Blog 2 - Group 19

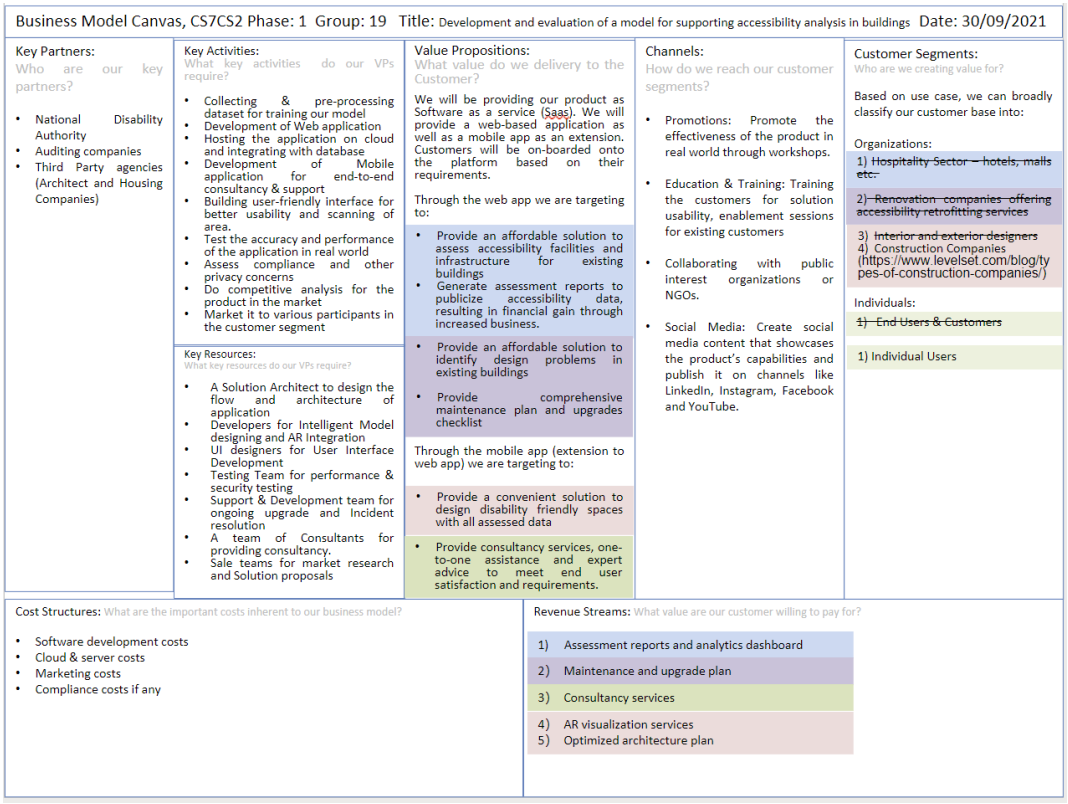
Motivation

The accessible design emphasizes that in modern society with highly developed science and technology, the planning and design of buildings and equipment must take full account of the needs of people with different degrees of disability impairment and people with declining normal mobility to use them, according to the World Health Organization 2018 report, the global population over 60 years of age will increase from 900 million (12%) to 2 billion (22%) between 2015-2050 [1], and for the number of the disabled population in the 2020 WHO survey, 15% (1 billion) of the global population has some degree of disability [2].

With such large numbers, if a company does not consider accessibility design issues, the loss to business can be huge, for example, a shopping complex, which has an average customer sales of $10, assuming it will have 100 customers per day, it could lose $100 (a conservative estimate is that 10% of your potential customers will have mobility impairments) [3], for the government a large number of Accessible buildings would save the government a lot of money for people with disabilities to gain independence in society, allowing them to find jobs, purchase goods and services, and pay taxes [3].

With the current number of aging and disabled people, many old buildings will have to be retrofitted in the future, and for new building designs more accessibility designs will be considered, so the demand for accessibility design and retrofitting of buildings will be huge.

BMC



Value Proposition

We will be providing our product as Software as a Service (SaaS). We will provide a web-based application as well as a mobile app as an extension. Customers will be on-boarded onto the platform based on their requirements.

Through the web app we are targeting to:

1. Provide an affordable and easy-to-use solution to organizations to assess their facilities and infrastructure, generate assessment reports and charts to publicize accessibility data, resulting in financial gain through increased business.
2. Provide a convenient solution to identify design problems in buildings and generate comprehensive maintenance and upgrades checklists. This solution not only provides value to auditors or third-party agencies auditing buildings, but also to individual customers looking to achieve compliance targets for their houses.

Through the mobile app, which will be an extension to web app, we are targeting to:

- Provide a solution to construction companies so that architects or designers can design disability friendly spaces with all assessed data in a timely and efficient manner.
- Provide consultancy services, one-to-one assistance and expert advice to meet end user satisfaction and requirements. This includes giving suggestions for improvements and guidance to implementing it.

Features:

In order to identify design problems, the app would serve as an extension to the web application. The mobile app would:

1. Provide AR visualization of the space to be scanned and collect data points.
2. Based on the data points, analyze parameters like:
    1. Inclination
    2. Doors
    3. Lightening in doorways and staircase,
    4. Emergency exists
    5. Emergency evacuation routes and procedures
    6. Good signage design
    7. Other safety parameters
3. Use the model to generate assessment reports and analytical data which can be visualized on the web application.
4. Generate a comprehensive maintenance plan and upgrade checklist to address the design problems.

Pains:

For individuals:

1. If an individual wants to accommodate a particular accessibility feature in his home, the auditors and third-party agencies charge hefty fees just for analysis of the space.
2. Individual interior designers or architects use older and manual techniques for assessment of a space. This involves carrying heavy equipment to the site and maintaining it.

3. They also need to learn how to operate complex equipment and sometimes hire labor for the same, as well need specialized mapping knowledge to make accessibility improvements and designs.
4. Some individuals need one-to-one assistance or expert advice for improvements in terms of accessibility, which is not readily available.
5. Some interior designers need expert advice on design problems in the space they are working on and also need assistance in designing disability friendly spaces.

For organizations or governments:

1. Companies in the hospitality sector like restaurants, hotels and shopping malls lose a large number of potential customers due to the lack of accessibility in their buildings.
2. Many organizations need to meet specific requirements or compliance targets for constructing a new building as per government guidelines for accessibility, and it can be a roadblock if not acknowledged in time.
3. Many people with disabilities are unable to shop, work and study independently due to poor building accessibility in society, resulting in lost tax revenue and increased government burden.
4. A large amount of important government building data has been compromised due to inadequate data protection by third-party auditors.
5. Construction companies and auditors are concerned about the high cost of labor and equipment maintenance for accessibility assessments.
6. Few old buildings require time-to-time auditing and maintenance for accessibility and it requires paying hefty fees to auditors and going through a time-consuming process.

Gains:

For individuals:

1. For simple improvements and designs for accessibility, they will get design advice and assessment data at their fingertips at an affordable cost. All they need to do is scan the environment on their phones and avail services that suit their needs.
2. People with disabilities can always scan their current environment and find an emergency exit that matches their situation.
3. No heavy equipment is needed. A smartphone is all that is required to take the input of the environment.

4. Architects/designers can use all the detailed assessment data and reports to design a disability friendly space, saving a lot of time as compared to conventional methods.

For companies or governments：

1. Incorporate professional accessibility design recommendations early in the building design process or make accessibility improvements later in the building process, saving budgets and generating evaluation reports and charts to publicize accessibility data.
2. Government audits of buildings will be simple and easy, we will focus only on accessibility in designated areas, and the privacy of building data will be very secure.
3. Construction companies and third-party auditors will save more money and time for accessibility assessments, equipment maintenance, and worker payroll.

Customer Segments

For Individuals

1. Those who are frustrated by the high cost of hiring a professional design or construction company to individually retrofit doors or other parts of a building for accessibility.
2. Those who do not want to waste time designing accessible buildings.

For Organizations

1. Those who want to increase or improve the accessibility of their buildings to gain potential customers.
2. Those who want to reduce cost budgets.
3. Those who want to protect the privacy of building data.
4. Those who want easy access to solutions and evaluation data.
5. Those who do not want to learn to operate complex equipment and want a simple and effective way to design accessible buildings or access for themselves or their family and friends.

Customer Interviews

Hypothesis

We assume that our customers are users who have a need to transform their living and office environment, either as designers in a renovation company or as ordinary residents. We need to test their propensity to trust products coming from different sources (online or offline) and their preference for the fee model.

Experiments

The questions in the section above were used to conduct two separate types of survey interviews. We used Survey Questions and Interviews Questions.
We obtained the results by distributing the Survey Questions on the internet and sending them to our friends.
We used Interviews Questions with people working in the renovation and design industry, and with people working in commercial flats.

Survey Questions

Survey Questions

1. Question: Do you usually prefer to buy items that you see through social media or other online advertising?
   Answer: Yes/No
2. Question: Where is the main place where you usually work?
   Answer: Hotels, shopping malls, general companies (not construction companies, decoration companies)/ Construction or renovation company/ Home/ Other
3. Question: Would you like this place to be made more accessible if it were adapted to make it easier for you to visit?
   Answer: Yes/No
4. Question: Would you prefer to get accessibility advice via AR (augmented display) on your mobile device rather than manual detection?
   Answer: Yes/No
5. Question: Which payment cycle do you think consumers would be willing to choose to pay for this accessibility testing service?
   Answer: Short-term agreement (1 to 6 months)/ Long-term service agreement (more than 6 months)/ One-time fee

6. Question: Would you prefer a one-to-one human consultation service to solve problems you encounter while using this service?
   Answer: Yes/No
7. Question: Have you ever used an AR (augmented reality) app on your phone?
   Answer: Every month/ Once every few months or never

Interviews Questions

1. What challenges you face to make accessibility plan?
2. If you have used the solution, What is the name of Solution?
3. Which feature you liked the most?
4. You need some extra feature?

Action

In order to test our hypothesis, we conducted interviews with various clients. These included designers working in renovation companies, employees working in hotels or flats and employees working in general companies.

Results

Surveys Interviews

- A sample of 18 results was obtained through questionnaire interviews:
    1. Over 70% of users are willing to buy products found online, indicating a high level of trust in online purchases.
    2. With 65% of our users working for decorators, the overall results of our questionnaire are more reflective of the views of decorators.
    3. With 76% of users willing to use AR devices, users are not averse to new technologies such as AR.
    4. With 59% of users preferring to pay for a short period of time, long-term and one-off payments are not popular.
    5. More than half of people want one-to-one human service, and the number of people who think they can't use AR to solve problems is high, suggesting that users are not optimistic about the ease of use of AR devices.
    6. Over 70% of people do not have much experience of using AR applications, suggesting a high cost of ownership at the outset.
- What we learned through face-to-face interviews:

1. the client is currently using traditional methods for accessibility modifications;
2. the traditional method is cumbersome and requires a quasi search for *CODES FOR ACCESSIBILITY DESIGN*. It is also possible to complete the retrofit, but it is very cumbersome.
3. AR technology is now being used in other areas of the renovation sector and the feedback from clients has been very positive, so clients are generally willing to try it if it is used in the same way in accessibility retrofits.

- Summary

1. Online promotion is better. We initially considered using offline exhibition boards in front of renovation companies, or advertising on bus stops, but in reality, online consumption is generally accepted by customers, and online promotion reaches more users and has more quantifiable indicators, such as: views, clicks, visits, etc. Therefore, the price is manageable and the results are visible.
2. Users do not have much experience with AR applications. Many users only use AR apps once in a while or not at all, so our product development needs to take into account more newbie orientation content. 2.
3. Users do not hate AR devices. As AR technology is currently in a rapid stage of development, we thought that users would be reluctant to learn new technology, but in fact they are not reluctant to use AR devices, even if they are not familiar with them.
4. Short-term fee models. Long-term models tend to mean lower per-use fees, and one-time fees tend to mean no cost hassles after a single high fee, but users don't prefer either one, and instead opt for short-term models, which are more of a compromise.
5. the need for human service. Many users would like to have a human service in this application, which means that it will be an important part of the system, but also that the users do not trust the AR device's ability to solve problems, so the application will have to have enough people to provide a human service in the first place, and through iterative optimization of the software, the system will gradually replace the human service with an intelligent service. This means that the application has to prepare enough people to provide human services in the first stage, and through iterative optimization of the software, gradually let the system's intelligent services replace human services, thus improving the quality and efficiency of services.

Pivots

Type of Market Fit

Our product is essentially a service for consumers, so we are in the B2C category. And it should be a one-sided market, as the focus of business is on attracting customers and conducting business.

The customers we cater to are divided into organizations and individuals.

Individuals:

A more economical analysis service for individual customers who need accessible building analysis.

Elderly, infirm and disabled people：

With aging and the number of disabled people, a lot of individual homes are not adapted to suit these people so many individual homes are not accessible if you are a landlord about to sell your home you are losing potential customers or you have a family member or friend who is disabled but you don't want to learn to operate complex specialist equipment and design yourself. I think we are a good fit for this market and we will provide easy-to-use and no expertise required design solutions to these end users.

Organizations:

A more efficient building accessibility analysis service for corporations for large projects. Most service companies and public sector companies need to consider the accessibility of their buildings when building. Real estate companies also need building accessibility analysis for construction and renovation.

Interior and exterior designers:

Not all designers or architects are well versed in accessible design, it requires a great deal of expertise and equipment and undeniably the learning cycle for it will be long and tedious. For example, if you are a house exterior or interior designer but your client needs you to design an accessible route. We will go through, analyze parameters such as inclination, doors, lighting, emergencies and generate reports, emergency evacuation routes and procedures, good signage design, safety issues and provide an audit list of repairs and upgrades. You just need to focus on your other design directions and leave the rest to us.

Hospitality Sector:

Just like hotels and malls, could by improving or designing your accessibility of buildings, you will gain more potential customers and we will provide an AR visualization of the space to be scanned, collecting data points. Based on the data points, use the model to generate evaluation reports and analyze data that you can use to promote, increase your business competitiveness and gain more benefits. We are well suited to this market.

Construction and renovation companies:

Both of the two kinds of companies have accessibility designing requirements. But that's just part of the building designing and constructing or renovating. And it is expensive to organize and training the specialized departments. It is not cost-effective. So, outsourcing that part of the work or finding a partner just like us would be a better and more cost-effective choice.

Governments:

When retrofitting government buildings, they often do not want to show building-specific data. We can focus on only the parts they need. For example, for accessibility retrofitting of access roads, we can scan only the access road itself to protect the confidentiality of the building.

Analysis of the Competition

There are currently several companies offering accessibility analysis and retrofitting services, including the National Disability Authority, which provide a service to review building accessibility.

"Occupational therapist brings along a manual, a number of paper-based data collection forms ... a folding ruler, a pen and paper ... and possibly also a camera"[4], The services offered by traditional businesses are largely dependent on human labor.

The cost of training a domain expert as well as the manpower to conduct accessible building analysis is significant and may be unaffordable for the individual consumer with disabilities.

For the corporate level consumer, due to the sheer volume of work involved, the time cost of reviewing and designing with manpower alone is significant, and companies will be more than happy to accept a more efficient service.
We compare the traditional building accessibility analysis service with our service:

	Traditional Company	Our Product
Data Collection	Professionals, ape measure, digital camera, slope measuring device, laser scanner, etc.	An intelligent electronic device with sufficient hardware, Our mobile app
Data Storage	2D: text and pictures.	3D models.
Analysis	By professionals with personal experience and knowledge.	Evaluation reports and analyze data generated by the system with the help of models and computers.

Compared to traditional companies, our use of human resources is much more focused and efficient. Firstly, consumers can measure the building data and map the 3D model of the building through the mobile app, while professionals only need to review and improve and analyze the data based on the evaluation report and analysis generated by the algorithm, making the use of human resources more efficient and focused.

Our approach also significantly reduces the cost of human resources, which are often a significant part of a company's operating costs. By reducing the cost of our solutions in this way, we have greater profit margins and can therefore offer a more economical solution than traditional accessible building analysis companies by making concessions and thus gaining a higher market share.

Personas for the Customer Segment

Persona 1: Families with people with accessibility requirements

Common Problems:

- Not having enough budget to hire professionals.
- Only a small proportion of the building needs accessibility modifications.

Persona 2: Interior and exterior designers

Common Problems:

- It is very cumbersome to carry a large number of measuring tools.
- Data collection and storage are very inconvenient.

Persona 3: Hospitality Sector – hotels and malls

Common Problems:

- There may be customers with accessibility requirements who need to consider the building's accessibility analysis needs.

Persona 4: Construction and renovation companies

Common Problems:

- Building accessibility analysis is a must but not the main business they operate in, e.g., construction companies, third-party audit firms.
- It is not cost-effective to build and train a team of professional building accessibility analysts.

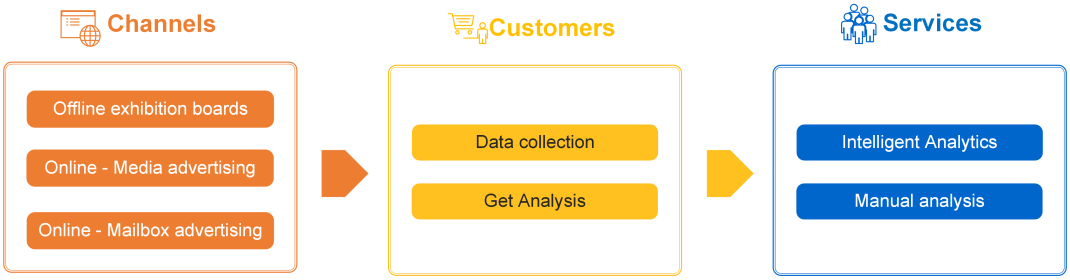
Minimum Viable Product Outline

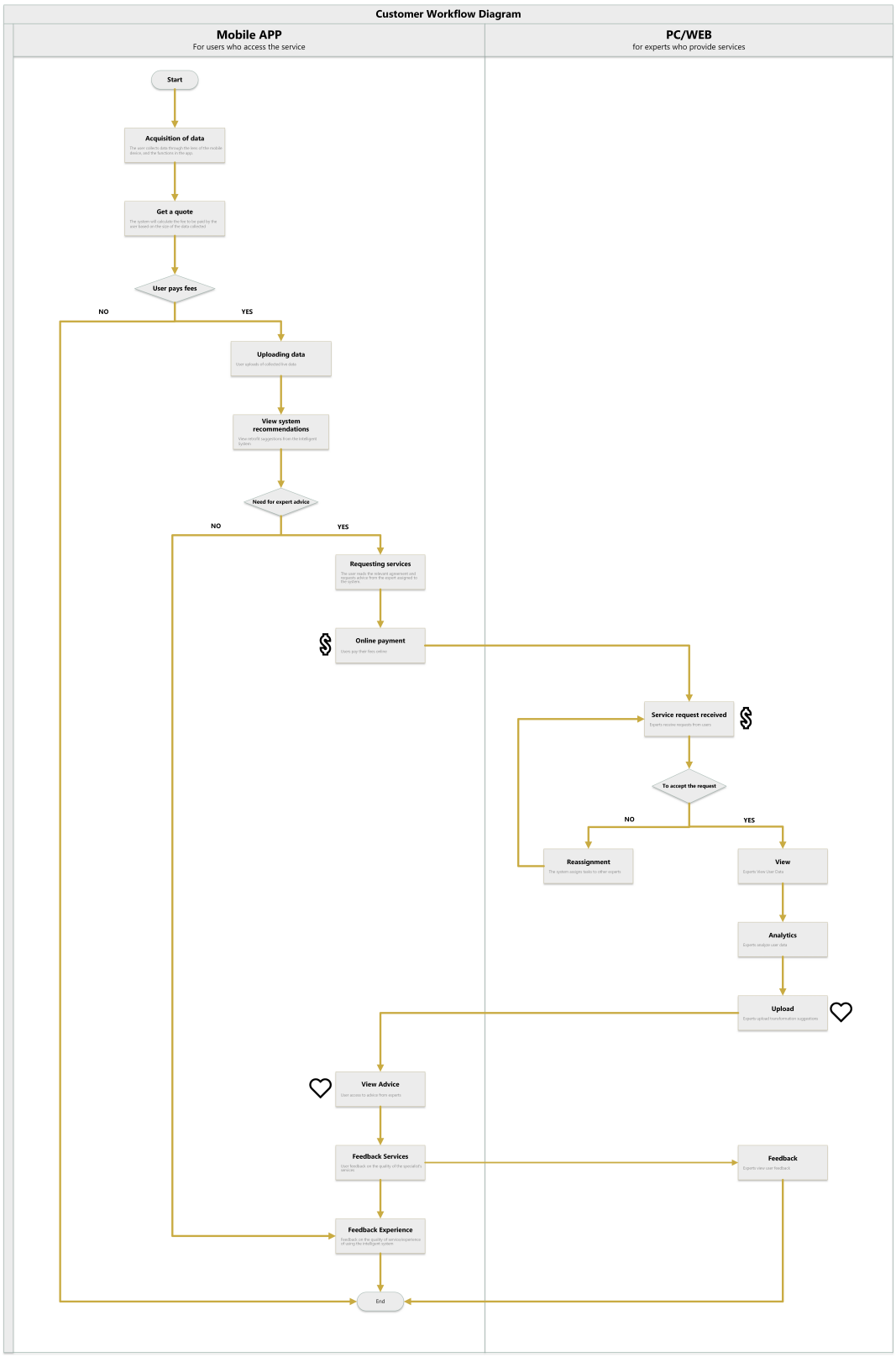
The basic requirement for the use of AR feasibility analysis is the collection of environmental data, so a camera is a must. In addition to the collection of environmental data, it is also necessary to be able to provide human services, so the downloading of the collected environmental data is also a must. Considering the need for the system to be compatible with as many platforms as possible, a mobile application is used as a framework with embedded WEB pages, i.e. it allows the client to simultaneously capture and upload data from the mobile device's camera on the mobile phone, and then the service provider can view and analyse the data via a WEB browser on the mobile phone or PC.

A technical breakdown of the deliverable is as follows:

- An Android/iOS data collection application.
  Features:
  1. environmental data acquisition via camera;
  2. uploading data;
  3. Access to retrofit recommendations;
  4. Human service request.
- A WEB application that can be embedded in Android/iOS applications.
  Features:
  1. downloading the results;
  2. Upload analysis results.

Customer Workflow Diagram





Model Economics

Expected customers through GET-KEEP-GROW funnel

Get

- **Compete for targeted customers and place online ads.**

Targeting of customers with mobility problems, the elderly, renovation companies, renovation designers, etc., through a segmentation of customers in the online advertising platform.

- ** Purchase offline exhibition space in locations close to target customers. **

Offline advertising in offline exhibition spaces in locations such as decorators, flats, schools, nursing homes and hospitals.

Keep

- **System quality upgrade.**

Regular updates to the system to improve its ability to identify and analyse the environment.

- **Latest analysis results alerts.**

After the system has been upgraded to analyse the environmental data that has been uploaded by users in the past, if there is a significant difference, a notification message will be sent to the user to remind them that they will have a better experience when using the analysis function again.

Grow

- **Periodic customer return visits.**

Customer visits to understand the quality of service, customer willingness to return and user viscosity, so as to improve the quality of service.

- **User referral programme.**

Through a mechanism of user-to-user referrals to each other, discounts on service purchases are offered to users who refer new users to register.

Generating Demand

At the heart of the way we generate demand are 'inform' and 'persuade'. These two points are the same whether applied online or offline. We achieve this by putting these two messages into our advertising messages both online and offline.

- By "informing" users who already have a need for accessibility adaptations about our capabilities. Therefore we need to work more with the marketing department in marketing and promotion to put our ability to solve problems in front of users and to 'inform' them. For example, by promoting our ability to make "extremely accessible" accessibility adaptations to customers, hotels and flats with limited mobility.
- We use 'persuasion' to get people who do not have the need for accessibility to try our services. We use motivational persuasion to convince users using the following motivations.
    - adapting one's own accessibility to potentially make it easier for a friend, if not for oneself.
    - adapting one's own accessibility will make making the unexpected happen more unexpected.
    - adapting one's own accessibility will prepare one for an uncertain future with certainty
    - adapting one's own accessibility would be caring and respectful of unknown visitors.

Estimated Customer Acquisition Cost

Channels	Cost	User Views	User Conversion Rate	End Users
Email	€500	10,000	1%	100
Social Media	€1,000	20,000	2%	400
Search Engine Advertising	€2,000	1,000	5%	50
Offline Display Boards	€2,000	3,000	1%	30
Website advertising	€2,000	10,000	3%	120
TOTAL	€7,500	38,000		700

- Thus the total customer acquisition cost for a period of a month would be approximately €10.71 (Cost/Conversion).

$$CAC = 7500/700 = € \ 10.71$$

Revenue Stream Type

We derive our revenue from two main types of services, one provided by the system and one provided manually.

* System-provided analysis services
* Manual analysis services

- Analysis services provided by the system

  The user pays a short term service fee of one quarter (three months) for access to the data upload and system analysis functions, with minor upgrades at least once a month and significant upgrades every 3 to 4 months.
  The user pays €60 per quarter or €240 per year.

- Manual analysis services

  If you require a higher quality of analysis, you can choose a manual analysis service, which will be one of the key revenues since nearly half of the users in the above survey require a manual analysis service.
  Users pay €200 for each manual analysis service.

Estimated LifeTime Value

For calculating the lifetime value (CLV) per customer we will be using the following formula:

CLV = (average value of purchase) * (number of times customers will buy each year) * (average length of the customer relationship (in years))

Users are categorised according to their background, and our platform has two types of users, as follows:

1. general users (users who do not have professional design skills)
2. Professional users (users with professional design skills)

- General users. The average user is more likely to have a need for manual services, often for a shorter period of time, but with a higher annual spend and a lower LifeTime Value, an approx lifetime value would be as follows, all values in
  euros.

Average Value of Purchase	440
Number of buys each year	1
Length of custom relationship	1

CLV = 440 * 1 * 1 = 440 **euros per year**

- Professional users. It is more likely that there is no demand for human services, the demand tends to be long term, but the annual spend is less, the LifeTime Value is higher, an approx lifetime value would be as follows, all values in
  euros.

Average Value of Purchase	240
Number of buys each year	1
Length of custom relationship	5

CLV = 240 * 1 * 5 = 1200 **euros per year**

Itemise business costs

- **Business Cost**

Our commercial costs include monthly development costs, and marketing costs, excluding the cost of an expert service team as the business grows.
The above monthly marketing costs are €7500/per month and the development costs are €1000/per month, so our fixed business costs are €8500 per month.

In the first three-month version there will be a minimum team of experts, so at a price of €4000 per person per month, the commercial cost is €12500 per month.

Survey and Conclusion

Our team uses questionnaires and user interviews to understand our customers and the needs of the market. Based on the feedback we receive from our customers, we make adjustments to our business process.

The channels we have tried and approached are:

- Face to face interviews - We conducted face to face interviews with hotel and flat staff, both from the Dublin flats and from the Chinese hotels.

- Online Survey Form - We use an online survey to find out what students, friends, family members and former colleagues think.
- Online Interviews - We interviewed working designers from various Chinese design companies about their ideas through online interviews.