecture. Think for example of wall panels, roof tiles, emergency shelters or office cubicles.

What do you think of the application of ocean plastics in this context?

What exterior architecture features come to mind?

- And why?

What interior architecture features come to mind?

- And why?

Now what if The Ocean Cleanup were to produce building materials and donate them to a good cause, what sort of products do you think of?

What causes should they be donated to?

- and why?

Idea 1: roof tiles

Imagine The Ocean Cleanup would produce ocean plastic roofing tiles. These tiles could serve as a sustainable and durable alternative to regular materials. They could be used in buildings in the public space or in for example office buildings.

(Show visualisation)

Do you like the application of ocean plastic in this way?

- Why?

Do you think this product could be a conversation starter?

- Why?

Do you think construction companies would be willing to pay a premium for ocean cleanup products in this way?

- Why?

What kind of buildings do you think are best suited for such roof tiles?

- Why?

Idea 2: Acoustic panels

Imagine The Ocean Cleanup would use some of its plastic for office interiors, in this case acoustic panels. These could serve both a functional and decorative purpose. They could also serve as a conversation starter.

(Show visualisation)

What do you think of this application of ocean plastic?

Would you like to see such acoustic panels in your own workplace?

- Why?

Do you think these acoustic panels could serve as a conversation starter?

- Why?

Do you think companies would be open to spending more on such acoustic panels?]
- Why/why not?

What type of companies do you think would be most open to such acoustic panels?

Idea 3: Plastic for good

Ocean plastic could be pressed into bricks and plates and be used in the construction of temporary buildings. Think of for example shelter after a natural disaster, refugee housing or COVID test/vaccination locations. The Ocean Cleanup would make their material available for free/an as low as possible cost for such purposes.
(Show visualisation)

What do you think of such a use for ocean plastic?

Do you think The Ocean Cleanup should give such plastic away for free?
- Why/why not?
- Would this change or improve your opinion on The Ocean Cleanup?

How do you think such 'plastic for good' could be financed?

What kind of NGO's could The Ocean Cleanup work with?

Are there any other ways of using plastic for good you could see?

Tier 3: Arts and experiments

The final type of plastic is difficult to recycle traditionally. It consists for example of fishing nets with metal cores, of pieces that are too small to sort by polymer type or of other types of ocean waste such as glass. A possible strategy for finding a purpose for these plastics is to turn it into art. Small particles could for example be pressed together into a plates that are each unique in colour and patterns. Or The Ocean Cleanup could encase peaces of ocean plastic in transparent epoxy as small souvenirs. Maybe The Ocean Cleanup could even use this plastic to create a big piece of art/statue for a coastal town!

What do you think of the application of ocean plastics in this context?

Do any specific use cases come to mind?

Idea 1: pressed wall art

In this case, mixed colours of ocean plastic would be pressed together to create a plate with an individually unique appearance. This plate could be framed on a wall as art.
(Show visualisation)

What do you think of this use of ocean plastic?

Would you want to own such a piece of art?
-Why or why not?
- If so, how much would you be willing to pay for such an art piece?

Do you think such a piece of art could be a conversation starter?
-Why or why not?

Idea 2: Souvenirs

In this example, a piece of ocean plastic would be encased in epoxy. This would result in the effect of ocean plastic in frozen water. These could for example be sold as souvenirs;
(Show visualisation)

What do you think of this use of ocean plastic?

Do you think such a piece of art will raise awareness for the ocean plastic problem?
-Why/why not?

Idea 3: Community art

In this example, an artist would create a large piece of art to be displayed in the public domain.
(Show visualisation)

What do you think of this use of ocean plastic?

Where should such art be placed?
-Why specifically?
- Are there places where it shouldn't be placed?

Do you think such a piece of art will raise awareness for the ocean plastic problem?
-Why/why not?

Closing

What ideas were your favourites?
- Why?

Do you have any other ideas?

Anything you would like to add?

THANKS FOR
READING