

Dyson School of Design Engineering
Innovation and Entrepreneurship 2024-2025

Cyclogic

Business Report

Alex Li
Zoe Hall
Greg Hamlet
Erik Minseo Kim
Yujeong Seo

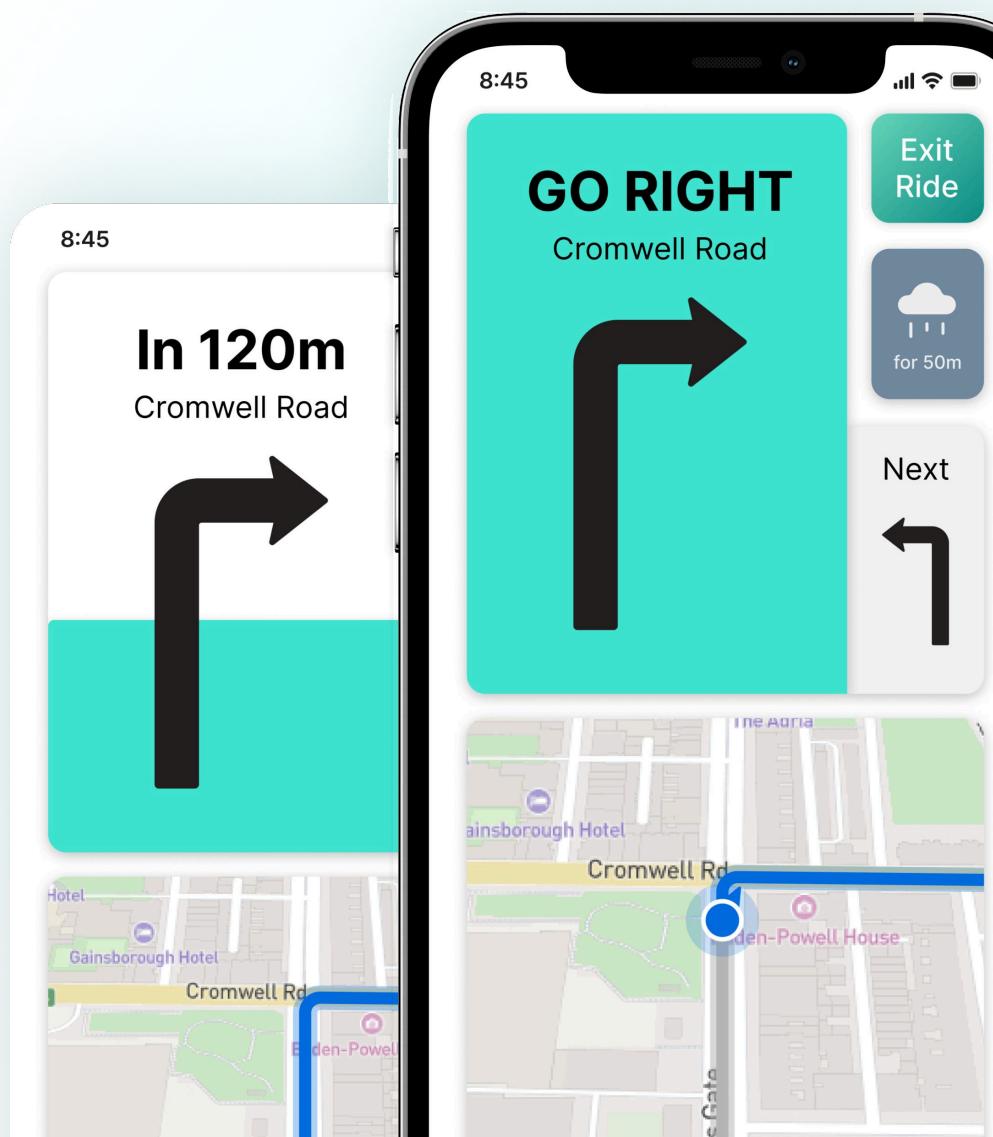


Table of Contents

1. Executive Summary	04
The Problem & solution		04
The Market		04
Our Business		05
2. Market Overview	06
Market Trends		06
SWOT Analysis		07
3. Design Journey	08
Design Opportunity		08
Primary User Research		08
Initial Ideas		10
Consumer Insights		11
Prototyping and Design		12
4. Business Model	13
Model Selection		13
Business Model Canvas		14
Value Proposition		15
System Diagram		15
Customer Segments		16
Revenue Generation Strategy		16
Cost Structure		17
5. Market Analysis	18
In-depth Market Trends and Analysis		18
Competitor Landscape		18
Competitor Case Study		20
Differentiation Factors		20
Potential Risks and Contingency Plans		21
6. Market Opportunity Calculation	22
Top-down Approach		22
Bottom-up Approach		23
Assumptions and Sensitivity Analysis		23
Potential Bias and Limitations		24
7. Sales Channels	25
Routes to Market		25
Sales Channels		26
Customer Acquisition Cost (CAC)		28
Customer Lifetime Value (LTV)		29
8. Assumptions	30
Idea Hypothesis Canvas		30
Mapping & Prioritising Assumptions		30
Validating Assumptions		31

9. Forecasted Profit & Loss	-----	32
Cost of Goods Sold (COGS)		32
Operational Expenses (OPEX)		33
Marketing Channels and Revenue Streams		33
Scenario Cases		34
Profit and Loss Summary		36
10. References	-----	37
11. Appendices	-----	41

1. Executive Summary

1.1 The Problem & Solution

Problem

Cycling in London is growing in popularity as people choose a healthier and active lifestyle over rising costs and poor pollution on other forms of transport. However, despite this growing demand, London's infrastructural development is not keeping up. Moreover, current navigation apps on the market lack differentiation, offering similar experiences and function. Cyclists want to a more personalised cycling experience, creating a more positive and safer experience whilst cycling in cities.

Solution

Cyclogic is a navigation app that supports cyclists by providing up to date information on their routes, creating a safe and enhanced experience by optimising their routes using their personal information. By collecting data from our own users through reviews and working with local councils, the algorithm allows us to monitor and update the information provided for our users to give them the latest information needed. The user interface is upgraded, opting for a clean and digestible experience.



Fig 1. Our developed app using Figma, highlighting the onboarding, navigation, and review process.

1.2 The Market

Market Overview

The cycling market in London shows strong growth, with 1.26 million daily cycle journeys in 2023, up 6.3% from the previous year and 20% since 2019. Cycling now makes up 4.5% of all transport modes. This growth is driven by government-backed initiatives like safer cycling routes, cycle-to-work incentives, and advancements in AI and IoT technology.

Despite this, the market faces challenges such as seasonal usage, infrastructure limitations, and safety concerns regarding theft and road conditions, highlighting the opportunity to develop solutions that enhance urban cycling experiences.

Design Journey

The design journey of Cyclogic was rooted in user-centric approach, developed through iterative processes of identifying design opportunity, benchmarking initial ideas, and validation. Valuable real user insights narrowed down the design direction to cycling navigation app, guiding the features and interface to meet their unique needs.

Competitor Analysis

The cycling navigation app market features global players like Google Maps, which offers free navigation but lacks cycling-specific features, and niche apps like Komoot and Ride with GPS, which provide detailed route planning but have limited user engagement outside cycling communities. Indirect competition includes city councils, bike-sharing programs, and apps like Waze, which offer navigation but don't focus on cycling needs. Our app aims to bridge these gaps by offering highly personalised routes, real-time updates, and enhanced safety features, addressing unmet needs in this growing market.

Market Opportunity

Top-down and Bottom-up approaches are taken to calculate the market opportunity. Top-down approach provided the 3 year Serviceable Obtainable Market (SOM) of USD 0.793 million, which is **GBP 0.626 million** and bottom-up approach provided the 3 year SOM of **GBP 0.561 million**.

1.3 Our Business

Business Model

Subscription model, as it provides continuous revenue and engage users, is chosen for the business model for Cyclogic. The value of the app lies by redefining the cycling experience, focusing on safety and personal aspect of cycling. While designed for a broad spectrum of cyclists, the app provides targeted experience based on individual experiences. Furthermore, customer segments and diverse revenue generation strategies are specified considering the potential path of expansion and to improve the flexibility of the business.

Sales Channels

Routes to market is considered in multiple steps from key stakeholder engagement to long-term expansion, matching the projected timeline for development, beta, and launch phase that spans over three years. Potential sales channels include social media influencers, App store and Google Play advertisements, TfL Advertisements and community building. Sales channels are deployed at different stages based on the market, mainly targeting 1) commuters into potential cyclists or 2) existing cyclists to use Cyclogic.

The calculation of values gave **Customer Acquisition Cost of £3.914** and **Customer Lifetime Value of £7.488**. This is slightly over the industry standard but optimising sales channels and expansion within the market will affect the figure in a long term.

Assumptions

Several assumptions were identified to enable the calculation and estimate Cyclogic's performance. Out of all, three top assumptions that can negatively impact the business and poses highest degree of uncertainty were covered for validation.

Profit & Loss

By the third year, we achieve an EBITDA margin of 17%, reflecting a steady recovery from the negative margins of years 1 and 2, driven by high initial investments in advertising and R&D. As an early-stage navigation app, our margins align with industry trends, where upfront costs for user acquisition, infrastructure, and software development typically result in negative profitability. By reinvesting 20% of revenue into advertising, we are establishing a strong foundation for growth in a competitive market. To move toward the mature-stage benchmark of 20-35%, we can focus on optimising subscription offerings and exploring additional revenue streams, such as premium features or partnerships.

2. Market Overview

2.1 Market Trends



Figure 2. Global and UK Market Trends

Bicycle market is an expanding market projected to reach global revenue of \$131.02 billion and UK revenue of \$8341.5 million in 2030. In more broader cycling market, that encompasses the rental services and subscription models, Mintel forecasted the UK cycling market value to reach £1.5 billion in 2028[3].

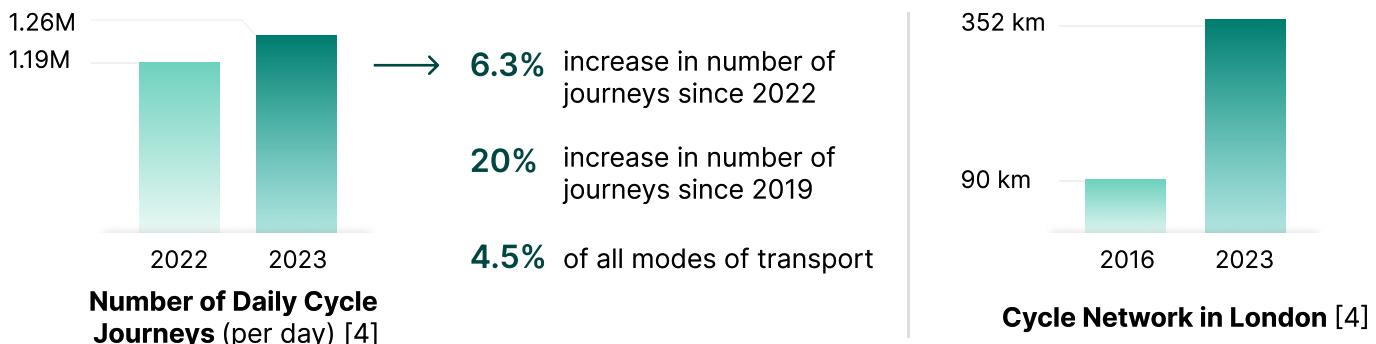


Figure 3. London TfL Cycling Data

Transport for London (TfL) data highlights that the number of daily cycle journeys increased in 2023 as 1.26 million, up by 6.3% compared to 2022, and 20% compared to 2019. Main growth factors analysed by London Cycling Campaign (LCC) include the implementation of safer cycling routes and increased number of commuting cyclists due to road congestion[5].

The PESTEL analysis outlined the **dynamic external factors** that could impact the market.

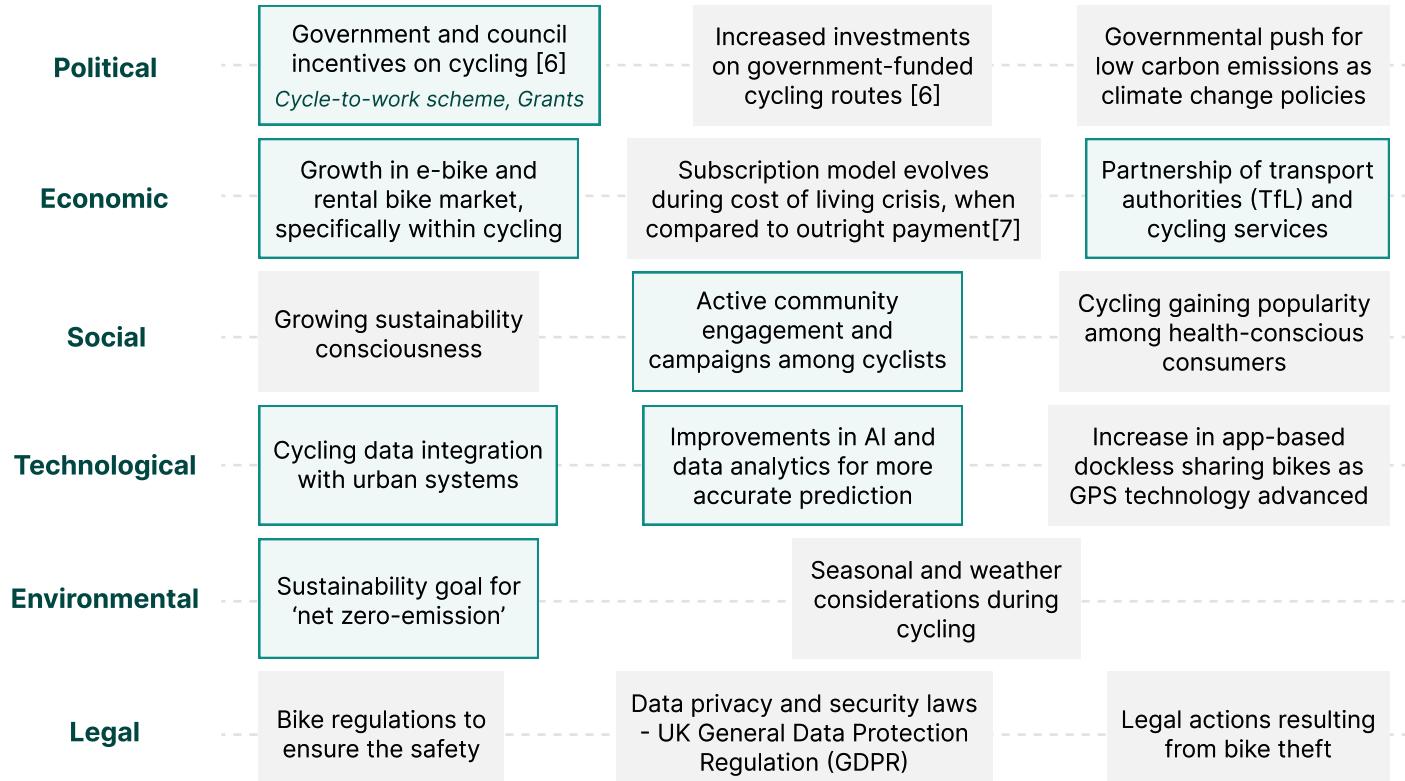


Figure 4. PESTEL Analysis of Cycling Market

2.2 SWOT Analysis

Driven from the trends in PESTEL analysis, SWOT framework helped to identify and evaluate the strengths, weaknesses, opportunities, and threats of the market. Capturing the key factors guides the strategic planning by exploiting advantages and opportunities, identifying areas for improvement, and handling risks.

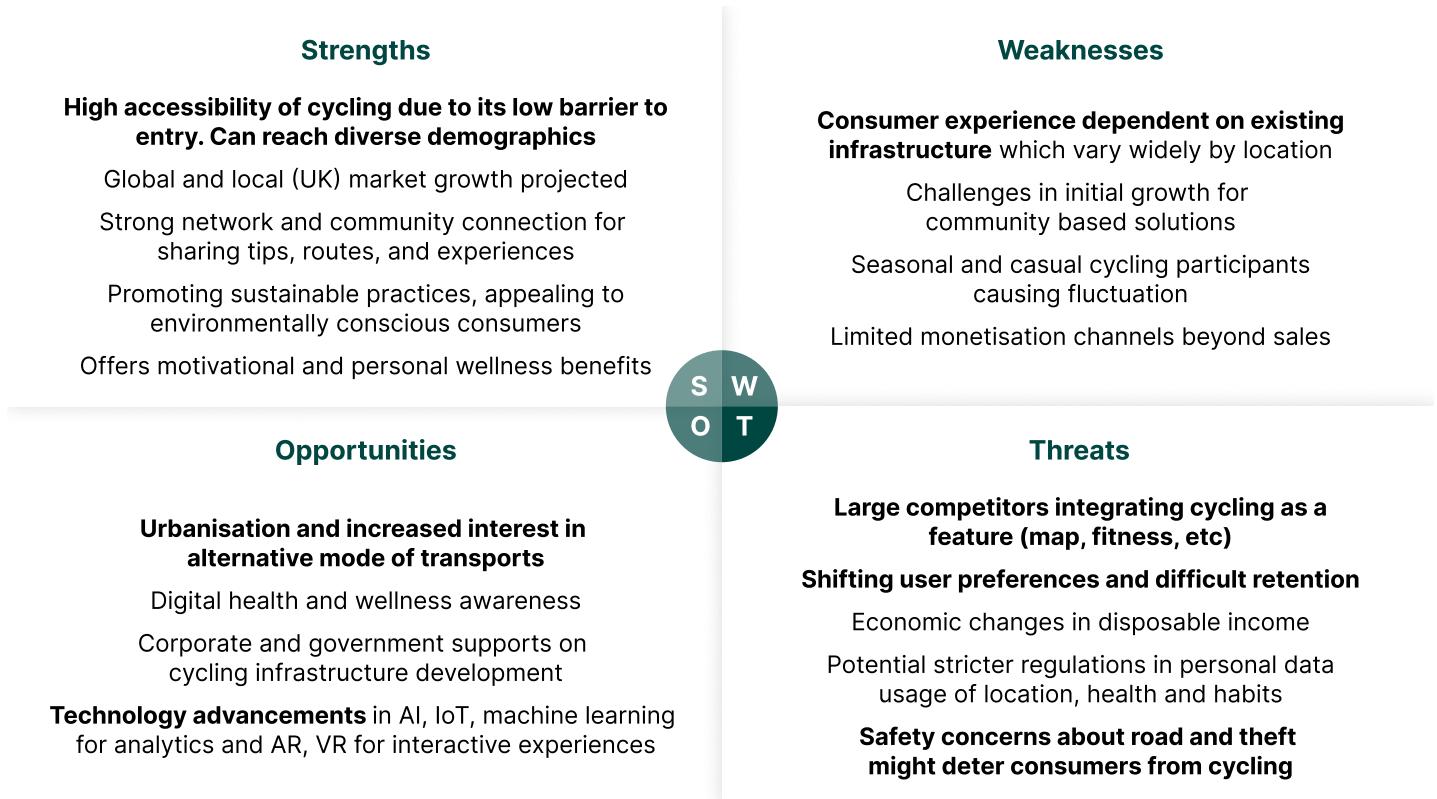


Figure 5. SWOT Analysis of Cycling Market [8]

Cycling market analysis led to three big trends, considered for business idea development and value proposition.

Broader Scope and Diversified Types of Cyclists

The expansion of cycling user base is no longer reliant on conventional bike sales. The market is evolving as e-bikes, bike-sharing, and rental options become dominant. Changes are driven by affordability and convenience as well as technological advancements that enable operational efficiency. These developments make cycling more accessible to light and casual users, emphasising on flexibility and inclusivity of dealing with them.

Data-driven experiences

More cyclists expect personalised, data-driven solutions that enhance the riding experiences. Static or generalised functionality is no longer sufficient to meet shifting user preferences. Technologically, AI or machine learning advancements enable services to optimise data for specific user needs while continuously evolving in functionality. For example, this includes the analysing user performance and providing location, preference based recommendations. In a long term, this data-centric approach can support urban and product improvements.

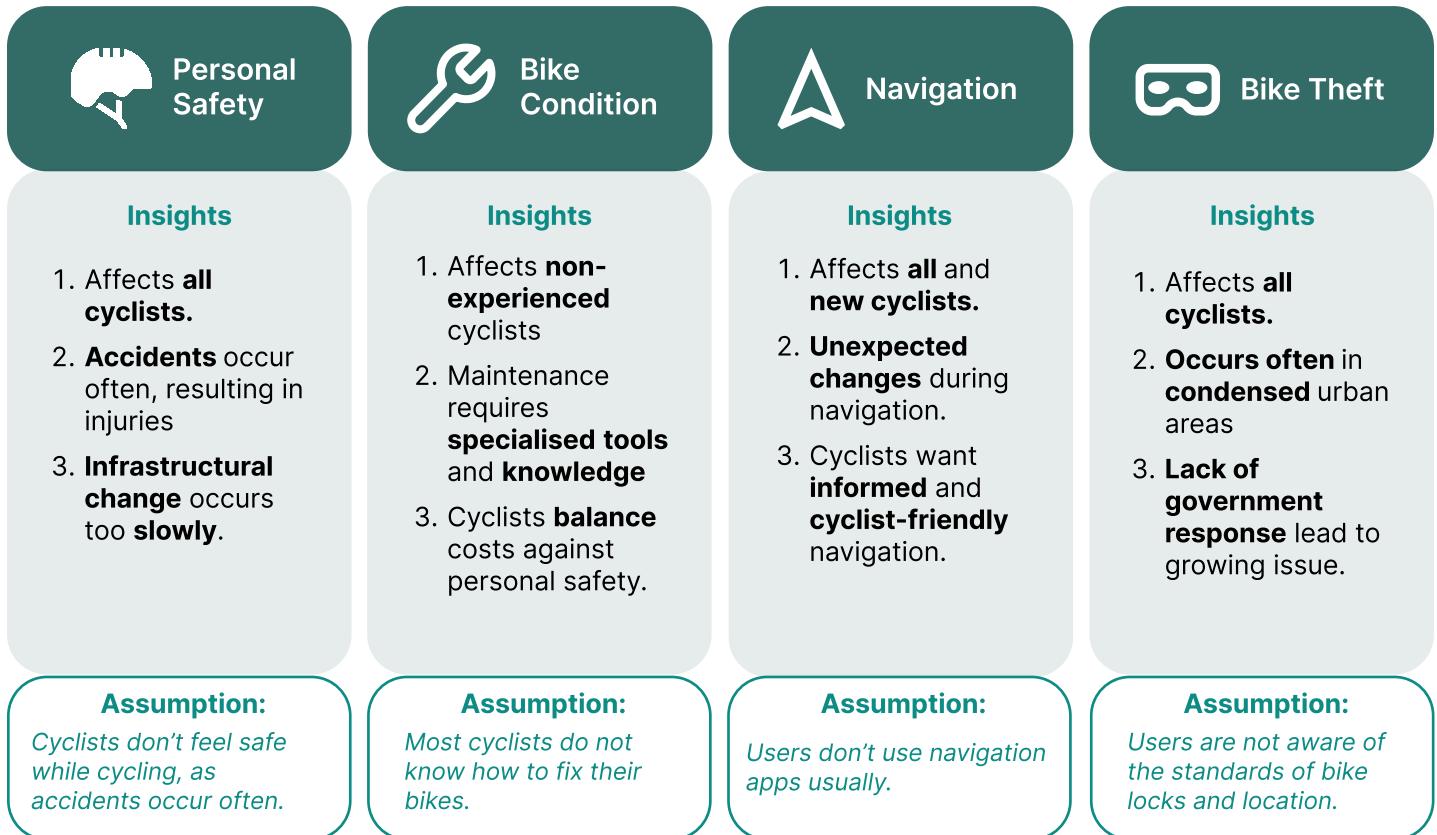
Corporate and Governmental Supports

Aligning with the global sustainability awareness, cycling is actively promoted by both corporate and government initiatives. Governments invest in infrastructure upgrades, grants, and cycle-to-work schemes as incentives. Similarly, many companies adopt cycling initiatives with government support and aim to improve employee wellness by providing perks and setting up facilities. These collective efforts create a firm ground for the market growth, further expanding the potential user base for cycling solutions.

3. Design Journey

3.1 Design Opportunity

By looking through keywords on online forums such as *Reddit* [9] for cyclists, cycling was still viewed to be dangerous as modern road infrastructure simply did not address cyclists' daily needs and their growing demands. Four main themes related to cycling safety were combined.



3.2 Primary User Research

In-person interviews



Figure 6. Our team speaking with cyclists and mechanics at the RAG Bike Auction

We partnered with *Imperial College Raising and Giving Society (RAG)* at their bicycle auction to interview a few users about their cycling experiences. Cyclists ranged from new to experienced, and we tested our initial assumptions. **New cyclists** confirmed that they wanted to start cycling, but were **anxious** about cycling on the road with cars in new settings. **Experienced cyclists** expressed the **difficulty** of exploring **new areas** in London, finding it hard to cycle using existing navigation apps. An **expert bike mechanic with 35 years of experience** expressed his **concern** about **rising bike theft in London** after being asked about bike theft.

Initial Survey Design

An initial survey was organised using a flowchart, so users answers questions based on their experience. Our objectives of our first survey was to find **primary evidence** for our **assumptions** and which problems resonated the most with our target market.

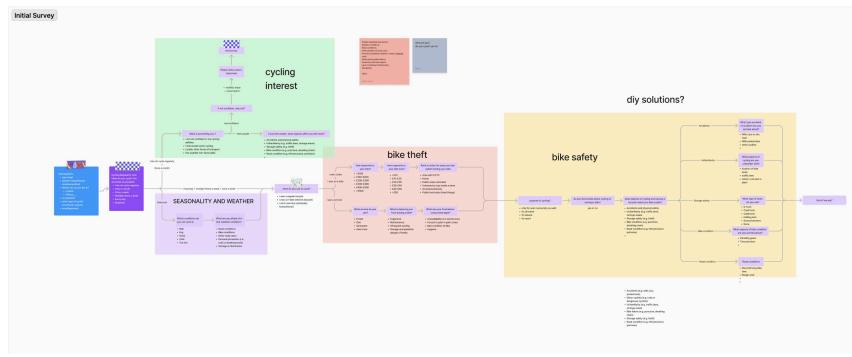


Figure 7. A diagram of our survey flow, with each section targeting a different demographic and their experience.

The sections were broken down into different aspects of cycling. By starting with questions regarding their demographic, such as age and frequency cycling, we were able to connect issues to their demographic.

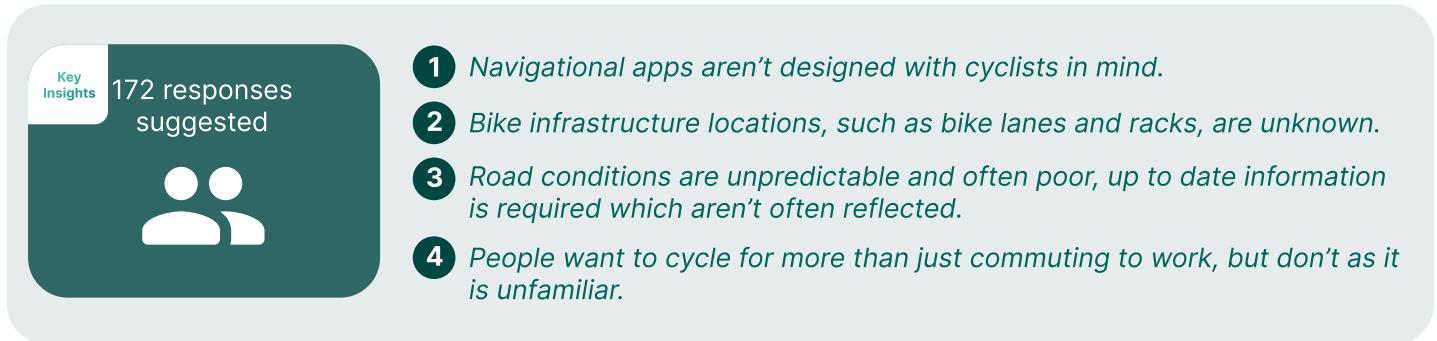
Initial Survey Results

Our survey gained 172 responses, with the insights confirming our assumptions that cyclists faced.



Figure 8. Diagrams representing the demographic breakdown of our initial survey.

Respondents were mainly students and working professionals aged between 18-22 and 23-40 years old located in London. For cycling frequency, about 1/3 people cycled every day, and 1/3 people cycled once or multiple times a week. The main insights which were generated from this survey include:



Addressing Assumptions

Assumptions in the initial secondary research obtained online from cyclists on online forums were addressed in this initial survey as well.

- 1. Personal Safety:** Most accidents can be attributed to poor infrastructure and driver fault, as suggested in our research. Cyclists also felt uneasy on unfamiliar routes. *Information on cycling infrastructure such as its location is crucial.*
- 2. Bike Conditions:** Some cyclists own equipment and fix their own bikes. However, most users do not know how to repair their own bikes, and bike shops present a problem of trust due to lack of experience. *It'll be important for a community to share their experiences.*
- 3. Bike Theft:** Almost all cyclists owned bike locks, specifically D-Locks which are more secure. *Cyclists are more concerned about how safe places are to lock their bikes.*

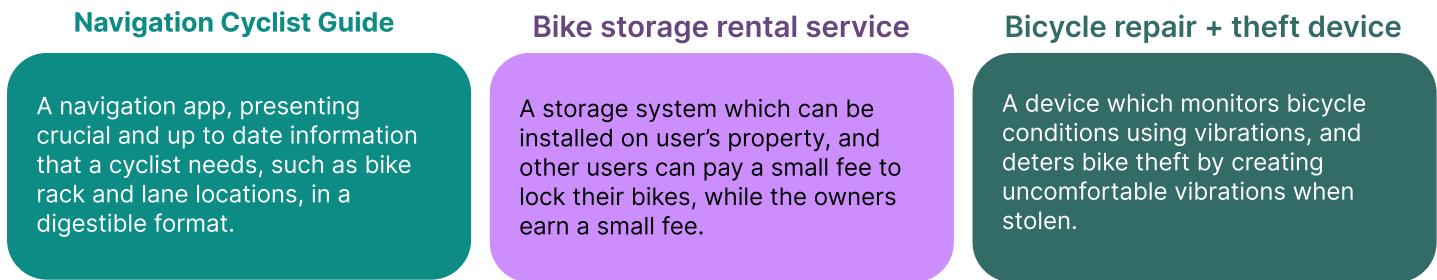
3.3 Initial Ideas

From the insights gathered above, the initial problems were rephrased into *How Might We* problem statements to better identify what the product goals are.

 Personal Safety	1. HMW help cyclists stay safe on the roads? 2. HMW inform users where important infrastructure is?
 Bike Condition	1. HMW support users with locating bike repair specialists? 2. HMW help users find the right shop for their costs and repair requirements?
 Navigation	1. HMW help cyclists navigate safely using familiar routes? 2. HMW give cyclists updated information on their infrastructure?
 Bike Theft	1. HMW keep their bicycle safe from theft? 2. HMW inform users where thefts occur often?

Ideation

An ideation workshop was conducted by the group using the problem statements. Three of the ideas were developed further, and were measured against the outlined objectives. In addition to those objectives, the ideas were also measured against how innovative, impactful, and feasible they were.



Initial Ideas Benchmarking

The results are presented on a radar graph, showing a visual comparison between their rankings.

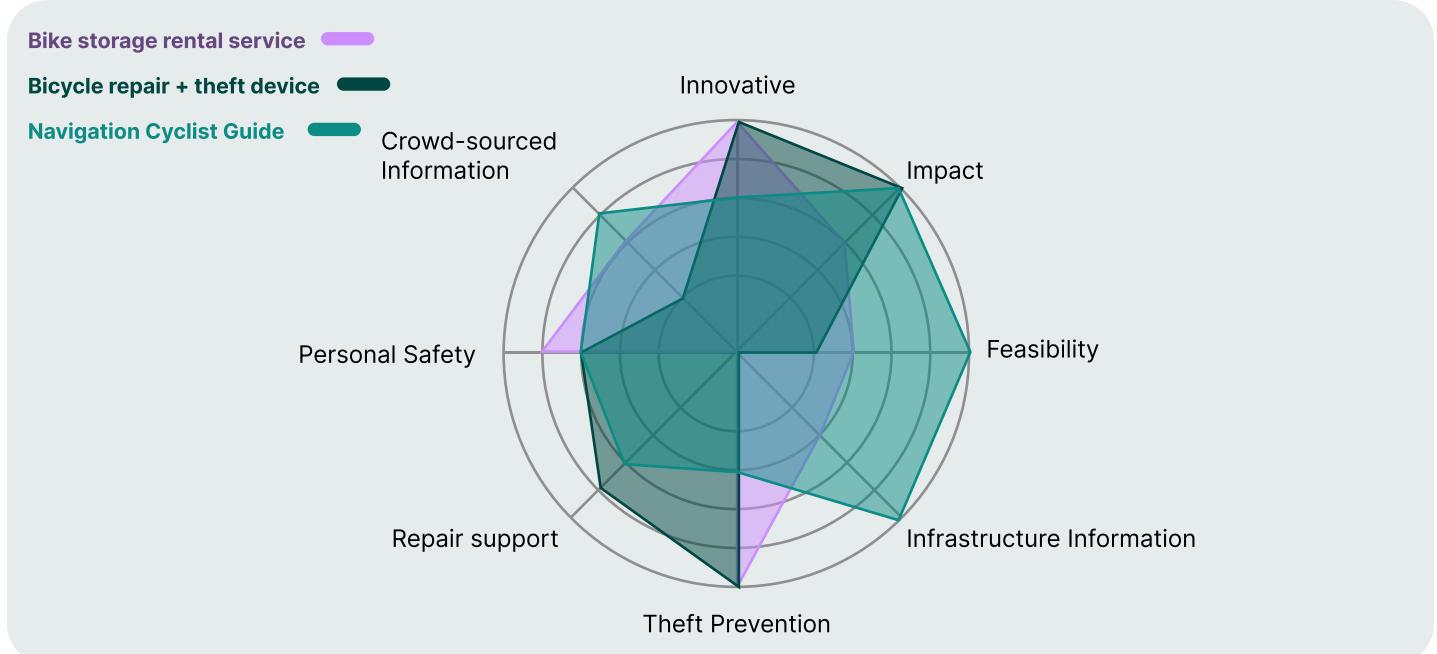


Figure 9. A radar graph comparing our three initial ideas against our product benchmark.

The navigation app was chosen as it had the highest potential, addressing all the problem statements. It was also more feasible and created the most impact for our cyclists. The other ideas lacked feasibility and impact, and didn't address enough of the other problems. SWOT analyses were employed to summarise the shortfalls of the two ideas.



Figure 10. SWOT Analysis of Idea 1

Figure 11. SWOT Analysis of Idea 2

3.4 Consumer Insights

To further define our scope, our target demographic and their assumptions were identified. Our main demographic are students and working professionals in London, aged from 18-34. Using the data from our initial survey, we **created two personas**.



Kevin Lim
Student at Imperial College
Age: 20

- Cycles to university multiple times a week.
- Wants to save costs, cycling to other places in London.
- Feels unsafe on larger roads, don't know where proper bike lanes are.



Daniel Giordano
Working professional in London
Age: 28

- Cycles every day to work commuting 60 minutes per day.
- A few close-calls with accidents while cycling through London.
- Cycles the same route, but occasionally has unexpected closures.

Figure 12. Personas created from our target demographic (Portraits generated from AI Faces BRIX Agency Plugin)

Secondary Research

To further understand the navigation market, a competitor analysis was conducted from a design perspective. The objective of this survey was to learn preferred features and styles of existing apps.

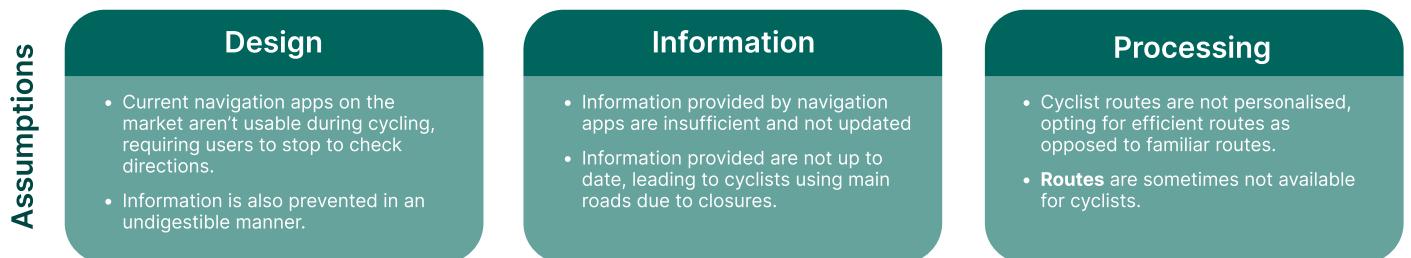


Figure 13. Outlined assumptions for our secondary research

In-depth survey results

A total of 24 questions were asked, regarding their general cycling experience and their impression of three competitors. 23 responses were gathered, and their insights also addressed our assumptions, such as navigating apps being unusable and giving the wrong information.

Key Insights

23 Responses



- Majority** of users do find current navigational apps unusable, requiring them to stop to check directions or miss their turns.
- Offered** routes sometimes are incorrect, such as being not cyclable. Users often suffer due to re-routes from unexpected changes.
- Users** do feels safer when cycling familiar routes, but since most navigational algorithm optimises for efficiency, personal routes aren't offered.

Table 1. Competitor analysis, comparing strengths and improvements as suggested by our user survey

Strengths	Improvements
 Google Maps <ul style="list-style-type: none"> • Clean and simple UI • Offers multiple routes for users • Highlights information about the route, such as if cycle lane or not 	<ul style="list-style-type: none"> • Sometimes suggest routes which can't be used for cycling • Community function isn't used for reviewing routes
 Waze <ul style="list-style-type: none"> • Clean UI, personal customisation • Offers en-route information, such as speed traps • Perspective view is more intuitive 	<ul style="list-style-type: none"> • Designed for drivers only • Too much information during navigation hard to interpret easily
 Komoot <ul style="list-style-type: none"> • Route customisation, sharing and saving • Can switch between sport or commute mode • Offline routes 	<ul style="list-style-type: none"> • Main use case is for long journeys • Unintuitive UI, causing confusion on use • Niche customer base

3.5 Prototyping and Design

By using Figma's prototyping feature, a lo-fi prototype was created. The major features which were implemented include:

1. Review function for the community to review routes and add crucial information and warnings for other cyclists, such as telling other cyclists about road closures.
2. Present information on the map simply, showing up to date location information on where road closures are, slippery roads or large foot traffic, bike locks and repair stores.
 - a. Bike locks and repair stores will have ratings tagged with their pins, informing new cyclist based on previous community experience.
3. Personalised recommended routes, optimising for familiarity as opposed to efficiency.
4. Digestible and easy to understand navigation experience, opting for a progression bar to show turns with visible colours, including a navigating line to show entire journey progress.
5. A friends list, to see where your cycling friends are and see their contributions to the database.

To create an authentic experience for validation, the app was designed to follow the process outlined below:

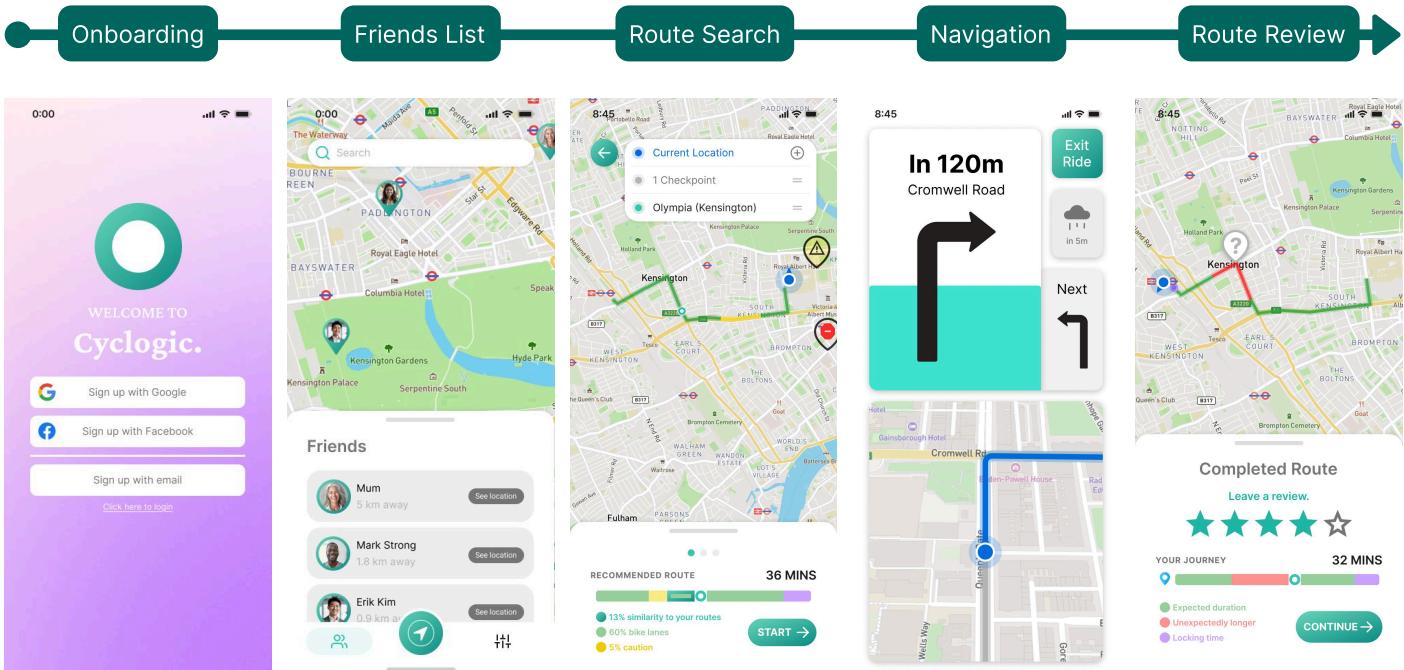


Figure 14. A preview of our working prototype, representing a typical new user's progression of using the app.

Validation

To gain validation for the prototype, 3 members of our target demographic participated in a test using our prototype. The participants were shown the prototype and were allowed to freely explore functions. During the navigation, the user was guided through the UI and was tested on a bicycle. Generally, feedback was positive, responding to new welcomed features such as real time weather-based information, friends function, and review function. Users also expressed that they felt safer with familiar routes being included in new routes, citing "comfort" and feeling "easier" whilst cycling familiar routes.



Figure 15. User validation using our app, performing user onboarding, route searching, navigation, and route review

4. Business Model

4.1 Model selection

There are six major models for app products. We considered these structures and how they were relevant to optimising the experience for users.

Table 2. Comparison of Business Models [10]

Model	In-app advertising	Freemium	Flat rate	In-app purchases	Subscription	Sponsorship
Description	Free app with income	Gating features behind a paywall	Upfront payment at download	Selling virtual (or physical) goods	Gating content behind a paywall	Incentivised advertising
Pros	Data collection, Quick initial engagement.	Quick user base, flexible, greater engagement	Upfront revenue, cleaner interface, more invested users.	Flexible, low risk, high engagement, high profit margin.	Lowers app churn, continual revenue, engages app users.	Better received by users, everyone benefits, can align with app conversion funnels.
Cons	App churn, reduces experience, reduce efficiency of use.	Risk of app churn, risk of providing an inferior experience.	Oversaturated market, app store cut, less popular model, cost barrier	App store cut, bad publicity, tighter regulations.	Not suitable for all content, difficult to determine a correct paywall position.	Need to be careful with what actions are being incentivised, results are unsure.
Other	When the goal is to accumulate a large user base and gather data	Great for addictive apps. "try before you buy" model.	Key to success is having good ranking and reviews	Lucrative models use in app currencies to optimise the app.	Best suited for apps that are a service.	Incentivise users for completing certain actions.

Factor considerations

Scalability Small overhead costs Effect on experience Engages app users

For our product's business model, we selected the subscription based business model as it suited our requirements best. The sponsorship system also did well, and would provide a lot of opportunity in building a community. We aim to consider the subscription model in our final business model and consider opportunities for partnerships and sponsoring charities that align with our goals for bike safety.

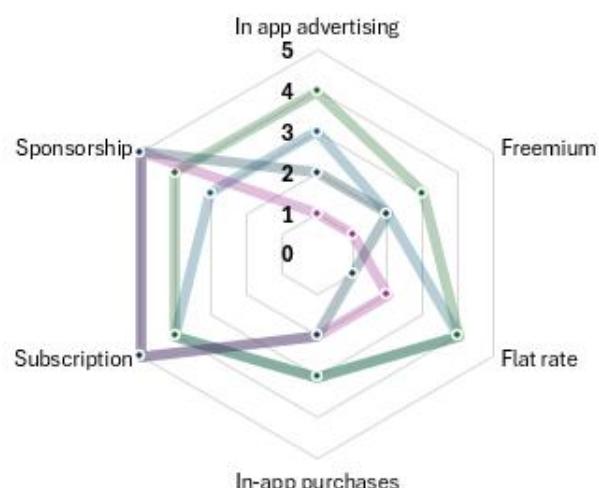


Figure 16. Business model comparison

4.2 Business Model Canvas

Key Partnerships	Key Activities	Value Propositions	Customer Relationships	Customers Segments
People <ul style="list-style-type: none"> Local businesses and advertisers Travel and Tourism companies Bike rental services Bike safety organisations Bike repair shops Providers <ul style="list-style-type: none"> Mapping data providers Mobile network providers 	<ul style="list-style-type: none"> Mapping data collection User experience Customer support Marketing Data analytics (Integration with external devices) Navigation and traffic updates <div style="background-color: #339999; color: white; padding: 5px; text-align: center;"> Key Resources </div> <ul style="list-style-type: none"> Mapping data Search algorithms APIs User data Mobile applications User contributions 	<ul style="list-style-type: none"> Easy navigation for cyclists Real-time traffic and event updates Customisable route planning Voice-guided mapping Offline maps Tourism suggestions Personalised suggestions Biking safety maps 	<ul style="list-style-type: none"> Customer support User feedback User interactions Personalisation In-app tutorial and guides Crowd sourced traffic information Syncing with friends <div style="background-color: #339999; color: white; padding: 5px; text-align: center;"> Channels </div> <ul style="list-style-type: none"> Online & Mobile platforms Advertising Premium subscription Social media Customer support 	Primary <ul style="list-style-type: none"> Cyclists <ul style="list-style-type: none"> Urban areas New to the area Confidence from beginner to experiences Potential <ul style="list-style-type: none"> Sustainability conscious Cycle enthusiasts Tourists
Cost Structure			Revenue Streams	
Variable Costs: Marketing, R&D, Web Hosting, Customer support. Fixed Costs: Data storage and management, Licensing fees, Rent, Insurance, Salaries, General & Admin, App store, IP, Accounting contractor, API.			Advertising: Social Media Influencing, TfL Adverts, Community building through Charity partnerships, Adverts on google Play and App Store Other avenues: Data Licensing, Subscription income, In app advertisements.	

Figure 17. Business Model Canvas of Cyclogic

4.3 Value Proposition

Value Proposition Canvas

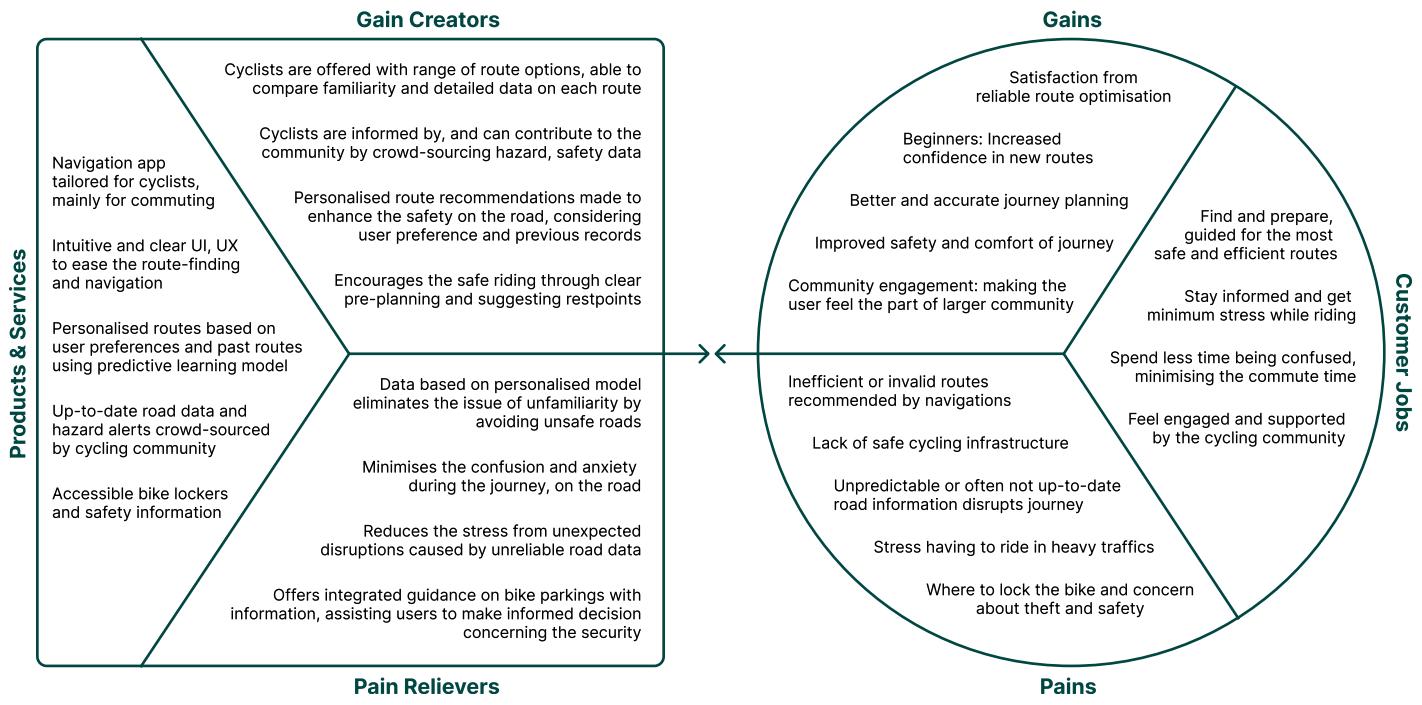


Figure 18. Value Proposition Canvas

Market Need

Existing navigation solutions are typically part of generic navigation and are not specifically designed for cyclists, particularly commuters. The market for urban cyclists commuting regularly demands for safe, efficient, and personalised guidance. Additionally, casual users such as beginners present unique need of prioritising safety over the fastest route, mitigated by avoiding unfamiliar areas and minimising unexpected disruptions.

4.4 System Diagram

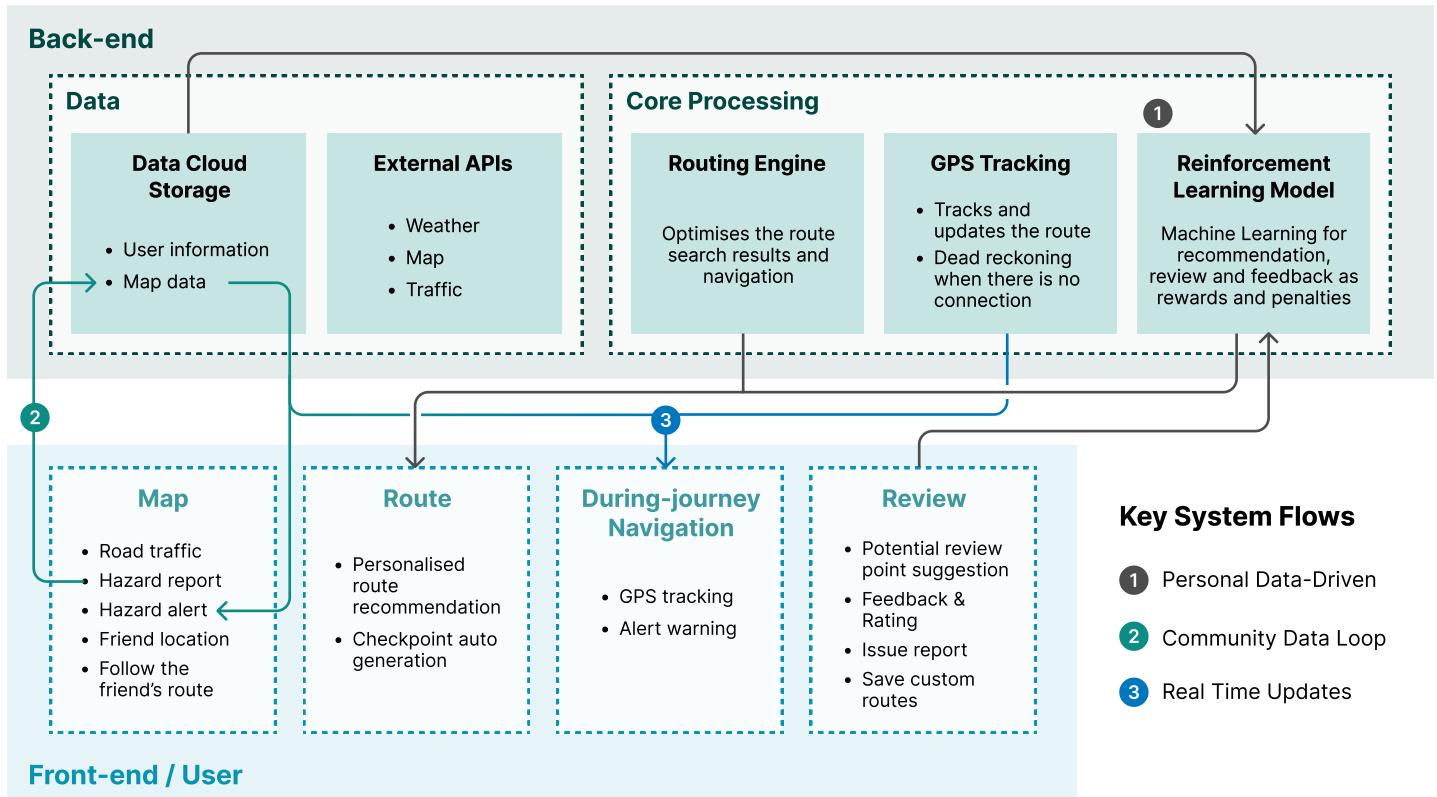


Figure 19. System Diagram of Cyclogic

Figure 19 outlines the system diagram illustrating how the data provided by and collected from the app flows through a loop of optimisation and front-end interaction for display. The continuous backend processes ensure a seamless user experience from the beginning to the end of cycling journey.

Personal Data-Driven

This flow works around each user's data and the learning model that processes the optimisation.

- **Route recommendation:** User requests the route → Routing engine processing based on learning model (Map data, Community feedback, Previous data) → Optimised route
- **End-of-journey review:** User feedback, rating on journey → Rewards and penalties for learning model → Improves future route recommendation

Community Data Loop

This flow depicts how the system exploits the crowd-sourced information and update on real time.

- **Hazard:** User flags the alert → Reported to map data → Display on global map

Real Time Updates

- **Position update:** GPS detects the deviation in route → System recalculate the route based on the position → Sends new guidance with minimal change
- **Alert update:** System detects new alert in current route → System recalculate the route, avoiding the hazard → Sends new guidance with minimal change

4.5 Customer Segments

Primary Customer Segment

Cyclists for Commuting

- Students, Professionals
- Located in London, UK, urban area in general

Beginner

- New to cycling or to urban area
- Less familiar to safety rules
- Priority on safer, quieter roads to avoid cars
- Priority on shorter, easier routes

Experienced Cyclists

- Often commute longer distance
- Cycle in diverse conditions
- Frustrations from unexpected delay or changes
- Priority on efficiency and time savings

Potential Customer Segment

Sustainability-conscious citizens

Potential cyclists for commuting, who values cycling as sustainable alternative for the mode of transport

Cycle enthusiasts

Cyclists seek for rich cyclist-tailored community data Would seek for diverse routes, beyond commuting

Tourists

Seek for convenient and eco-friendly way to explore city Unfamiliar with the locations and overall landscape Journeys tend to be flexible and include multiple stops

Figure 20. Primary and Potential Customer Segmentation

With an initial focus on commuting cyclists, Cyclogic targets a specific yet flexible, expandable market. Commuters' needs can be categorised based on their confidence levels in cycling, guiding the app's tailored user experience and identifying key marketing opportunities.

As a path for expansion, Cyclogic can attract prospective cyclists with sustainability or health-conscious values that motivate them to cycle for commuting. Additionally, as the app grows and its database expands, the crowd-sourced features will enhance its value in the near future. After gaining the popularity and strong database, the app can expand geographically, beginning with other regions in the UK and seek for globalisation eventually.

Revenue Generation Strategy

In Section 4.1, the Subscription model is chosen as the primary business model. Premium subscriptions are expected to serve as the main, direct revenue stream, offering additional features. While a limited number of trial or premium features are available to all, unlocking unlimited access requires a paid subscription of monthly £7.99. The app will offer enhanced analytics and personalisation, which strengthens the core feature of Cyclogic.

To diversify revenue sources beyond the Subscription model, additional strategies are also considered:

Advertising

The advertising strategy will leverage various platforms to increase visibility and attract wider users. External promotions on TfL ads or social media target untapped user bases to convert passengers into potential customers. Digital advertising on Google Play store or App store ensures that the app reaches active seekers of similar services, increasing the efficiency. More details of advertising is discussed in Section 7.

Data Licensing

The app's data provides valuable insights into cycling behaviour, opinions on infrastructure and unique cycling-specific traffic data. Licensing the data to local or traffic authorities would help improve infrastructure and safety, which aligns the goal of the app. Recognising the sensitivity of data privacy, it will only include anonymised, aggregated statistics, ensuring no personally identifiable information is included. Users will have full transparency and control over what is shared.

Partnerships

Strategic partnerships, envisioned in 3 years after the launch as the app gains reputation, can generate revenue through commissions and collaborations.

- Partnerships with local businesses, such as bike shops and cafes, will allow enhanced in-app appearance tailored to users' routes. For example, the location may be recommended more often as a checkpoint.
- Partnerships with bike rental companies for integrated navigation and booking: Commission revenue generated when the users connects to the service via Cyclogic. Also the convenience will drive engagement.

4.6 Cost Structure

The cost structure in Figure 20 is broken down by segments: Cost of Goods Sold (COGS), Operational, Research & Development, and Marketing. The cost involved in is a mix of variable costs and fixed costs, providing a balanced financial foundation ensuring both stability and flexibility upon scaling the service.

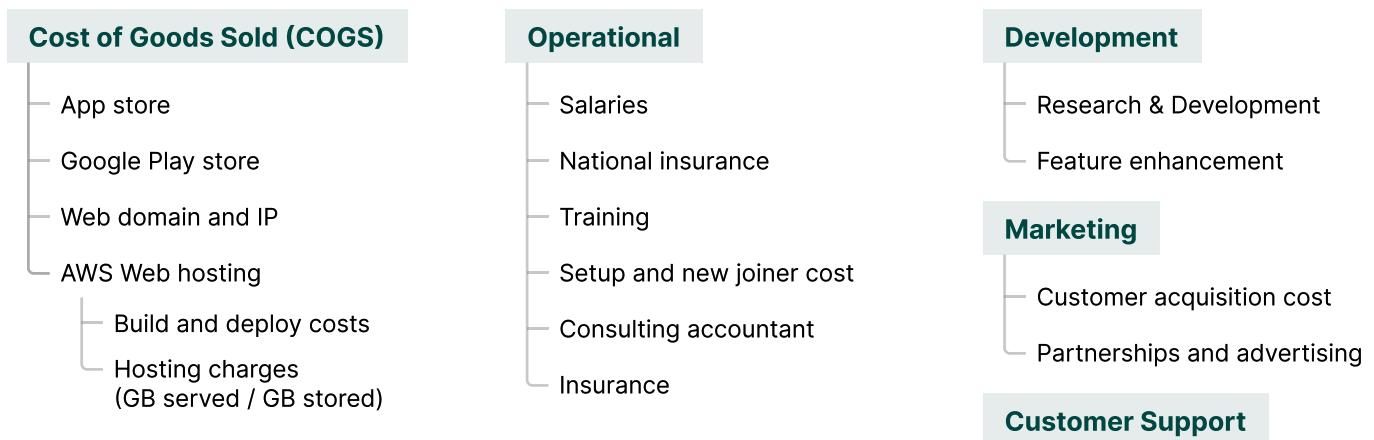


Figure 21. Cost Structure by Segments

5. Market Analysis

5.1 In Depth Market Trends and Analysis

The navigation app market, led by Google Maps, earned \$16.2 billion in 2022 and is expected to grow 14.8% annually, reaching \$36.6 billion by 2028[11]. Much of this growth is due to demand for easy-to-use, real-time navigation tools, especially for cyclists who want GPS devices that connect with their smartphones and provide live tracking and performance stats. Better wireless technology, like Bluetooth, has made it easier for cycling devices to work smoothly with other gadgets, supporting a larger trend toward fitness tools that help people stay connected and track their progress. Cycling is also growing in popularity in cities like London with a 26% increase since 2019, where more people of all abilities are taking to bikes for commuting and recreation[12].

5.2 Competitor Landscape

Porters 5 Forces

The implementation of the Five Forces tool allow us to analyse the industry landscape to present key insights. As a user based product, their bargaining power supersedes that of suppliers as they can directly affect the size and reputation of the brand. The market is well developed overall, which leaves little space for entrants and opportunity for alternative services[13].

Threat of New Entrants: Moderate to Low

New apps emerge steadily as they try to compete in certain niches such as hiking and cycling. However, it is difficult to gain enough traction as they don't provide strong incentives and USPs to compete with apps like Google/Apple/Strava. Already established communities within these apps also make it difficult to convince new users to switch or join.



Bargaining Powers of Buyers : High

Cyclists have the highest level of influence on the app as our profits are based on the size and influence of our user base. They have complete control of which app they choose based on ease of use, trends and even seasons. This puts pressure on apps to continuously come up with new features and offer competitive pricing, convincing subscriptions and creative marketing.

Industry Rivalry

Google and Apple Maps currently dominate the industry with emerging apps targeting specific user groups on the rise. Googles dominance in the domain make partnerships and exposure difficult. The development of activity apps such as Strava, RIDE with GPS and Komoot present a competitive sports market with a loyal user base.



Bargaining Power of Suppliers: Moderate

Suppliers such as the Map API and databases have control over the informational base of our app, therefore they are an integral piece[14]. This means they have moderate bargaining power. However we hope that building our own database as numbers grow will reverse these roles as companies such as Google seek out our data/services for their own purposes.

Threat of Substitutes: Moderate to High

The threat of substitutes is more significant due to the size of indirect competitors such as hardware GPS, navigation and infrastructure changes to city way-finding. While our app is targeting a specific sector of navigation, giants in industry are more familiar and convenient for all types of transport. The threat depends on the users experience and customer preference.

Figure 22. Porters 5 Force analysis on the navigation market

Insights

Although there are strong existing companies, the proof of success in emerging companies such as Forest demonstrate that Cyclogic can compete within industry possessing unique USPs. Users will play an important part in our success as we must convince communities to switch apps and address their key needs. Ultimately the awareness of existing products and their outdated USPs allow us to capitalise on their weaknesses.

Direct Competitors

Four navigation apps were compared, each with their own individual characteristics. From global giant Google Maps which provides a plethora of information, including restaurant reviews and cycling routes, and the new more similar competitors like Komoot and RIDE. We have identified these apps from our initial market research, user interaction and survey results, as potential direct competitors[15].

Table 3. A competitor analysis, outlining properties such as their pricing model and weaknesses.

Competitors	Google Maps [16]	Apple Maps [17]	Komoot [18]	Ride with GPS [19]
Monthly Users	1 Billion +	500 million	40 million	3 million
Target User	People seeking navigation and trip planning. Travel guides. Business promotion	People seeking navigation and trip planning. Business promotion.	Outdoor sports cyclists, for performance and experience.	Outdoor sports cyclists, better route planning and offline accurate GPS usage.
USP	Full service systems for multiple models of transport. Includes reviews and large array of information	Automatically available to Apple Users. Clear and simple display with little extra information.	Wayfinding related to cycling, running and hiking. Blog based posts for community reviews.	Ultra-reliable cycling navigation, syncing with Garmin/Wahoo. Share routes and create custom routes.
Pricing Model	Free to users. Business pay a fee for pin promotion and soft advertising.	Free to iPhone users. Businesses pay a fee promotion similar to Google.	Free simple tools. Premium subscription for £4.99. £4-30 for different regions.	Free simple tools. Premium subscription for £7.99 for improved features and route planning.
UI/UX	Clean styling however app has lot of options and menu items. Small buttons and arrows.	Clean styling with reduced colouring, slow feedback. Simple low amounts of info.	Map with very detailed paths. Suggested route icons.	Very detailed information for performance (can be overinformative). Unclear visual instructions.
Route Planning	Cycling routes take into account road type %, time and immersive 3D walkthrough. E-bike rental options.	Displays minimal data on road conditions however does offer choice based off of business. Hills and time efficiency.	Cycling routes take into account your fitness, surface suitability, level required and way types.	Very detailed for planning tailored routes, adding stops, suggested adding points. Recording and recommendations.
Personalisation	Users can save routes and use AI to recommend destinations. Community. No icon/app editing.	Users can save destinations and has a limited community. No app/icon editing.	Can save destinations, routes and post favourite pictures. Profile and community.	Can track friends and family, profiles, connect to personal devices.
Weaknesses	Widespread information and services are spread thin. Not meant for cyclists.	Apple struggles with real time updated routes and lack of detail in their overall map.	Komoot lacks usability and clean UI/UX. Payments for multiple areas limit use.	Similarly, struggles with UI/UX. Main issue is providing multiple options for quicker rides.

Indirect Competitors

Indirect competitors to cycling navigation apps include city councils, governments, bike-sharing programs, and e-bike rentals all of which contribute to cycling infrastructure and services in ways that impact navigation app usage. For instance, initiatives that increase bike lanes and create better cycling maps which make urban cycling more accessible and may reduce reliance on navigation apps by providing clear, physical route guidance and safety information[19]. Forest cycles are an excellent example of an emerging rental app in London with a growth in active users of 130% since 2023 as a e bike rental service, due to ease of use and their "fun" aesthetic[20]. Something that Waze does very well, offering users the chance to customise their personal icons and see their friends on the map[21].



Cycling navigation computers can be another form of indirect competitors. These devices, attached to the handle of a bike, function as a GPS navigation/route setter for cyclists. Garmin and Wahoo have a strong foothold in this market[22]. These are considered to be indirect due to the necessity of a stand-alone device for navigational use, which is not the case for apps on smartphones. They also cater to more extreme cyclists as opposed to the everyday commuter due to their high cost of around £2-300 on average, with additional subscription costs.



5.3 Competitor Case Study

As Google Maps has the highest market value, growth and is considered the best navigation app. We have selected it for further analysis to determine any weaknesses that present opportunity for our app.

Cycling Navigation UI/UX

Upon selecting a destination, you are presented options for differing routes depending on time (Fig 22a), simplicity and ease. The road types are shown however these are not relayed in real time and often do not reflect the condition of the route. In Fig 22b, we can see Google Maps' new feature that shows the 3D pathways which is great for journey visualisation. However, we can see across that the cluster of small buttons and hard to read directions do not provide a user-friendly experience for cyclists who need an efficient and effective journey. [23]

Pricing breakdown

Maps generates revenue from two primary sources: local ads for businesses and custom maps using their APIs. Google earned 7% of its revenue from ads placed on their websites, including Google Maps, in 2023.[24]

Weaknesses & Opportunities

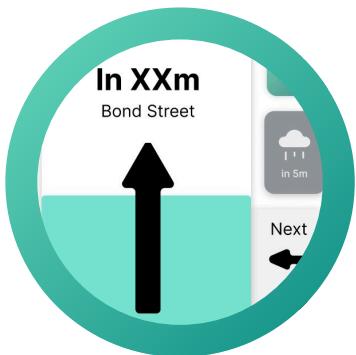
Google is a successful giant, however we can see that in its breadth it lacks in user-aware features. The importance of real-time updates and alerts for cyclists' safety is paramount. The app also does not offer any personalisation in information or aesthetic, which presents issues for people with varying degrees of cycling experience. An interesting point with Google is that they actually acquired their direct competitor Waze in 2013 for 1.3 billion and instead of integrating into Google still remains standalone in its data and business model[25].

5.4 Differentiation Factors

Our user-tailored cycling navigation app stands apart from the competition by bridging the gap between general navigation apps and extreme sport route planning apps in the form of the three main features below:



Figure 223 The various screens of the Google Maps app in use, displaying the UI.



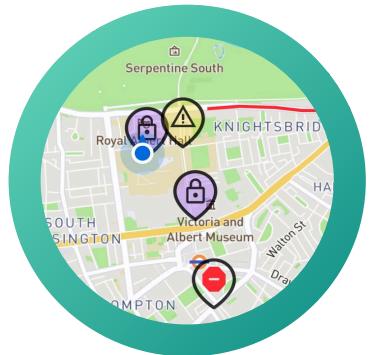
Unique Navigation UI

Our app features drastically improved navigation visuals, for easy to understand directions and turn timings. Improving the journey safety for the user.



Personalised User Route Optimisation

Initial user data on the cyclists' abilities can be used to improve routes. Over time, data gathered on user journeys will be fed back into future route presentation.



Real Time Environment Awareness

By effectively informing the user of road hazards, surface types, weather alerts and traffic we can offer a safer journey.

5.5 Potential Risks and Contingency Plans

Internal and external risks were established to identify areas of weakness. We categorised using a PESTLE framework to clarify which area the risk was prevalent in. Contingencies were set in place in different forms such as Active/Passive acceptance, Containment, Avoidance and Transfer of risk.

Table 4. Critical Internal and External Risks Contingency Plans

Critical Risks	Impact	Probability	Contingency Plan and Analysis	Impact	Probability
Internal Disruption of Leadership: Founders disagree or leave.	High	Medium	Active acceptance - Be clear in shareholder agreements about handover period as well as a strong board to advise and inform company decisions.	Medium	Medium
Data Protection: Improper usage and security of user data	Medium	Medium	Containment - Advanced encryption algorithms implemented with secure data protection protocols. Ensure privacy by design and ask for specific consent when sharing data points with external companies.	Low	Medium
Brand exposure and widespread usage : Initial profits will be low due to reliance on users	Medium	Medium	Active acceptance - Majority of start ups will take a few years to see profit but we will try to establish a strong user base through our community channels, engaging marketing techniques as well as active partnerships with relevant brands.	Medium	Low
External Political - legislation changes for cyclists and safety whilst navigating.	High	Medium	Avoidance - ensure that our app meets the safety legislation of navigation apps with non invasive or distracting features. For example actively holding a device is currently illegal in all forms of motor transport, may lead into cycling.[14]	Low	Low
Economical - market competition and over saturation.	High	High	By creating our unique USP we can establish a difference in competition with protection in the form of creative freedom and potential patented technology.	Low	Low
Social - use of friend tracking ability to be misused.	Medium	Medium	Containment - all connected people will have to pass human verification as well as consent from user to share data including location, rides and personal details.	Medium	Low
Technological - GPS bugs and server crashes result in dangerous usage.	High	Medium	Containment - Actively assess the systems, update software regularly to address vulnerabilities early. Ensure that the user's navigation can be accessed entirely offline as a backup to any potential issues.	Medium	Low
Legal - Usage of app by Thieves to target users and hotspots.	Medium	Medium	Containment - as user incidents can be reported and thereby assessed and actually used to help identify the criminal act. Again users' personal data will be protected and advised in the terms/agreements.	Medium	High
Legal - Lawsuits from users due to safety concerns and accidents.	High	High	Address safety legalities and ensure that users are educated on how the app should be used in terms and agreements for safeguarding. Users will not be encouraged to perform dangerous procedures and risk will be displayed clearly on each route.	Medium	Medium
Competitors - Rise in electric bike rentals such as lime/forest replaces personal bikes.	Medium	Medium	Transfer of risk - we will move with the shift and tailor our services to better include rental schemes. Such as partnering with Lime/Forest/Santander similar to google.	Low	Medium

6. Market Opportunity

6.1 Top-down Approach

The top-down approach takes a macro-level perspective, using industry data and market trends to estimate the potential market size

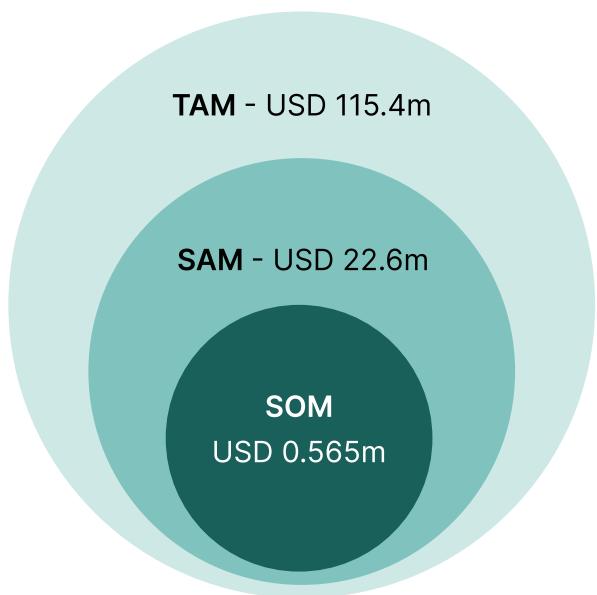
Total Addressable Market (TAM)

The Total Addressable Market (TAM) for the global cycling navigation market can be found by considering multiple resources.

1. The global navigation app market size is USD 1.62 billion in 2024 according to Statista. [26] The percentage of navigation app users that use them for cycling is 5.1%. [26] Hence the total addressable market proportion of cycling navigation app market can be estimated at **USD 82.6 million**.
2. The current cycling navigation computer market has a size of USD 684.90 million in 2024 from Mordor intelligences.[27] The cycling navigational computer users are projected to turn over to smartphone based apps due to the ease of use and accessibility. Our product targets commuting cyclists, excluding mountain bikers and sports users as they represent a different market segment. According to Statista, commuting purposes makes up about 36% [28] Hence, the TAM can be estimated to **USD 246.6 million**.
3. From these 2 numbers, a weighted average is done, based on confidence level for each calculation. The cycling computers target hardcore enthusiasts, making it unclear if commuters, our target users, are included. The estimates are combined and weighted 8:2, yielding a TAM of **USD 115.4 million**.

Serviceable Available Market (SAM)

1. UK navigation app market size: According to Statista Market Insights the UK navigation app market size in 2022 is USD 282.8 million. [29]
2. According to the UK Government, 8% of the population cycle regularly to commute. Segment proportion of the total market allocated to the UK cycling navigation apps is **USD 22.6 million**. [30]



Serviceable Obtainable Market (SOM)

1. A new or niche business entering a market dominated by major players like Google maps and Komoot could capture a market share ranging from 1% to 5%.
$$22.6 \text{ million} * 0.025 = \text{USD 0.565 million}$$
2. From the results of the survey, 78% of the respondents showed willingness to use an well designed app specialised for cycle commuting navigation. Assuming a capture rate of 50% for the interested market, our market share can be estimated as shown below.
$$22.6 \text{ million} * 0.78 * 0.5 = \text{USD 8.814 million}$$

Calculation using market share were selected over using survey methods due to its realistic estimates results and potential bias from respondents affecting the results to be overly optimistic.

Figure 24. Top-down Approach

3 year SOM: Applying the Compound Annual Growth Rate(CAGR) of 11.98%, [31]
3 year SOM can be predicted to reach **USD 0.793 million**

6.2 Bottom-up Approach

Identify the number of cyclists in London

1

According to TfL, 24% of Londoners reported having cycled in 2023 [29]

$$8.866 * 0.24 = \mathbf{2.13 \text{ million people}}$$

Segment proportion of interested users for our service

2

From TfL's cycling advocacy data report, 30% of cyclists use their bikes to commute [30]

$$2.13 * 0.3 = \mathbf{0.639 \text{ million people}}$$

Competition factor

3

Due to navigation giants such as Google maps, our market share is at the lower end at a share of 2.5%

Applying the percentage of market share on users, $0.639 * 0.025 = \mathbf{16000 \text{ people}}$

Average Revenue Per User (ARPU)

4

The average revenue per user benchmark for a hybrid subscription+free navigation software is USD 10~USD 40. An average of \$25 was selected for calculation. [32]

Annual Market Opportunity

ARPU * User numbers
 $= 25 * 16000 = \mathbf{\text{USD 0.4 million}}$

Figure 25. Bottom-up Approach

3 year SOM: Applying the Compound Annual Growth Rate(CAGR) of 11.98%, [31]

3 year SOM can be predicted to reach USD 0.562 million

6.3 Assumptions and Sensitivity Analysis

Assumptions

1. Market Scope Assumptions

- Our target user base is the population that uses bikes as a mode of commute. Hardcore performance enthusiasts, mountain bikers and off-road travellers are outside our market scope.
- Market projections are based on industry estimates from trusted sources such as UK government, Mordor Intelligence and Statista, with the assumption that their data is accurate and relevant to the market.

2. Segment Proportions

- Proportions of cycling navigation app market from the total navigation market are calculated based on the percentage of cycling users for navigation applications, based off reliable figures of the UK government.

3. Market Expansion

- The projected Compound Annual Growth Rate (CAGR) of 11.98% assumes a sustained growth for the cycling navigation market. Any variation from this growth rate could affect the accuracy of the market estimation.

4. User Behaviour

- Segment proportion of interested users for our service; everyone using bikes to commute will rely on digital navigation for their journey.
- Predicting user behaviour and average revenue per user (ARPU) relies on the assumption of consistent spending habits and adoption rates driven by the platform's unique features.

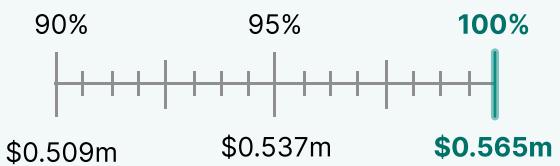
Sensitivity Analysis

Assumptions from market opportunity were analysed to find their impact on the calculations. The Figure 25 in the following page shows the range of fluctuations to the calculations.

Percentage of cyclists commuting by cycling (8%) might vary



Not everyone (100%) might use digital navigation while cycling



Projected market share of 2.5% for our service could vary



Assumed average revenue per users (\$25) could vary



Proportion of cycling navigation users from the total navigation app users (5.1%) might vary



Projected Compound Annual Growth Rate of 11.98% could vary



Figure 26. Sensitivity Analysis

Percentage of cyclists for commuting purposes and **Compound Annual Growth Rate** affects the market opportunity calculation the greatest.

6.4 Potential Bias and Limitations

- **Survey Accuracy:** The accuracy and representativeness of survey data in estimating the willingness for our service includes biases because our respondents do not fully represent the standard distribution of the cycling population in London
- **Static Assumptions:** Calculations were done believing market conditions or user behaviours won't change significantly over time, which limit the realistic accuracy of the estimation.
- **Data Quality and Accuracy:** Using outdated or inaccurate data can lead to inaccurate projections.

7. Sales Channels

7.1 Routes to Market

Engagement with Key Stakeholders

Transport for London (TfL): Cyclogic will collaborate with TfL to leverage their expertise in urban mobility innovation. The partnership aims to enhance cycling infrastructure and integrate Cyclogic's navigation features with existing cycling initiatives and community programs.

Cycling Advocacy Groups: To build credibility and strengthen its market position, Cyclogic will engage with influential organisations including London Cycling Campaign and Sustrans. These groups' advocacy for cycling-friendly policies and infrastructure will enhance Cyclogic's visibility among urban cyclists, fostering a sense of community and shared mission.

Pilot Testing and Feedback

Impact Assessment Report: Key urban centres with significant cycling populations, specifically London, will serve as initial deployment sites. Conducting comprehensive impact assessments will help identify user trends, address potential challenges, and inform the development of pricing models tailored to various user segments.

Demonstration of Use: An initial rollout in one location will serve as a proof of concept, showcasing the app's potential to investors, stakeholders, and end-users. This pilot phase will generate actionable feedback to refine the app's features, ensuring it meets user needs before scaling operations.

Awareness Building

Investor Awareness Expansion: Cyclogic will actively participate in cycling and technology events, such as the London Bike Show and TechHub Meetup London, to attract investors aligned with its vision. Hosting targeted investor sessions will also provide valuable insights into potential expansion and strengthen investor relations.

Public Awareness Expansion: Public engagement strategies include promoting Cyclogic at high-profile cycling events and urban expos. Collaborative campaigns with advocacy groups will focus on public safety and the benefits of cycling, increasing app visibility and adoption.

Long-term Expansion

Network Expansion: Following the successful implementation in London, Cyclogic plans to expand into other major UK cities. This phased approach will ensure a strong foundation in domestic markets before exploring international expansion opportunities, adapting the app to diverse cycling cultures and urban environments.

Timeline of Implementation

Cyclogic's implementation strategy spans three years, divided into distinct phases:

- **Development Phase (6 months):** Focused on app development, securing funding through applications to the British Design Fund and TRIG, and forming strategic partnerships. No revenue at this stage; securing investment is crucial.
- **Beta Phase (6 months):** Launching the beta version to a targeted audience, gathering feedback, and refining the app. During this phase, Cyclogic will apply for government start-up loans to support further development. Revenue generation has still not started on this phase.
- **Launch Phase (2 years):** Scaling operations, executing marketing campaigns, and rolling out the app to a broader audience across the UK, setting the stage for international growth.

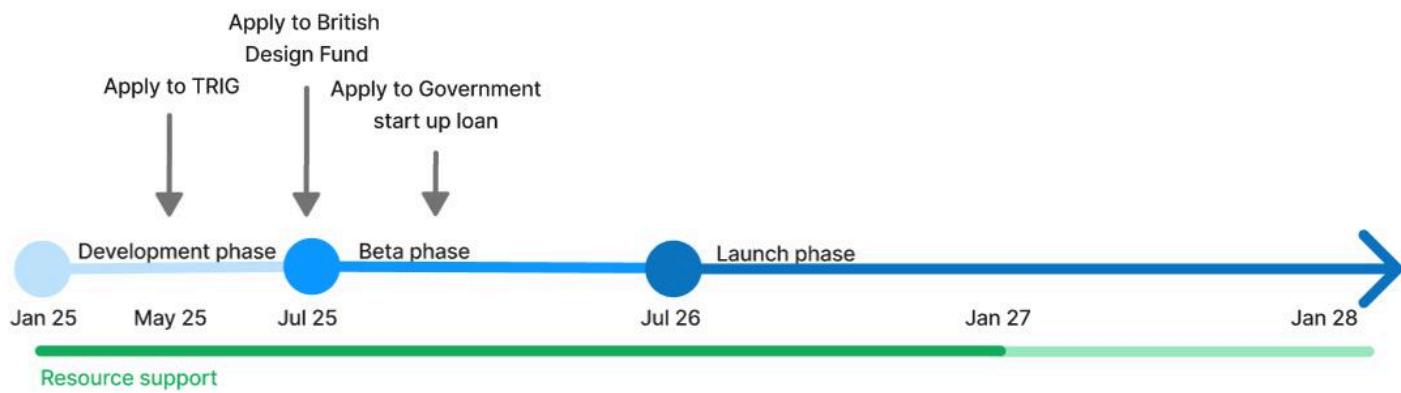


Figure 27. Timeline of Implementation

7.2 Sales Channels

Approach and Bulls Eye Framework

To ensure we addressed all effective channels we used the “Bulls Eye Framework”. Which allowed us to brainstorm, narrow down and identify the channels for strategic outreach.

As previously stated we are generating our revenue from ad-placement, business promotion partnerships and premium user subscriptions. Similarly to Forest who claims that they generate enough ad revenue to give their 500,000 users a year a free 10 minutes of riding a day (11 million)[33].

We have identified four main areas that align with our target users. We aim to target majority of our users through Google Ad marketing campaigns with a more physical aspects primarily being displayed in public transport areas. Although we have some creative methods of reaching users such as *branded cycle seat covers and cycling events*, these will fall under our community building aspect. As we grow over time, we aim to work in conjunction with companies such as the London Cycling Campaign (LCC) [34] and promotion of cycling brands. This will give a wide range of accessible users through marketing in conjunction with using organic word of mouth within the tight knit community.

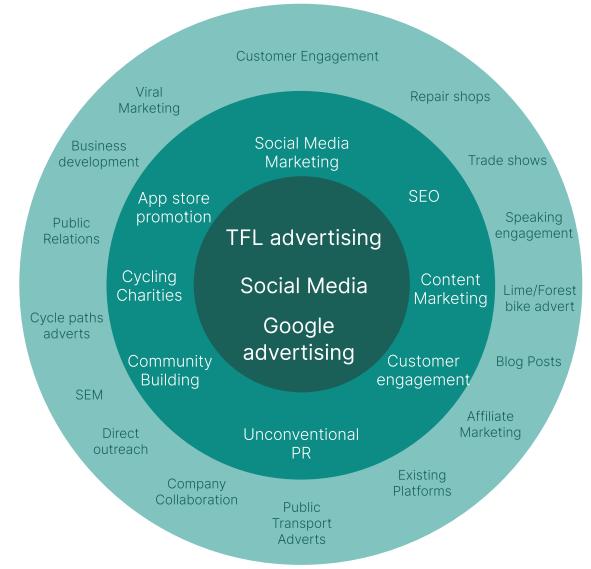


Figure 28. Bullseye Framework for Sales Channels

Social Media Influencers

As cycling as an activity grows, so does its social media presence with the emergence of influencers both in sport and casual cycling. In support of this, as our area is marketed to all commuters we can also use general influencers to reach users. As we are an app, influencer based promotions are extremely simple and low effort for the content creators. Such as our connection Theo Clarke pro cyclist with 4k followers on Instagram who has a keen group of cyclists and low level sponsorship from brands [35].

In a finding by Harvard Business Review we found that more than 75% of brands have a dedicated budget for influencer marketing, from Coca Cola to Dior [36]. We also found from Business of Apps [37] Influence Marketing costs from a global value of \$22.1 billion with the most influential platforms being TikTok and Instagram. Accounting for the size of our start up and our target market, we would primarily target nano/micro-influencers ranging from 1-10-50k followers. Targeting larger influencers on TikTok as their price per post sits significantly lower than Instagram at around £40 as opposed to £80. This will allow us to cover a wide range of users [37].

Within Phase 1 we will allocate £2000 for influencer marketing with the assumption that each nano/micro-influencer has roughly 7.5k followers. We have predicted that will we gain 5,159 app downloads.

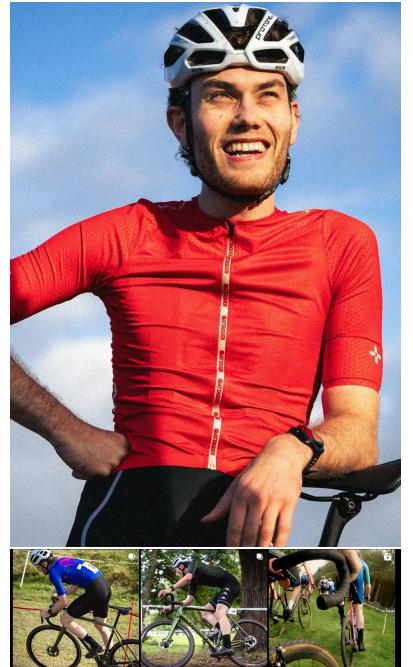


Figure 29. Sales funnel diagram for influencer marketing, resulting in 69 paying users.

App Store and Google Play Advertisements

By improving our app promotion on app platforms and using *Search Engine Optimisation (SEO)*, we can increase of chance of recognition and downloads. Taking into consideration that Google Play has 2.5 billion users worldwide and Apple Maps has recently reached 650 million average visits a week [40], we can see that a large majority of app download decisions are made whilst visiting the Appstore. By targeting key words such as Cycle, Maps, Bike Ride and Route we can rank higher in search results in conjunction with paid promotion by the app store to appear at the top of search bars.

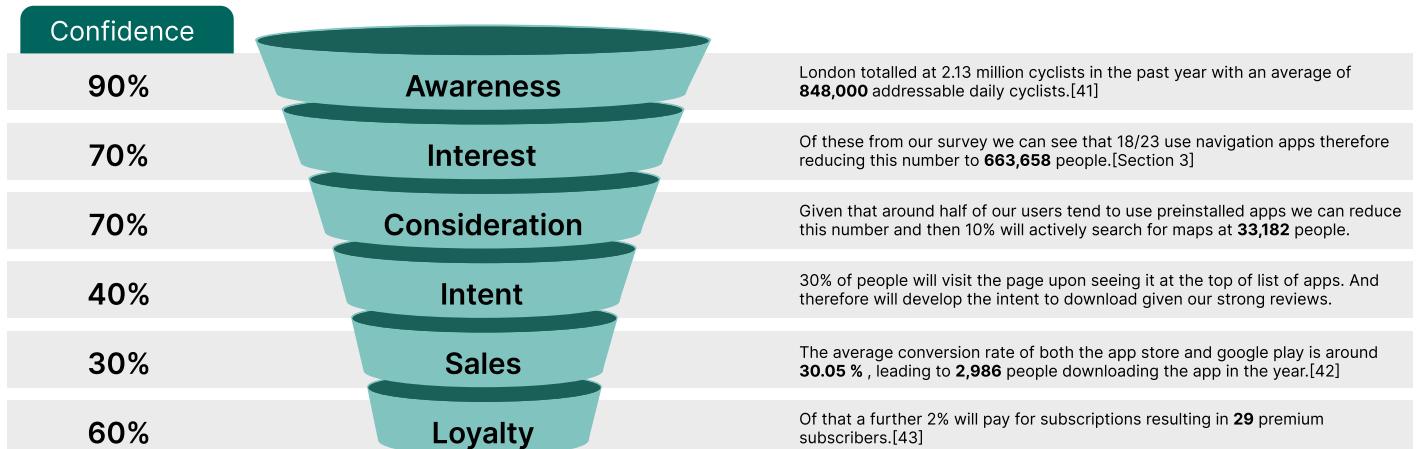
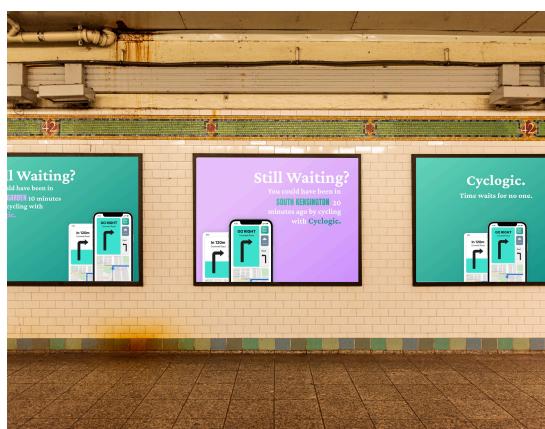


Figure 30. Sales funnel diagram for advertisement through App Store and Google Play

Given we are addressing the UK, specifically London, we must narrow down these numbers for better representation. Starting with online users in 2022 at 71.8 million [44] narrowing down to London which accounts for 12% of the population and applying the statistic that 5% of everyday trips are cycling. We result in 466,000 daily users. However, TfL also identified 1.26 million daily users so we will take an average of 848,000 interested users [41]. We can then begin by addressing 10% of this market for app store searchers. Given that the app store is extremely competitive and users often select known or top apps we must have a strong initial funding of SEO and ASO to give us the initial edge. However we must implement the other sales channels in order to provide user incentive in the form of reviews, word of mouth and brand recognition.

TfL Advertisements



As a replacement competitor, public transport represents an interesting opportunity for converting people to cycling my using creative marketing methods. It turns out that in London almost all journeys of less than 5km (3 miles) are quicker by bike, and public transport only becomes faster for more than 50 percent of journeys if you're travelling more than 13 km [45]. Given this statistic and the benefits associated with cycling we hope to attract more users in the summer months when factors such as weather conditions will work in our favour [46]. Beginning with the average overall daily tube users, 4.05 million, we selected areas within the demographic that highlights areas improved by cycling and by users that cycle more often. These are highlighted in stations that we will place our ads such as Kings Cross, Tottenham Court Road, Waterloo, Paddington, Oxford Circus, and Victoria totalling in 925,866.6667 daily users [47].

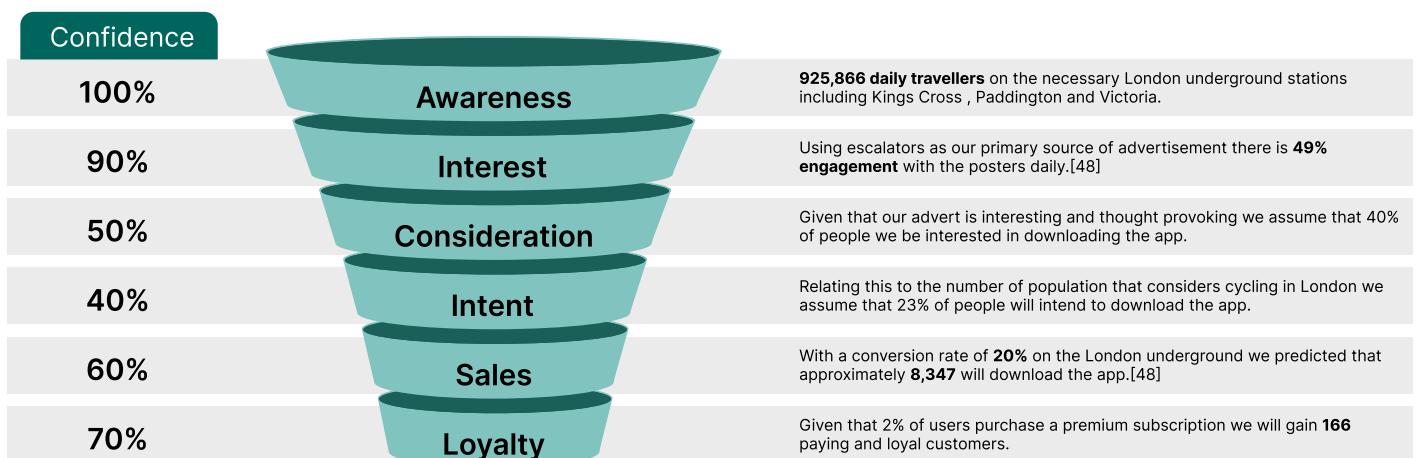


Figure 31. Sales funnel diagram for TfL advertisement in underground stations

The effectiveness of tube ads is unique due to the surrounding infrastructure and experience while viewing ads. 65% of people feel the advertising on the underground isn't as intrusive and 7/10 feel they have enough time to properly read and engage in adverts [49]. Companies use these biases to deliver more thought out and impactful adverts leading to commuters enjoying tube ads more than any other medium. We also identified that 1 in 5 users in London are between the ages of 15-34 with a higher income, which is great for our app as we know that our user demographic is more suited to these internal areas [50].

Community Building



Given that the cycling community is a tight knit system that often creates a spread of communication via word of mouth, it's important that we establish an in person presence. During summertime when cycling events are at their peak and people are at their most likely to cycle, we aim to go to 4-5 events. For example targeting uni welcome weeks/open days as well as charity lead events such as Cycling in London Campaign [51]. A specific study of this has been analysed below:

Case Study: **Imperial Union Welcome Week** has about 9000 footfall[52]. Paying 3 employees minimum wage in London (£13.85 for an hour x 3 x 3) leads to £124.65 plus £80 for 2000 flyers so £204.65 for total cost[53].

- Awareness - 2000 people 80% confidence
- Interest - decrease 1/4 so 250 people - 90% confidence
- Consideration - down by 20% so 200 people - 80% confidence
- Intent - down by 30% so 140 people - 50% confidence
- Sales - down by 25% so **105 people per event avg** - 40% confidence
- Loyalty - 10% so 10 premium subscribers people - 30% confidence

Using this model and applying it to other events at a similar numbers we can see that we will gain an estimated **525** downloads at £1000 investment.

7.3 Customer Acquisition Costs (CAC)

Overall we delivered a strong initial marketing round with a total of 17,000 users gained at a low cost of £13k. We can see that social media outlets performed well as it allowed us to directly target relevant users therefore increasing the effective engagement thereby resulting in a low CAC of £0.387. Tube adverts proved to be the highest level of users, but at an increased cost. We believe that the exposure of the brand imagery repeated on a multitude of rides will help cement our app in industry. Although Community Outreach had the worst CAC at £1.9, it is important that we connect with people personally and engage in their problems.

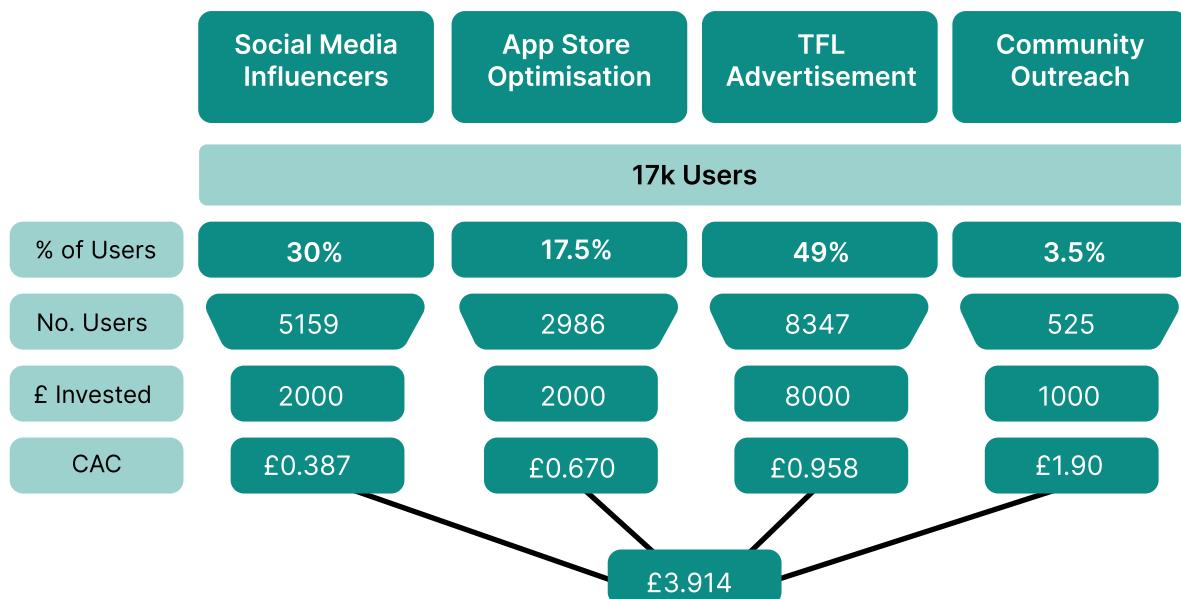


Figure 32. CAC summary for all relevant sales channels leading to £3.914 CAC

7.4 Customer Lifetime Value (LTV)

We assume based on Google Maps model, that the average session on our app lasts 3 minutes, and the average session would use 50 sessions per month. These figures match Google Maps as we expect customer engagement with the app will match Google Maps [54] as our features are proven to be more engaging as seen in validation section .

As we offer a premium subscription, which is ad free, we have two types of app users. We generate revenue from premium members through the subscription and selling their data, which we have competitively priced at £7.99 per month. We also generate revenue from free users through data licensing and ad revenue from both banner and video advertisements [55].

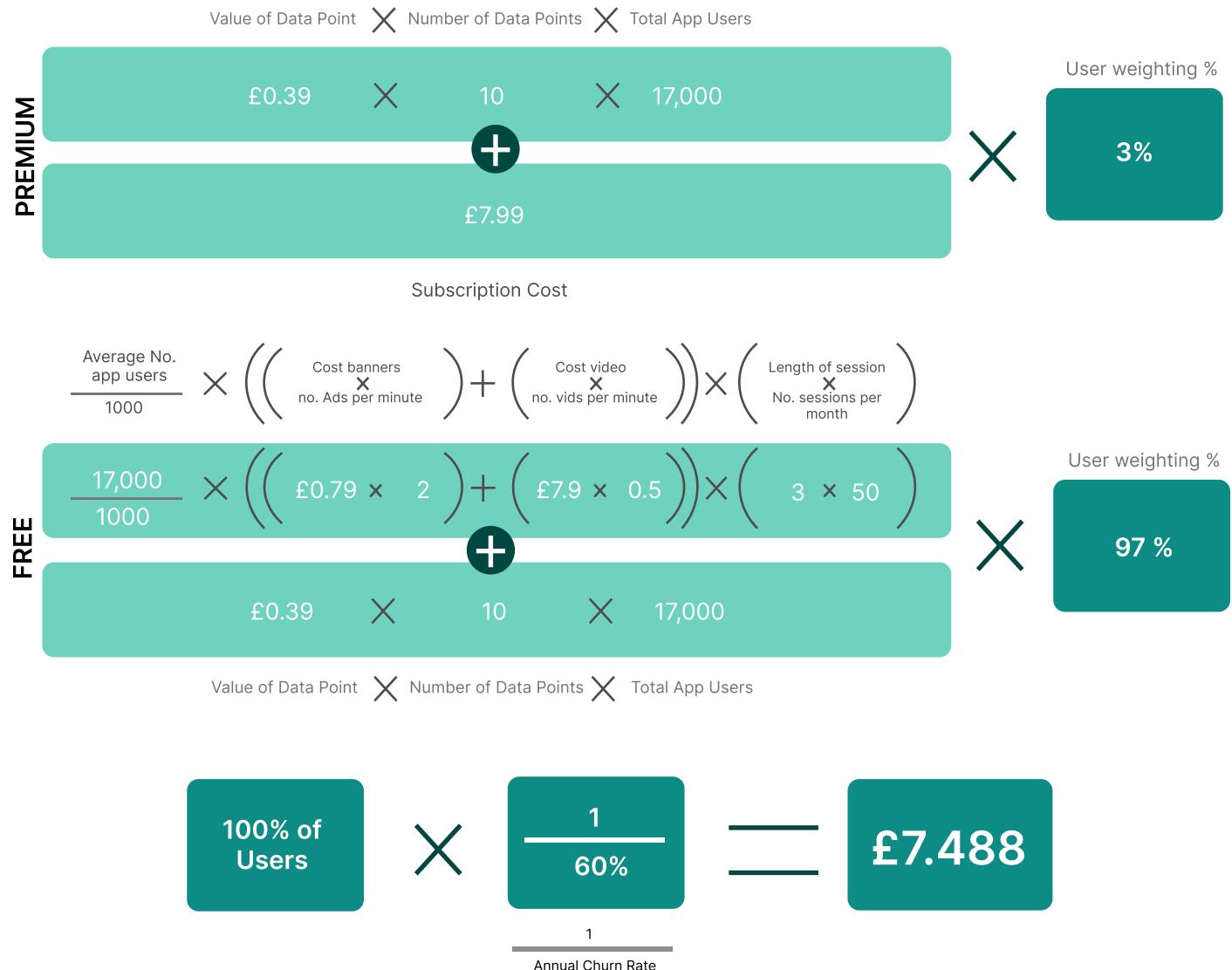


Figure 33. LTV calculations for both premium and free users and final LTV

Our final LTV is at £7.488 which when compared to our CAC at £3.914 is not drastically larger which represents a realistic evaluation of our sales channels in our first year. Our annual churn rate stems from personal services apps having an average annual retention of 41% [56]. When compared to industry standard CAC of \$1.75 - 3.52 for mobile applications, according to Statista (2019), we found our app places slightly above this. However, when optimising sales channels in our next years we will aim to reduce this [57]. Our LTV is also set to increase as we reach further into the market and the number of cyclists increases in London [58].

8. Assumptions

8.1 Idea Hypothesis Canvas

Effective planning for the future of our business requires identifying, prioritising, and testing key assumptions. While these assumptions are noted throughout the report, the process becomes more structured by clearly defining and mapping out the core idea and hypothesis underpinning the business.

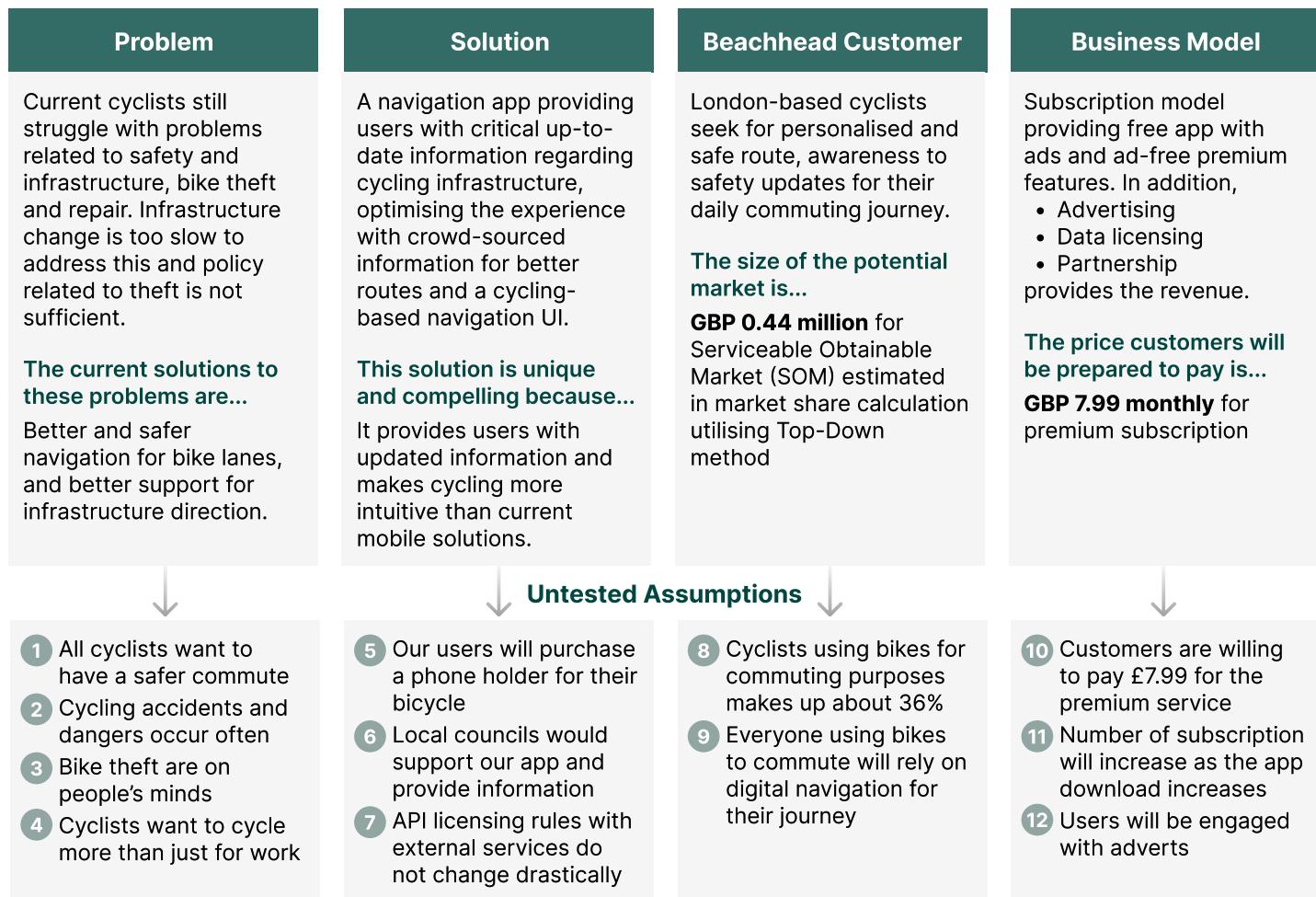
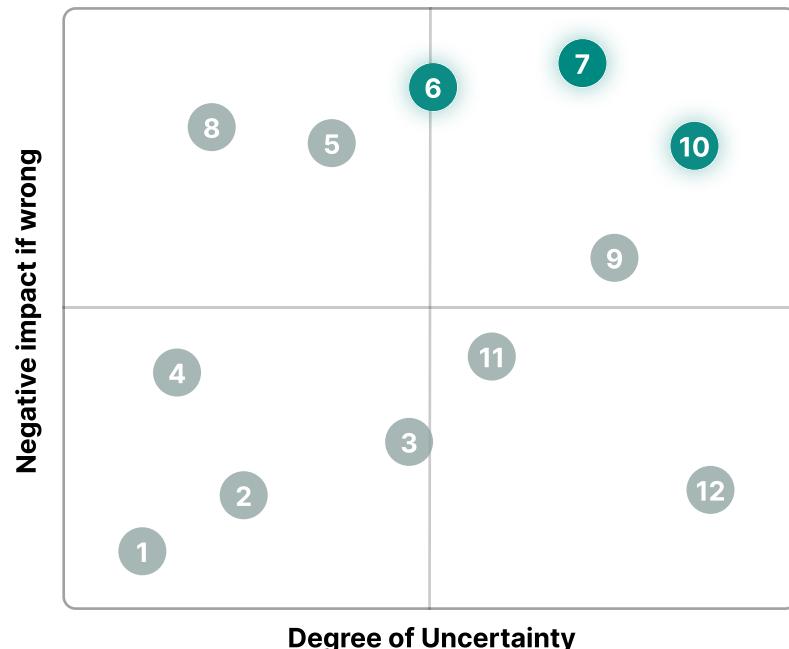


Figure 34. Idea Hypothesis Canvas

8.2 Mapping & Prioritising Assumptions



The assumptions were prioritized based on two factors: the level of uncertainty (how little was known about the topic) and the potential impact on the business if the assumption proved to be incorrect.

Justification: Each assumption was individually rated by each group member on a scale of 1 to 10 (Low to High) based on two factors:

- Probability: The likelihood that the assumption is incorrect (degree of uncertainty).
- Impact: The severity of the negative consequences if the assumption proves to be wrong.

The ratings were then averaged, and each assumption was placed on a matrix for visualisation and to identify the most critical ones.

Figure 35. Assumptions Mapping

XYZ Hypothesis

Top Three Untested Assumptions

6 Local councils would support our app and provide information

7 API licensing rules with external services do not change drastically

10 Customers are willing to pay £7.99 for the premium service



XYZ Hypothesis

At least 80% of local councils will support our app and provide cycling-related data to benefit cycling infrastructure and safety in their regions.



At least 85% of external service providers will maintain their current API licensing terms for the next 3 years.



At least 80% of active users will be willing to pay £7.99 for premium features if these features significantly enhance their cycling experience.

Figure 36. Assumptions into XYZ Hypothesis

8.3 Validating Assumptions

Local Council Support on the App

- **Cycling and Walking Investment Strategy 2 (CWIS2):** CWIS2 underscores the ambition to make cycling and walking the preferred modes of transport by 2040. To support this, the government allocated £2 billion over five years, a significant increase from the £1.2 billion in CWIS1[59].
- **TfL Funding on London Borough:** London boroughs are allocated with £80.4 million in funding for cycling routes from TfL. Also for 2024/25, TfL offered additional £5 million for borough-led cycling schemes[60]. Aligning the long-term vision of government, council, and TfL validates the support for our app.

API Licensing Rule Stability

- **Contract Duration:** If you have formal agreements with API providers, verify their duration and the terms regarding changes to licensing. Some contracts include clauses that protect existing users from drastic changes within a set period.
- **Future Prospect of OSM:** OpenStreetMap is increasingly being integrated with artificial intelligence (AI) and machine learning for applications like automated data validation, map feature extraction, and enriching geospatial data quality. AI-based tools are expected to play a larger role in maintaining the accuracy and timeliness of OSM's data[61].
- **Mitigation Strategy:** Even if the assumption is valid today, include a contingency plan in your project to handle unexpected API changes. This might involve maintaining alternative APIs or building adaptability into your system.

Customer Willingness for Premium Features

- **Pricing Strategies of Competitors:** Key competitors in the cycling navigation app space include Strava, Komoot, Ride with GPS, MapMyRide, and Trailforks. These apps offer a mix of free basic features and premium plans ranging from £3 to £10 per month. Premium features often include detailed route planning, offline navigation, performance analytics, and live tracking. Notably, Ride with GPS's premium service, priced at £7.99/month, aligns closely with your proposed pricing, making it a relevant benchmark. (Section 5.2)
- **User Research:** In the validation survey for Cyclogic's mock-up, two-thirds of respondents expressed a willingness to pay the £7.99 subscription fee, with many describing it as "on the lower side of subscription fees." The feedback indicated a general agreement that the pricing was reasonable and aligned with customer expectations.

10. Forecasted Profit & Loss

To ensure a smooth launch for the first three years, a *Profit and Loss* statement was compiled to forecast and make strategic decisions to mitigate financial instability. By considering our costs and revenue through a scenario analysis, we can critically analyse what our most sensitive factors are for success.

10.1 Costs of Goods Sold (COGS)

COGS is a key metric used to evaluate software companies for a liquidity event. It's an important factor in assessing a company's scalability and financial stability. Software executives often miscalculate accounting formula, as SaaS costs to deliver solutions to customers are hard to determine. [62]

Hosting Expenses

Since we plan on hosting our app on Google Play [63], App Store [64] as well as a website [65], there are several hosting platforms we plan on using. A cloud-based application is also required to host the app. For this we selected Amazon Web Services' Amplify [66] as we get significant credit through Imperial Enterprise Lab[67]. It has several benefits such as a free UI app development software, and build and deploy costs based on usage. This is preferable for us as we are initially operating on a small scale.

Table 4. Hosting expenditure summary for the first 3 years.

	Year 1	Year 2	Year 3
Apple App Store	£77.61	£77.61	£77.61
Google Play Store	£19.60	£0	£0
IP Web domain	£20	£20	£20
AWS Web Host	£492.25	£517.60	£318.85
Total Cost	£609.46	£615.22	£416.46

Monthly build & Deploy expenses = number of developers*number of commits/day*avg. build time *\$0.01 #7

Monthly hosting charges = \$0.0023(web app size*number of developers*number of commits/day*number of days) + \$0.15(daily active users*average page size*days per month #8

Table 5. Hosting expense structure changes for phases.

	Number of developers	Code commits / month
Development phase	2	176
Launch Phase	3	4

With the support package for AWS software, the more significant costs will be reduced as this will cover the web hosting charges. These are expected to be more significant in the first few stages, as there will be significantly more code updates.

We also intend on using the API from openstreetmap [68], which is free for commercial use.

Costs for App, Customer and Employee Support

As our app will be in development for the majority of the first 3 years, hiring a customer support team will not be necessary until the business has significantly scaled up. Customer support process during the beta release will be a feedback form and user interviews, which will be facilitated by a member of the initial founding team, Alex Li. When we launch our app fully at year 2, we will have a FAQ section based on the previous feedback form with some troubleshooting protocols. We expect to hire a customer support team when we are making a profit.

DevOps and Software Analytics

A key role is DevOps in software, as they support the app's daily functions. By programming internal analytic functions, we can save costs from purchasing external analytic platforms such as Google Analytics [69]. To further mitigate costs, our CTO will take charge of DevOps until we can hire a dedicated engineer in year 2, post-app launch.

10.2 Operational Expenses (OPEX)

Overhead costs

To mitigate overhead costs, the founding team will work remotely until we start making a profit. At the end of year 1, we will apply for a membership at **Makerversity Under 30s** program [70], allowing us to enjoy 3 months of free office space usage. This can enable the team to work closely during a period heavily focused on marketing. It is crucial for the team to remain in London as our app will be based in London.

Company Setup Costs

Registering with the government costs £50 [70], and to facilitate the document processing, the CEO will handle this process. We will also trademark our logo and brand, which will cost £170 with the UK government [71]. By doing these two steps, it protects our founders from financial troubles and our intellectual property.

Employee Structure

Our plan for team growth can be split into the first three years. Mitigating costs will be crucial for our first two years, so employee benefits will be limited. As we plan on keeping our team small, an HR department won't be crucial for our development. This will most likely continue through year 2 as our resources are focused towards marketing. At the start of year 3, which we hope to start making a profit, will hire a dedicated DevOps Engineer and part-time UI/UX designer. Initially, our HR responsibilities will be handled by our CEO until our team grows further past year 3.



Research and Development costs

Since we are a startup focused on cycling navigation innovation, all engineering efforts will go toward R&D and infrastructure maintenance. Until we achieve profitability and a solid user base, we won't allocate a specific R&D budget. Afterward, we plan to reinvest 5% [73] of revenue into dedicated R&D projects. We will budget £95.4 [74] per person monthly for development training, supporting employees and fostering a multidisciplinary team. This rate is 20% above the 2023 market average to remain competitive. Working remotely with personal computers removes new joiner costs.

Table 6. Operational expenses summary for the first 3 years.

	Year 1	Year 2	Year 3
Consulting accountant	£294	£294	£294
Insurance	£56.88	£56.88	£56.88
Set up Costs	£220	£0	£0
Total Costs	£570.88	£350.88	£350.88

10.3 Marketing Channels and Revenue Streams

Based on the Sales and Marketing Channels, It was determined that the ARPU for premium users is £8.49 per month, and the ARPU for free app users is £4.33 per month. This is based on our initial assumption that the premium subscription costs £7.99 per month. We assume that app downloads will directly come from our main marketing channels. As the app will not be launched in the first year, £800 will be spent on social media marketing. Based on the sales channels, the expenditure for year 2 was determined. The budget for Year 3 will be between 11-20% of the revenue from the previous year proportionate to the initial structure.

Table 7. Marketing Expenditure for Year 2.

Social Media Marketing	TfL Adverts	Community Building	App Store Adverts
Year 2	£2,000	£8,000	£1,000

10.4 Scenario cases

As the web hosting costs are directly proportional to the amount of app usage, we modelled multiple scenarios for varying advertising investments and price models for our premium subscription. Best and worse case scenarios for app engagement and therefore longevity. Testing key assumptions.

For this analysis, the revenue that's proportionately redistributed to the marketing expenditure, was tested between the industry standard range of 11-20%. # The number of people who purchase a subscription that is already a free app user also varies between 2-4%. The subscription price is the only other direct factor we can control, and we considered several price points similar to existing app models. The total revenue and expenditure was calculated and compared over a 3 year time frame.

Table 8. Scenario analysis for advertising investment and pricing structure

	Worst	Expected	Best
Advertising investment of revenue	11%	15.5%	20%
Subscription Interest	2%	3%	4%
Subscription Price	£2.99	£5.99	£9.99
Confidence Factor	30%	60%	20%
In app advertisement revenue	£25,749	£30,132	£36,600
Data Licencing revenue	£137,260	£171,100	£221,516
Subscription revenue	£12,417	£45,197	£126,626
Total expenditure	£371,444	£377,370	£386,200
Total revenue	£175,426	£246,429	£384,743

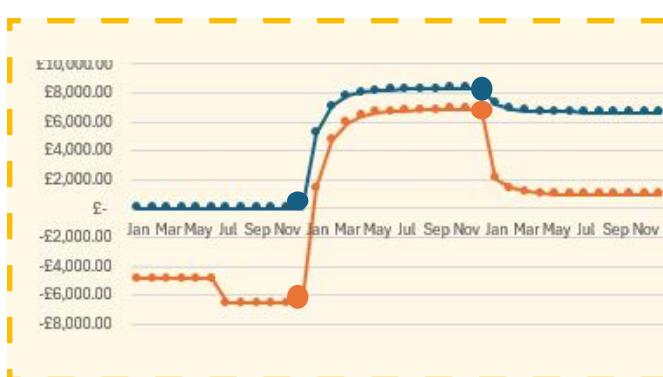


Figure 37. Revenue and expenditure for worse case assumptions



Figure 38. Revenue and expenditure for best case assumptions



Figure 39. Revenue and expenditure for expected assumptions

10.4 Scenario cases

Worst

No potential to break even

Advertising investment

This model performs poorly and would not support the company. We tried to identify why this was.

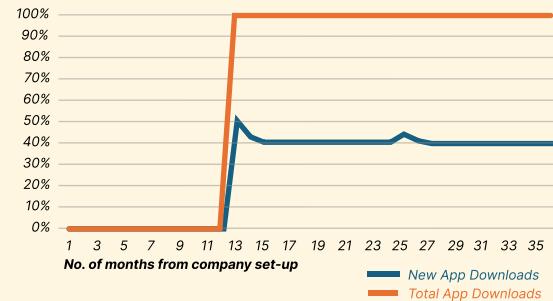
Initially, it was believed that the factor which had the biggest positive impact on the model was the advertising efforts. It was believed that these efforts directly influenced the number of app downloads. However, when the two extreme cases engagements were compared, there was no significant difference.

Changing any one variable to its maximum range does not provide an effect model.

Engagement for 11% revenue marketing reinvested



Engagement for 20% revenue marketing reinvested

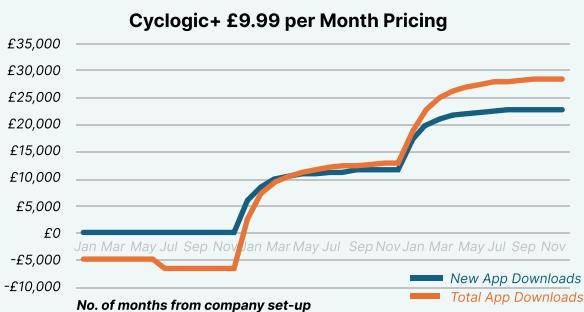


Expected

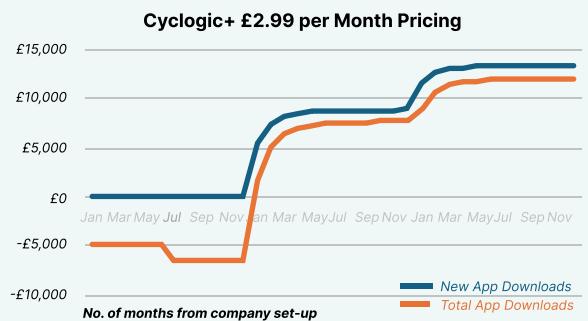
Potential to break even in Y4

Best

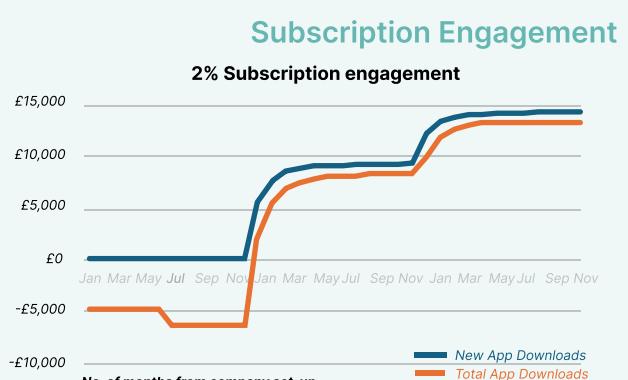
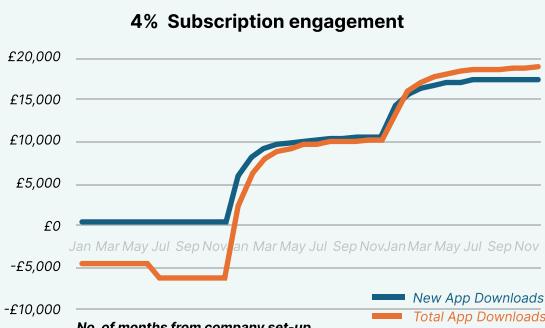
Breaks even within the 3 year timeline



Subscription Price



While increasing app users is important, our niche market limits this approach. To boost average revenue per user, we analysed how varying subscription prices and subscription engagement rates affected results. It was found that increasing premium price had the most significant impact. engagement, we can have greater confidence in the success of increasing the price. Since engagement is also dependant on the quality of the UI, optimising user experience remains a priority for app development.



10.5 Profit and Loss summary



Figure 40. Final total profit and loss

Expected

Table 9. Scenario analysis for advertising investment and pricing structure

Link to Profit and Loss spread sheet: Final.xlsx	Advertising investment of revenue		20%
	Subscription Interest		3%
	Subscription Price		£9.99
Revenue	Year 1	Year 2	Year 3
- Costs of Goods Sold	£0	£116,699	£223,156
= Gross profit	£117	£97.	£411.27
(Profit Margin)	(£117)	£116,602	£222,745
- Sales & Marketing	£800	£13,000	£23,340
- General & Admin	£350	£350	£350
- Employee Salaries	£77,190	£108,394	£160,027
= EBITDA	(£78,458)	(£5,143)	£39,027
(EBITDA margin)	-	(4%)	17%
- Corporate Tax	(£19,614)	(£1,286)	£9,756
= Net Profit	(£58,844)	(£3,857)	£29,270

10. References

1. Grand View Research, "Bicycle market size & share | global industry trends report, 2018-2025," Grandviewresearch.com, 2018. <https://www.grandviewresearch.com/industry-analysis/bicycle-market>
2. "UK Bicycle Market Size & Outlook, 2030," Grandviewresearch.com, 2024. <https://www.grandviewresearch.com/horizon/outlook/bicycle-market/uk>
3. Mintel, "Trends Shaping the Future of the Cycling Industry | Mintel," www.mintel.com, Feb. 06, 2024. <https://www.mintel.com/insights/sports-gaming-and-entertainment/trends-shaping-future-cycling-industry/>
4. Transport for London, "New TfL data shows sustained increases in walking and cycling in the capital," Transport for London, Dec. 06, 2023. <https://tfl.gov.uk/info-for/media/press-releases/2023/december/new-tfl-data-shows-sustained-increases-in-walking-and-cycling-in-the-capital>
5. S. Munk, "London cycling numbers go wild," London Cycling Campaign, Dec. 07, 2023. <https://lcc.org.uk/news/london-cycling-numbers-go-wild/>
6. "Cycling and walking," GOV.UK. <https://www.gov.uk/government/collections/cycling-and-walking>
7. Whistl, "How Subscriptions Have Evolved During Cost-of-Living Crisis," Whistl, Sep. 06, 2023. <https://www.whistl.co.uk/insights/how-subscription-services-have-evolved-response-cost-living-crisis> (accessed Dec. 12, 2024).
8. "CIPD | SWOT Analysis | Factsheets," CIPD. <https://www.cipd.org.uk/knowledge/factsheets/swot-analysis-factsheet>
9. Various Redditors, "Reddit - Dive into anything," Reddit.com, 2024. <https://www.reddit.com/r/londoncycling/> (accessed Oct. 17, 2024).
10. "App Monetization: 6 models for mobile apps to make money," Localytics, <https://uplandsoftware.com/localytics/resources/blog/app-monetization-6-bankable-business-models-that-help-mobile-apps-make-money/> (accessed Dec. 12, 2024).
11. Business of Apps, "Navigation App Market," Business of Apps. <https://www.businessofapps.com/data/navigation-app-market/> (accessed Dec. 12, 2024).
12. Time Out, "London's cycling boom continues: a quarter more Londoners cycle now than in 2019," Time Out, Dec. 6, 2024. <https://www.timeout.com/london/news/londons-cycling-boom-continues-a-quarter-more-londoners-cycle-now-than-in-2019-120624> (accessed Dec. 12, 2024).
13. Investopedia, "Porter's Five Forces," Investopedia. <https://www.investopedia.com/terms/p/porter.asp>
14. Google Maps, "Explore Google Maps," Google. <https://www.google.co.uk/maps/about/#/>
15. Apple Maps, "Maps," Apple. <https://www.apple.com/uk/maps/>
16. Komoot, "Komoot Product Overview," Komoot. <https://www.komoot.com/product>
17. Ride with GPS, "Ride with GPS," Ride with GPS. <https://ridewithgps.com/>
18. Cycling UK, "Infrastructure Campaigns and Guidance," Cycling UK. <https://www.cyclinguk.org/infrastructure>
19. ZAG Daily, "Forest gifts £11 million in revenue to riders," ZAG Daily. <https://zagdaily.com/trends/forest-gifts-11-million-in-revenue-to-riders/>
20. DesignRush, "Best App Designs: Waze," DesignRush. <https://www.designrush.com/best-designs/apps/waze>
21. Cycling Weekly, "Cycling GPS Units Buyer's Guide," Cycling Weekly. <https://www.cyclingweekly.com/group-tests/cycling-gps-units-buyers-guide-181254> (accessed Dec. 12, 2024).
22. M. Burmeister, "Why Google Maps Has a Bad UX," Medium. <https://medium.com/@michelburmeister/why-google-maps-has-a-bad-ux-d62ce4aa4386> (accessed Dec. 12, 2024).
23. Investopedia, "How Does Google Maps Make Money?" Investopedia. <https://www.investopedia.com/articles/investing/061115/how-does-google-maps-makes-money.asp> (accessed Dec. 12, 2024).

24. U. Levine, "Was Selling Waze to Google a Good Decision? Founder of Waze Reflects on the Deal," Forbes, Jun. 9, 2023. <https://www.forbes.com/sites/urilevine/2023/06/09/was-selling-waze-to-google-a-good-decision-founder-of-waze-reflects-on-the-deal/> (accessed Dec. 12, 2024).
25. GOV.UK, "Using Mobile Phones When Driving: The Law," GOV.UK. <https://www.gov.uk/using-mobile-phones-when-driving-the-law#:~:text=It's%20illegal%20to%20hold%20and,videos%2C%20or%20browse%20the%20web>
26. "Navigation - Worldwide | Statista Market Forecast," Statista. <https://www.statista.com/outlook/amo/app/navigation/worldwide>
27. "GPS Bike Computers Market Share, Growth, Analysis (2022 - 27)," www.mordorintelligence.com. <https://www.mordorintelligence.com/industry-reports/gps-bike-computers-market>
28. "Navigation - Europe | Statista Market Forecast," Statista, 2022. <https://www.statista.com/outlook/dmo/app/navigation/europe> (accessed Dec. 12, 2024).
29. "Navigation - United Kingdom | Statista Market Forecast," Statista. <https://www.statista.com/outlook/amo/app/navigation/united-kingdom>
30. "Walking and cycling statistics, England: Introduction and main findings," GOV.UK, Aug. 30, 2023. <https://www.gov.uk/government/statistics/walking-and-cycling-statistics-england-2022/walking-and-cycling-statistics-england-introduction-and-main-findings>
31. Transport for London, "New TfL data shows sustained increases in walking and cycling in the capital," Transport for London, Dec. 06, 2023. <https://tfl.gov.uk/info-for/media/press-releases/2023/december/new-tfl-data-shows-sustained-increases-in-walking-and-cycling-in-the-capital>
32. Mark, "Cycle Commuters in London Double | Travel to Work," Bikes.org.uk, Feb. 14, 2013. <https://www.bikes.org.uk/cycle-commuters-in-london-double/>
33. HumanForest, "Why Do We Have In-App Advertising on Our eBike App?" HumanForest Help Center. <https://help.humanforest.co.uk/en/articles/201-why-do-we-have-in-app-advertising-on-our-ebike-app> (accessed Dec. 12, 2024).
34. HumanForest, "What Do Forest eBike Corporate Partnerships Do?" HumanForest Help Center. <https://help.humanforest.co.uk/en/articles/86-what-do-forest-ebike-corporate-partnerships-do> (accessed Dec. 12, 2024).
35. London Cycling Campaign (LCC), "Home," London Cycling Campaign. <https://lcc.org.uk/>
36. T. Clarke, Instagram Profile. <https://www.instagram.com/theoclarkes/> (accessed Dec. 12, 2024).
37. HBR, "Does Influencer Marketing Really Pay Off?" Harvard Business Review, Nov. 2022. <https://hbr.org/2022/11/does-influencer-marketing-really-pay-off> (accessed Dec. 12, 2024).
38. Business of Apps, "Influencer Marketing Costs," Business of Apps. <https://www.businessofapps.com/marketplace/influencer-marketing/research/influencer-marketing-costs/> (accessed Dec. 12, 2024).
39. AppTweak, "Average App Conversion Rate Per Category," AppTweak. <https://www.apptweak.com/en/aso-blog/average-app-conversion-rate-per-category#:~:text=Average%20app%20install%20rate%20on%20the%20App%20Store,-In%20the%20first&text=On%20average%2C%203.8%25%20of%20users,rate%20can%20vary%20between%20categories> (accessed Dec. 12, 2024).
40. Socialinsider, "TikTok Benchmarks: How to Compare Your Brand Performance," Socialinsider. <https://www.socialinsider.io/blog/tiktok-benchmarks/#:~:text=But%20here's%20the%20kicker%20the,more%20invested%20in%20the%20content> (accessed Dec. 12, 2024).
41. Apple, "Apple Spotlights the Top Apps and Games of 2023 on the App Store," Apple Newsroom, Dec. 2023. <https://www.apple.com/uk/newsroom/2023/12/apple-spotlights-the-top-apps-and-games-of-2023-on-the-app-store/#:~:text=The%20App%20Store%20is%20the,than%20650%20million%20weekly%20visitors>
42. Transport for London, "Travel in London 2023: Active Travel Trends," Transport for London, 2023. <https://content.tfl.gov.uk/travel-in-london-2023-active-travel-trends-acc.pdf> (accessed Dec. 12, 2024).
43. Apple, "View Basic App Promotion Performance," Apple Search Ads Help. <https://searchads.apple.com/help/apple-search-ads-basic/0044-view-basic-app-promotion-performance>

44. Business of Apps, "App Store Optimization Statistics," Business of Apps. <https://www.businessofapps.com/marketplace/app-store-optimization/research/app-store-optimization-statistics/> (accessed Dec. 12, 2024).
45. RevenueCat, "State of Subscription Apps 2023," RevenueCat. <https://www.revenuecat.com/state-of-subscription-apps-2023/#:~:text=Less%20than%2025%20of%20app,many%20paying%20users%20per%20download> (accessed Dec. 12, 2024).
46. uSwitch, "Mobile Statistics," uSwitch. <https://www.uswitch.com/mobiles/studies/mobile-statistics/> (accessed Dec. 12, 2024).
47. Road.cc, "Bikes Faster Than Public Transport for Most London Journeys Under 8 Miles," Road.cc, Dec. 2023. <https://road.cc/content/news/93687-bikes-faster-public-transport-most-london-journeys-under-8-miles#:~:text=It%20turns%20out%20that%20in,that's%20how%20slow%20it%20is!%E2%80%9D> (accessed Dec. 12, 2024).
48. Transport for London, "Technical Note 04: How Has Cycling Grown in London," Transport for London, 2023. <https://content.tfl.gov.uk/technical-note-04-how-has-cycling-grown-in-london.pdf> (accessed Dec. 12, 2024).
49. Time Out, "Revealed: London's Busiest Tube Stations in 2023," Time Out, Jun. 10, 2023. <https://www.timeout.com/london/news/revealed-londons-busiest-tube-stations-in-2023-100623> (accessed Dec. 12, 2024).
50. TMH Media, "The Power of Tube Advertising," TMH Media. <https://tmhmedia.co.uk/the-power-of-tube-advertising/> (accessed Dec. 12, 2024).
51. Marketing Week, "Exterior Media's Tube Ad Platform is Unlike Any Other," Marketing Week, Nov. 19, 2023. <https://www.marketingweek.com/exterior-media-tube-ad-platform-unlike/> (accessed Dec. 12, 2024).
52. Priority Outdoor, "London Underground Tube Advertising," Priority Outdoor. <https://priorityoutdoor.co.uk/london-underground-tube-advertising/#:~:text=Retail,Media> (accessed Dec. 12, 2024).`
53. London Cycling Campaign (LCC), "Events Calendar," London Cycling Campaign. <https://lcc.org.uk/events-calendar/> (accessed Dec. 12, 2024).
54. Imperial College Union, "Advertise with Us," Imperial College Union. <https://www.imperialcollegeunion.org/advertise-us> (accessed Dec. 12, 2024).
55. Instantprint, "A5 Flyers & Leaflets," Instantprint. <https://www.instantprint.co.uk/flyers-leaflets/a5?&paper-type=value-gloss-130gsm&print-type=single-sided&lamination=no-lamination&spotuv=none&quantity=2000> (accessed Dec. 12, 2024).
56. Managed build server - AWS CodeBuild pricing - AWS, <https://aws.amazon.com/codebuild/pricing/> (accessed Dec. 12, 2024).
57. Alchemer, "2021 App Retention Benchmarks," Alchemer Blog, 2021. <https://www.alchemer.com/resources/blog/2021-app-retention-benchmarks/#:~:text=According%20to%20research%20from%20Appsflyer%20and%20MixPanel%2C,apps%20across%20categories%20is%20somewhere%20between%2020%2D30%> (accessed Dec. 12, 2024).
58. Statista, "Mobile App: Average User Acquisition Cost," Statista. <https://www.statista.com/statistics/185736/mobile-app-average-user-acquisition-cost/> (accessed Dec. 12, 2024).
59. Gov.uk, "The second cycling and walking investment strategy (CWIS2)," GOV.UK, 2023. <https://www.gov.uk/government/publications/the-second-cycling-and-walking-investment-strategy/the-second-cycling-and-walking-investment-strategy-cwis2>
60. "London's boroughs to be allocated £80.4 million in funding to continue vital work making streets healthier and safer for all," Prgloo.com, 2024. <https://tfl-newsroom.prgloo.com/news/londons-boroughs-to-be-allocated-gbp-80-4-million-in-funding-to-continue-vital-work-making-streets-healthier-and-safer-for-all> (accessed Dec. 12, 2024).
61. S. Barker, "Choosing The Best Maps API In 2024: An In-Depth Comparison - ExpertBeacon," Expertbeacon, Oct. 14, 2024. <https://expertbeacon.com/choosing-the-best-maps-api-in-2024-an-in-depth-comparison/> (accessed Dec. 12, 2024).

62. M. Soltesz, "What Software Executives Should Know About COGS," SEG, May 19, 2022. [Online]. Available: <https://softwareequity.com/blog/cogs-in-saas/>.
63. InspiringApps, "How to Submit an App to the Google Play Store." [Online]. Available: <https://www.inspiringapps.com/resources/24/how-to-submit-app-to-google-play-store/#:~:text=Your%20developer%20account%20is%20crucial,can%20submit%20apps%20for%20free>.
64. Apple Developer Forums, "Forums Thread #76587." [Online]. Available: <https://forums.developer.apple.com/forums/thread/76587>.
65. Startups.co.uk, "Domain Name Cost: Summary of Top Providers." [Online]. Available: <https://startups.co.uk/websites/hosting/domain-name-cost/#:~:text=tool%20for%20this.-,Summary,top%20domain%20name%20providers%20include>.
66. Amazon Web Services, "AWS Amplify." [Online]. Available: https://aws.amazon.com/amplify/?trk=9f85580b-8aea-42f8-9936-26c5e66c2072&sc_channel=ps&ef_id=:G:s&s_kwcid=AL!4422!10!71468487255637!71469012884992&msclkid=b06307ee755211ed3d6260b668e50ce6.
67. Imperial Enterprise Lab, "Perks and Tools." [Online]. Available: <https://www.imperialenterpriselab.com/resources/perks-and-tools/>.
68. Amazon Web Services, "AWS Amplify." [Online]. Available: https://aws.amazon.com/amplify/?trk=9f85580b-8aea-42f8-9936-26c5e66c2072&sc_channel=ps&ef_id=:G:s&s_kwcid=AL!4422!10!71468487255637!71469012884992&msclkid=b06307ee755211ed3d6260b668e50ce6.
69. Amazon Web Services, "AWS Amplify." [Online]. Available: https://aws.amazon.com/amplify/?trk=9f85580b-8aea-42f8-9936-26c5e66c2072&sc_channel=ps&ef_id=:G:s&s_kwcid=AL!4422!10!71468487255637!71469012884992&msclkid=b06307ee755211ed3d6260b668e50ce6.
70. OpenStreetMap, "Copyright." [Online]. Available: <https://www.openstreetmap.org/copyright>.
71. Google Marketing Platform, "Google Analytics Overview." [Online]. Available: https://marketingplatform.google.com/intl/en_uk/about/analytics/#:~:text=Google%20Analytics%20gives%20you%20the,journey%20and%20improve%20marketing%20ROI.

11. Appendix

Appendix A. Survey Results

Initial Survey Results

	A	B	C	D	E	F	G	H	I	J
1	Timestamp	How old are you?	What is your gender?	Where do you live?	Is this where you cycled the most?	If you answered no, where did you cycle the most?	Please comment about the difference in cycling	What is your occupation?	How often do you cycle?	What is preventing you from cycling in cities?
2	Timestamps deleted	18 - 22 years old	Male	London	Yes	London		Working professional	I cycle every day	
3		18 - 22 years old	Male	London	Yes			Student	I cycle every day	
4		Older than 65 years old	Male	Copenhagen	Yes		Attitude of drivers to cyclists and cycle lanes.	Working professional	I cycle every day	
5		18 - 22 years old	Male	London	Yes		In Netherlands everyone respects cycle lanes a lot	Student	I cycle every day	
6		23 - 30 years old	Male	London	Yes			Working professional	I cycle every day	
7		23 - 30 years old	Male	London	Yes		Different biking infrastructure	Student	I cycle every day	
8		18 - 22 years old	Female	London	Yes	London	Generally how traffic works (not the obligatory rules)	Student	I cycle every day	
9		23 - 30 years old	Male	Oxford	Yes		Cycling in London = death. Cycling in Oxford = act	Student	I cycle every day	
10		18 - 22 years old	Male	London	Yes			Student	I cycle every day	
11		18 - 22 years old	Male	London	Yes		I cycled in Kuala Lumpur. London has a way better	Student	I cycle every day	
12		23 - 30 years old	Non-binary	Portsmouth	No	London	There are no real bike routes, or infrastructure in q	Student	I cycle every day	
13		18 - 22 years old	Male	London	Yes	London	And what do we say about paint?	Student	I cycle every day	
14		18 - 22 years old	Male	London	Yes		Paint is not protection!	Student	I cycle every day	
15		23 - 30 years old	Female	London	Yes		When cycling in america I felt cars were not lookin	Student	I cycle every day	
16		18 - 22 years old	Male	London	Yes	London		Student	I cycle every day	
17		18 - 22 years old	Male	London	Yes		Student	I cycle every day		
18		41 - 50 years old	Male	London	Yes		Working professional	I cycle every day		
19		18 - 22 years old	Male	London	Yes		You gradually turn into a bit of a menace on the road	Student	I cycle every day	
20		23 - 30 years old	Male	London	Yes			Working professional	I cycle every day	
21		51 - 65 years old	Male	Amsterdam	Yes			Working professional	I cycle every day	
22		31 - 40 years old	Female	Copenhagen	Yes		No bike lanes. No culture towards respecting the l	Working professional	I cycle every day	
23		23 - 30 years old	Male	Copenhagen	Yes		I've cycled in Amsterdam and it's comparable, just	Working professional	I cycle every day	
24		23 - 30 years old	Male	London	Yes		London was okay when I rode on lime bikes, but q	Working professional	I cycle every day	
25		18 - 22 years old	Male	London	Yes		Cars give priority in Belgium. Give much more spa	Working professional	I cycle every day	
26		18 - 22 years old	Male	Manchester	Yes		Although it is nowhere near as good as it could be	Student	I cycle every day	
27		23 - 30 years old	Female	London	Yes			Student	I cycle every day	
								Student	I cycle every day	

Figure 39. A screenshot of the initial survey, [click here to view the entire sheet](#).

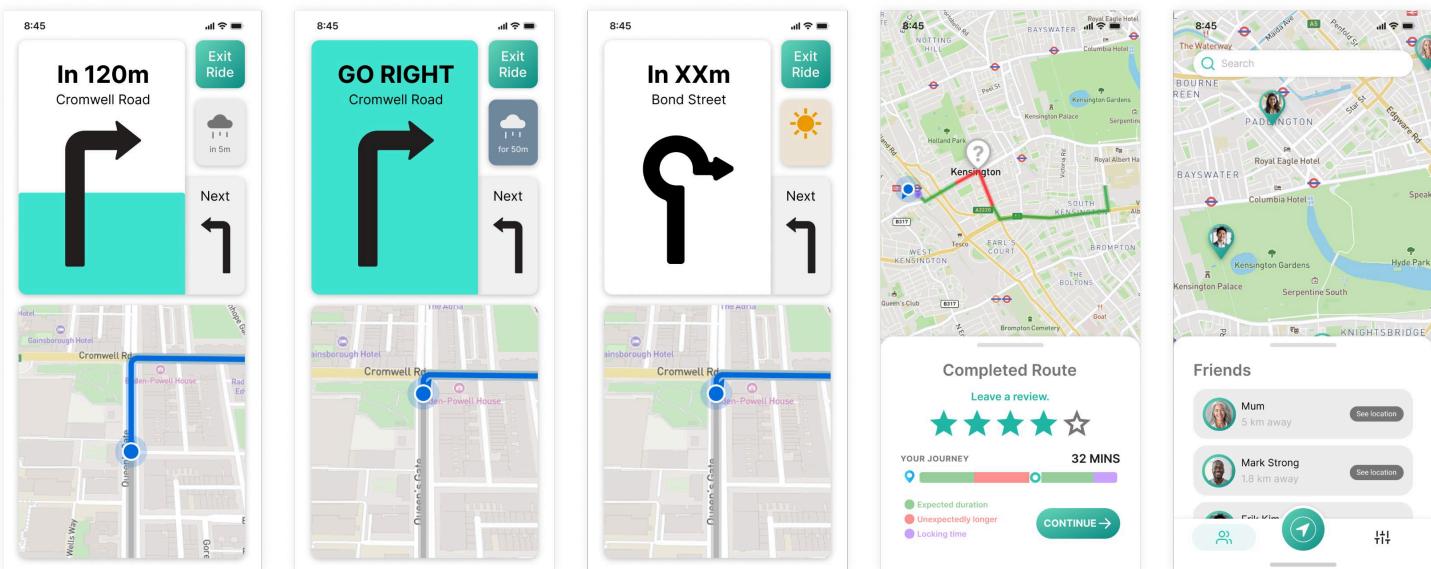
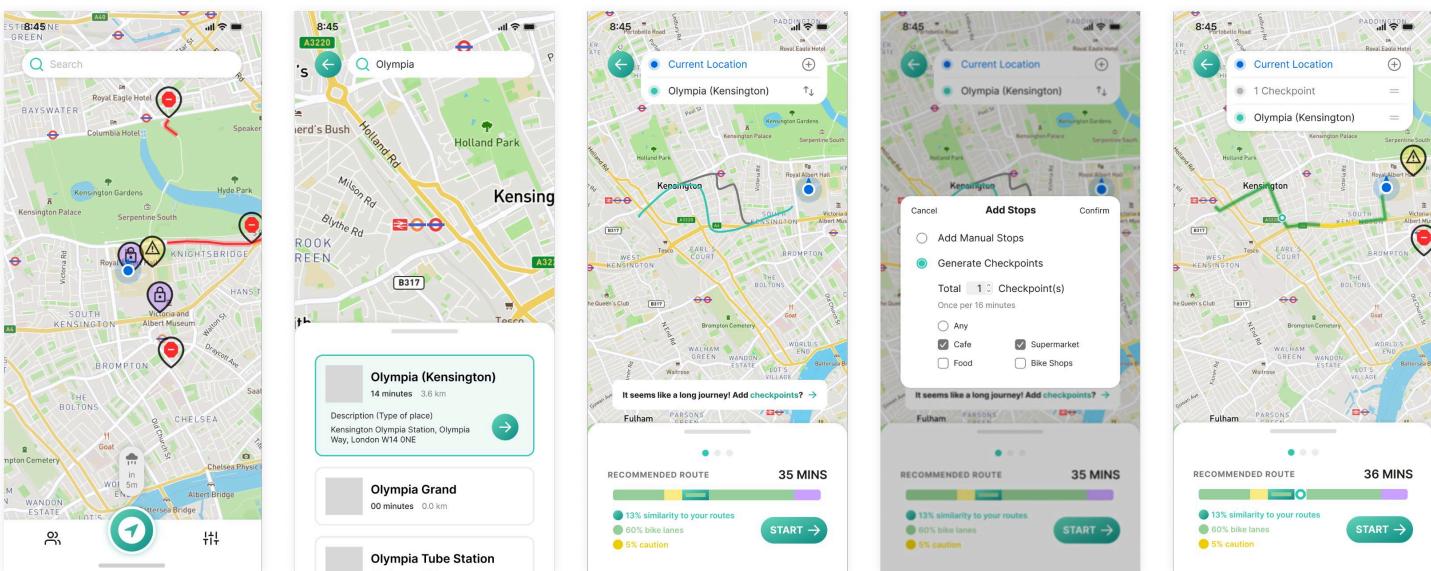
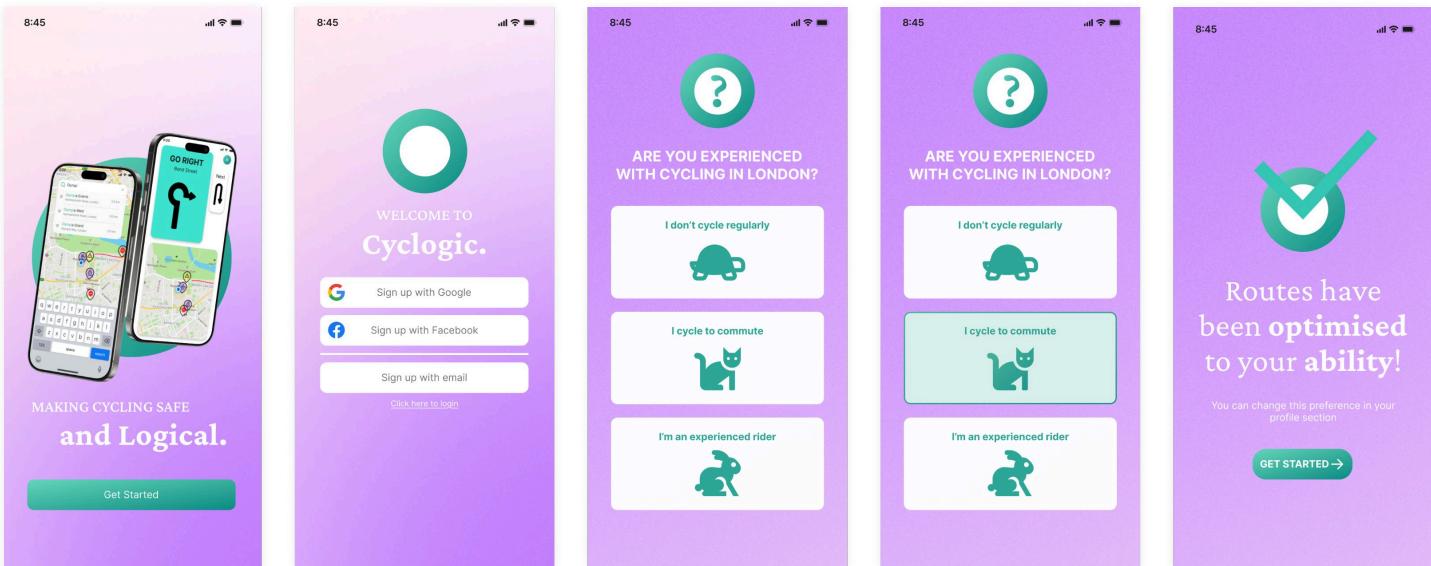
Second Survey Results



Figure 40. A screenshot of the second survey, [click here to view the entire sheet](#).

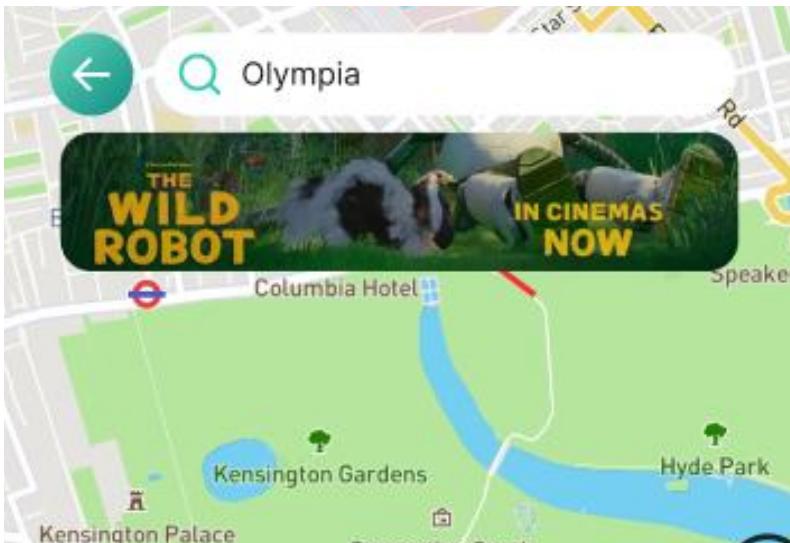
Appendix B. Figma Prototype

Key pages from Figma Prototype. Each page and button is connected via prototype function, enabling actual user interaction to gain the feedback.

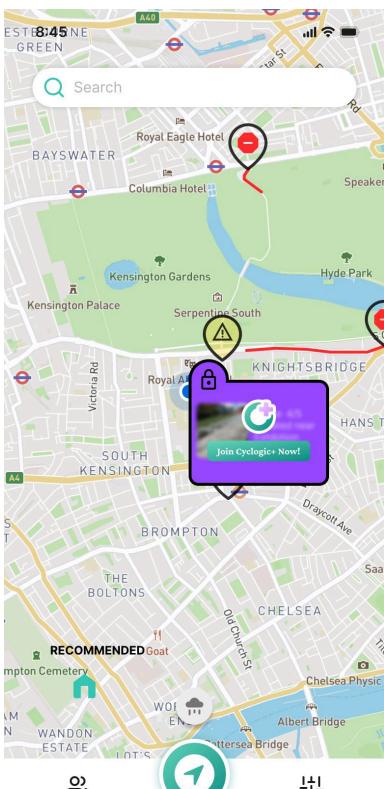


Appendix C. In-App Revenue Generation Strategies

In-App Adverts: Banner and Video



Premium Subscription Pages



8:45

Join Cyclogic+ Now!

Cyclogic

Use Cyclogic for your daily cyclist needs.

Free Plan

- Navigation
- Warnings and Closures
- Lock locations
- 2 Custom Routes

Cyclogic+

Enjoy a premium tailored experience being a Cyclogic+ member.

£4.99 per month

- Everything in the free plan
- Lock locations and scores
- Unlimited custom routes
- Offline navigation
- Friend and family locations
- Customisable Navigation UI
- Special Icon and Badge

Subscribe

Continue with free plan →

This image is a comparison page for Cyclogic's free plan versus their premium Cyclogic+ plan. It shows a purple header with the text 'Join Cyclogic+ Now!' and two main sections. The left section, 'Cyclogic', lists basic features like navigation and custom routes. The right section, 'Cyclogic+', lists additional premium features such as unlimited custom routes and offline navigation. Both sections include a 'Subscribe' button at the bottom.