



EcoExplorer

4WAU00, User Testing, Evaluation & Improvement - Q4 (2024)

Group 15

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An aerial photograph of the TU/e building in Eindhoven, taken at sunset. The building is a large, modern structure with a glass facade, reflecting the orange and red hues of the sky. The surrounding area is filled with trees and other buildings, creating a dense urban landscape.

Eindhoven, June 21, 2024

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1 | Introduction

In this project, the goal is to think of a sustainable product that can be brought to the market with moderate success. In previous courses, the main ideas of the product have been created, and full prototypes have been constructed. In the last course of this USE learning line, it is time to imagine the product being sold to a general audience. Many things come into play here. If the product needs to be sold, then a responsible company needs to be made, who have to successfully interpret their strengths and weaknesses, define the consumers who will actually buy the product, make a final vision of the sellable product in question, create a complete overview of the total costs that will be needed to sell the product and to combine the most important risks the company will face in a risk analysis.

In the following chapters, it will be shown how the final state of the sellable product is made. First, a retrospective will be shown of the product itself, which will indicate how far the product has come so far. After that, the previously mentioned responsibilities of the company will all be mentioned one by one, in great detail. This will finally lead to the most conclusive state of the product for this USE learning line, which is called EcoExplorer. But first, a brief introduction EcoExplorer will be given on the following page.

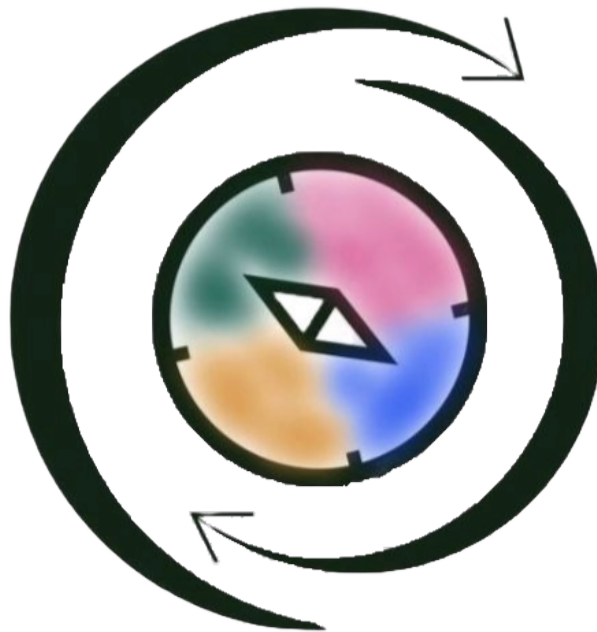


Figure 1.1: Logo EcoExplorer

1.1 | The product

EcoExplorer is a handheld device equipped with GPS navigation, trivia questions about eco-friendly destinations, and a point-based reward system. EcoExplorer has several key benefits. It is a user-friendly device that provides seamless navigation, eliminating the need for multiple devices. Additionally, the device offers educational trivia questions about Amsterdam and the sustainable initiatives in and around the city. EcoExplorer also promotes eco-friendly behavior and helps users discover sustainable options throughout Amsterdam.

1.1.1 | What makes the product unique

EcoExplorer stands out due to its combination of several unique features. Firstly, it is a physical product, which sets it apart from typical mobile apps and reduces the overall screen time, allowing users to fully immerse themselves in their surroundings. The rental services which are available at key tourist locations ensure that the product is easily accessible. The integration of both GPS navigation and educational trivia questions offers an engaging and informative experience, guiding users to eco-friendly destinations while learning about Amsterdam and the sustainable initiatives in and around the city. Lastly, the point-based reward system encourages users to try the trivia questions, adding a fun and competitive element to their trip. Points earned by correctly answering trivia questions can be redeemed for rewards, like discounts for the next time renting EcoExplorer or for local sustainable businesses. These combined features make EcoExplorer a unique and an attractive option for those looking to explore Amsterdam in a sustainable and educational way.

1.2 | The customers

The EcoExplorer is intended for anyone looking for an engaging and sustainable way to explore Amsterdam. The target customers include tourists, locals, and environmentalists, all with unique needs and interests.

Tourists: Visitors exploring Amsterdam who seek convenient and engaging ways to discover the city. They are interested in experiencing the city without the constant distraction of their phones and want to use a device that can direct them to eco-friendly destinations while offering educational trivia questions about the city.

Locals: Residents of Amsterdam who are looking for new ways to explore the city they live in. They might be interested in discovering lesser-known and sustainable spots within the city. EcoExplorer offers a new perspective on their familiar surroundings and an opportunity to find more eco-friendly places.

Environmentalists: Individuals passionate about promoting eco-friendly practices and supporting sustainable tourism. They are likely to appreciate EcoExplorer's emphasis on sustainability and promoting of eco-friendly destinations, while teaching its users about local environmental initiatives.

2 | Evaluation & Reflection of MVP

2.1 | Overview of the MVP

In the last course, the group was able to fully design, 3D print, manufacture, solder, and program the EcoExplorer product, shown below in [Figure 2.1](#).



Figure 2.1: EcoExplorer Device

The EcoExplorer incorporates gamified elements, such as trivia questions about the city, to earn points that can be redeemed for discounts at sustainable locations. To operate the device, the user simply powers it on and selects an activity category from the menu. Navigation is achieved using four buttons. Once a category is chosen, the user is presented with a trivia question. Upon answering correctly, the user can select from a list of four randomly generated sustainable activities. The device then switches to GPS mode, guiding the user with directions for eco-friendly transportation methods such as biking, walking, or running. Upon completing the activity, the user earns points, which can be later redeemed at the shop.

2.2 | Key Learnings

EcoExplorer was originally intended to be a device in combination with an app. However, one of the most significant questions raised by both users and tutors was the purpose of having an app on their phone if one of the objectives of the EcoExplorer device was to reduce screen. This sparked a discussion amongst the group, and ultimately lead to the elimination of the app aspect of the product and to rely solely on the device itself for information delivery. This decision was made based on user and tutor feedback, while carefully considering the main objectives of EcoExplorer. By removing the app, users are no longer glued to their smartphones to engage in sustainable activities. Instead, all essential information is easily accessible directly from the EcoExplorer device. Users can now fully immerse themselves in sustainable activities without the distraction or temptation of their smartphones.

2.3 | Challenges Faced

A large part of the EcoExplorer product revolved around the GPS module being able to communicate with the display to provide the user with real-time directions on how to get to their sustainable activity. However, after working on it for the entire 8 weeks of the last course, this goal was unable to be achieved. As this functionality is a fundamental aspect of the EcoExplorer, it will be assumed in this course, that the GPS communication works perfectly and the EcoExplorer functions exactly as it should.

2.4 | User Involvement

Potential users were involved by conducting a survey. In total 25 people responded, 14 of whom were women and 10 were men. The questions were asked to get more insights into the needs and preferences of the user. The most important aspects were whether they wanted to rent or buy the product and for what price this should be. Besides, where they prefer to rent or buy it and if getting discounts would motivate them to act more sustainably. All interview questions can be found in [Appendix B](#). From the

survey, it was found that all participants go on vacation at least once per year, of who 92% are students. Of the participants, 64% mentioned they do not want to have a time limit on their phone. Because people who want to explore a new city will generally not constantly use their phones, a time limit was deemed unnecessary.

Additionally, 84% of the participants would be more motivated to make sustainable choices while being on vacation if this results in getting discounts. This is mostly because it makes their trip cheaper and because acting sustainable feels good. Therefore, discounts will be added through partnerships with sustainable companies such as restaurants. A majority of 72% prefers renting over buying, because it would ultimately be cheaper as they would not use it on all vacations. Besides, they find it to be more eco-friendly. Of these participants, 44% wants to pay 3-5 euros per day (Figure 2.2a). The remaining 28% prefers buying since it is cheaper on the long term. The prices that people are willing to pay for the product are varied as shown in (Figure 2.3b)



Figure 2.2: Survey results

Because of these results, it was initially decided to rent the product for €3,99 per day. Unfortunately, the company would be unable to break even in a reasonable amount of time at a price of €3.99 per day, thus it was eventually decided to rent the product for €6.99 per day. Customers will be able to rent EcoExplorer at various locations throughout the cities, as 74% of participants preferred this.

The results of the participants calling themselves “travel enthusiasts” have also been analysed separately since these are people that might use our product most often. Their answers show they want to rent the product. Besides, it is noticeable that they are willing to spend more money on the product.

Later on, a second round of user involvement was done by creating a new survey. The goal of this survey was to validate our decisions based on the previous user evaluation. These questions were about the booths through Amsterdam, the renting price, discounts, having no phone limit, the cities, the location of advertisements, and the use of social media. All interview questions can be found in Appendix B. This survey got 20 responses within the age range from 18 to 65. All participants respond positively about renting the device at the booths. They think this makes the renting process easy and quick. Another reason is that it makes it possible to rent the product from multiple locations and thus different starting points are possible. Lastly, some consider having our own booths is better since it makes EcoExplorer independent from other companies.

Of the participants, 65% mentioned that they would rent the product when the price is €3.99. Moreover, all participants would use the discounts that they can earn by acting sustainable. Fifteen percent even mention that they feel forced to use the discounts. However, this would work positive, since this means that they will go to a sustainable company to use their discount.

Furthermore, it was decided to add a deposit, so customers are more likely to return the device in good condition. Luckily, 85% of the participants do not think this is a problem and would still rent the product. All participants also agreed with not adding a time limit on their phones. Moreover, all participants think expanding our market in the future by renting EcoExplorer in other cities would be nice. This way, they can explore more cities in a fun and sustainable way.



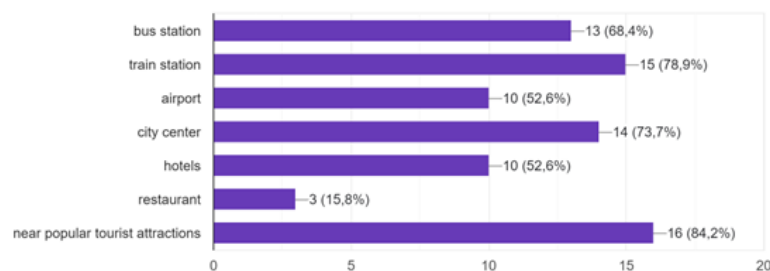
(a) Where users want to get EcoExplorer.

(b) Price for buying EcoExplorer

Figure 2.3: Results regarding the place and price.

A staggering 94.7% of the participants would want to use EcoExplorer in big cities. Less than half of the participants would want to use it in smaller cities, and 26.3% would want to have it only for capitals or also in villages (Figure 2.3a).

Furthermore, it was questioned where people would want to see advertisements for it as tourists in Amsterdam (Figure 2.3b). From the results, it is clear that people want to see it near popular tourist attractions since they are already there for sightseeing. Other most answered options are at the train station, city center, and bus station. These places are convenient places for tourists as they will arrive there from traveling from another city, and because it is a location they will often pass by.

**Figure 2.4:** Where people would like to see advertisements.

Lastly, it was asked on which platforms people would like to see updates about EcoExplorer or other information (Figure 2.4). As Instagram and TikTok were already created, other possible platforms for future endeavors were asked if the current platforms were found to be successful.

2.5 | Conclusion and Future Outlook

Based on the received feedback, there was decided to first launch EcoExplorer in Amsterdam instead of Eindhoven. This decision was made, as Amsterdam has more yearly visitors, which results in more possible customers and thus better market opportunities. The following step involved determining whether the user evaluation results were economically feasible. Based on the user evaluation, it was found that renting the product for €3.99 per day is most sought after among the potential customers. To validate whether this is feasible, break even calculations have to be made. Those calculations will also be used to determine the amount of booths and advertisements that can be placed throughout Amsterdam. Based on these results, Instagram posts providing information about EcoExplorer were shared, which would attract possible future customers.

3 | SWOT analysis

3.1 | SWOT analysis - Product

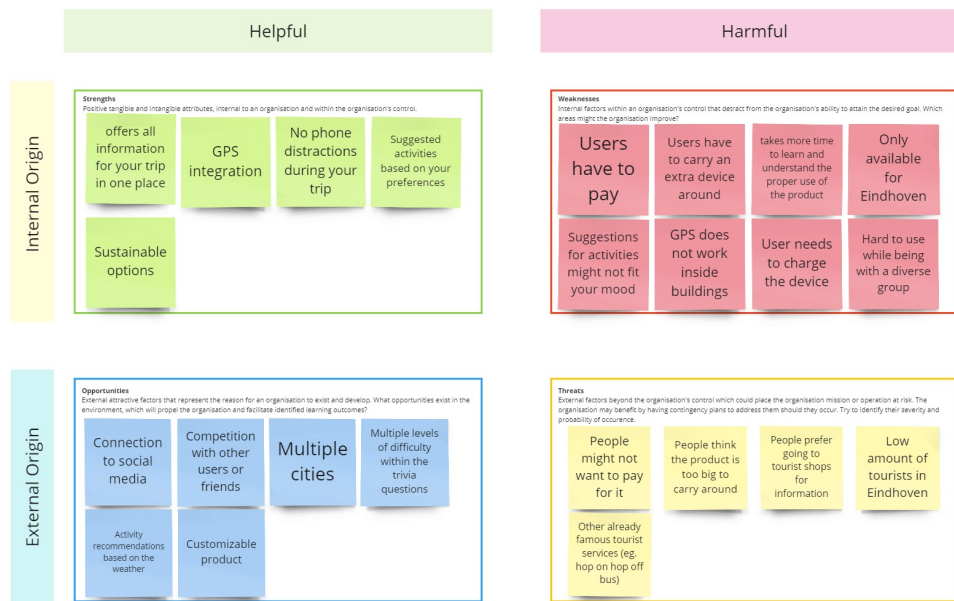


Figure 3.1: SWOT analysis on product

A swot analysis based on the product itself (Figure 3.2) was created by analyzing the user involvement throughout the USE courses. The strengths of the product are related to its functions such as GPS integration, having no phone distractions, and getting sustainable options. From user interviews was found that the biggest weakness was that users have to pay for the product. At the same time, the competitor Google Maps is available for free which is a threat. Another recurring weakness was that users have to carry an extra device around next to their phone. Besides, it is only available in Amsterdam. However, expanding this to more cities and countries is an opportunity for the future. Another opportunity is to add an element of competition with friends or other users. This way, sustainable behaviour could be encouraged even more.

3.2 | Confrontation Matrix - Product

		Opportunities				Threats			
		O1	O2	O3	O4	T1	T2	T3	T4
Strengths	S1	+	+	+	0	0	0	0	0
	S2	--	0	++	0	0	0	0	0
	S3	++	++	0	0	0	0	0	0
	S4	0	0	+	0	0	0	0	0
Weaknesses	W1	0	-	+	0	--	-	0	0
	W2	0	+	0	-	0	0	0	0
	W3	0	0	0	0	0	0	0	0
	W4		0	0	0	0	0	-	---

Figure 3.2: Confrontation Matrix on product

Afterward, a confrontation matrix (Figure 3.2) was created with the four most important aspects of the strengths, weaknesses, opportunities, and threats from the SWOT analysis (Figure 3.3). For each combination a '+' was given for a strong positive relation, a '-' for a negative relation, 0 in case there was no relation, a '--' for a strong negative relation, and a '-' for a negative relation.

There is no relation found between the threats and strengths since all threats are about people not wanting to use the product. In that case, there will not be any strengths. The threats in combination with the weaknesses highlight the issue of the device only working in Amsterdam. Therefore, a possible solution is

O1	Connection to social media
O2	Competition with other users or friends
O3	Recommendations based on the weather
O4	Customizable product
T1	Low amount of tourists in Eindhoven
T2	People might not want to pay for the product
T3	People might choose for more famous travel products
T4	People think the product is too big to carry around
S1	GPS integration
S2	No phone distractions during the trip
S3	Sustainable options
S4	Suggested activities based on your preferences
W1	Only available in Eindhoven
W2	Hard to use while being with a diverse group
W3	GPS does not work inside buildings
W4	Users have to carry an extra device around

Figure 3.3: Explanations opportunities, threats, strengths and weaknesses of the confrontation matrix on the product

to expand this in the future to more cities. Another negative aspect that arises is that an extra device is inconvenient to carry around. To solve this issue, the device should be able to “replace” the phone, in a way that people can keep their phone in their pocket or backpack. Comparing the strengths with opportunities, positive perspectives are found. For example, adding a connection to social media or competition with other users to encourage sustainable behaviour even more.

3.3 | SWOT analysis - Position in the market

A SWOT analysis of the market position was also created which can be seen in **Figure 3.4**.

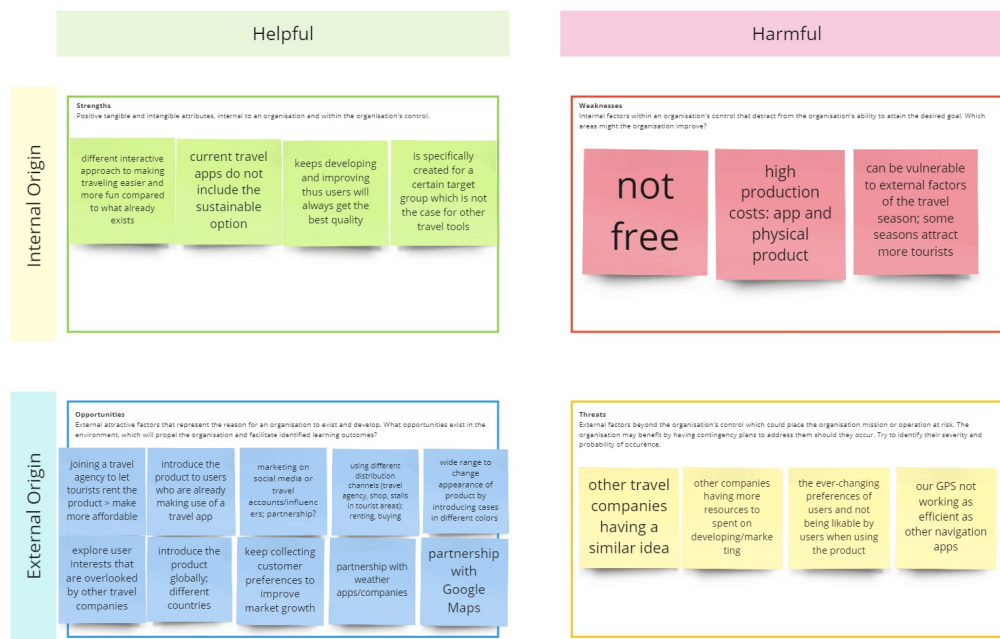


Figure 3.4: SWOT analysis on position in the market.

The strengths revolve around how our product differs from other services on the market. EcoExplorer focuses on interaction and sustainability, which have not been merged in previous travel apps. Because this product is utilized for travel, one weakness that must be considered is that there will be fewer customers outside of peak travel season. Since the product is not free like other travel apps, it is critical to attract consumers by making it more affordable, efficient, and user-friendly. Building partnerships and making the product rentable can be a game-changer for the product's success. The biggest threats emerge from the market competition, which must be properly examined. Threats to

user satisfaction and product efficiency can be mitigated by continually attempting to improve the product.

3.4 | Confrontation Matrix - Position in the market

Based on the most important aspects of the SWOT analysis (Figure 3.6), a confrontation matrix was made which can be seen in Figure 3.5.

		Opportunities				Threats			
		O1	O2	O3	O4	T1	T2	T3	T4
Strengths	S1	0	0	+	0	-	0	0	0
	S2	++	0	0	0	0	-	0	--
	S3	0	+	+	+	+	0	++	+
	S4	+	0	++	+	0	0	+	0
Weaknesses	W1	-	0	0	0	0	0	0	0
	W2	++	+	0	-	0	--	0	--
	W3	-	0	0	0	0	-	0	0
	W4	0	0	0	0	0	--	0	0

Figure 3.5: Confrontation Matrix on position in the market.

O1	join travel agency to make it rentable
O2	partnership with Google maps/weather apps
O3	explore overlooked interests/preferences for improvement
O4	customizable colors
T1	other companies having similar idea
T2	other companies have more resources
T3	preferences can change thus product does not fit interest
T4	not most efficient GPS
S1	different interactive approach
S2	sustainable option
S3	keeps developing and improving -> best quality
S4	created for a specific target group
W1	Not free/expensive
W2	high production cost
W3	vulnerable to external factors such as travel season
W4	Not globally available

Figure 3.6: Explanations opportunities, threats, strengths and weaknesses of the confrontation matrix on the product

Opportunities and strengths are linked in that making EcoExplorer rentable will boost its appeal to students. Additionally, reusing each device enhances sustainability. Continuous evaluation and improvement are key to maintaining interest. Efficient GPS is crucial for EcoExplorer's success and sustainable travel, making smooth navigation essential. Staying unique requires monitoring competitors, as they can outperform the company. To maintain market position, it is vital to identify and address development areas by observing existing products. Regarding opportunities and weaknesses, forming partnerships can reduce costs, making the product more affordable and efficient. Collaborating with companies that have production and marketing resources will drive success. Entrusting these tasks to experts allows focus on unique challenges. By combining threats and weaknesses, companies with more resources can better manage high production costs. Forming strong partnerships is essential for overcoming this, as a start-up lacks the necessary resources for success.

4 | Market introduction strategy

4.1 | STP market analysis

With the product being complete, it is time to define the specific consumers who will be interested in the product. An STP market analysis, which consists of segmentation, targeting, and positioning of the product, requires that all possible customers for the product are divided into subgroups (segmentation), from where one or two groups are chosen (targeting). With the chosen subgroup, the goal becomes how to present the product effectively to that specific audience (positioning). An STP analysis will always be useful, since it will be tailored to specific groups that are interested in EcoExplorer, maximizing the possibility of sales. In this chapter, the three steps of the STP market analysis will be further explored.

4.2 | Segmentation

A good first step in defining your market is dividing all possible customers into TAM, SAM, and SOM. A figure is provided below to give a more detailed explanation of each segment.

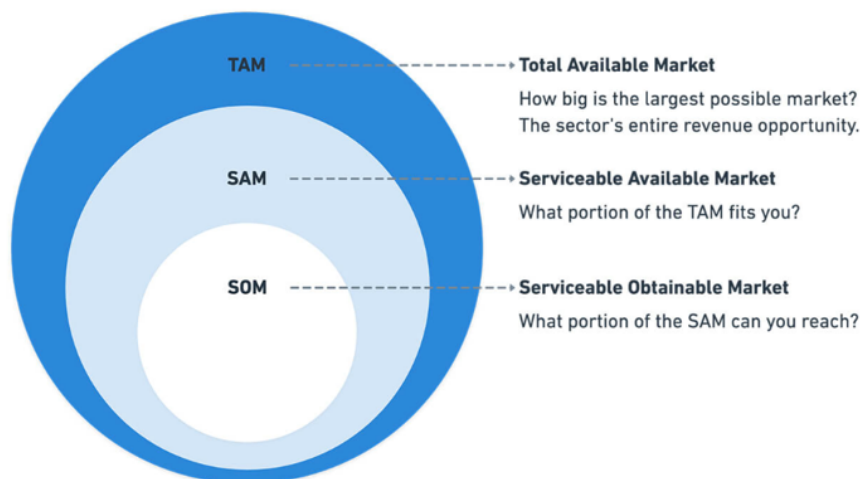


Figure 4.1: Segmentation components, <https://www.yieldify.com/blog/stp-marketing-model/>

The TAM will be the largest possible market, this will simply consist of all tourists. Since EcoExplorer will only be available in Amsterdam, it is unlikely that all tourists will come into contact with the product, so a more specific audience must be defined. The SAM is the portion of the TAM that fits EcoExplorer, which will then be all tourists who will be visiting Amsterdam in the future. To get even more specific, the SOM will then be tourists who will be visiting Amsterdam and will also explore the city a lot. The SOM category has the highest chance of coming across EcoExplorer sooner or later. Once the SOM is defined, it is time to segment the target audience. It was decided to do this mostly based on age, since other means of segmentation, like country, occupation, or opinion segmentation did not seem to affect the targeting process.

4.3 | Targeting

With the segmentation method being age, specific age groups must be chosen to whom the product is tailored. The following age segments were chosen based on age groups.

1. 12-17
2. 18-24
3. 25-34
4. 35-65
5. 65+

EcoExplorer will always be marketed to a younger audience who are more experienced with electronic devices. The transition to EcoExplorer will then always be more natural, so the first three age groups were chosen as targets. With these age groups, 5 personas could be created that serve as ideal customer types.

- 1- People of the age of 12-17 or 18-24 who are not from The Netherlands and are on a trip with friends. This group of friends will wander around the city but will question themselves on what to do.
- 2- People of the age of 25-34 who are not from The Netherlands and are on a business trip with a little extra time on their hands. They are looking for something to do.
- 3- People of the age of 18-24 who are travel bloggers and not from The Netherlands. They are looking for quick ways to find the best activities to write about.
- 4- People of the age of 18-24 who are questioning their carbon footprint and are looking for environment-friendly activities or establishments.
- 5- Parents of the age of 25-34 who did not plan for their trip to Eindhoven and are looking for activities.

These personas are only concepts and need to be refined in the next paragraph. Only one persona will be given in the main text, the rest will appear in [Appendix A](#).

4.4 | Personas

1. Blake Wright



Figure 4.2: Blake Wright

Blake Wright (left) is a 17-year-old male from England, seen here with his group of pals. Every year they go on summer vacation to a new place. For this year, it was time to visit Amsterdam. After looking around the most popular tourist spots of the city, they realize that they still have some time left before going back. They see EcoExplorer as a method to see the more niche locations of Amsterdam and they also see being sustainable as a nice bonus.

4.5 | Positioning

After choosing the 5 personas that EcoExplorer is tailored towards, it is necessary to explore the possibilities of how EcoExplorer is presented to the target audience. EcoExplorer will consist of functional and benefit-based positioning, where customers will buy the product, which will be of benefit to them in the form of exploring sustainable places. EcoExplorer has gained more and more distinctions from competitions over the last few quartiles. Countering distractions from your phone, giving more under-the-radar recommendations and the point system which will give discounts are new bonuses that other apps such as Google Maps and TripAdvisor do not have. From the user survey in subsection 2.4, it was concluded that it was for the best to rent out the EcoExplorer device for 3.99 euros per day, because 72 percent of all survey participants preferred renting and the majority preferred renting it for three to five euros. This should be a low investment for the customer, while the owners of EcoExplorer can gain profit in a couple of months.

EcoExplorer will be advertised on abris across Amsterdam. These ads are located at bus and tram stations and will be seen by tourists traveling around the city. There are a total of 1350 stations across Amsterdam and from a travel study in Utrecht [10], it was discovered that 75 percent preferred tram stations and 25 percent preferred using bus stations. If 5 percent of all stations will include EcoExplorer ads, this will mean that 51 tram and 17 bus stations will include abri's with EcoExplorer advertisements. The costs of these advertisements will be later explained in subsection 6.2.

4.6 | Customer Experience

A customer experience describing the users' experience before and after purchasing our product was also created. These mappings are made by validating the user perspectives from prior interviews. Validating the experience ensured that all processes were clear, generating a user-friendly product. The customer experience can be seen as follows in Figure 4.3:

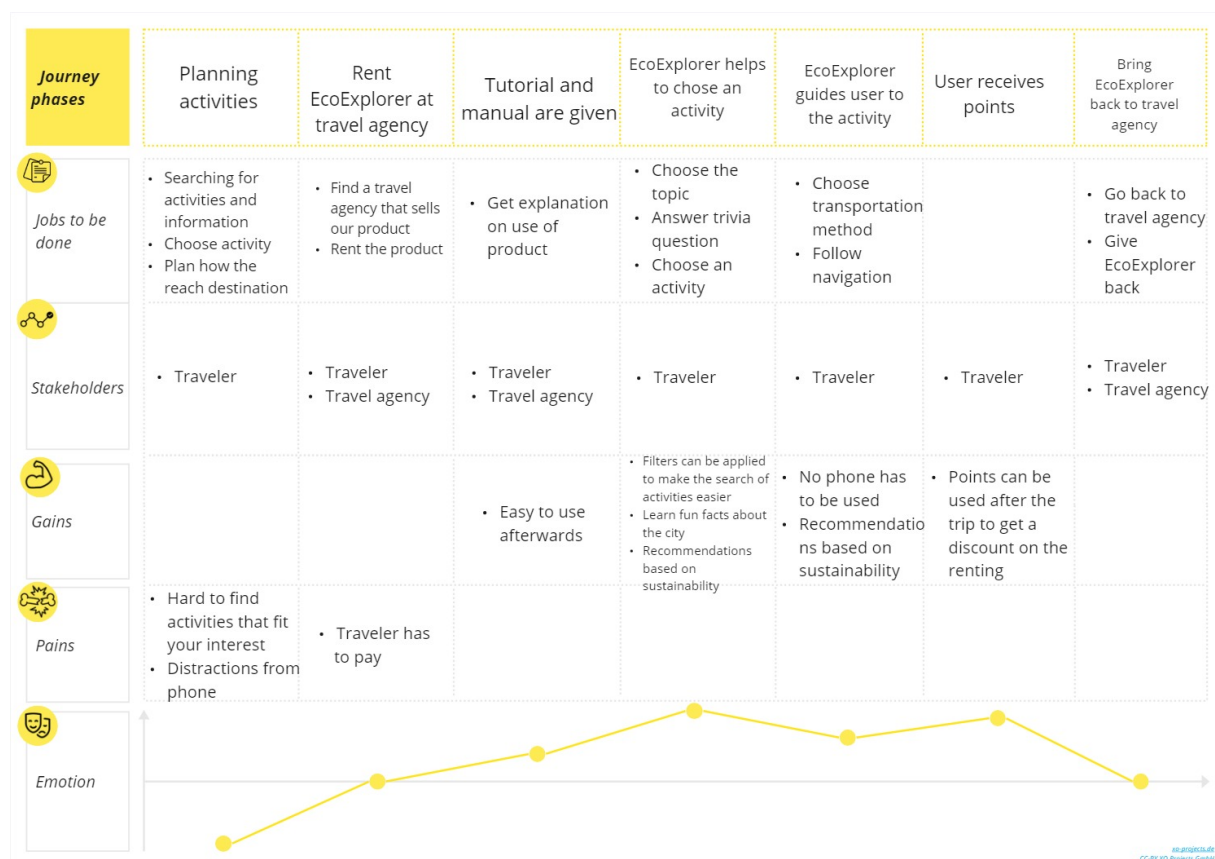


Figure 4.3: Customer Experience

5 | Branding of EcoExplorer

For EcoExplorer's success in the business, branding needs to be established. Users need to know what our brand and vision is, so they will recognize it everywhere they go.

To create a recognizable branding, a mascot (Figure 5.1) is designed to create an emotional connection. It has been decided to choose a koala since this is one of the animals connected to traveling [5]. To connect the mascot to the theme of our product, namely discovering new cities, a backpack and hat have been added. It was chosen to use the color green since this is associated with sustainability [8]. The mascot will be used on social media channels and advertisements throughout the city so people will start recognizing it after a while.



Figure 5.1: Mascot of EcoExplorer

To convey our vision to our target group the social media platforms TikTok (Figure 5.3) and Instagram (Figure 5.2) are used. Instagram is used in a more formal way by explaining the concept of EcoExplorer, while TikTok is used in a more engaging and fun way to attract customers. To reach our target group via Instagram posts, there has been used hashtags in the captions related to our product, such as traveling, sustainability, and vacation. This ensures, we more likely end up on the feed of travel enthusiasts. Moreover, a business account was opened that focuses specifically on the tourist sector, so people who are interested in tourism will get our posts on their feeds.

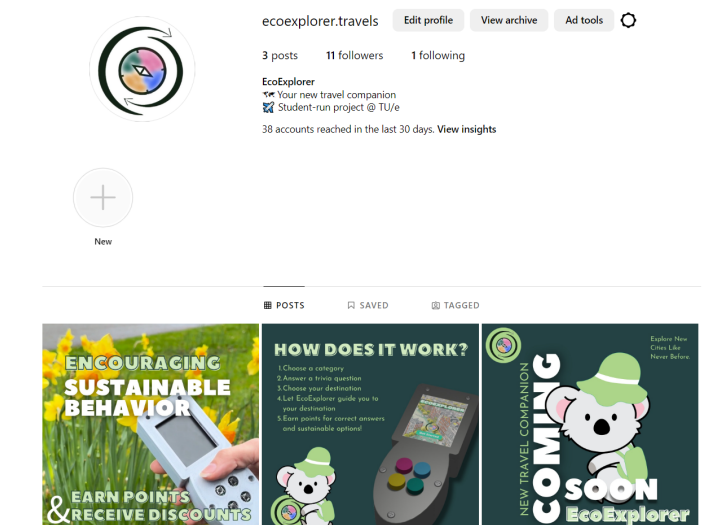


Figure 5.2: Instagram page of EcoExplorer

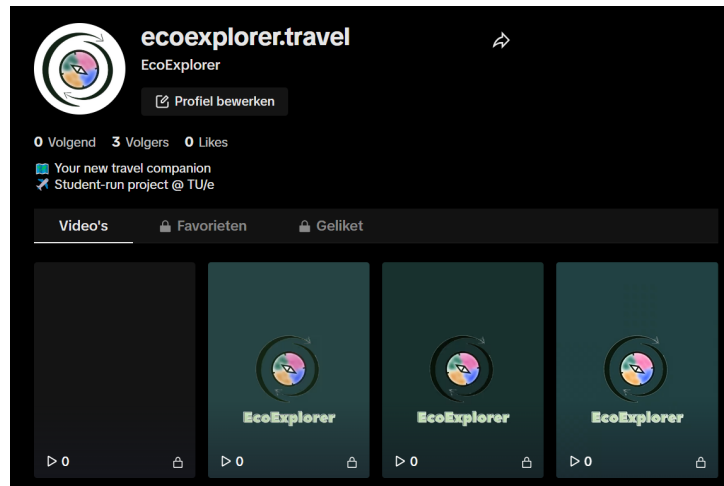


Figure 5.3: TikTok page of EcoExplorer

The TikTok includes catchy phrases about our product. Some of the slogans used in the videos are "Let EcoExplorer be your sports buddy, showing you the way to exciting activities with a sustainable twist.", "Say goodbye to the constant buzzing and beeping of your phone, EcoExplorer is your new travel companion.", and "This is how you roll to your destination with EcoExplorer.". The TikToks are made based on current trends on the platform. For now, Brazilian marketing strategies that start with a funny accident and transition to our footage are used.

Moreover, the TikToks will not only be made by the company employees but also by the users themselves. This will lead to the users feeling more heard about their thoughts and preferences. This will also make the users of EcoExplorer feel part of a community.

For viewing a compilation of the TikToks see <https://youtube.com/shorts/YVtPjtq0k8s?feature=share>

6 | Lean (Business) Model Canvas

6.1 | How to earn money with EcoExplorer

The primary income will be from renting out EcoExplorer devices at key tourist locations across Amsterdam. Customers can rent the device daily, allowing them to explore the city with GPS navigation and educational trivia questions. In addition to daily rentals, the subscription model will be introduced. Subscribers will pay a monthly or annual fee to access EcoExplorer devices at a discounted rate, catering to frequent travelers and locals who wish to regularly explore eco-friendly destinations. This model provides a steady income and encourages repeated use of the product. Furthermore, the point-based reward system not only improves user engagement but also opens up opportunities for partnerships and sponsorships. Users can earn points by correctly answering trivia questions, which can be redeemed for rewards such as discounts for the next time they rent EcoExplorer or at local sustainable businesses. These partnerships can provide additional revenue, for a small fee the local eco-friendly businesses will be promoted on the device, driving business to our partners while providing value to our customers.

6.2 | Initial Investment

The initial investment includes device manufacturing, marketing, operational expenses, permits, staffing, transportation, and insurance. The exact amount depends on the scale and the scope of the launch.

6.2.1 | Chamber of Commerce Registration Fee

To legally operate a business in the Netherlands, EcoExplorer must register with the Chamber of Commerce (Kamer van Koophandel). The registration fee is a one-time payment of €80.10. Registering with the Chamber of Commerce is mandatory for all businesses in the Netherlands. This process ensures that the company's information is properly documented and accessible to relevant authorities and potential customers or partners [1]. It's important to note that while the registration fee is a one-time expense, businesses are required to keep their information up-to-date with the Chamber of Commerce. Any changes in the company's details, such as address or ownership, must be reported and updated accordingly. However, these updates do not come with any additional fees.

6.2.2 | Manufacturing

The manufacturing of the devices is a significant part of the budget. Initially, only 150 devices will be produced, since it was decided by the EcoExplorer team to start small and scale gradually. The pros of starting small include reduced risk with a lower initial investment, additionally it is easier to manage and maintain quality control. Furthermore, starting small enables the company to quickly adapt and respond to feedback and operational challenges, test market response, gather customer feedback, and make necessary adjustments. The devices include electronics such as a battery, GPS module, DC-DC converter, LCD display, buttons, and a micro-controller. The price to manufacture one device is €27.96, as seen in the bill of materials table. Therefore, the total manufacturing costs for 150 devices is €4,194.

6.2.3 | Marketing

Effective marketing strategies are important for promoting EcoExplorer and generating interest among potential customers. To ensure a successful launch and maintain a steady flow of customers, a dedicated marketing budget is necessary. The money will be used to create promotional materials and for digital marketing campaigns tailored to the target audience. The extensive public transportation system in Amsterdam presents a valuable opportunity for advertising. The city has a total of 850 bus stops and 500 tram stops, each equipped with digital displays for advertising called "abri's". With these abri's, EcoExplorer can reach a broad audience and attract potential customers. The cost of occupying a single abri is €85 per week and a two-month campaign, spanning the summer vacation, would amount to €680 per abri. To achieve optimal exposure, EcoExplorer aims to occupy 5% of all abri's in Amsterdam, which translates to 51 tram stops and 17 bus stops. By investing in this advertising strategy, EcoExplorer can effectively promote its eco-friendly rental service to commuters and pedestrians throughout the city. The total cost for occupying these 68 abri's during the summer vacation period is €46,240.



Figure 6.1: Abri in Amsterdam [3]

6.2.4 | Permits

Additionally, the operational expenses for the rental distribution points must be considered. This includes the cost of obtaining permits to operate rental booths throughout the city. There are two types of permits for selling items on the street, namely the pedlars and pitch licences. The pedlar's licence is required to sell products on the street and from door to door, meaning that the seller does not have a set location. This permit is inexpensive, at €22.50, but it has several significant limitations: it is not permitted to sell in certain areas, including the city centre, and it is not allowed to sell on Sundays. A pitch licence is required to sell from a booth or stand in public locations. This permit allows one to sell anywhere in the city as long as no harm or danger is caused to others; however, it is not permitted to sell at markets or events, for that street market licence is needed. The pitch licence can be obtained permanently, for a season (a few weeks) or incidentally (every now and then). Because of the constraints of the pedlar's licence, the pitch licence is better suitable for renting out the EcoExplorer and costs €182.60. [2]

6.2.5 | Staffing

To give the most amount of people the chance to rent an Eco explorer device, there will be 3 booths placed throughout Amsterdam at strategic locations like Central Station, Schiphol, popular districts (e.g., Jordaan, de Pijp), and main squares (e.g., Dam Square, Leidseplein). To ensure that customers will always have a staff member to talk to, each booth will be managed by two employees. This way, if one of the employees needs to use the restroom, there is still someone protecting the booth and devices, and potential customers have someone to turn to. Staffing the booths with knowledgeable and friendly personnel is important to ensure good customer service. To reduce the total cost, the company will focus on hiring students who live in Amsterdam. Since these students live in Amsterdam, they are familiar with the area, and because they are students, they are relatively inexpensive. The minimum wage for anyone over the age of 21 is currently €13.27 per hour. However, according to Nagaraju, B. and Pooja, J., the performance of employees increases with a slightly higher salary [6]; therefore, instead of €13.27, the employees will be paid €15 per hour. Ultimately, the total cost for six employees is approximately €15,653 per month.

Additionally, the team that founded EcoExplorer will also receive a salary. The team will work part-time, for 15 hours per week, since the team consists of students who also want to have time to focus on studying. Just like the employees, the team will earn €15 per hour. Since a month consists of approximately 4.35 weeks, the monthly expense for the salary of the team will be approximately €4,892.

6.2.6 | Insurance

Having good insurance coverage is crucial for any company looking to reduce potential risks, liabilities, and financial losses. EcoExplorer relies on insurance to protect against damage, theft and liability resulting from bodily injuries or property damage, all while offering consumers a safe way to explore Amsterdam. To address these concerns, EcoExplorer requires three types of insurance: Commercial Property Insurance, Inland Marine Insurance, and General Liability Insurance, which will be discussed further.

Commercial Property Insurance

Commercial Property Insurance covers the physical assets, such as the rental booths and devices, against

risks like fire, theft, vandalism, and certain types of damage. EcoExplorer needs this insurance to protect the booths and devices stored at the rental locations from unexpected incidents that could result in damage or loss. The estimated cost for Commercial Property Insurance is €500-€1500 per year.

Inland Marine Insurance

Inland Marine Insurance covers items that are frequently moved or transported. For EcoExplorer, this insurance is necessary as the devices will be rented out and used by customers all over Amsterdam, making them susceptible to damage and theft while away from the rental locations. The estimated cost for Inland Marine Insurance is €1000-€2000 per year.

General Liability Insurance

General Liability Insurance covers legal liabilities resulting from bodily injuries or property damage. EcoExplorer needs this insurance to cover potential lawsuits if a customer is injured while using one of the devices, such as if a device malfunctions and causes harm. It also protects against claims and legal fees if a device unintentionally damages someone's property. The estimated cost for General Liability Insurance is €500-€1500 per year.

The estimated total cost for these three insurance types is €3500 per year.

6.2.7 | Buffer

Launching a new company often comes with unexpected expenses and unforeseen challenges, such as delays in device manufacturing or unexpected legal or regulatory requirements. To reduce the risks associated with such uncertainties, it is important for startups to incorporate a buffer into their initial investment. By including a buffer in the initial investment calculation, startups can enhance their chances of success. [4]

According to the U.S. Small Business Administration (SBA), experts suggest setting aside a buffer equal to at least 20% of the total startup costs [9]. Similarly, an article published on Entrepreneur.com advises that, as a rule of thumb, buffers should be around 10 to 20 percent of the total startup costs [7]. Therefore, a buffer of 20% will be incorporated into the initial investment calculation.

6.2.8 | Information gathering

To gather information for the EcoExplorer device, Dutch ecology students will perform volunteer work on the sustainability of the different places in Amsterdam. This is to avoid using the costs of API calls from Google or TripAdvisor. The information gathering will consist of photos of the places, writing reviews, and a full sustainability analysis. The work that the students will do is voluntary and so no costs will be included here.

6.2.9 | Total

The total initial investment required for the launch of EcoExplorer includes registration fees, manufacturing costs, marketing budget, permits, salaries, and insurance. The detailed breakdown of these costs can be found in [Table 6.1](#). To ensure a successful launch and to be prepared for the summer holiday, which is anticipated to be the busiest period for EcoExplorer, the marketing budget, salaries for both the company's founders and personnel, and insurance have been calculated for an initial two-month period.

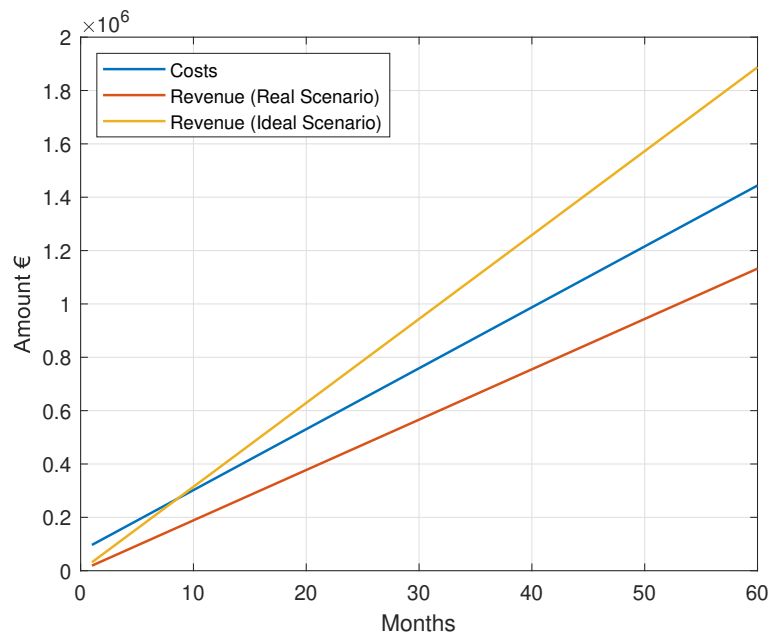
7 | Break even calculations

The break-even analysis was done using MATLAB, where a graph was created showing the amount in Euros against the number of months (see [Figure 7.1](#)). The graph includes three lines: one representing the costs and two representing the revenue in both ideal and real scenarios. In the ideal scenario, all 150 devices are rented out every single day, while in the real scenario, only 60% of the devices are rented out daily. The graph shows that in the ideal scenario, the company would break even after approximately nine months. However, in the real scenario, the costs increase faster than the revenue, therefore the company would never break even.

To address this issue and to encourage EcoExplorer to grow beyond Amsterdam, the company will add 150 devices each year across various cities, such as Utrecht, Den Haag, and Leiden. These extra devices come with additional costs for manufacturing, insurance, and staffing new booths. For every 150 devices, three

Table 6.1: Initial investment

Category	Cost
Chamber of Commerce Registration Fee	€80.10
Manufacturing	€4194
Marketing (2 months)	€46,240
Permit	€182.60
Salary EcoExplorer Team (2 months)	€9,784
Staffing (2 months)	€31,307
Insurance (2 months)	€583.33
Buffer (20%)	€22,648.21
Total	€115,019.24

**Figure 7.1:** Break-even Analysis

booths will be set up, each staffed with two employees, as detailed in [subsubsection 6.2.5](#). The break-even analysis (see [Figure 7.2a](#)) shows that in the ideal scenario, the company would break even after just nine months. While this is very ambitious, it does showcase the potential of EcoExplorer. Additionally, in the real scenario, a break-even would be achieved after 55 months or approximately 4.5 years. Note that by that time EcoExplorer would have expanded four times into various cities. [Figure 7.2b](#) shows the net profit and loss over the initial eight years (96 months). The graph shows that, in the realistic scenario, EcoExplorer will face its maximum deficit of approximately €130,000 two years from launch, which is just €15,000 below the initial investment. However, after the initial two years, the curve begins to go upwards, indicating a gradual reduction in losses. This graph also shows that EcoExplorer will break even after approximately 4.5 years. From this point onwards, the company will generate profit. By the end of the eight-year period, EcoExplorer is expected to achieve a considerable profit of half a million euros.

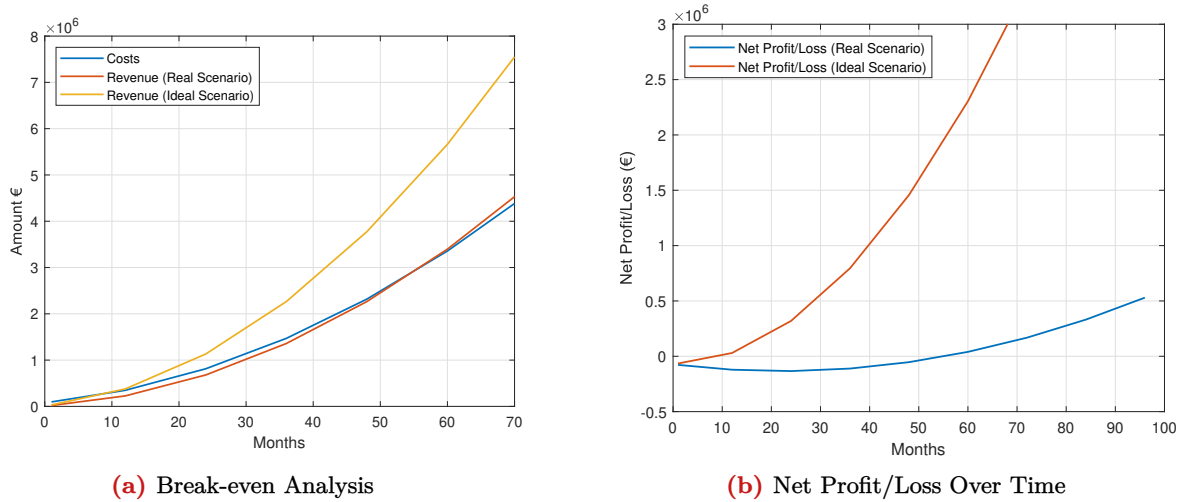


Figure 7.2: Financial Analysis Graphs

8 | Concept Product

8.1 | Introduction

This section showcases the concept product, focusing on improvements made to transform the MVP into a market-ready product. It covers the final design, including 3D models, the Bill of Materials (BoM), manufacturing methods, and animations to demonstrate the product's functionality and readiness for sale.

8.2 | Improvements from MVP to Sellable Product

One of the major drawbacks of the original MVP was its cost. The group was able to manufacture the working prototype at a cost of 62.96 € per unit.

This high per-unit cost posed a significant challenge, as it limited the ability to produce and distribute the product at a scale that would be commercially viable. Additionally, the cost was higher than what most users indicated they would be willing to pay, according to the user interviews discussed earlier.

To address this issue, the group explored alternative components, buying products in bulk, and utilizing different manufacturing processes.

8.2.1 | Alternative Components

When looking at [Table A.1](#), one can see that the majority of the cost of the MVP is attributed to the Raspberry Pi Zero W, the GPS Module, and the LCD Display. Fortunately, the GPS Module becomes significantly cheaper when purchased in bulk quantities, which will be discussed in the next section. However, this cost reduction does not apply to the Raspberry Pi Zero W and the LCD Display.

Therefore, the group considered alternative components for the EcoExplorer, such as switching from a microcomputer like the Raspberry Pi to a micro-controller like the ESP32. The ESP32 is designed for more specific, typically simpler tasks, making it significantly cheaper, which is perfect for our use case.

Secondly, an alternative LCD screen could be selected. The prototype's LCD screen was chosen primarily for its short shipping time. However, a Module Ili9341 2.4 inch LCD Display, with an identical size and resolution to the current Waveshare 2.4 inch display has a considerably lower cost, thus it will be selected for the final EcoExplorer product.

8.2.2 | Buying in Bulk

One of the best ways to help decrease our cost per unit as a starting company is to buy in bulk.

Although purchasing a large quantity of components requires a higher initial investment, the group has determined that the significant cost savings outweigh the temporary strain on the cash flow.

All components were purchased in quantities of 150, which was explained earlier in the report. This brought down the price dramatically for some components. Specifically regarding the ESP32 and the GPS module, where the price went from 10 € per unit to 3.48 € and 13.5 € to 2.25 € euros per unit respectively.

The finalized Bill of Materials (BOM) is displayed in [Table 8.2](#), detailing both the price per unit and the average cost of each component when purchasing 150 units.

8.2.3 | Manufacturing Methods

The second way the group considered possibly reducing the price of manufacturing the EcoExplorer was to research other types of manufacturing processes. The MVP is currently 3D printed in PLA (Polylactic acid). While 3D printing in PLA (Polylactic acid) offers benefits such as environmental friendliness, low startup costs, and rapid prototyping capabilities, it also presents drawbacks. These drawbacks include the relatively slow production speed and the challenges associated with automation. Thus, the group decided to research other production methods that could potentially be used to manufacture the EcoExplorer.

Manufacturing processes for plastic-based consumer electronics commonly fall into two categories: molding and additive manufacturing. Molding contains processes like injection, compression, and blowing, whereas additive contains 3D printing, laser sintering, and vat photopolymerization. Given the complex shape and budget constraints of the EcoExplorer, the group opted to explore injection molding and 3D printing. This decision was made after eliminating other processes, as they were deemed less suitable based on these requirements.

As described earlier, for an initial product launch, the group would like to aim for 150 EcoExplorer units. This unit size highly determines the type of manufacturing process. A basic overview of the pros and cons of injection molding and 3D printing can be shown in [Table A.2](#).

Ultimately by looking at the table, it seems like the best option would be injection molding, however, the group believed that it would be an even better idea to get a quote for the injection molding process, to see if it makes sense.

Using Protolabs, a company specializing in creating prototypes and low-volume parts fast through various manufacturing processes, the group was able to receive a quote for injection molding.

The initial quote for the mold itself is 6295 €, with an additional price of €13.88 per unit. With 150 units, the total cost comes out to 8377 €. For 3D Printing, however, it is a field cost of 1.36 € per unit, so 204 € to manufacture 150 EcoExplorers. A more visual comparison of the price difference can be shown in [Table ??](#).

Due to the low quantity of units, it is clear that 3D printing is definitely a much more viable manufacturing process in order to test our product in the market without having to invest too much money in the process. The group however would eventually consider switching to injection molding when wanting to manufacture a much larger volume of EcoExplorers in a much quicker time period.

However, one question that may arise is whether 3D-printed PLA is of high enough quality for a product that is being sold. So, the group began researching other companies selling 3D printed products and came across a unique one, called Jointlocker.

Jointlocker is a company based in the USA that 3D prints a holder lighter and a joint, shown below in [Figure 8.1](#).



Figure 8.1: Joint Lockers Product

Joint lockers have been extremely successful with their 3D printed products, and have sold out 4 times in Urban Outfitters stores, a clothing company based all over the world. Their success demonstrates that high-quality 3D-printed products can indeed meet consumer expectations and achieve significant market acceptance.

Thus, the group believes that 3D printing can provide a sufficiently high-quality product for initial market testing and limited release. The example of Jointlocker shows that with proper design and quality control, 3D-printed products can achieve commercial success and be well-received by customers.

In conclusion, starting with 3D printing allows the group to test the market and refine the product without a significant financial investment. Once the product has been validated and demand increases, switching to injection molding will enable more efficient large-scale production, ensuring that the EcoExplorers can be manufactured quickly and cost-effectively while maintaining high quality.

8.3 | Definition of Sellable Product

8.3.1 | Final Design and 3D Models



Figure 8.2: High Angle View

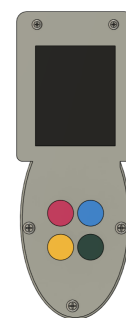


Figure 8.3: Top View

Figure 8.4: Final Rendered Views of The Eco Explorer

In comparing the EcoExplorer to the size and weight of an iPhone, the group aims to provide a familiar reference point for understanding its dimensions. Given the extensiveness of smartphones in modern society, using an iPhone as a comparison allows for easy visualization and comprehension.



Figure 8.5: Top View

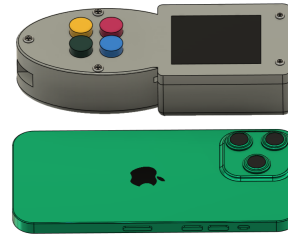


Figure 8.6: Side View

Figure 8.7: EcoExplorer vs iPhone 15 Pro Max Size Comparison

	EcoExplorer	iPhone 15 Pro Max
Weight (grams)	180	221
Height (mm)	154	160
Width (mm)	60	70
Depth (mm)	33.5	8.25

Table 8.1: Comparison of EcoExplorer and iPhone 15 Pro Max

As illustrated in Table 8.1, the EcoExplorer boasts a lighter weight and smaller dimensions for height and width compared to the iPhone 15 Pro Max. However, it is notably thicker than the iPhone. Despite this, the EcoExplorer remains conveniently portable, easily fitting into the palm of your hand or the pocket of your pants.

8.3.2 | Bill of Materials (BoM)

Table 8.2 displays the price to manufacture 1 unit when purchasing 150 units, as well as how that price is distributed among the components.

Table 8.2: Bill of Materials

Model	Cost (€)
ESP 32	3.48
GY-NEO6MV2 GPS Module	2.25
Module Ili9341 2.4 inch LCD Display	5.81
Li-Po Battery 2500 mAh	8.50
Sseed Studio Lipo Rider Plus	5.96
3D Printed PLA (71 g)	1.36
Breadboard Tactile Pushbuttons (x4)	0.60
Total	27.96

With a price reduction of 35 € or 55.61% per unit from the original MVP, the group is now able to increase profit margins and lower initial startup costs, which is crucial for the group as a new business. This reduction not only enhances affordability but also widens market accessibility, thereby encouraging sustainable growth and development.

8.3.3 | Product Animation

Blender, a 3D modeling and animation tool, was utilized to capture the functionalities of the EcoExplorer which were then compiled into a marketing pitch video. The final result of this can be seen in the final pitch presentation, however, some renderings of the images can be shown below. These images are included in the report to provide a clear visual representation of the EcoExplorer's design and functionality.



Figure 8.8: EcoExplorer Off



Figure 8.9: Color Options



Figure 8.10: GPS Functionality

Figure 8.11: Final Renderings Made With Blender to Showcase Product Functionalities

9 | Full Risk Analysis

To successfully create a business and avoid any pitfalls, risks should be identified which is done with a full risk analysis. This model will aid in identifying internal and external risks for EcoExplorer and the company. In this model, the various risks will be rated based on their certainty of happening, our impact, and the importance of the risks for the company's success. This will result in a final risk class of low, medium, or high.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Product Family & Brand Positioning risks	1. Product enhances potential of product family development	4	2	2	L
	2. Product provides opportunities for platform development	5	4	4	M
	3. Product's platform will be accepted by consumers	3	3	5	H

Figure 9.1: Risk category: Product Family and Brand positioning

The biggest risk from the risk category product family and brand positioning risks (Figure 9.1) is whether consumers will accept the product's platform. Currently, the product is only available in Amsterdam but it will expand in the future. It will be harder to make sure that customers around the world will accept it since their preferences might vary and interests can also change over time. To reduce this risk, surveys could be sent out every six months. Using this information, the product can be altered resulting in the best user experience possible.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Intellectual property Risks	1. Required external licenses or know-how known and available	4	5	5	L
	2. Relation to legal and patent rights of competitors known and arranged	1	5	4	H
	3. Relevant patent issues are understood	3	5	4	M
	4. Trade mark registration potential known and arranged	1	5	3	L

Figure 9.2: Risk category: Intellectual property risks

A high risk in the category of intellectual property risks (Figure 9.2) is the awareness of the legal and patent rights of competitors. At the moment, this risk is still high since it has not been looked into what is already owned by other companies. By doing research and contacting travel professionals, the company can learn more about what will negatively impact us and we can resolve any legal issues that might surface. If legal problems arise, the guidance of a legal advisor will be needed.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Supply chain & Sourcing risks	1. Capacity available to meet peak demands	5	5	4	L
	2. Contingency options available for each of the selected suppliers	1	4	3	M
	3. Required quantities will be produced against acceptable prices	4	4	5	L
	4. Appropriate contract arrangements with suppliers will be settled	4	5	5	L

Figure 9.3: Risk category: Supply chain and sourcing risks.

Most of the supply chain and sourcing risks (Figure 9.3) are low risks since they can be prevented by doing extensive research before choosing suppliers. There should be looked into which suppliers provide the best quality for the best price. Also, after deciding on a company, there should be made sure that appropriate contracts are drawn up to lower the risks of any problems in the future.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Consumer Acceptance Risks	1. Product specifications meeting consumer standards and demands	4	4	5	L
	2. Target consumer's attitudes will remain stable during the development period	2	1	3	M
	3. New product will be communicated successfully with target consumers	5	5	4	L
	4. Consumers will be convinced that they get value for money, compared to competitive products	4	4	5	L
	5. Product appeals to generally accepted values (e.g. nature, environment)	3	3	2	L
	6. Product will reduce consumer's costs, compared to competitive product	1	1	3	H
	7. Advertising will be effective	4	4	3	L

Figure 9.4: Risk category: Consumer acceptance risks

The biggest risk concerning the consumer acceptance risks (Figure 9.4) is that our product will not reduce the consumer's costs, compared to competitive products and services. Our main competitors, namely Google Maps and TripAdvisor, are both free. However, our product provides services that those companies do not have such as sustainability recommendations and trivia questions. By offering a product that focuses more on a personalized and fun journey, this risk will be lower.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Competitor Risks	1. Introduction of new product line will change existing market share positions	5	3	2	L
	2. Introduction of the new product will have impact on market prices	4	3	4	M
	3. New product enables the creation of potential barriers for competitor	4	4	3	L

Figure 9.5: Risk category: Competitor risk

The risks revolving around competitor risks (Figure 9.5) are not very big since the impact will not affect the market position immensely. The development in our company's product range will also not be very different from what is currently available. It will mostly have additional features to increase the user's experience but the main idea and vision will remain throughout the development. Thus, the market share position and impact will not be significant.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Commercial Viability Risks	1. New product is commercially viable in case of market restrictions	4	4	4	L
	2. Delays in product launch will leave the commercial viability of the new product untouched	4	3	3	L
	3. Sales projections for new product are realistic	3	3	5	H
	4. Estimated profit margin are based on convincing research data	4	4	3	M
	5. Profit margin will meet the company's standards	3	3	4	M
	6. Knowledge of pricing sensitivity is available				
	7. Long term market potential is to be expected	5	3	4	M
	8. Fall back to prior product concept is feasible	4	3	3	L

Figure 9.6: Risk category: Commercial viability risks

The major risk is that the sales projections might be unrealistic (Figure 9.6). It has been calculated when profit will be made but currently, it is only done using data from the summer season. Furthermore, the sales can be inaccurate due to the seasonal impact. This can be solved by looking into more tourist data on how often they rent something. Despite the data, there are still many aspects that have an influence on tourist sales, thus calculating the sales projections will have many risks.

Risk Category	Risk Statements	What is the level of certainty that the statement will be true?	Ability of team to influence course of actions within time and resource limits	Relative importance of statement for obtaining project success	Risk class
Organizational & Project Management Risks	1. Project goals and objectives are feasible	4	3	5	M
	2. Project team is sufficiently authorized and qualified for the project	3	4	4	M
	3. Project team will effectively utilize the knowledge and experience of (internal) experts	3	5	3	L
	4. Roles, tasks and responsibilities of all team members are defined and appropriate	1	5	4	H
	5. required money, time and (human) resources estimations are reliable and feasible	4	4	5	M
	7. Collaboration with external parties is effective	3	4	5	H
	8. Project has an effective planning and contingency planning	5	5	4	L

Figure 9.7: Risk category: organizational and project management risks

A big risk of the organizational and project management (**Figure 9.7**) is that there has not been paid enough attention to the organizational side of our company. The team should clearly divide tasks on who is responsible for what part. This way, the roles and tasks will be clear which will prevent disagreements and miscommunication. Moreover, another risk is that we are not sure whether a collaboration with external parties will be effective. To make this less risky, we should get in touch with those companies as soon as possible. To find the right companies that match our vision, we can use the students that we hire. They know the companies based in Amsterdam better, and will thus more likely find the right partnerships.

10 | Evaluation

All the expectations of the company responsible for selling EcoExplorer, introduced in [section 1](#) have been fully defined and further explored. EcoExplorer, a sustainable device that is meant to explore new areas and discover more niche locations, is met with a generally positive response from the target audience, which is mostly tourists, who are generally young adults. It was ultimately decided to rent out the EcoExplorer device, instead of selling it, since this fell for the most part in line with the expectations of the target audience for the product.

Strengths, weaknesses, opportunities, and threats have been identified by the company responsible for EcoExplorer. With this, some shortcomings of the device were still explored, such as the device only working in Amsterdam and EcoExplorer as a device being on your service together with your phone. Finally, a confrontation matrix was made to combine the strengths and weaknesses with the opportunities and threats. A lot of useful insights were presented here, including the points that would lead to the success of the product and the setup for some challenges lying ahead for the company, such as the total costs to ultimately sell the EcoExplorer product.

All possible users of the EcoExplorer product were segmented and the most likely groups to interact with EcoExplorer were targeted, which were mostly young adults who are on a trip and have some free time left. The product is positioned in such a way that the chance of interaction with these people is maximized. Ads are placed at bus or tram stops, which these tourists will most certainly come across. Lastly, customer experiences were noted down to track possible situations that the audience will have with EcoExplorer to further account for more improvements.

A business model was created to show the final vision for EcoExplorer, which went into the last questions that were still unanswered, such as why the product is unique and how to earn some money with it. A complete list of costs was also created to show the expenses it will take to fully launch EcoExplorer. All the things were considered here that were needed to create and sell the EcoExplorer devices. A further in-depth analysis of how these devices will be created is also mentioned. Buying in bulk, manufacturing methods, and the final physical design were all important aspects to consider during this process.

Finally, a risk analysis is provided, which will comment on certain negative consequences of the EcoExplorer device and how to negate them as much as possible. The risks will also show the scenarios where the EcoExplorer product could flop or flourish in the future.

Unfortunately, it was decided not to continue with the EcoExplorer product if the device were to be released. This decision is mainly based on two factors, which are the position in the market of EcoExplorer and profitability.

EcoExplorer, while being a fun niche, was decided to be not viable in today's market. Although distinctions were found in [subsection 4.5](#), objectively, it must be stated that companies such as Google and TripAdvisor are goliaths in their market fields right now. It is very unlikely that EcoExplorer while having its benefits, will be used before these other apps. This issue was already stated in the first stages of the project, but there was still a lot of faith that more aspects could be found that made EcoExplorer more unique. To improve the EcoExplorer idea, something had to fundamentally change about that product that would differentiate it more from the competition, which was not feasible for a product that already had a detailed foundation.

EcoExplorer is also not looking favorable on the financial side. Looking at the graphs of [Figure 7.1](#), it is seen that revenue, even in a real scenario, is not profitable enough. Firstly, it will take too long to get the first profits from EcoExplorer and after that, profits will not increase by a lot. When the revenue trends follow a less-than-ideal scenario, the profits will look even more grim. It was decided that there is simply too much risk attached to all the costs of bringing EcoExplorer to the general market. Looking at the costs in [subsection 6.2.9](#) that could be improved, there is not a lot left to be refined. The only aspect that could be improved is the daily rent price of the device, which could be increased. A risk would then form that the device would become less desirable to customers, though.

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A | Appendix

A.1 | Other personas

■ Shān grén



Figure A.1: Shān grén

Shān grén is a 28-year-old male and a Chinese businessman. He had a trip to Amsterdam to attend a conference meeting for his company State Grid. With a little extra time on his hands before returning he decided to explore the city and see one of the EcoExplorer booths. Out of curiosity, he decides to rent the device to stay sustainable and see more cultural locals.

■ Greta Nilsen



Figure A.2: Greta Nilsen

Greta Nilsen is a 22-year-old travel blogger from Norway. When visiting Amsterdam, she tries to take as much in as possible for the best quality on her blogs. Hoping that her blogs gain more traction, she rents the EcoExplorer device to visit more unknown places hidden from your average tourists. With this, she can say that she visited 'the real Amsterdam'.

■ Janna de Jong



Figure A.3: Janna de Jong

Janna de Jong is a 19-year-old Dutch student from the University in Utrecht, who spends her time touring around various cities in The Netherlands. Janna greatly enjoys showing sustainable behavior to ensure a better tomorrow. She sees EcoExplorer as a new way to express her beliefs.

■ Family Schmidt



Figure A.4: Family Schmidt

The Schmidt family of 4 is having a hard time during their trip to Amsterdam. They spent too little time preparing and are now stunned by what to do. They turn to EcoExplorer, hoping for entertainment.

Model	Price (€)
Raspberry Pi Zero W	16.00
GY-NEO6MV2 GPS Module	13.50
Waveshare 2.4 inch LCD Display	13.00
Li-Po Battery 2500 mAh	12.00
Seeed Studio Lipo Rider Plus	6.50
3D Printed PLA (71 g)	1.36
Breadboard Tactile Pushbuttons (x4)	0.60
Total	62.96

Table A.1: Cost Breakdown of Components

Aspect	Injection Molding	3D Printing
Pros	■ Very fast process ■ Fully automated ■ Wide material range (including thermoplastics)	■ Rapid prototyping ■ Low startup cost ■ Flexibility in design
Cons	■ High start-up costs	■ Slow process ■ Limited material range

Table A.2: Pros and Cons of Injection Molding and 3D Printing

Manufacturing Method	Total Price (Euros)
Injection Molding	8377
3D Printing	204

Table A.3: Comparison of Total Price for Manufacturing 150 Units

B | Appendix

User Involvement Questions first survey:

- I am...
 - a student
 - a parent
 - retired
 - a travel enthusiast
 - other...
- What is your age?
 - 12-17
 - 18-24
 - 25-34
 - 35-65
 - 65+
- What is your gender?
- How often do you go on vacation?
 - 0 times per year
 - 1 time per year
 - 2 times per year
 - 3 times per year
 - 3+ times per year
- Would you prefer buying or renting EcoExplorer?
 - Buying
 - Renting
- Why do you prefer buying/renting?
- What price are you willing to pay to rent ExoExplorer for one day?
 - 0-2 euros
 - 3-5 euros
 - 6-8 euros
 - 9-10 euros
 - 10+ euros
- What price are you willing to pay to buy ExoExplorer?
 - 0-9 euros
 - 10-19 euros
 - 20-29 euros

- 30-39 euros
- 40-50 euros
- What location do you find most convenient to rent EcoExplorer?
 - Train station
 - Airport
 - EcoExplorer booths through the city
 - Other...
- Do you like the idea of having a time limit on your phone?
 - Yes
 - No
- If sustainable choices lead to a discount on the rental price, would this motivate you to make more sustainable choices?
 - Yes
 - No
- Why?
- Would you use EcoExplorer while exploring a new city?
 - Yes
 - No
- Why?

Questions second survey:

- What is your age?
 - 12-17
 - 18-24
 - 25-34
 - 35-65
 - 65+
- What is your gender?
- EcoExplorer will be rentable at booths throughout the city. Do you think this is a good option?
 - Yes
 - No
- Why
- The price will be 3.99 euros. Would you rent this product?
 - Yes
 - No

- Discounts will be added to the service. People can use trivia and sustainable points to get discounts at sustainable locations such as restaurants and activities. Would you use the discounts?
 - Yes
 - No
- Would you feel forced to use the discounts?
 - Yes
 - No
- Your phone will not have a limited use so you are responsible for your phone distractions.
 - I prefer freedom over blocking my phone.
 - Blocking your phone is better.
- You will need to pay a deposit which you will get back when the product is brought back. Would you still want to use the product?
 - Yes
 - No
- Booths will be placed in Amsterdam. Would you want EcoExplorer in other cities?
 - Yes
 - No
- Where would you want to use EcoExplorer?
 - Only capitals
 - Big cities
 - Smaller cities
 - Villages
- Where would you want to see advertisements for the product?
 - Bus station
 - Train station
 - Airport
 - City center
 - Hotel
 - Restaurant
 - Near popular tourist attractions
- We are active on Instagram and TikTok. Which other platforms would you like to see us on?
 - BeReal
 - LinkedIn
 - Twitter
 - Facebook
 - YouTube
 - No other platforms