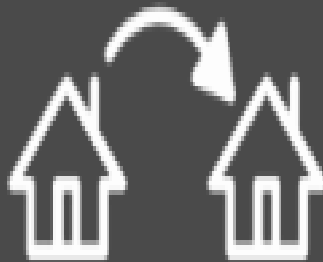# Business Plan

Final Project – Barcelona Technology School

Get Settled

By:

Sebastian Natalevich

Sibasis Dash

Francisco Coreas   June 2019

Table of Contents:

Section 1: Introduction

🔸 Problem validation

A. Background:

The process of moving out from a person's native country, although exciting, is also stressful. One of the most stressful parts of this process is related to finding the right flat to live in. After hearing experiences from our classmates in the Big Data Master classes, including one from a cofounder, we noticed that this is a problem that could be being experienced by a larger audience.

B. Validation:

To gain further insight on the problem a set of Interview Questions was drafted (see Idea Validation Appendix) and the resulting Interview helped us identify the following Customer Pains:

1. Complicated decision making due to the to the wide range of options to search from.
2. Not knowing enough about the neighborhoods in Barcelona, for a more educated and adequate decision.
3. Prices paid for the flats were well above their budgeted amount.
4. Initial flat choice was inadequate, making the student move around to a different flat.
5. Slower adaptation to Barcelona as the students are not able to establish routines until they have found the adequate place to live in.
6. Long wait to get a long-term flat after arriving in Barcelona.
7. Difficult communication towards flat owners.
   a. Language barriers with most flat owners only speaking Spanish.
   b. Unresponsiveness to phone calls, emails or chat conversions.
8. High deposits requested upfront from owners, 6 to 8-month deposit requested in more than one occasion.
9. Fraudulent flat postings from fake owners.
10. Not being able to get a Padron and NIE given they don't have a LT lease contract.
11. Not being able to sign up for internet and mobile services or opening a Bank Account given lack of NIE or Padron.
12. Added stress to an already stressful experience of moving out from native country.

Further validation was carried out through a Survey answered by 25 BTS students (See Appendix 2), relevant insights captured by the survey were:

1. 12 different languages were spoken by the interviewed population of students.
2. Most students could speak English fluently.
3. Age group ranged from 22 to 40 years.
4. 60% of the students did not have a long-term lease when they arrived in Barcelona.
5. 80% began looking for a flat to live in, at least 1 month before arriving in Barcelona.
6. Most students placed a higher value in staying within budgeted rent when searching for a place to live in.
7. Trendiness of neighborhood, distance to school, criminality and proximity to Points of Interest were also highly valued when searching for a LT term lease.
8. 70% of the students used apps that connected them to flat owners.

9. 20% of students took more than 2 months to get a LT lease after arriving in Barcelona.
10. Language barriers, paying more than budgeted amount and not knowing the surroundings before moving in were the higher valued pains.
11. Difficulty in decision making due to wide range of options had an interesting response rate as well.
12. 66% of the people have found a place to live in the Gothic, Eixample and Barceloneta neighborhoods.

C. Problem Identifications:
Foreign students in Barcelona face a common problem, this is that their settling in endeavor can become an expensive, time consuming and unsafe experience, making the job of getting settled in Barcelona a stressful and demanding process.

Section 2: Value Proposition

A. Who are we?
For foreign students **who** will be moving into Barcelona, **the** Get Settled Platform **is** a recommendation engine **that** will provide students with the best fitted location to settle in. The user experience will be enhanced by incorporating students' preferences into the Get Settled algorithm, simplifying the decision-making process and giving students an overview of neighborhoods fitted to their preferences. **Unlike** the current services that fail to provide a 'hit the spot' suggestion, **Get Settled** will do by combining a powerful algorithm with geo-location and user profiling techniques.

B. Mission

To connect students to the living space that best adapts to their way of life, enabling them to settle in faster in Barcelona.

C. Vision
To become the number one option for students around the globe when they are searching for a place to live in Barcelona.

D. What we do?
Given that most students do not really know Barcelona's residential ecosystem students have a difficult time deciding on where to live in, making this the most critical stage of the overall reallocation process and one which needs a fast solution. Get Settled solves this problem by providing the students with a selection of flat suggestions. Flat suggestions are fitted to the student's preferences after they fill out information regarding monthly housing budget, school address and desired proximity to given address.

E. Why we do it?
Students are the future of the world, they will lead teams, companies and countries. Experiences from abroad, both learning and living, represent a critical stage in the student's evolution in the world, therefore it's important that together with a high-quality education, they are also able to

enjoy their abroad living experience. This positive experience promotes a better environment for students to inspire and change the world.

With a focus in reducing one of the most stressful parts of the reallocation process we will be helping students to find a place to live, in a faster, less time consuming and less stressful way. As a positive side effect, being able to move into the correct place to live in quickly, will enable foreign students to register at the immigration offices, after which they will be able to sign up for important living services, such as wifi and mobile services, as well bank accounts and public transportation services, finally being able to settle in faster and therefore having more time to enjoy gorgeous Barcelona and inspire for the future of humanity.

Ultimately students will place a high value over a solution that simplifies the process of finding a place to live in as it provides them with an opportunity for a getting a better abroad living experience.

F. <u>User Stories:</u>
With the insight from the interview and surveys we have identified 17 user stories that our product will aim to solve in different stages of the development. These user stories are:

1. Students want to be able to search for neighborhoods, so that they can get an idea of a place to live in.
2. Students want to live in a place that meets their budget, so that they can have left over money for entertainment and travel.
3. Students want to live in a safe and secure neighborhood, so that they can move around the surroundings unworried.
4. Students want to live in a flat that is close to their school/university, so that they can get to school and home quickly.
5. Students want to live in a place near the beach, so that they can practice water sports and walk in the beach and have an inspiring scenery.
6. Students want to live near supermarkets, so that they can get their groceries easier.
7. Students want to live near nightlife centers, so that they get to enjoy the Barcelona nightlife experience.
8. Students want to live near museums, so that they can get to know the city's cultural experience.
9. Students want to live near parks and green areas, so that they can hang out near their home, breath in clean air and make picnics.
10. Students want to live in a place that is near to metro/bus stations, so that they can travel easily around town.
11. Students want to see the neighborhood suggestions in detail, so that they can quickly get to know the neighborhood and surroundings.
12. Students want to decide on their Barcelona neighborhood before arriving, so that they can settle in faster.
13. Students want that their preferences are considered, so that they can get the best fitted neighborhood suggestions.

14. Flat owners want to have less unproductive meetings with students, so that they can rent their flats faster.
15. Schools/universities want to help students settle in faster, so that students can focus in school and be happy.
16. Service providers want students to get their NIEs faster, so that they can sell students their products.
17. Adjuntamiento wants students to get a place to live in faster so that they can register the students on time and keep their logs updated.

G. How we do it?

1. Neighborhood rankings are obtained from three different categories:
   a. Price ranking.
      ▪ We connect to APIs from different online room/flat renting businesses (i.e. Idealista) and extract the available offering of living spaces at the time of the query.
      ▪ The ranking is obtained after getting the count of available offerings in the neighborhood that meet the price range criteria given as input by the student. Higher ranked neighborhoods are those where more available flats within the given price range are available.
   b. Point of Interest main ranking (POI)
      ▪ The user provides a street and number from Barcelona, usually this address will be the location of their University/School.
      ▪ Student will also provide a desired commute time to the given address.
      ▪ A ranking is obtained with the given information, further information on the methodology is given in forthcoming pages.
   c. Security ranking.
      ▪ Information from Barcelona Open Data is used to obtain a criminality rate.
      ▪ Neighborhoods that are ranked the safest are the ones with the least number of incidents per 1000 inhabitants.
      ▪ Further information on the methodology is given in succeeding pages.

2. User preferences:
   a. Users are assigned 9 points which they will distribute throughout the categories (i.e. budget, POI and security).
   b. Categories that are assigned the most points will have a greater weight in the algorithm's final ranking.

3. Results:
   a. Users will receive a map highlighting the suggested neighborhoods and points that represent the flat suggestions and the given point of interest.
   b. User will also receive images and links to the flats/rooms that meet their budget and that are available in their best fitted neighborhoods.

Section 3: Market Dynamics and Strategy

A. Market Analysis and competitors:
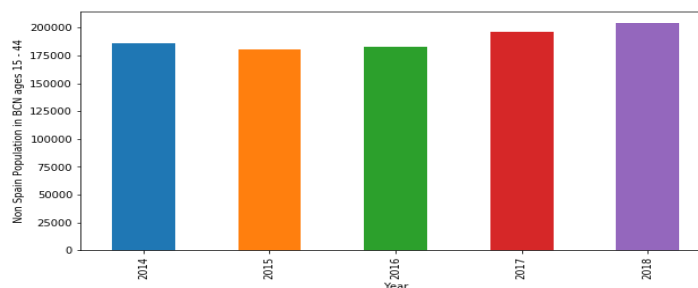
1. Target Market
    - Foreign students between the ages of 15 and 44 years that will reallocate to Barcelona for more than 3 months.
    - During 2017, 208k students enrolled in Barcelona Universities, an average of 212k per year over the past 5 years. See an evolution of student enrollment in Barcelona universities below:
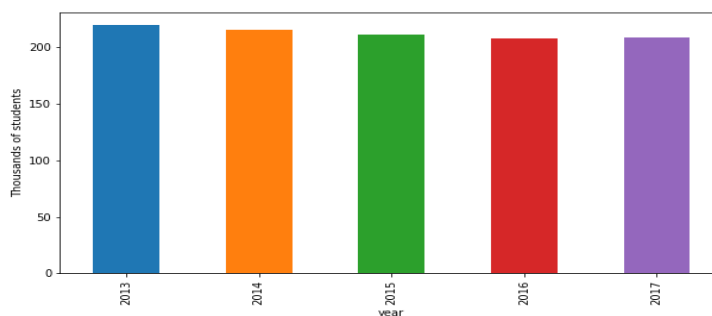
    - More importantly, during 2018 17.8K students from outside of Barcelona enrolled in Barcelona Universities, on average 16.9k students are enrolling each year at Universities in Barcelona since 2014, see evolution graph below:
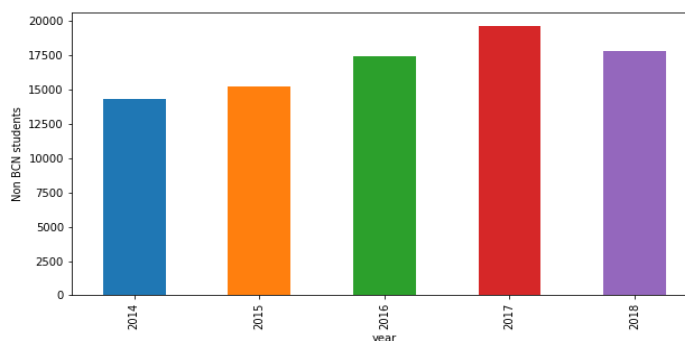
    - During 2018, 204k non-Spanish nationals between the ages of 15 and 44 were living in Barcelona, an average, since 2014, of 190k people. See an evolution of foreign population in Barcelona for the target market ages below:

    - Student enrollment at Barcelona Universities is stable at approximately 200k, which means that Barcelona continues to be appealing for students and provides a steady

target market for Get Settled. Furthermore, Forgein enrollment is also steady and confirms Barcelona remains appealing for foreigners.

- We aim to capture 30% of foreign students enrolling in Barcelona Universities through our website, which represents approximately 5k users. As Get Settled gains popularity we expect that organic growth will help us penetrate 50% of this market.
- Future development could also extend our target market to other foreign persons moving to Barcelona, not only students, therefore it's important to monitor statistics on Non-Spanish nationals, where the trend is increasing y-o-y.

2. _Marketing Strategy:_

a. *Schools and Universities*
- Schools: It's important to reach those schools in countries that export an important number of students to Universities in Barcelona, being able to reach students at School College Fairs , when students are still deciding on their University, will facilitate their reallocation decision and motivate them to move to Barcelona. Early adopters in this stage will have a better chance to get the right flat at the right price and Schools will be interested in any tool that helps their students with their College decision.

- Universities in Barcelona: As evidenced by our surveys, 60% of students do not have a long-term place to live in, when they arrive in Barcelona. Universities in Barcelona would be interested in adding this tool as a value-added service for their students. In Barcelona the University with the most foreign students enrolled since 2014 is Universidad Autonoma de Barcelona, followed by Universidad de Barcelona. Initially we would seek partnership with the top 4 Universities for foreign students in Barcelona, see graph below:
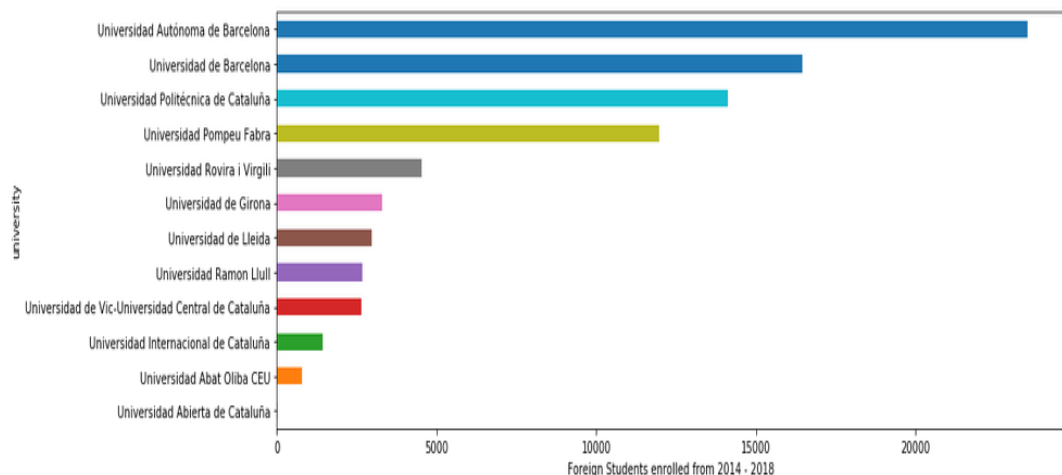
- Universities outside Spain: Barcelona Universities have exchange programs with Universities all around the world. We will look to promote our product with these exchange program Universities and thereby open another channel to reach students in other countries.

b. *Facebook ad campaign*
- Our target age group represents 74% of Facebook's 2.2 billion users as portrayed in Forbes:
  > "During October 2018, 423 million men and 267 million women aged 25 to 34 were using Facebook. Young men between 25 and 34 years represent the biggest group of active Facebook users worldwide accounting for 19% of the total active users." (Angelovska, 2018)
- Given Facebook ads work like Pay Per Click Advertising, it proves to be an economic yet powerful tool for lead generation. Facebook also has some added benefits that will allow us to add video or image to our ads and although people don't click on the ad it will still provide exposure towards a targeted audience.
- After answering a set of questions, to confirm reallocation to Barcelona, the ad's Call to Action will redirect users to the Get Settled website, allowing them to test the service. Additionally, Facebook ads are perfect as they allow us to collect basic information from potential customers, which has already been shared with Facebook.

c. *Word of mouth marketing*
- Good experiences are the base for creating loyalty from customers and is a driver of word of mouth marketing. As more users decide on the right place to live in through our website, they will widespread their positive experience towards other potential users and allow us to achieve an important organic growth in our subscriber base.
- We note that loyalty to our brand can't be measured by how often a user utilizes our service, as the probability for a user to reuse the service once they have settled is small. Nonetheless, user recommendations to a third party can be used as a loyalty indicator. To further incentive this word of mouth marketing we can provide rewards for users that recommend the website to their friends, some ideas of such incentives are:
  - Supermarket coupons
  - Mobility tickets (TMP, Aerobus, Bycing, etc.)
  - Free passes to different venues happening in Barcelona
  - Discounts in restaurants and bars

3. <u>Competitive Landscape</u>

   a. *Place I Live (https://match.placeilive.com/)* is not a competitor yet as it currently only offers its services to Chicago, San Francisco, New York, Berlin and London. The company provides a service that matches the user to a best fit neighborhood after they answer a set of questions. To provide this recommendation they score neighborhoods on a scale of 0-100 and create a Life Quality Index (LQI)[1] which they combine with the answers from the users to the questions.

---

[1] "The LQI is calculated by combining all the data on transportation, safety, health, affordability, entertainment, demographics, leisure and other essentials for everyday life. All our data comes from very reliable sources, like the MTA, NYPD, Google, Socrata, Foursquare and the U.S. Census to offer you the best information to find the right place to live." (Place I Live)

b. *Right Move (https://where.rightmove.co.uk/)* is not a competitor yet as its neighborhood suggestion service only includes the United Kingdom, although the platform doesn't offer the vast amount of information on neighborhoods that Place I Live provides, it does provides a connection to the available flats in the suggested neighborhoods. The user gets the suggestion based on the proximity to a point of interest and a given price range. We note that Right Move can become a competitor soon as it already has presence in Spain, but its services are focused on flats and houses that are for sale and do not recommend users to a Barcelona neighborhood.

c. *Google like competitors:* Google, Citymapper and their peers could be considered competitors as they hold every bit of information of the City and are great engines to help Students get to know the Barcelona landscape before they arrive, nonetheless they don't provide custom fit suggestions for their users. Furthermore, we mostly see these companies as partners as the future developments of the product will connect to their APIs to provide further benefits for our users.

d. *Idealista like competitors:* Although Idealista, Badi and all the vast range of real estate agencies in Barcelona are competitors given potential users can directly get a flat by accessing their website, nonetheless they are mostly considered partners. Get Settled will connect to their APIs to link the Get Settled website to their apartment offerings, this will help flat owners attract users who are more informed on the Barcelona landscape therefore increasing success rates for flat owners renting their spaces. See appendix 11 for more information on Partners and Competitors.

B. Key Financials and Projections:

Get Settled Initial Cash Flow	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Total
Cash Inflows	**1,200 €**	**2,400 €**	**3,600 €**	**4,800 €**	**2,400 €**	**1,200 €**	**600 €**	**0€**	**0€**	**0€**	**0€**	**0€**	**16,200 €**
Pay per use	1,200 €	2,400 €	3,600 €	4,800 €	2,400 €	1,200 €	600 €						16,200 €
Recomender fees													0€
Cash Outflows	**-20,100 €**	**-5,460 €**	**-5,965 €**	**-5,965 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-84,410 €**
Initial Investments	-20,000 €	-5,360 €											-25,360 €
Webpage/app development	-20,000 €												-20,000 €
Legal and incorporation costs		-3,200 €											-3,200 €
Legal counsel fees		-2,160 €											-2,160 €
SGA and Wages	-100 €	-100 €	-5,965 €	-5,965 €	-5,865 €	-5,865 €	-5,865 €	-5,865 €	-5,865 €	-5,865 €	-5,865 €	-5,865 €	-59,050 €
Advertising	-100 €	-100 €	-100 €	-100 €									-400 €
SG&A			-865 €	-865 €	-865 €	-865 €	-865 €	-865 €	-865 €	-865 €	-865 €	-865 €	-8,650 €
Salaries / Wages			-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-5,000 €	-50,000 €
Financing requirements	**-18,900 €**	**-3,060 €**	**-2,365 €**	**-1,165 €**	**-3,465 €**	**-4,665 €**	**-5,265 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-5,865 €**	**-68,210 €**

1. Cash outflows:
    - Webpage development has been estimated at EUR20,000.00 the budget for the webpage development includes a moderately stylized design, 10-50 pages, SEO placement guarantee and Basic database integration. Refer to webpage budget appendix.

- Legal fees add up to EUR5,360.00 which is the cost of duly incorporating and registering a new company in Spain.
- We have estimated EUR400.00 for advertising costs, from June to September, based on the pay per click schema from Facebook adds. The selected months for advertising consider that 80% of students began looking for a flat to live in at least 1 month before arriving in Barcelona.
- SG&A sum up to EUR865.00 per month and they consider EUR700.00 for office space, EUR180.00 for electricity, EUR15.00 for internet services and EUR30.00 buffer for unforeseen expenses.
- Wages and salaries consider a 3-person workforce with the Data Analyst receiving EUR1,800.00 the Business Promoter EUR1,600.00 and the Database Specialist EUR1,600.00

2. Cash inflows:
- The revenue model is based on a pay per use, to catch the user's attention we will provide free neighborhood suggestions, however if users want apartment recommendations as part of the results, they will have to pay EUR1.00 for each time they run the search engine.
- Revenues will be generated between the months of June and December, considering that University classes in Barcelona begin between September and November.
- The high traffic months go from July to October and this is when 80% of total revenues for Get Settled will be produced.
- During our first year we are estimating that in average 2,000 paying customers will be using the website in the high peak months.

3. Financing Requirements:
- With the first year of operations we have estimated that financing needs will add up to approximately EUR70,000.00, most of which will be used to pay for salaries and the website development.

4. Revenue drivers after 1st year of operations:
- Organic growth from satisfied customers will drive growth in our subscriber base.
- Road shows in cities and countries that have a high rate of students coming to Barcelona, will also help in driving our subscriber base.
- Pay per use will be increased to EUR2.00 given a better iteration of the suggestion engine and further increases until a ceiling of EUR3.00 will be happening year on year.
- New tailored premium services to be included such as:
  - Lifestyle considerations
  - Restaurant suggestions
  - Venue and events suggestions
  - Monthly list of things to do.
- Advertisement from service providers in Barcelona can be channeled through our website. Given our market niche service providers can advertise specific products that are best fitted for students.

- Expanding the service into other popular cities for students, such as Madrid, will help in redirecting a larger amount of traffic to our website.

Section 4: Big Data Solution & Infrastructure Proposition

Ranking Methodology

A. User Inputs:

1. Ranking inputs
   a. POI inputs:
      i. Users provide an address (street and number), in this case given our persona are students we assume they provide the University's address.
      ii. User provides desired commute time, in minutes, to their POI.
   b. Budget inputs:
      i. Users provide a price range which represents how much they are willing to pay on a monthly basis for an apartment.
      ii. Users provide housing type of preference, specifying if they are looking for a full flat, only a room or if they are indifferent to it.

2. Weights
   a. The user gets 9 points which they can distribute among the three ranking categories. More points in a category means that the user places more value over it and will have more weight in the algorithms final ranking decision.
   b. The user must allocate all 9 points and categories need at least a 1-point allocation; 0 points is not permitted.
   c. User can allocate the same amount of points to all categories.

B. Price ranking:

1. Tools:
   a. Python
   b. Jupyter Notebook

2. Data sources:
   a. Source: Idealista API < https://api.idealista.com/3.5/es/search >

3. Dataset Strategy:
   a. Currently Idealista's API connection provides us with a limited amount of calls and the max. number of pages that can be collected in each call is 50. Given this limit we will be storing a day's worth of calls into the database, this will allow us to speed up the algorithm, as it will work with data stored in our database and will also guarantee that the day's information is always available.
   b. From Idealista we can collect the following information:

i. Type of house: (house, flat, room)
ii. Price of house
iii. Neighborhood of location
iv. Latitude
v. Longitude
vi. Url to Idealista link of house
vii. Thumbnail of house

c. The ranking will be created using the student's monthly budget input. Students will be asked to provide a price range, which will then be used to count the houses that fall in the given range, each house that is within the range will be added to the neighborhood's count of houses that fall in the given price range. Finally, neighborhoods with the most houses in the given price range will be better ranked, meaning that user have a higher chance of getting a house that is within their budget at these top ranked neighborhoods.

C. Point of Interest (POI) ranking:

1. Tools:
   a. Python
   b. Jupyter Notebook

2. Data sources:
   a. Source: Here < https://developer.here.com/?cid=www.here.com-main_menu >

3. Dataset Strategy:
   a. We combine the user's given inputs, POI and desired commute time from POI with Here's API.
   b. Using the Here API, the POI is plotted as a center point and circles are drawn around the center point. Each circle is drawn by connecting 16 points that surround the center point.
   c. User weights and commute time from POI are combined to get outer circle's radius, which represents the distance to the Point of Interest. For example, if the user assigns a weight of 1, which represents little significance of this variable, we multiply the result of the subtraction of 9(total number of importance points) – 1(assigned importance) times 120 (meters) and then add it to the distance we derive from the user's given commute time.
      i. user importance meters = (9-1) = 8 * 120 = 960 meters
      ii. derived distance from commute time = 700 meters
      iii. radius of outer circle to POI = 960 + 700 = 1,660 meters
   d. The assumptions that are made to get the distance, in meters, is that the average speed of a person in a sidewalk is 5 km/hour (Wikipedia, 2019), so from this we can derive that a person walks 83.3 meters per minute.
   e. Each circle that is drawn is reduces the distance to the POI by 300 meters. Circles are drawn until the distance to the radius is less than 1.

f. The ranking is finally obtained by counting the number of points (out of each set of 16 points) that fall in each neighborhood, therefore the neighborhoods with more points falling in them represents that the neighborhood is closer to the POI and is therefore better ranked. Image 1 represents the operation that the algorithm is using to obtain the rankings.

Image 1:

.

D. Security ranking

1. Tools:

   a. Python
   b. Jupyter Notebook

2. Data Sources:
   a. Incidents: < https://opendata-ajuntament.barcelona.cat/data/en/dataset/incidents-gestionats-gub >
      1. Update frequency: Yearly basis, data currently updated from years 2015-2018
      2. Columns in database:
         i.   'Incident Code': Unique code for incident.
         ii. 'Description Incident': One-line incident description.
         iii. 'District Code': Unique district code.
         iv. 'District Name': Name of the district where the type of incident happened.
         v.   'Neighborhood Code': Unique district code.
         vi. 'Neighborhood Name': Name of the neighborhood where the type of incident happened.
         vii. 'Year': Year when incident happened.
         viii. 'Month of Year': Month number in which the incident happened.

        ix.   'Month Name': Month name in which the incident happened.

        x.   'Number of Incidents': Number of incidents of the same description reported in Barcelona for the given year and month.

b. Population and Density per neighborhood: ‹https://opendata-ajuntament.barcelona.cat/data/es/dataset/est-densitat/resource/c2377d82-774c-4d54-8e56-6c8978189df9 ›

    1. Update frequency: Yearly basis, data currently updated from year 2017

    2. Columns in database:

        i.   'District Code': Unique district code.

        ii.   'District Name': Name of the district where the type of incident happened.

        iii.   'Neighborhood Code': Unique district code.

        iv.   'Neighborhood Name': Name of the neighborhood where the type of incident happened.

        v.   'Població': Population in neighborhood

        vi.   'Superfície (ha)': Area of Neighborhood in hectare

        vii.   'Superfície Residencial (ha)': Residential area in hectare

        viii.   'Densitat (hab/ha)': Neighborhood density

        ix.   'Densitat neta (hab/ha)': Density per residential area in neighborhood.

3. Dataset Strategy:

a. Incident categorization: There were 93 unique incidents throughout the years 2015 - 2018. Given incidents have different risk factors, (i.e. a robbery represents a more painful experience than a report of noisy neighbors) the different incidents descriptions have been categorized into high risk, medium risk and low risk. Higher risk incidents play a more important role in determining the security ranking for a given neighborhood. Incident categories are portrayed below and also find incident map in Incident Mapping Appendix.

        i.   'Low Risk' = No multiplying effect, each incident counted as 1.

        ii.   'Medium Risk' = 10 times 'Low Risk', each incident is counted 10 times.

        iii.   'High Risk' = 100 times 'Low Risk', each incident is counted 100 times.

b. Neighborhoods with a greater population density will naturally reflect more incidents than less populated neighborhoods. The model would be bias towards choosing neighborhoods that have small populations, excluding safe neighborhoods that are highly populated.

c. Bias reduction: The total amount of incidents in the neighborhood (already transformed in categorization) is divided by the population in the neighborhood and then multiplied by 100 [(incidents/population) *100] (Taylor C. , 2018).

d. The result of the previous equation makes neighborhoods comparable despite their population size. The incident score is represented by the number of incidents per 100 people. A high incident score represents an unsafe neighborhood and will place low in the ranking.

E. Final Ranking and visualization

1. Ranking Combination
    a. We begin with the first two rankings, POI and Budget, so we can focus the final ranking in fewer neighborhoods (i.e. 10 neighborhoods instead of 73), given these two ranking will filter out neighborhoods that are either too far away from the POI or that are completely out of budget.
    b. We then include the Security Ranking score for each of the neighborhoods in the reduced list.
    c. Normalization: Given we are using the scores obtained in each of the categories these are normalized by subtracting each score from the mean value of the ranking category and then it's divided by the standard deviation of the category.
    d. Finally, the normalized scores are then multiplied by the weights that the user assigned to each of the categories to compute a final score for each of the neighborhoods in the final list.
    e. Neighborhoods with the highest score become the better ranked neighborhoods.

2. Visualization
    a. Using the python Telluric library (Satellogic, 2018) we are then able to highlight the top three neighborhoods in a map of Barcelona. The highlighted neighborhoods show the POI as a point in the map, as well as the suggested housing options in different color. See Image 2 as a sample of the solution.
    b. The user also obtains an image of the flat/room as well as a link to the flat/room in the Idealista website.

Image 2:
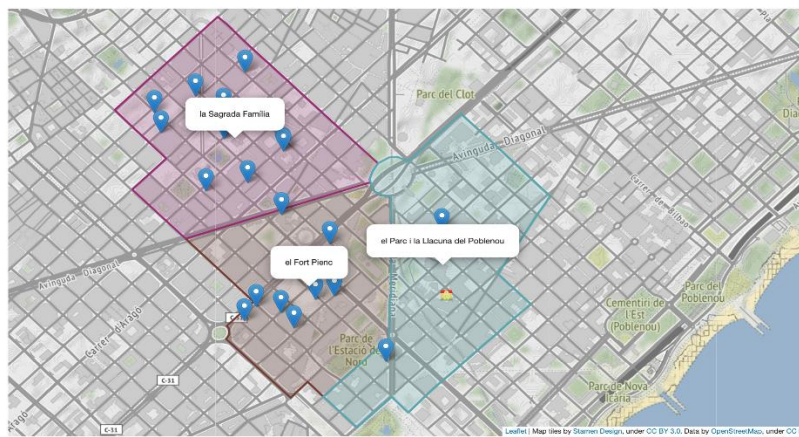
3. Link to Github repository and website:

   https://github.com/snat07/GetSettled

   https://getsettledbcn.wixsite.com/getsettled/result

🔸 Data Architecture:
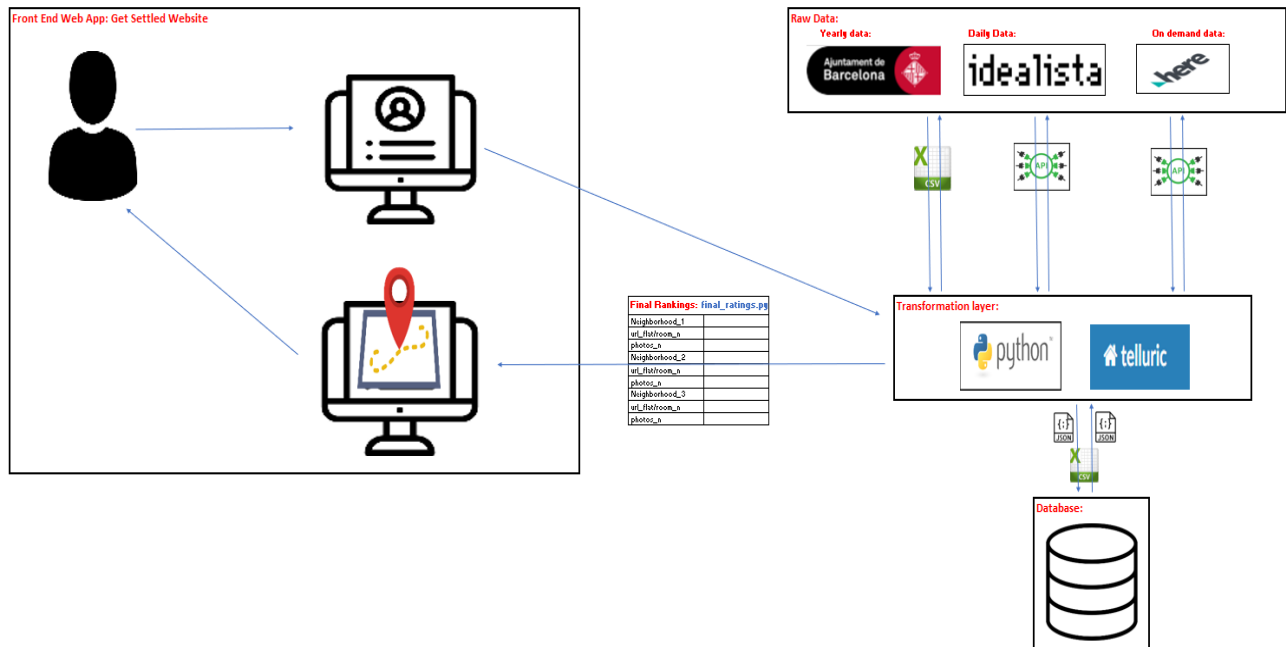
1. Data types:
   a. Raw data will be fetched from four sources. The proposed infrastructure divides the data in three main categories:
      i. Yearly Data: Barcelona Open Data is fetched from Adjuntament de Barcelona which is updated on a yearly basis. This data is only used to produce the Security Ranking and we will update the database once the information from the new year is uploaded to the Barcelona Open Data portal. This information is available in Json and csv formats, currently we collect csv.
      ii. Daily Data: Connection to Idealista's API provides us with information on available flats which are used to produce the Budget ranking and to provide the users with a selection of flats. Given that a flat that was available today might not be available tomorrow we will collect this data on a Daily basis and store it in our Database, this will help speed the algorithm as we won't have to wait for any lags that might occur from the connection to the Idealista's API and we will also ensure that daily limit is not surpassed.
      iii. On demand data: This category includes connections to Here as well as inputs provided by users which we feed to the Here API. The data we collect and store from this operation is mostly related to inputs provided by the users as we don't collect information from Here's API, which is only used to formulate the calculation of the POI ranking.
   b. Transformation Layer: All the information will then be transformed through a Python script that will automatically produce the final ranking, we have included Telluric which is the Python library we use to produce and highlight the neighborhood

suggestions in the Barcelona map, which we then feed to the user through the browser.

    c. All information, including final rankings will be stored in a simple SQL Database with the purpose of using it for future developments and improvements to the product.

F. <u>Website Design</u>

    a. See website design in Appendix

Section 5: Product Development

New functionalities, scaling and future value creation

1. Lifestyle

   Foursquare, Trip Advisor and Yelp like applications have numerous venues, Get Settled and its users can benefit from this information. By scraping the APIs of these companies Get Settled will extract venues in Barcelona and categorize them to produce lifestyle categories with the help of feature engineering, some examples of the categories we can extract are:

   - Restaurants
   - Outdoor / beach
   - Fast food
   - Health & Fitness
   - Parks
   - Nightlife
   - Culture
   - Shopping
   - Food markets

   On a first iteration over this feature we can personalize neighborhood suggestions for users based on their lifestyles, which will be inferred from their responses to a new question category. However, with further developments we will use sentiment analysis from user rating in these platforms and if for example a user is particularly interested in well rated Italian Restaurants, we can then filter the restaurants category by Italian restaurants and extract the best rated restaurants near the user's suggested neighborhood, and provide fit suggestions through push notifications to the user's smart phone (once the mobile application is available).

   Furthermore, venues interested in increasing traffic towards their events could find Get Settled useful for promoting these events to the best fitted audience. With the help of the lifestyle category we could also focalize specific offerings and promote venues to the audience where it will have more impact. For example, if a user is interested in the cultural experience in Barcelona, we can than suggest best days to visit the cultural venues surrounding the neighborhoods, or send promotional codes for entering museums, thereby saving money for the user's and helping the venues reach the correct audience for their events.

2. Neighborhood Statistics

   Barcelona Open Data[2] also offers information on age groups and nationalities of the people that live within a neighborhood. When the neighborhood suggestions are given to the user, we can include a visual interface that describes and summarizes important aspects of the neighborhood such as these age groups, nationalities, crime rates. Furthermore, we can enrich these statistics by providing summaries that showcase restaurants by cuisine, nearby metro stations and surrounding bus routes. The neighborhood statistics will be a great tool for users to get to know

---

[2] http://www.bcn.cat/estadistica/catala/dades/barris/tdemo/imi/nacn2017.htm
http://www.bcn.cat/estadistica/catala/dades/barris/tdemo/imi/edq2017.htm

key aspects of the neighborhood before they arrive in Barcelona and will also allow them to make a better decision on the neighborhood.

3. Events newsletter to create user loyalty
Several sources can be found in the internet that showcase events happening throughout the year in Barcelona. Barcelona Open Data website has datasets that includes the different events in the city[3], Meetup and other similar applications also provides an updated platform with different types of events happening in Barcelona. Given that we will already have knowledge on the user's lifestyle we can create clusters of user's with similar lifestyles and produce weekly or monthly newsletters that will give the user a summary of events that might interest them as well as a "venue suggestion of the week" category. This will help Get Settled to better engage with its users and increase loyalty towards the brand. We can also use these communications to continue gathering information from users, for example after the user has finally established in a home, we can use these interactions to engage with the user and find out if the neighborhood and flat in which they established was well fitted to their expectations, allowing Get Settled to label its suggestion data and in the future to provide better suggestions using machine learning techniques.

4. Collaborative filtering to improve user profiling
Popular social networks platforms such as Instagram or Facebook will provide an important improvement to our suggestion engine with little interaction from our users in the Get Settled platform. When the user chooses to connect these platforms to the Get Settled website, we could use profiling techniques that will help us gain some knowledge of the user based on their friends, check-ins, their photos and the hashtags they use the most. Ideally, we would be able to recreate a home profile of the user and try to suggest a neighborhood and lifestyle recommendation that will fit their current profile and therefore help users feel more at home, but in Barcelona.

5. Scaling the service to other cities and for other types of users
Initially our target audience is Barcelona foreign students and we will develop the previously mentioned functionalities in the Barcelona area, nonetheless once they have been deployed they could be replicated relatively faster in other cities with large populations of foreign students arriving each year as well as in cities that have Open Data available. What is most important is that once The Get Settled website has developed these functionalities the product will also cater expats and not only students, exponentially expanding our target market in each new city as well as in Barcelona.

6. Developing the Mobile Application
Mobile application development is rather expensive but it's a valuable source for reaching more users. A sustained organic growth in the Get Settled website will help us promote our product to friends, family and fools and get enough funding to produce a Mobile application.

---

[3] https://opendata-ajuntament.barcelona.cat/data/es/dataset/agenda-cultural
https://opendata-ajuntament.barcelona.cat/data/es/dataset/agenda-diaria

Having a mobile application that incorporates all mentioned features will improve outreach and help sustain organic growth for the following years. Some benefits from having a mobile app include:

- Increased Visibility to Clients at All Times
- Building Brand Recognition
- Increase in Customer Engagement
- Increase in Customer Loyalty

Having a functional website is the place to start. However, after attracting new customers, we can urge them to download the app on their mobile devices and finally use the app to generate profitable opportunities. We will also be able to create engagement by encouraging user reviews and interactions in a simple way and even create social networks from people with similar lifestyles moving into Barcelona. (Gazdecki, 2016)

7. Value generation for Get Settled and to companies

As more features and the mobile application are rolled out, more real estate agencies will have the need to attach to the platform as we will be able to provide a greater and more efficient outreach to their potential customers. Furthermore, venues will become interested in this same outreach and this is when we will be able to monetize, by promoting their services through our platform, opening a new revenue stream for Get Settled.

Additionally, "Such a platform could be of tremendous use to city designers, business owners and marketers who could customize their products and services basis the "lifestyle" group of each Neighborhood and build their business models around smaller cluster centers." (Mertikas, 2019). Ultimately the economic benefits from being able to reach a pre profiled audience would be incredible for companies and for Get Settled.

✚ Data Architecture for the future Get Settled:
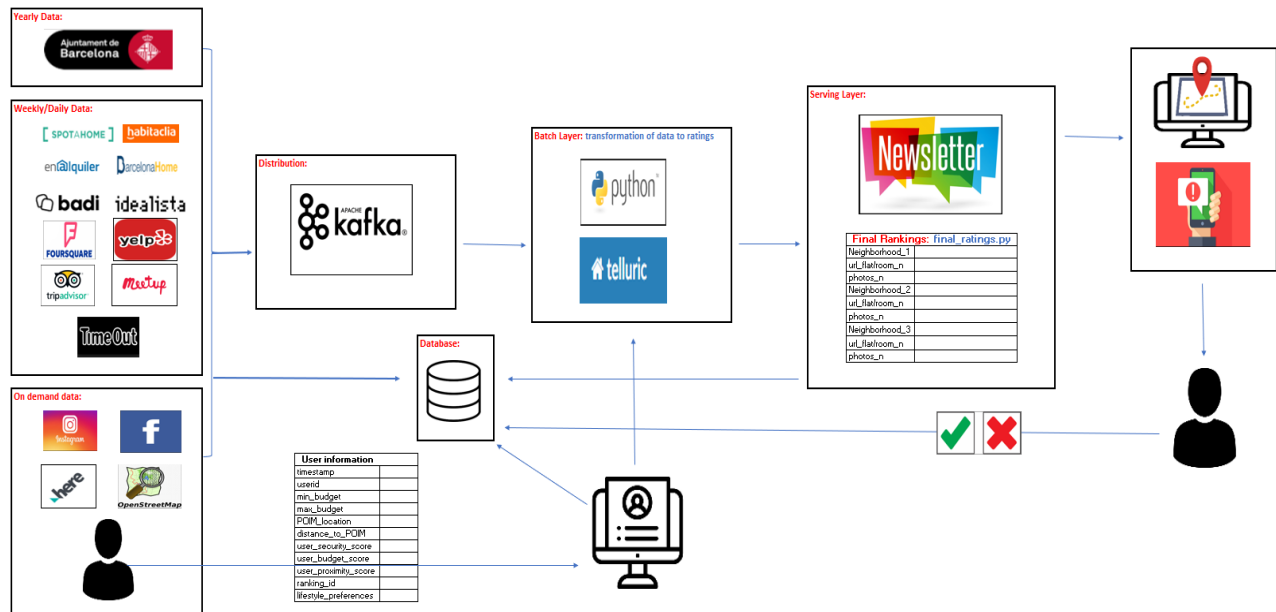
The new architecture considers the different data streams we will have out our disposal. We have again divided the raw data on yearly, weekly/daily and on demand data. This approach to architecture provides the best option as it uses batch processing to provide comprehensive and accurate views of batch data, that will allow us to gather structured and unstructured data.

Distribution (Apache Kafka)
Initially the data that will be harvested from different sources have a small volume and less variety between each other. Nonetheless, future integrations with more real estate partners, social networks and venue information will increase the volume of the data and bring more data variety into the architecture. Kafka provides key benefits such as acting as a buffer, so our systems don't crash, reduces the need for multiple integrations and allows us to deliver data quickly to our users. (Maarek, 2018)

Batch Processing (Python)
We will continue developing new Python scripts that will deliver better rankings and visualizations as well as it will become an important tool when enough information is available to start producing machine learning models.

Section 6: Bibliography

Angelovska, N. (2018, December 20). *Men Dominate Facebook With 35% More Active Accounts Than Women*. Retrieved from Forbes: https://www.forbes.com/sites/ninaangelovska/2018/12/20/men-dominate-facebook-with-35-more-active-accounts-than-women/#

Gazdecki, A. (2016, August 29). *10 Ways Your Business Can Grow with a Mobile App.* Retrieved from Small Business Trends: https://smallbiztrends.com/2016/08/benefits-of-having-an-app.html

How much should a website cost in 2019? (2019). Retrieved from Web FX: https://www.webfx.com/How-much-should-web-site-cost.html

Maarek, S. (2018, March 8). *4 Key benefits of Apache Kafka for Real-Time Data*. Retrieved from Udemy: https://business.udemy.com/blog/4-key-benefits-of-apache-kafka-for-real-time-data/

Mertikas, D. (2019, April 10). *What Neighborhood should I live in?A recommendation system for new Expats.* Retrieved from Medium Corporation: https://medium.com/@d.mertikas/what-neighborhood-should-i-live-in-a-recommendation-system-for-new-expats-2941b27c55ab

Satellogic. (2018). *Telluric*. Retrieved from Telluric: https://telluric.readthedocs.io/en/latest/

Shouldis, G. (2017, January 7). *The 7 Best Places To Advertise Your Business Online* . Retrieved from 3bugmedia: https://3bugmedia.com/best-places-advertise-business-online/

Taylor, C. (2017, July 24). *Facebook Lead Ads: The Definitive Guide For 2017*. Retrieved from Ad Espresso: https://adespresso.com/blog/facebook-lead-ads/

Taylor, C. (2018, March 13). *How to Calculate Prevalence Rates Per Thousand*. Retrieved from Sciencing: https://sciencing.com/calculate-prevalence-rates-per-thousand-7533277.html

Wikipedia. (2019, June 20). *Walking*. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Walking

Section 7 – Appendixes

Idea Validation Appendix

Interview Questions:

- How did you pick the Neighborhood?
- How did you find the apartment?
- What about the language experience?
- Did you felt in anytime that you are going to be scammed?
- Are you happy with the result?
- How was the experience? Did you find it stressful?
- Did you receive any help? From whom?
- What about the language experience?
- Do you think if you had more guidance, this would been much easier?
- After undergoing the whole process of coming to Barcelona and getting settled
    i) Which was the most stressful part?
    ii) Why?
    iii) Did you receive help from your University?
    iv) Did you find all the info and things you needed, easily?

Appendix 2

1. Select Gender:
25 responses
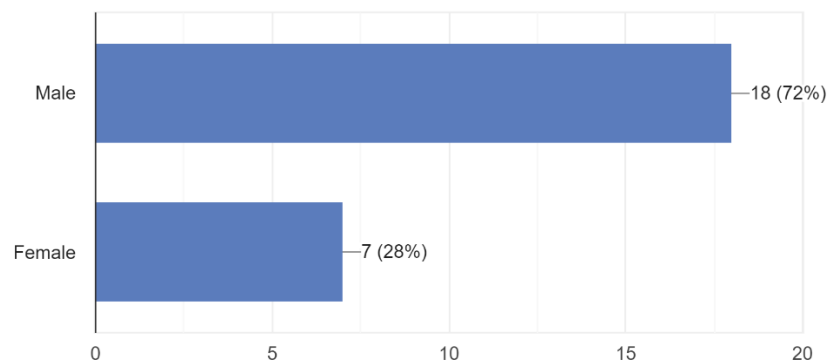
2. Age:
25 responses
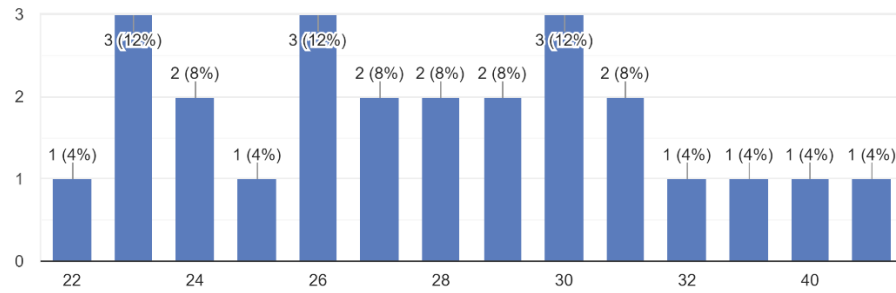
3. List your native speaking language :
25 responses
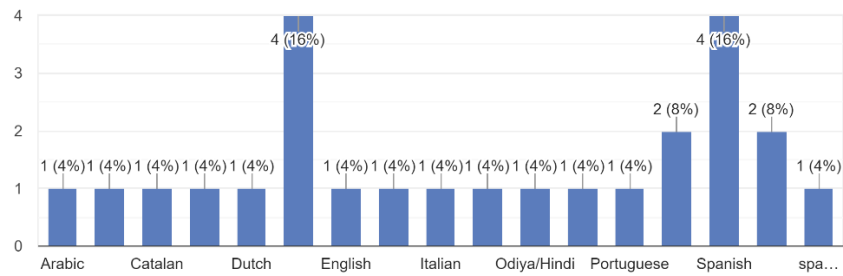
4. Select level of language comprehension/communication skills (0 - 5):
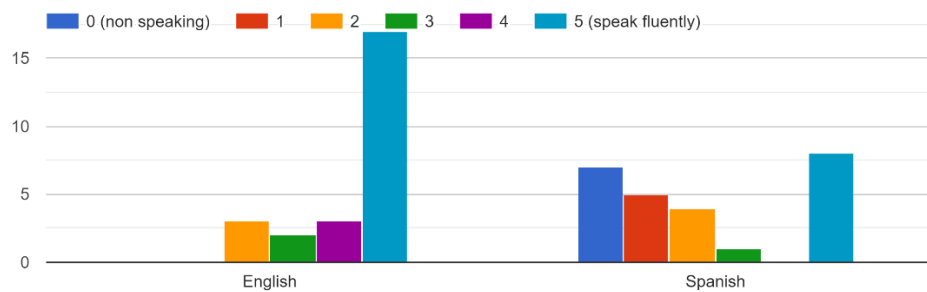
6. Did you undergo the process of searching for a place to live in, in Barcelona?

25 responses

- ● Yes
- ● No

80%
20%
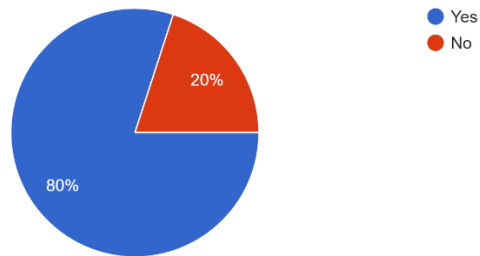
7. When you first arrived in Barcelona, where did you accommodate yourself into before moving into your longer term flat/apt?

20 responses

- ● Already had a long-term flat
- ● At a short-term lease (1 to 6 months)
- ● Airbnb
- ● Friend's flat
- ● Hotel
- ● A hostel close to BTS

15%
15%
20%
40%
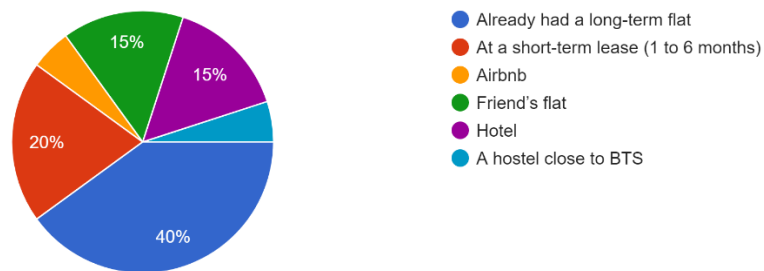
8. Which sources did you use to help your search for a place to live in Barcelona?

20 responses

Apps connecting to flat/apt owners	14 (70%)
Friend references and guidance	6 (30%)
Google maps and/or similar apps	5 (25%)
	5 (25%)
Third party services (real estate agent…	7 (35%)
Housing websites	1 (5%)
Website	1 (5%)
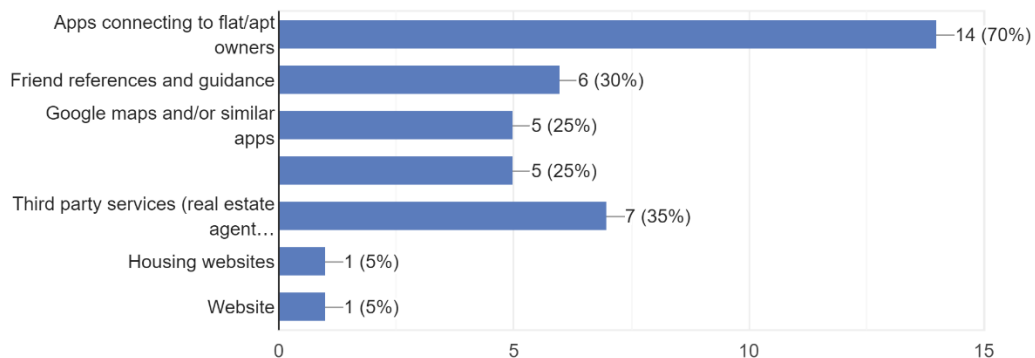
9. How many months before your arrival to Barcelona did you started the search for a place to live in?

20 responses

- 🔵 > 6 months
- 🔴 4-5 months
- 🟠 2-3 months
- 🟢 0-1 month
- 🟣 Began after arrival
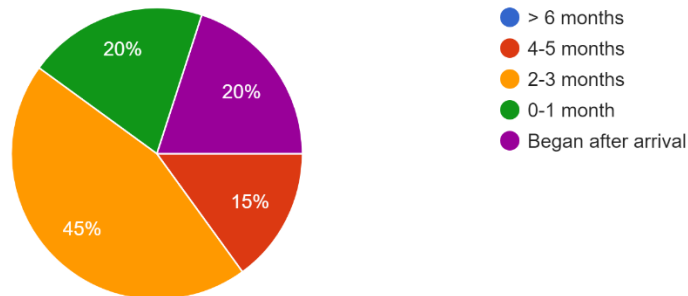
10. How many months after arriving in Barcelona were you able to get a long-term lease (i.e. >6 months)?

20 responses

- 🔵 > 6 months
- 🔴 4-5 months
- 🟠 2-3 months
- 🟢 0-1 month
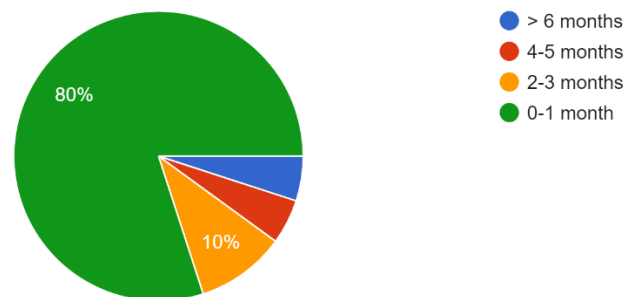
13. Which neighborhood did you accommodate yourself into?

18 responses

- 🔵 Don't know name of the neighborhood
- 🔴 Born
- 🟠 Barceloneta
- 🟢 Corts
- 🟣 Cuitadella Villa
- 🔵 Eixample
- 🩷 Gothic Quarter
- 🟢 Gracia

🔼 1/2 🔽

27
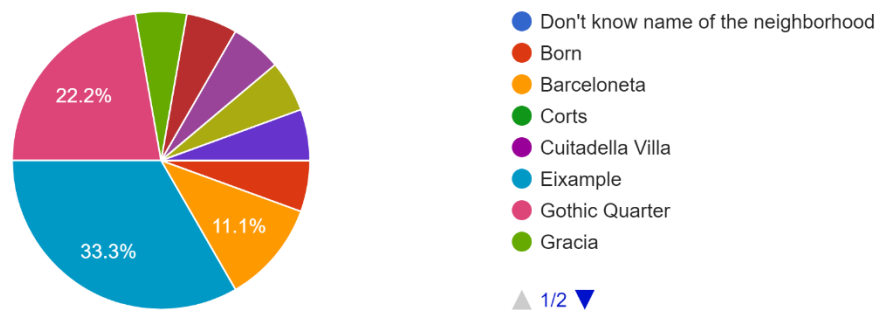
5. When searching for a long-term lease (i.e. > 6 months) which would you value most?
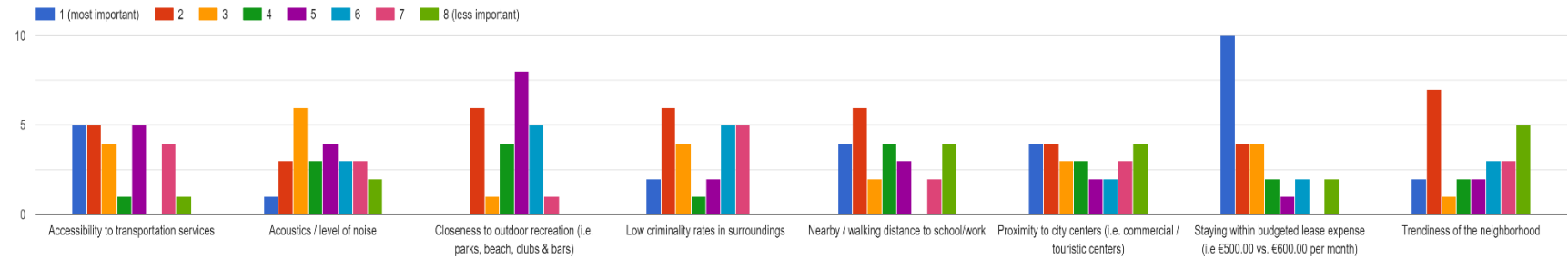
11. Which of the following pains did you experience during your flat renting experience?
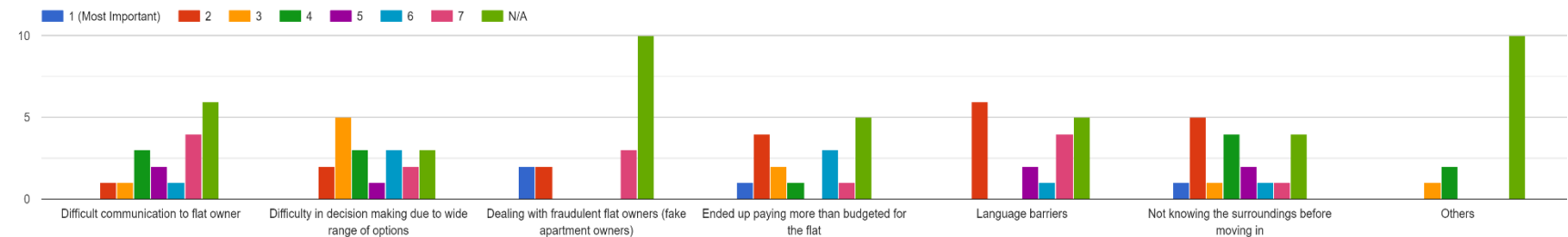
12. If others was selected before, please describe:
5 responses

Needed to act quickly because I needed Padron and NIE, did not have chance to explore many options or think about if my apartment was good or right for me. Just needed something that was not bad and quick.

Very high deposit (6 months of rent)

Na

The only problem I've had with my flat is roommate issues. We've had arguments about cleaning

Most of te flat owners didn't respond.

District and Neighborhood Detail Appendix

1. Ciutat Vella
   1) la Barceloneta
   2) Sant Pere, Santa Caterina i la Ribera
   3) el Barri Gòtic
   4) el Raval
2. Eixample
   1) Sant Antoni
   2) la Sagrada Família
   3) el Fort Pienc
   4) l'Antiga Esquerra de l'Eixample
   5) la Dreta de l'Eixample
   6) la Nova Esquerra de l'Eixample
3. Gràcia
   1) el Camp d'en Grassot i Gràcia Nova
   2) la Salut
   3) Vallcarca i els Penitents
   4) el Coll
   5) la Vila de Gràcia
4. Horta-Guinardó
   1) Can Baró
   2) la Clota
   3) Horta
   4) Montbau
   5) la Font d'en Fargues
   6) la Teixonera
   7) el Baix Guinardó
   8) el Carmel
   9) Sant Genís dels Agudells
   10) la Vall d'Hebron
   11) el Guinardó
5. Les Corts
   1) les Corts
   2) la Maternitat i Sant Ramon
   3) Pedralbes
6. Nou Barris
   1) Ciutat Meridiana
   2) Vilapicina i la Torre Llobeta
   3) Porta
   4) Vallbona
   5) Can Peguera
   6) la Trinitat Nova
   7) la Prosperitat
   8) Torre Baró
   9) Canyelles
   10) les Roquetes

       11) Verdun
       12) el Turó de la Peira
       13) la Guineueta
7. Sant Andreu
      1) el Congrés i els Indians
      2) el Bon Pastor
      3) Baró de Viver
      4) la Trinitat Vella
      5) la Sagrera
      6) Navas
      7) Sant Andreu
8. Sant Martí
      1) Provençals del Poblenou
      2) la Verneda i la Pau
      3) el Besòs i el Maresme
      4) Sant Martí de Provençals
      5) la Vila Olímpica del Poblenou
      6) el Poblenou
      7) el Clot
      8) Diagonal Mar i el Front Marítim del Poblenou
      9) el Camp de l'Arpa del Clot
      10) el Parc i la Llacuna del Poblenou
9. Sants-Montjuïc
      1) Sants - Badal
      2) Sants
      3) Hostafrancs
      4) la Marina de Port
      5) la Font de la Guatlla
      6) el Poble-sec
      7) la Bordeta
      8) la Marina del Prat Vermell
10. Sarrià-Sant Gervasi
      1) Sant Gervasi - Galvany
      2) el Putxet i el Farró
      3) les Tres Torres
      4) Sarrià
      5) Vallvidrera, el Tibidabo i les Planes
      6) Sant Gervasi - la Bonanova

Risk Categorization Map

	high
0	FIRES
1	EXPLOSIONS
2	DANGEROUS MATTERS
3	TRAFFIC ACCIDENTS WITH PERILLOSSES MATTERS
4	POLICE SURVEILLANCE
5	ACTIVITY WITH PRISONERS
6	INFRACTIONS OF FOREIGNERS
7	DOMESTIC VIOLENCE
8	neighborhood coexistence
9	ATTACKS
10	NARCOTICS / psychotropic
11	AGAINST SEXUAL FREEDOM
12	MANIFESTATIONS / CONCENTRATIONS
13	FIRE / FIRE ALARMS
14	PUBLIC SERVICE FAILURES
15	VANDALISM

	medium
0	CRIMES AGAINST PUBLIC ORDER
1	INCIDENTS WITH PRISONERS AND DETAINEES
2	URBAN TRIBES
3	LOCAL INCIDENTS
4	TRAFFIC ACCIDENTS WITH WOUNDED
5	INJURED TRAFFIC ACCIDENTS
6	INCIDENTS WITH TRAFFIC HAZARD
7	INCIDENTS WITH ROAD AFFECTION
8	PEDDLING
9	ANNOYING ACTIVITIES IN PUBLIC SPACES
10	WASTE DISPOSAL
11	FOOD INCIDENTS
12	SALVATIONS
13	SHOWS IN PUBLIC SPACES
14	FOGUERES / BARBECUES
15	DISCOMFORTS BY GENERATORS
16	ILLICIT OCCUPATIONS
17	TEMPORARY TRAFFIC RESTRICTIONS
18	OCCUPATIONS OF PUBLIC SPACES
19	Strong winds
20	SNOW AND ICE
21	TORRENTIAL RAIN
22	WORKS / WORKS IN PUBLIC SPACES
23	FOOD CRIMES

	low
0	PARKING VIOLATIONS
1	OTHER INCIDENTS WITH ANIMALS
2	AGAINST THE RIGHTS OF WORKERS
3	HUNTING / FISHING / FLORA / FAUNA
4	custody
5	TRAFFIC CONTROLS
6	TRANSFERS OF VEHICLES WITHOUT INFRINGEMENT
7	MOVEMENT INFRACTIONS (VEHICLES)
8	ANIMALS / DANGEROUS INSECTS
9	OTHER INTERVENTIONS OF P, ADMINISTRATIVE
10	NON-AUTOMATED SIGNALS
11	OTHER ACTIONS IN THE ENVIRONMENT
12	ACCIDENT COMING FROM CME
13	CONDUCTIONS AND ACCOMPANIMENTS
14	INMOVILIZACIONES / DESIMMOBILITZACIONS
15	EDUCATIONAL SCOPE
16	PUBLIC TRANSPORT
17	REFORM
18	OFFICIAL BUILDINGS
19	EMERGENCY COMMUNICATIONS
20	TECHNICAL FAILURE
21	ACCIDENT PASSWORD SEM
22	TESTS OF THE SYSTEM
23	TECHNICAL ASSISTANCE
24	ASSISTANCE TO PEOPLE IN PUBLIC SPACES
25	ASSISTANCE TO PEOPLE IN BUILDING
26	ASSISTANCE MENTAL ILLNESS
27	BEACH ASSISTANCE
28	BASIC SUPPLIES
29	OTHER ACTIONS OF S, C,
30	INFRACTIONS IN VADOS AND RESERVATIONS
31	COMPANY ANIMALS
32	COLLABORATION WITH OTHER SERVICES
33	SUPPORTS
34	AUTOMATED SIGNALS
35	SCOPE OF PROTECTION OF THE MINOR
36	ASSISTANCE DRIVERS IN V, P
37	MUNICIPAL SERVICES MALFUNCTIONS
38	INSPECTIONS / CONTROLS IN LOCAL
39	COL·LBORACIÓ WITH JUDICIAL / POLICE AUTHORITY
40	CLAIMS IN BUILDINGS
41	ACCIDENT RECEIPT BY 080 (Recode)
42	WITHOUT IDENTIFYING

Competitive Landscape Appendix
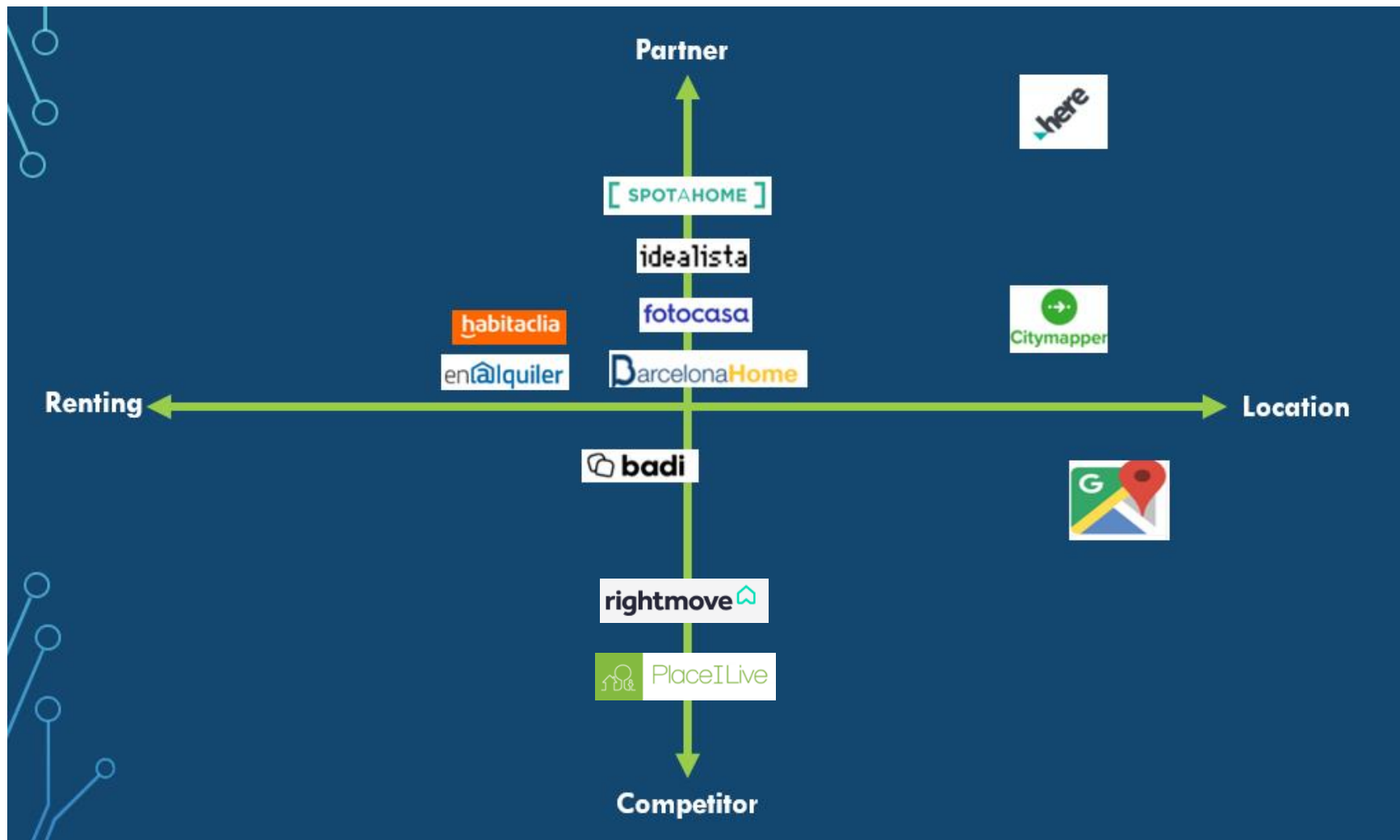
Place I Live Website Appendix

1/9
Who are you?
select one
- Male
- Female

2/9
What is your age?
select one
- 18-24
- 25-34
- 35-44
- Other

3/9
For whom are you searching a home?
select one
- Myself
- Myself and partner
- My Family with Children
- Other

4/9
What is an ideal neighborhood for you?
select at least one
Quiet + | Green ✓ | Residential + | Diverse +
Social ✓ | Hip ✓ | Artsy + | LGBT Friendly +
Next ▸

5/9
What are your priorities?
select at least one
Safety + | Noise Pollution + | Air Quality + | Price + | Commute +
Food and Restaurants + | Bars and Nightlife + | Shopping and Services +
Next ▸

6/9
Do you play any sports?
select one
- Yes
- No

6/9
Which sports?
select at least one
Running + | Biking + | Yoga ✓ | Going to the gym +
Basketball + | Tennis + | Football ✓ | Swimming +
Next ▸

7/9
Which specific amenities do you require?
select at least one
Farmer's Market + | Dog run + | Hospital / Clinic + | Car Parking + | Police Station +
Shared Bike Services + | Shared Car Services + | Waterfront +
Next ▸

8/9
How long should be your daily commute to work?
Provide location of your work and max desired commute time
1100 6th Avenue, New York, NY, USA
Commute time: **45 minutes**
Next ▸

8/9
Which is your preferred mode of transportation?
select one
- Subway
- Bus
- Car
- Other

9/9
Final bit of information!
Provide details
✔ Rent | Buy
Bedrooms: **1**
Budget: **$500-5,000**
Next ▸

Continues in next page

Right Move Website

Get Settled website design Appendix

Website Budget Appendix

FX 888-601-5359	SEO & REVENUE GENERATION ⌄ CONTENT & ANALYTICS ⌄ CREATIVE & UX ⌄ WHO WE ARE ⌄ CONTACT		
		LOW	**HIGH**
Number of pages	10 - 50	$ 2,000	$ 3,000
Style of design	Moderately stylized	$ 3,000	$ 5,000
Copywriting # of pages	5-10	$ 1,000	$ 1,500
SEO w/ Placement Guarantee	30 keywords	$ 2,000	$ 4,000
Responsive Design	Yes	$ 3,000	$ 3,000
Database Integration	Basic	$ 2,000	$ 4,000
e-Commerce Functionality	None	$ 0	$ 0
CMS	None	$ 0	$ 0
TOTAL ESTIMATED QUOTE		$ 13,000	$ 20,500