THE VISUALIZING FACTORS OF AIRBNB:
WHY DO PEOPLE CHOOSE TO STAY WITH AIRBNB?

SUNWAY UNIVERSITY

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSEWORK FOR THE BSC (HONS) INFORMATION SYSTEMS (BUSINESS ANALYTICS); YEAR 2

ACADEMIC SESSION: AUGUST 2019, SEMESTER 4 & 5

IST2234: VISUAL ANALYTICS TECHNIQUES FOR BUSINESS AND SCIENCE

DEADLINE: NOVEMBER 26th

ASSIGNMENT :

INSTRUCTIONS TO CANDIDATES

This is a group assignment.

IMPORTANT The University requires students to adhere to submission deadlines for any form of assessment. Penalties are applied in relation to unauthorized late submission of work.
- Coursework submitted after the deadline but within 1 week will be accepted for a maximum mark of 40%. - Work handed in following the extension of 1 week after the original deadline will be regarded as a non-submission and marked zero.
Lecturer's Remark (Use additional sheet if required)   I..... (Name) .....std. ID received the assignment and read the comments..... (Signature/date)

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Assignment Question

The assignment should be made in teams of SIX students. Solutions should be handed in a coloured report. The assignment requires you to research on a chosen case study in the area of visualization. Ultimate goal of this assignment is to able to understand how visualization works on certain entities for example: visualization of human behavior data, information visualization based approach for exploring databases. You are supposed to choose an industry, visualize the data by building a dashboard. You are supposed to write a research paper of 15 pages to be submitted that wraps up the entire process of you building the dashboard, which include storytelling and significant finding. In the paper should include, abstract, introduction, research methodology, findings, recommendation and conclusion.

Marking Scheme

Assessment	Full Marks	Marks Given
Clarity of ideas	5	
Orientation of ideas	5	
Abstract	10	
Introduction	10	
Research Methodology	10	
Findings/ Dashboard	30	
Recommendation and Conclusion	10	
Referencing	5	
Presentation	15	
TOTAL Marks	100	

Visual Analytics Techniques For Business And Science

(IST2234)

Title: The Visualizing Factors Of New York Airbnb Sales: Why do people choose to stay with Airbnb?

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Abstract

Data visualization representation is the presentation of data in a pictorial or graphical configuration. It empowers decision makers to view analytics displayed outwardly, so they can get a handle on troublesome ideas or distinguish new examples. With intelligent visualization, once can make the idea a stride further by utilizing innovation to bore down and visualize diagrams and charts more directly thus intuitively changing what information one can see and how it's handled. With large information there's potential for incredible chance, yet many retail banks are tested with regards to discovering an incentive in their huge information speculation. For instance, how might they utilize huge information to improve client connections? How – and to what degree – would it be a good idea for them to put resources into huge information? In light of the manner in which the human mind forms data, utilizing diagrams or charts to picture a lot of complex information is simpler than poring over spreadsheets or reports. Information perception is a snappy, simple approach to pass on ideas in an all inclusive way – and you can try different things with various situations by making slight modifications. Data Visualization can likewise distinguish territories that need consideration or improvement, explain which elements impact client conduct, assist one with understanding which items to put where and predict sales volumes. The aim of this report is to visualize and examine the main motivations for users to book personal accommodations found online through Airbnb along with what factors would cause tourist/visitors to live there. Ever since Airbnb burst into the market in 2008, the company has had a quick development that brings up issues about its present and future effects on the conventional settlement division. A quantitative research strategy was utilized in this paper to assemble multidimensional information. The strategy comprises of two self-administrated online reviews that were finished either by travelers who previously remained with Airbnb or by visitors who have not attempted it yet. After the reviews were directed and investigated, the outcomes are displayed and talked about as needs be. The exploration shows that a few angles have a basic significance in the basic leadership process. The essential outcomes exhibited here show that both the cost and the validness of the experience are the most critical characteristics in the decision of Airbnb. This paper is bolstered by the ideas of sharing economy, community oriented utilization, distributed settlement and buyer basic leadership, which are underlined in this investigation.

Keywords: **Data Visualization, Airbnb, Sales, Data, decision makers**

Acknowledgement

Firstly, we would want to deeply express our thanks to you Dr. Angela Lee Siew Hoong for providing us with the direction towards performing this assignment and teaching us the theory of this subject. We want to express our uncommon thankfulness and gratitude to our leader Koh Fu Kang for managing our time well throughout this assignment. We also would like to thank you, Dr Angela for empowering us to do this assignment as from this assignment, we find that through this subject, our whole assignment empowers the SDG as our visualized solution marks change providing Airbnb with a seemly likely great dashboards and solutions.

1. Introduction

Figure 1: Airbnb Logo

Airbnb is a key service of the sharing economy and is becoming essentially worldwide with many nights booked in rooms and homes. As we are aware, consumers are continuously adapting and moving towards the 'sharing economy'. Airbnb concluded that more than 60 million customers have utilized its sharing platform globally (Airbnb, 2016). Airbnb is effectively transforming the travel and short-term rental business since 2008. In addition, New York City has become one of the demanding markets for Airbnb, with more than 52,000 listings as of November 2018 (InsideAirbnb, 2016). Airbnb is an online service that allows homeowners to rent out extra bedrooms or the entire home/apartment as a short term let. The homeowner or 'host' can promote their property as three different types of listing. Shared rooms, private rooms, and entire homes/apartments. Through this research, we aim to understand the nature of the Airbnb Business in New York City by analysing the pattern of the variables for further development and basic visualization.

1.1 Context and previous research

These days, tourists/visitors would like to attempt new encounters and book their settlement in a non-customary way, for instance not with a hotel, however online with Airbnb. Airbnb represents an online platform where people can rent their properties as

tourist accommodation without having the standard amenities of a hotel. Airbnb grew quick, despite the fact that voyagers must place their trust in the settlement proprietors with respect to the nature of their remain. The underlying thought originated from the initial two organizers when they had quite recently moved on from college. They chose to promote their condo on a basic site as an AirBed and Breakfast for the International Design Conference delegates, who were hoping to keep away from San Francisco's costly inn costs in 2007. From that point forward, they accepted the third organizer and changed the site into a help for others to advance their rooms as shared convenience for voyagers, at first focusing on enormous and significant occasions. In the wake of enjoying some normal achievement, explicitly at the 2008 Democratic National Convention, the stage was re-begun in 2009 as Airbnb.com, and the administration was reached out past shared settlement to likewise contain the rent of whole properties (Guttentag, 2015). Given that it has just existed since 2008, there is restricted research accessible about Airbnb. In his unpublished ace proposition from 2011, Zachary Lamb portrays in a subjective path a portion of the reasons why Airbnb's clients decide to go with it rather than customary settlement. Guttentag, in his calculated work from 2015, portrayed the Airbnb organization from a troublesome advancement perspective. Tussyadiah and Pesonen's friend inspected experimental examination (2015) depended on the sharing economy writing and incorporated an overview about individuals' explanations behind utilizing distributed momentary rental convenience. Another overview was directed by the travel industry inquire about organization Phocuswright (Hennessey and Gasdia, 2014). The main worldwide monetary administrations firm Morgan Stanley additionally began to direct research through a customer poll, investigating the inspirations of visitors to pick remaining with Airbnb and the impact it would have on the travel industry part. Morgan Stanley likewise started a purchaser survey inquiring about the purposes behind utilizing Airbnb to examine the organization's potential impacts on inns and online travel offices (Nowak et al., 2015). These examinations uncover a portion of the expectations behind picking Airbnb, for example, legitimacy or lower costs, however they additionally make plain a few confinements, for example the constrained existing writing that is accessible on the point. The exploration referenced above, investigations the issues with respect to legitimacy, down to earth profits by the sharing economy, for example, costs, instead of the experience itself, and some of them allude just to general distributed rental settlement, not to Airbnb specifically. To wrap things up, the ends they have come to about the sightseers' inspirations are unique, starting with practical reserve funds, and proceeding with the legitimacy of the experience and consummation with family unit comforts. Another issue with this examination is that it thinks about every one of the customers as one single gathering, rather than separating them into the travel industry convenience showcase fragments dependent on buy inspiration (Guttentag, 2016). The most well-known inquiry is as yet attempting to find out Airbnb's effect on conventional convenience, for example, lodgings, presently and later on. To accomplish this, one would need to build up a comprehension of reasons why individuals proceed to trust and pick Airbnb. Other inquiries however concerning Airbnb, we would have to think about the favorable circumstances and hindrances of buyers and the substitution of existing accommodations.

1.2 Research purpose

The primary reason for this examination is to analyze and dissect the attributes which would cause a tourist/visitor to stay at a host’s property by trying to understand better

what are the motives of tourists when choosing Airbnb is important for Airbnb owners and other stakeholders, such as tourism firms or destination organizations, because from them they can learn more about what tourist requirement needs and wants. Moreover, figuring out buyers' preferences regarding Airbnb attributes helps to realize the advantages and disadvantages it has over other types of accommodation and vice-versa, the advantages and disadvantages of other types of accommodation have over Airbnb. The substitution effects that of Airbnb has on other types of accommodations could lead to the answer of the question regarding the effect it has over the traditional accommodation sector. It can also help the traditional accommodation sector to overcome Airbnb's threat. Therefore, this study helps to figure out the new accommodation trend along with the concepts of sharing economy with how likely what factors would cause a tourist to stay at a hosted area.The structure of the report includes research about abstract, acknowledgment, introduction, problem statement, literature review, research methodology, visualization analysis and conclusion

2. Problem Statement

2.1 Objective

The objective of this report is to assist hosts to make better decisions with their listing methods and improve their performance on the AirBnb platform. Through the acquiring insights, hosts can increase their occupancy rate by attracting consumers based on their pricing and listing methods.

2.2 Business Scenario

As of now, an Airbnb host currently has low bookings on his/her own properties. During festive seasons, the host would like to know how he/she can improve his/her booking rates during the festive season. The host property currently resides in a condominium in New York City where there are multiple Airbnb host in that same building. The competition is high in that building. To understand how the host can improve the booking rates he/she started looking into other more successful Airbnb host properties to understand how he/she can achieve the same amount of success. To understand more on how to improve on the host booking rate the host started looking into the dataset that were published by Airbnb yearly to understand more on how to attract more people to his property. To accomplish this the host is required to use a storyboard to observe other more successful condominium AirBnB unit in the same building. The storyboard will consist of info such as price for all units within the same building where the host may easily compare and see how does price affect the attraction of customers. With this, the host is able to see why other Airbnb host are more successful and how he can adjust the price to attract more bookings in the future.Next, the host may also use the storyboard to observe review given by people who had stayed in other condominium airbnb unit in the same building to further understand what do customers look for when they are staying in an Airbnb unit. With this, the host is able to improve his Airbnb services and attract more customers. New York City is a city of renters where vacancy rates are at crisis levels, and rents are continuously rising. Income levels for the average New Yorker haven't kept pace, and affordability is at low records. This occurs frequently, especially during festive seasons. This causes homelessness levels, food insecurities, economic and racial inequality rates to increase in New York City. It's at this time that short term rental

platforms, dominated by, have entered the market, and have grown to have listings of tens of thousands of rooms and entire apartments. Therefore, Airbnb addresses the demand for tourist accommodation and creates an income stream for "hosts," and ignores both the need for and loss of housing. For hosts, participating in Airbnb is a way to earn some income from their property, but with the risk that guests might do damage to it. For guests, the advantage can be relatively inexpensive accommodations, but with the risk that the property won't be as appealing as the listing made it seem.
Key Takeaway Examples:

- Travelers can often book an Airbnb for less than the cost of a hotel room.

  However, despite the price being cheap, the service of a airbnb hosted area may not be as good as that of a hotel.

- The main risk to the traveler is that the property may not live up to its listing.

  Sometimes, ads published online regarding a listing for tourists may not be exactly accurate. Therefore, sometimes, tourists might feel unhappy due to the accommodation not meeting pars with their standards.

- The main risk to hosts is that guests might do serious damage to their property.

  In some cases, not all guests are perfect as some guests are not trustworthy and are insufficient in taking care care of other people’s belongings

- The Living Conditions Might Be Unsafe Or Completely Unacceptable.

  In most cases, the pictures and property descriptions you see on Airbnb look attractive. However, there is no guarantee the place will look exactly as pictured. In fact, it might look completely different.

- One Might Fall Victim To An Airbnb Scam.

  Apparently, there are websites pretending to be Airbnb, and there are scammers pretending to be Airbnb staff. There is even a story of an Airbnb user who lost $4,800 to scammers they had been led to think were Airbnb representatives. All victims claim that the emails they received and payment details they were provided with looked completely legitimate. Spoofing is not the only Airbnb scam out there. There have been cases of listing price arbitrage, fake scam websites, offsite payment demands, hosts demanding extra cash, and so forth. (Scammers paradise, n.d.)

- There Might Be A Huge Expectation-Reality Gap.

  Most Airbnb hosts know how to make their property look attractive in pictures. Shooting from the right angle to make the place look more spacious than it really is, showing only those parts of the apartment that look good, editing pictures to mask any imperfections, relying on home staging secrets to make the place look cozy even if it’s not the list of tricks that hosts can use is long. In order to avoid disappointment upon arrival, it is crucial to remember that perfect-looking listings do not always equal perfect-looking properties.

- Your Hosts Might Turn Out To Be Slippery Characters.

  Just like any service with a human-factor involved, Airbnb is not perfect. Hosts are just humans and not all of them are trustworthy, reliable, and honest. When booking through Airbnb, you should be ready for all things unexpected. For instance, your Airbnb host may cancel your booking 24 hours before your arrival, so you'll have to search for a new accommodation in a hurry. Or even worse, your host may never show up to give you the key. There is a chance that your host has multiple listings of the same property and you're not the only one who booked that place for the same dates.

3. Literature Review

In the sharing economy, most companies use the world wide network as a primary interface to interact with customers and consumers through online sale services. Because this term is vague in marketing terms, we refer to these terms as social media marketing (Nadaraja, Yazdanifard, Rashad, 2013). As for our current study of company is Airbnb, it is known that the company makes money by providing short or long term rental services for tourists/visitors. The modes of stay of this company include private homes, apartments and etc booked by the Airbnb website. The company started it's prototype in San Francisco and expanded rapidly, and is now operating in all parts of the world. For travellers, airbnb is evicted as a tool for tourists. However, in the local market now, with a lot of sales booming up and down in airbnb's revenue, airbnb is needed of a technique to be able to examine purchasing patterns so that the company would be able to know how they need to adapt to the revolutionizing economy today. As we know, seeing is believing in visualization and well over half of humans are visual learners (Seeing is believing, 2018). Therefore, data visualization techniques which has been existence since the 17th century and the concept of using pictures to understand data has been around for centuries are crucial for analysis. If Airbnb wishes to analyze its performance, data visualization dashboards are the way to go. As a result from learning PowerBI through class engagements with Dr Angela, we have managed to come up with 4 visualizing dashboards which illustrate about trends, comparisons and and factors that may play a role in what would cause visitors/tourists to enjoy their services with airbnb following with whether they return or not for another stay through Airbnb. From our charts in our dashboard, we are able to create a cost-benefit analysis dashboard. A cost benefit analysis (also known as a benefit cost analysis) is a process by which organizations can analyze decisions, systems or projects, or determine a value for intangibles. The model is built by identifying the benefits of an action as well as the associated costs, and subtracting the costs from benefits.. Even so, based on the datasets that has been taken from the Airbnb website, the datasets showed a lot of imposing cons which are outweighing the benefits in a sale centric environment. While the introduction and expansion of Airbnb into U.S. cities and cities around the world carries large potential economic benefits and costs, the costs to renters and local jurisdictions likely exceed the benefits to travelers and property owners. Airbnb might, as claimed, suppress the growth of travel accommodation costs, but these costs are not a first-order problem for American families. The largest and best-documented potential benefit of Airbnb expansion is the increased supply of travel accommodations, which

could benefit travelers by making travel more affordable. In a nutshell, performing such analysis for Airbnb will allow the company to better know their own companies performance thus allowing the company to thus make better decisions.

4. Research Methodology

4.1 Study Area

The study areas included are the Boroughs in New York City which are Manhattan, Bronx, Brooklyn, Queens and Staten Island, and the respective neighbourhoods within them.

Figure 2: Geography of New York City

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The City of New York, usually referred to as either New York City (NYC) or simply New York (NY), is the most populous city in the United States. With an estimated population of 8,398,748 distributed over a land area of about 302.6 square miles (784 km2), New York is the most densely populated major city in the United States. It is located at the southern tip of the state of New York, known as the city's center of the New York metropolitan area. This city is also known as one of the world's largest natural harbors consisting of five boroughs, each of which is a separate county of the State of New York. The five boroughs are Brooklyn, Queens, Manhattan, The Bronx, and Staten Island which were consolidated into a single city in 1898.

4.2 Data Collection & Cleaning

SPECIFICATION:	Airbnb, Inc. operates an online marketplace for hospitality services. The Company offers lodging, homestays, and tourism services via websites and mobile applications. Airbnb's consumer market serves clients worldwide.
SECTOR	Hospitality
INDUSTRY	Lodging, Homestays, and Tourism
SUB-INDUSTRY	Internet Based Services
FOUNDED	06/27/2008
WEBSITE	www.airbnb.com
DATASET	New York City Airbnb Dataset
SOURCE	http://insideairbnb.com/get-the-data.html

Table 1: Dataset specifications

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
16	availability_365	Num	8	BEST.		availability_365
15	calculated_host_listings_count	Num	8	BEST.		calculated_host_listings_count
3	host_id	Num	8	BEST.		host_id
4	host_name	Char	35	$35.	$35.	host_name
1	id	Num	8	BEST.		id
13	last_review	Num	8	MMDDYY10.		last_review
7	latitude	Num	8	BEST.		latitude
8	longitude	Num	8	BEST.		longitude
11	minimum_nights	Num	8	BEST.		minimum_nights
2	name	Char	303	$303.	$303.	name
6	neighbourhood	Char	26	$26.	$26.	neighbourhood
5	neighbourhood_group	Char	13	$13.	$13.	neighbourhood_group
12	number_of_reviews	Num	8	BEST.		number_of_reviews
10	price	Num	8	BEST.		price
14	reviews_per_month	Num	8	BEST.		reviews_per_month
9	room_type	Char	15	$15.	$15.	room_type

Figure 3: Variable data type derived from SAS studio

Variables	**Specifications**
id	The ID of a listing
name	Name of each Airbnb stay (rooms)
host_id	The host's ID
host_name	The host's name
neighbourhood_group	The boroughs of listing in New York City
neighbourhood	The neighbourhood of listing in New York City
latitude	The latitude coordinate of a listing

longitude	The longitude coordinate of a listing
room_type	The room type of a listing
price	The price of room per night of a listing
minimum_nights	The minimum nights of stay of a listing
number_of_reviews	The number of reviews obtained of a listing
last_review	The last reviewed date of a listing
reviews_per_month	The percentage of total reviews in a month of a listing
calculated_host_listings_count	The number of total listings for a host
availability_365	The availability of the room in a year

Table 2: Variable specifications

Based on this report, no research instrument was used for this study as the dataset was obtained directly from Airbnb that allowed the public to download all the booking statistics and listings for New York City. Since the dataset is open source, similar datasets from different years were also downloaded for later analysis. The data utilizes public information compiled from the Airbnb website including the availability calendar for 365 days in the future, and the reviews for each listing. The Data is verified, cleased, analyzed, and aggregated by the Airbnb company.

The primary dataset of 2019 with more than over 40,000 dimensions and 16 variables showed interesting insights while sorting through the data and finding relevant information for later analysis and visualizations. The past years of the dataset including 2017 and 2018, were also downloaded for further visualization. Since all 3 datasets proved similar variables, the first glance of the data or listings from the Airbnb platform presented were snapshots of all the listings available at a particular time. Other snapshots of the data from previous dates, in this case, years, are available and stored in the primary dataset. It shows that each dataset from the Airbnb Open Source webpage is updated by month or year, which indicate the existing listings of a particular year being inside the updated year. For example, a host listed a room in the 2018 year,

will be present in the updated dataset file in 2019. In this case, careful filtering was performed to only filter the data for a particular year for later visualizations to avoid outliers. Moving on, the dataset showed no “private” information is being used as part of the data for the listings. Names, photographs, listings, and review details are all publicly displayed on the Airbnb website to avoid any confidentiality conflict between business and consumer. The disadvantage for doing so were, depending on individuals, they placed their full names as their host name, which got altered into unknown symbols or corrupted and thus making the variable unusable. Likewise, the listings in the same building, calculated by latitude and longitude, were anonymized by Airbnb individually, and therefore may appear “scattered” in the area surrounding the actual address, which will not cause any insignificant while mapping the visualization. The Airbnb calendar used to form the variable “Availability_365”, does not differentiate between a booked night and an unavailable night, therefore these bookings have been counted as “unavailable”. This serves to understate the Availability metric because popular listings will be “booked” rather than being “blacked out” by a host. The dataset provided information regarding the reviews for each listing. Although some reviews may be “spam”, the analysis suggests that spam reviews are small and do not affect the statistics and later visualization. Lastly, the neighbourhood names for each listings are compiled by comparing the listing’s geographic coordinates with a city’s (borough) definition of neighbourhoods.

The cleaning process for the datasets used required less configurations. There were very few entries that did not belong or did not match the data type of that specific dimension. Furthermore, any “corrupt” data that was found was deleted to avoid any discrepancy and outliers when performing visualization. There were also many dimensions with many null or missing values, most of which were not used for visualization. The null dimensions were replaced with 0 for numeric values. Lastly, several secondary variables were created which provided more insight and improve the visualization.

4.3 Study Framework

The study was started by understanding the complication of the data and its values for each dataset, including previous studies done by seniors. In order to create multiple dashboard to storytell the research questions, several trial and error, in this case, storyboards were created and drawn on paper to provide some insight before creating the dashboards.

4.3.1 Drawing of Storyboards

A storyboard is crucial for analyst to focus on creating the perfect picture and create better visualization and storytelling, which relates after the problem statement is completed. The purpose of creating a storyboard before proceeding to the dashboard was to receive feedback about the trial version of the future dashboard and how it is going to be. Doing so also allowed for better decision-making and saved time making multiple revisions and changes to the dashboard, which will be a backlash for the study. The following figures showcases the storyboards with its explanation attached in the appendix page.

4.3.2 Visualizing Dashboards

After receiving multiple feedback from the storyboard, it allowed the branch of new ideas to proceed to creating dashboards to provide insightful visualizations. Creating dashboards allowed for better graphic representations of the data, which allows for better understanding, and a more effective communication and motivation tool. In this study, the visualizations will be broken down into four interactive dashboards that will solve the research question as mentioned above.

The first visualization will act as the main dashboard, that began by forming the trend analysis of year 2019, 2018, and 2017. The main metrics such as total revenue will be shown as cards for users to easily identify the important information. Each dashboard will have six buttons that give users the ability to navigate to different dashboard. Different type of chart will be used for the appropriate data visualization. For example, the total revenue over the last few months will be visualized as a line chart. Slicers and filters will be available in the dashboard for users to select the information they want to see.

The following visualizations after the main dashboard will be the three correlating sub-visualizations that together, form the trend of the data. The main function from all the dashboards will be the slicers, tables, and dropped-down bars, which allowed for customized filtering. These filters will main triggers to allow users to look at different visualizations based on what was filtered. Likewise, cards will be present in most dashboards which allowed for better figured visualization. The following bar charts from each dashboard provide a detailed visualization to explore the question of total and average price, average occupancy, availability, and the overall number of reviews for Airbnb rentals. The different bar charts scattered in each dashboard will provide different insights but also assist in finding the correlation between room types, price, neighbourhood and etc. Lastly, all dashboards will include a type of map to show the correlations between different variables to understand the distribution of data across the boroughs and neighbourhoods.

5. Visualization Analysis

Information Visualization	Structure Of Visualization	Technique
Heatmap	Spatial Structure	Latitude & Longitude
Bar Chart	Relational Structure	Colour Scheme, Scale
Pie Chart	Relational Structure	Space Efficiency,Colour Scheme
Tree Map	Hierarchical Structure	Area Size , Colour Scheme

World Map	Spatial Structure	Latitude & Longitude
Multi-row Card	Textual Structure	Ranking,Space Efficiency
Line Chart	Relational Structure	Vertical & Edges
Column Chart	Relational Structure	Colour Scheme, Scale

Table 3: Structure of Visualization

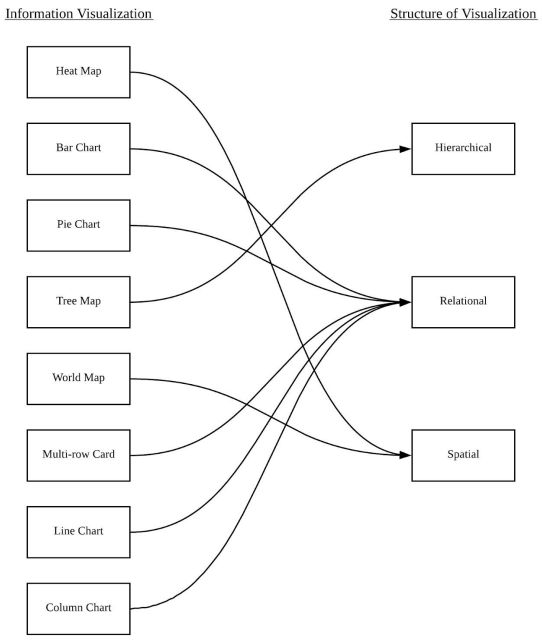

Figure 8: Structure of Visualization

The diagram above shows the type of information visualization techniques used on dashboards below. Each visualization techniques belong to different structure of visualization. Hierarchical structure is a data structure which the data is organized into a tree-like structure. Relational structure rigid-structured data sources characterized by complex relationships among a set of relations (tables) and spatial structure is model represented by either 2-dimensional or 3-dimensional figures.

5.1 Dashboard

5.1.1 Dashboard 1

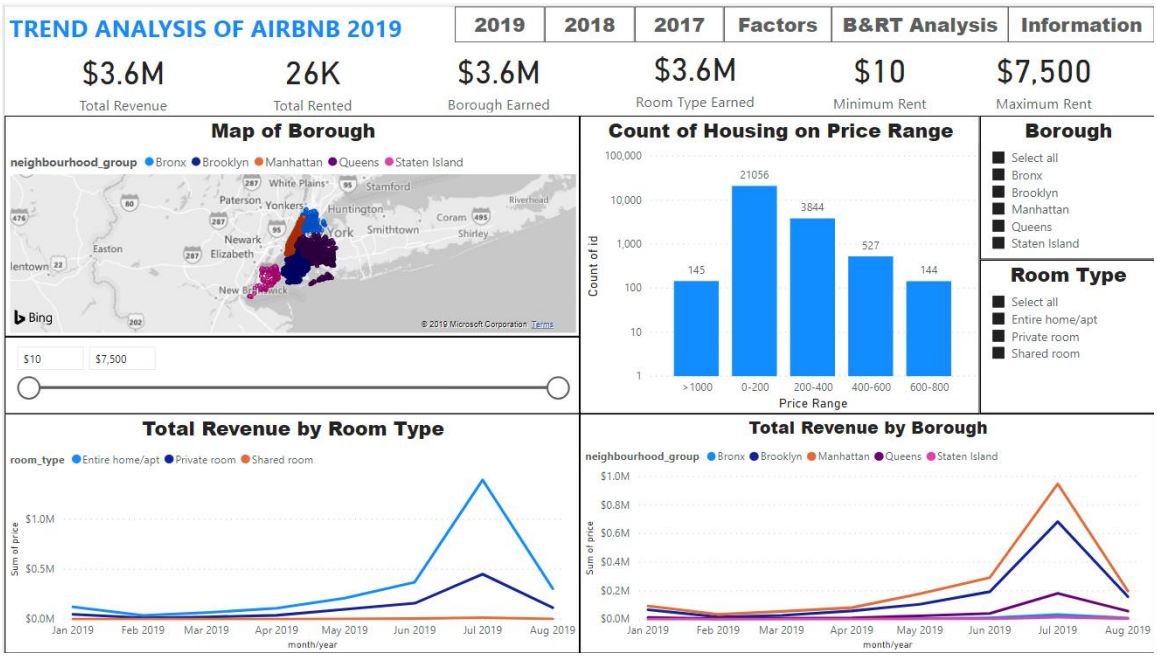

Figure 9: Airbnb Trend Analysis

Scenario

Big Picture

You are a data analyst at Airbnb New York Office, and you need to create a trend analysis to analyse the total revenue and other factors for the last few years. The dashboard will be created using the past databases stored on the server to analyse the trend over the last few and current year.

Specifics

- You want to know the total revenue earned for that year.
- You want to know the total number of listings rented.
- You want to see which borough earned the most.
- You want to see which room type earned the most.
- You want to know the minimum and maximum rent fees of different borough and room type offers.
- You want to know the number of listings depends on their price.

Related Scenario

- You are a data analyst at a car rental business company, you want to know the total revenue earned by renting out cars, the number of cars rented, which model of cars are the most popular, and the type of cars rented the most.
- You are a data analyst at a popular library, you want to know which author's books borrowed the most frequently, which genre and categories of books borrowed.

How people use the dashboard

The dashboard gives an overview of the key metrics to rental business which owners track. In the field of rental business, the total revenue is the most common and important metric for business owners to take note. Total revenue is the results to show whether the business is profitable or unprofitable. The dashboard shows the total number of listings rented as well as a few additional metrics for business owners to consider.

At the top of the dashboard in Figure 9.1, six buttons are there to help users to easily navigates to another dashboard by clicking on it. There are tooltips built in, so users can hover over any buttons to know the title for next dashboard users may wanted to see. Under those six buttons, a few important informations were shown as cards: the total revenue, total rented, borough earned, room type earned, minimum, and maximum rent. Those cards will change accordingly to what the users have filtered using the slicer except total revenue and total rented card. Both cards will always remain the same to help business owners to compare which borough and room type have the most revenue without unfiltering the slicer.

The map in Figure 9.2 shows the location of the listings in New York City. Each borough was differentiate with colors to help user to identify which borough they are selecting. Bubbles in the map will show other information users might need to know, information such as the name of the listing, room type, neighbourhood, and price. The slicer below the map allows user to set the minimum or maximum price they want to see. Bubbles in the map can be filtered out based on the price slicer or other filters in the dashboard such as borough and room type.

The stacked column chart in Figure 9.3 is used to show the total number of listings categorized based on the price range. The horizontal axis shows the grouping of price range and the vertical axis shows the total number of listings. Users also can add room type in this chart to show the number of listings on different room type in the respective price range. This chart can easily help user to identify which price range of listings were most frequently rented by consumers. Two slicers beside the stacked column chart allow users to select the borough or room type they wanted to see. The slicer changes all the charts according to what the user has selected.

The line charts in Figure 9.4 is used to show the total revenue based on room type and borough. The horizontal axis allows business owners to see on which month the revenue increased or decreased. The vertical axis shows the total revenue of the month reached. By observing Figure 9.5, the user can view the total revenue in details on both borough or room type when moving the mouse cursor to the line chart.

Figure 9.1: Buttons are displayed at the top for users to navigate to different dashboard. The cards show the key information of the business.

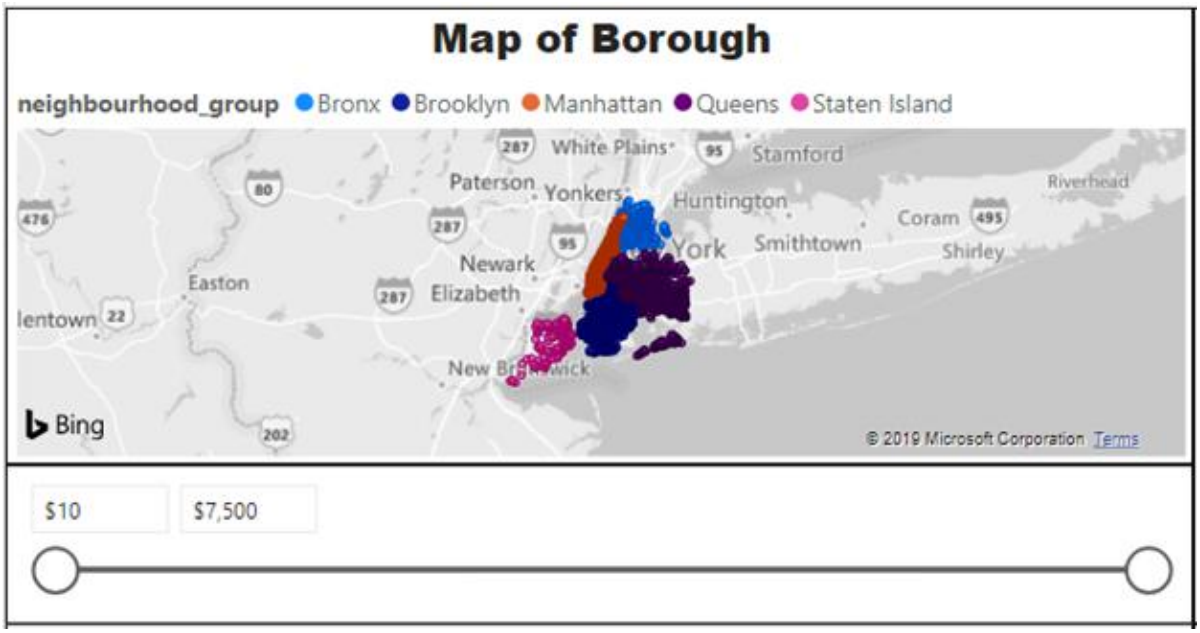

Figure 9.2: The map of borough with information such as name and room type of listings with the price.

Figure 9.3: The stacked column chart with additional filters on the side.

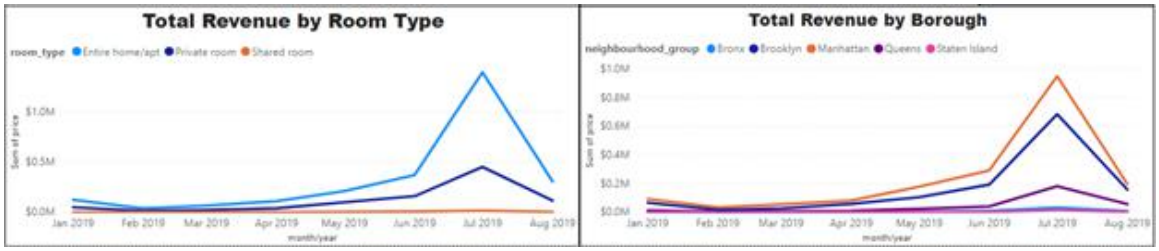

Figure 9.4: The line chart to show visualization of total revenue by Room Type and Borough.

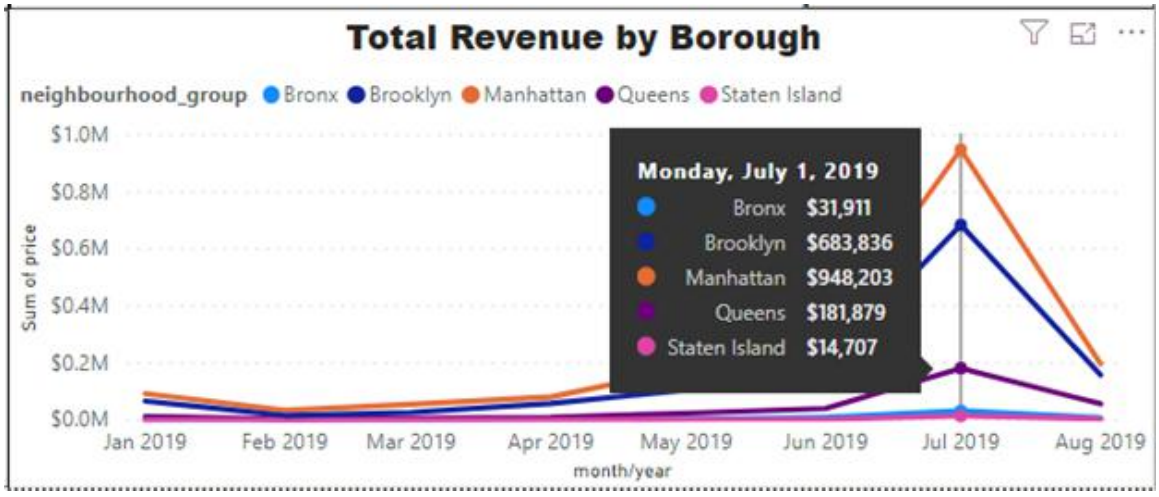

Figure 9.5: Tooltips are used throughout the visualization to show details of the data for any point selected.

Why This Works

A few Key Metrics Tracked in a Simple Way

This dashboard has only a few key metrics, total revenue being the important metric. The line chart, bar stacked column chart, and cards all show variations of those metrics; the line chart shows the total revenue of borough and room type, the stacked column chart shows the most frequent listings rented by price range, and cards show other information such as revenue by each borough and room type, as well as minimum and maximum rent. The only other item on the dashboard is the name and neighbourhood of listings on the map.

Discussion & Findings

As the year of 2019 hasn't ended yet, all trend analysis dashboard was analyzed using data gathered until the beginning of August for equally comparison between year 2017, 2018, and 2019. Total revenue of 2017 was the lowest compared to 2018 and 2019 with a total of 3.4 million dollars earned in New York City. This could be due to many economic changes in micro and macro environment happened in year 2017. The lowest number of listings rented were also happened during year 2017 with only 25 thousand listings compared to 27 thousand and 26 thousand listings in 2018 and 2019 respectively. All metrics showed that year 2018 has the best results compared to 2019 and 2017 with the highest revenue and listings rented.

5.1.2 Dashboard 2

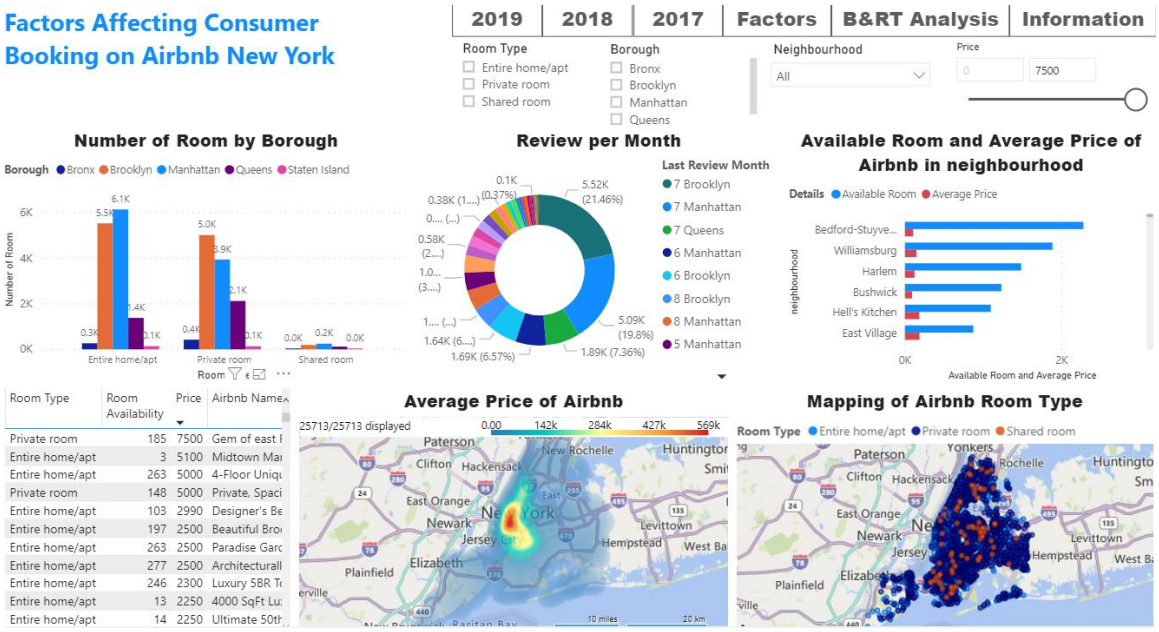

Figure 10: Factors Affecting Consumer Booking on Airbnb New York

Scenario

Big Picture

You are a marketing manager at Airbnb New York City Office, and you are required to create a dashboard to identify the current factors that affect Airbnb business. This dashboard will help Airbnb to make improvements on each aspect in the future and it's more easy for Airbnb to expand their business in the future.

Specifics

- You need to identify which part of the borough and neighbourhood has the most Airbnb services and why.
- You need to know which borough or neighbourhood has the most Airbnb users looking for and what is the insight of it.
- You need to know how customer review will affect the price of Airbnb in that particular region.
- You want to have a brief view of the location of all Airbnb service

Related Scenario

- You are an e-commerce website data analyst, you are required to know the factors that affect your online sales such as visitor counts, the bounce rate, which page and categories have the most visitors.
- You are a data analyst in a bicycle rental business company, you are required to identify the factor that affects the business such as the number of bicycles in an area, which segment customers we are targeting, which area should we allocate more stop, besides government law.

How People Use the Dashboard

The user may use the dashboard for future promotion or events besides identify new opportunity for Airbnb. The dashboard gives an overview on Factors affecting consumer booking on Airbnb New York City. This dashboard enables user to quickly browse through all the borough and neighbourhood. All visualization model in this graph are all responsive to the filter function, whenever a user change anything in the filter or click on any of the model information all graph will correspond to that selected data.

Figure 10.1: Dashboard Filter

The filter function in Figure 10.1 is to be used by user based on what they want to see. From here the user can select any room type they want to view, if no filter input is selected the system would show all data available in that filter box. The room type and borough are the same function where the user can select more than one selection in the checkbox. Neighbourhood filter is the same as borough and room type, but the user must click on the down arrow to show all selectable neighbourhood. The price filter is to allow users to specify the price range of the Airbnb they want to view by dragging the slider.

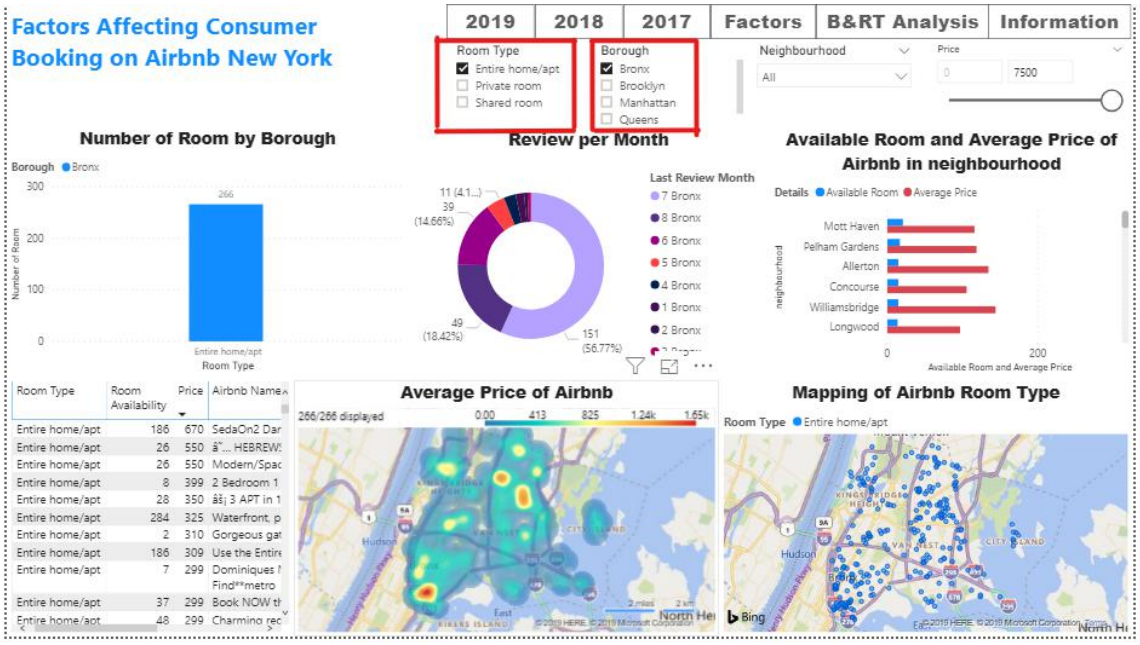

Figure 10.2: Filter Function selected showing that all models are responsive

At first glance the user may be overwhelmed with all the information the dashboard is showing but with the help of the filter bar on the top right, users are able to filter to what specific field they want to look at. For example, if users decide to see entire home available in Bronx, they can do so by choosing entire home in room type filter same goes to borough type. Once they had selected the two filters to the data, all the graphs and charts will change accordingly and show only data related to the selected filter. With this, it allowed the user to be able to focus view different data based on what they want to see.

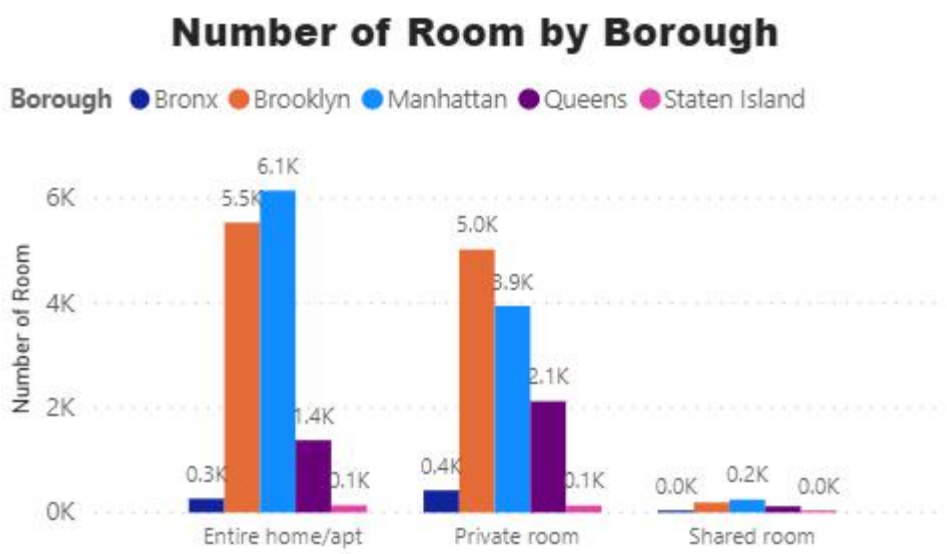

Figure 10.3 Grouped Bar Chart showing the number of Room Type in all Borough

Figure 10.4 Horizontal Grouped Bar Chart showing available room and average price by neighbourhood

The grouped bar chart in Figure 10.3 is to show the amount of room by room type available in each borough. Figure 10.4 shows the number of rooms available and the average price of a room in that neighbourhood. These two graphs tend to work well with each other. For example, if a user pick the neighbourhood Williamsburg in Figure 10.4, Figure 10.6 will be the responsive figure.

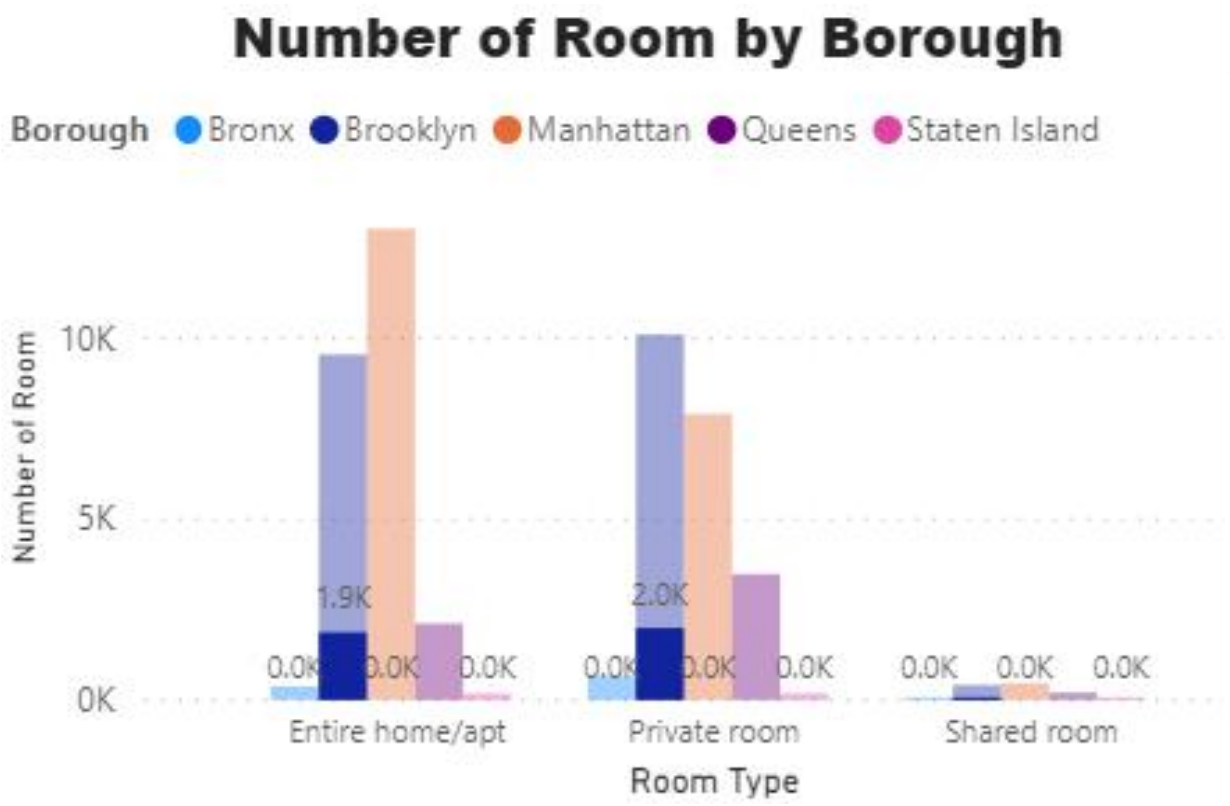

Figure 10.5 Responsive graph from Figure 10.4 neighbourhood selection

Figure 10.5 shows all the room type available for Williamsburg which were selected in Figure 10.4. The current figure shows that there were almost two thousand Entire Home/apt and two thousand Private Room in that neighbourhood. This would help users to understand what type of room are available based on the selected neighbourhood, either from the filter (Figure 10.1) or from Figure 10.4.

Room Type	Room Availability	Price	Airbnb Name
Entire home/apt	59	155	Your Oasis in The Bronx!
Entire home/apt	32	98	Your Home Away From Home
Entire home/apt	14	250	Yankee Nest
Entire home/apt	103	150	Well located apartment near NY City
Entire home/apt	284	325	Waterfront, perfect NYC getaway!
Entire home/apt	219	75	Visiting New York City? Stay in Da Bronx!
Entire home/apt	186	309	Use the Entire space 3 level home just redone.
Entire home/apt	196	67	Uptown Bronx Apartment
Entire home/apt	7	75	Uptown Boogie Down Studio
Entire home/apt	329	65	University Heights Best Bronx Deal
Entire home/apt	168	69	Unique Exposed Brick Loft Studio in Townhouse
Entire home/apt	302	35	Two Bedroom Apt 25 Min From Midtown Manhattan
Entire home/apt	330	100	Two bedroom apartment close to subway
Entire home/apt	261	175	Tranquil, Cozy, Comfy Cottage.
Entire home/apt	114	63	Tiny Private Artist's Studio in NYC
Entire home/apt	1	265	Three bedroom upscale condo
Entire home/apt	193	67	The Princess
Entire home/apt	2	105	The Most Affordable 3BR Apartment
Entire home/apt	271	103	The Heart of the Bronx

Figure 10.6 Table showing Airbnb information by Filter Function in Figure 10.1

Figure 10.6 is a table that shows information related to the Airbnb unit. If a filter was selected, the table would change accordingly based on the filter requirements. In the table, users are able to identify the price of each unit and the type of room along with the name of the listing.

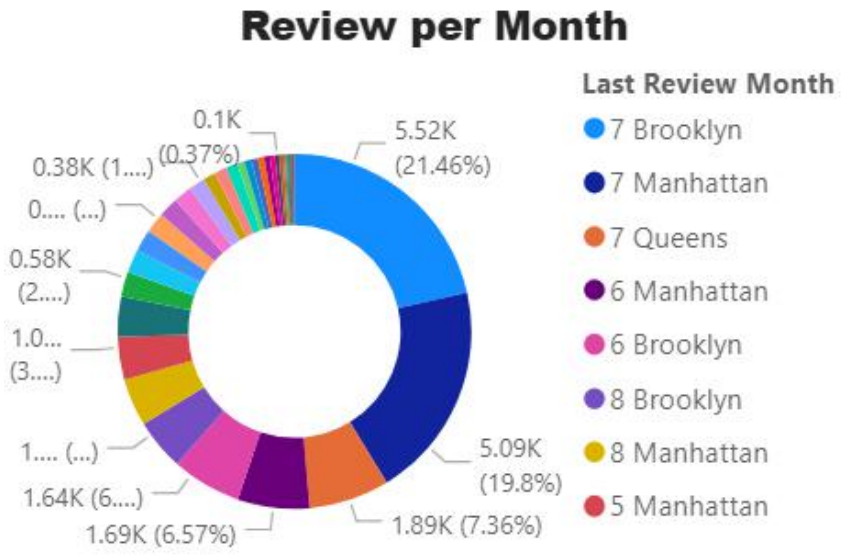

Figure 10.7 Review Per Month Donut Chart

From figure 10.7, users can understand the reviews per month in a particular borough will affect the consumer to book an Airbnb service. Nowadays, people tend to book a

room with higher ratings or more positive reviews. In this case, customer reviews are based on the cleanliness of the room, comfortability, extra charges or extra amenity services provided. Besides that, negative reviews will affect the number of booking for that unit. Figure 10.7 shows that the month of July in Brooklyn and Manhattan were the most reviewed month.

Figure 10.8 Choropleth map with Heat renderer type

Figure 10.8 shows a choropleth map visualization with heat renderer type. This figure indicates to the user which area in New York City has the highest average price. The initial look on Figure 10.8 would be quite hard for users to understand, but once the user zoom in their perspective of the heatmap, it would change drastically.

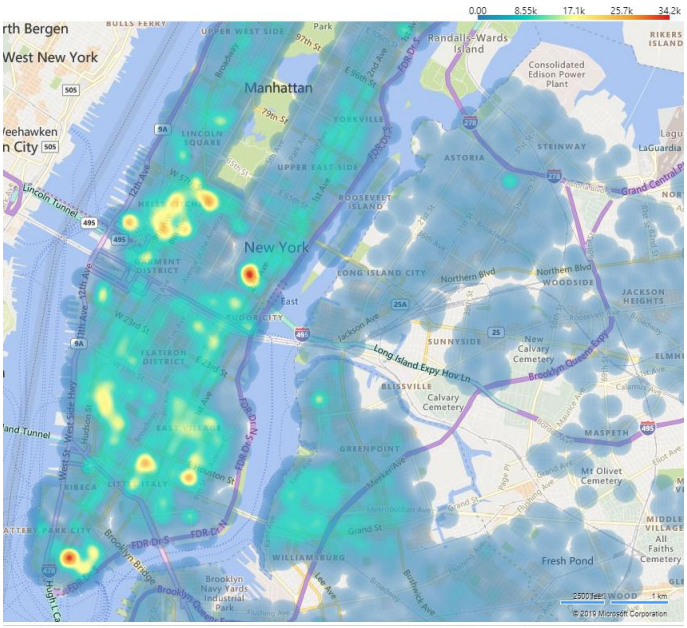

Figure 10.9 Zoomed in Choropleth map (Heat)

Once the user zoomed in the choropleth map, they would be able to see the area with the higher average price in bright red while the lower average price area would be lighter in colour. This would show users on which area of New York City has the highest average price of listings.

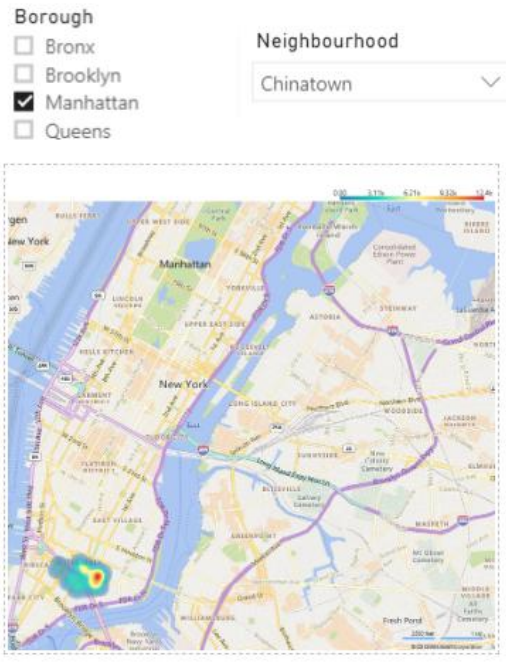

Figure 10.10 Responsive Choropleth map (Heat)

The choropleth map is also responsive to what the user selects in each filter. For example, if a user selects the borough Manhattan and neighbourhood Chinatown, the map would show the heat of that selected filter area. This allows user to pinpoint which Borough or neighbourhood to have a look.

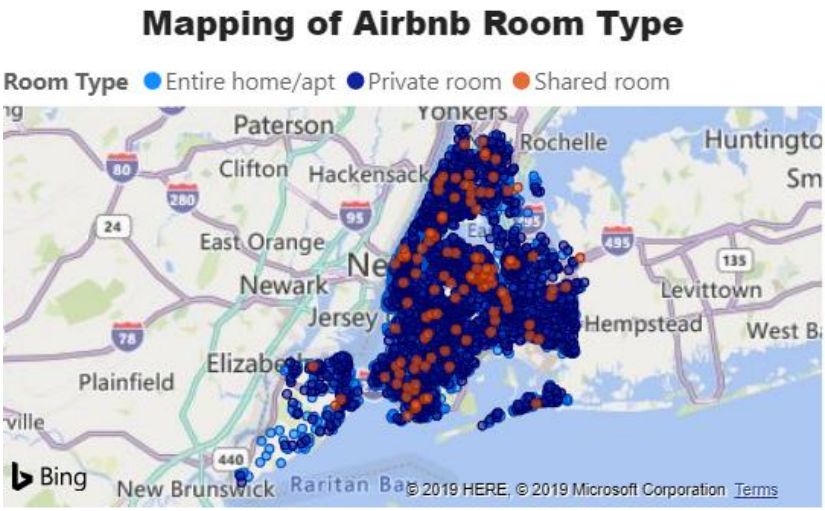

Figure 10.11 Map showing all Airbnb Room Type. Similarly, the responsive map will be clearer once zoomed or panned

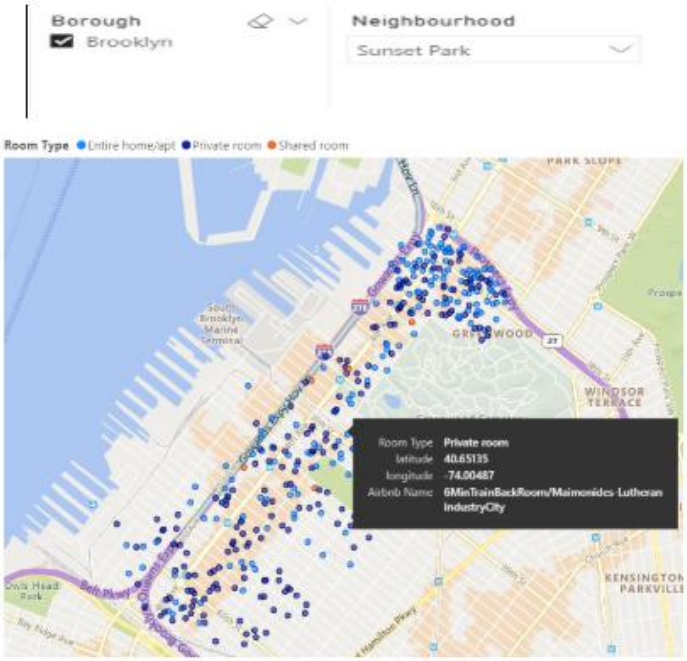

Figure 10.12 Map showing all Airbnb Room Type (Filtered)

Figure 10.12 shows a map with filtered borough to Brooklyn and Neighbourhood to Sunset Park. This map is useful if users want to check if the area of the listing is located in a safe area or close to any landmark.

Why this works

Detailed and Responsive Visualization
This dashboard contains all the information about the user required to check the factors affecting consumer booking. User can filter the data easily with the filter function and also able to view the responsive visualization based on the filter input. This would allow user to understand the difference between each Borough and neighbourhood clearly.

Simple Colours Usage
The colours used in this dashboard visual are all bright colours that would attract the attention of dashboard user. The colour difference used in each model with multiple colours are easy to recognize as well. In this dashboard the colours do not intercept with the background colours so that the user may use the dashboard with ease without missing anything.

Informative Chart Used
The chart that had been used in this dashboard enabled users to see everything regarding the Airbnb unit selected, once a user had determined what selection they have picked from the filter they are able to see everything clearly on the dashboard such as Room Type, Price, Location of the Airbnb, Availability and also the name of the Airbnb.

Discussion & Findings

Based on the result from the dashboard, Manhattan had most Airbnb services but when comparing the geographical size of it, it is the smallest borough in New York City. Comparing the average pricing among other boroughs in New York City on the heatmap above, Manhattan has the highest average price in New York City. One of the factors is Manhattan has many tourist attraction places such as Central Park, American Museum of Natural History, Empire State Building and Times Square. Many tourists have high demand on the Airbnb unit which is located near to those tourists spots. With limited unit of Airbnb, tourists had been forced to book the room outside Manhattan which make them have a choice to choose between convenience spot or long distance spot or not even book Airbnb services. Furthermore, many big corporate companies had their headquarters located in Manhattan. Most of the top management are required to travel to headquarters for their company events. Airbnb is a best choice because of the convenience and also the more affordable price.

5.1.3 Dashboard 3

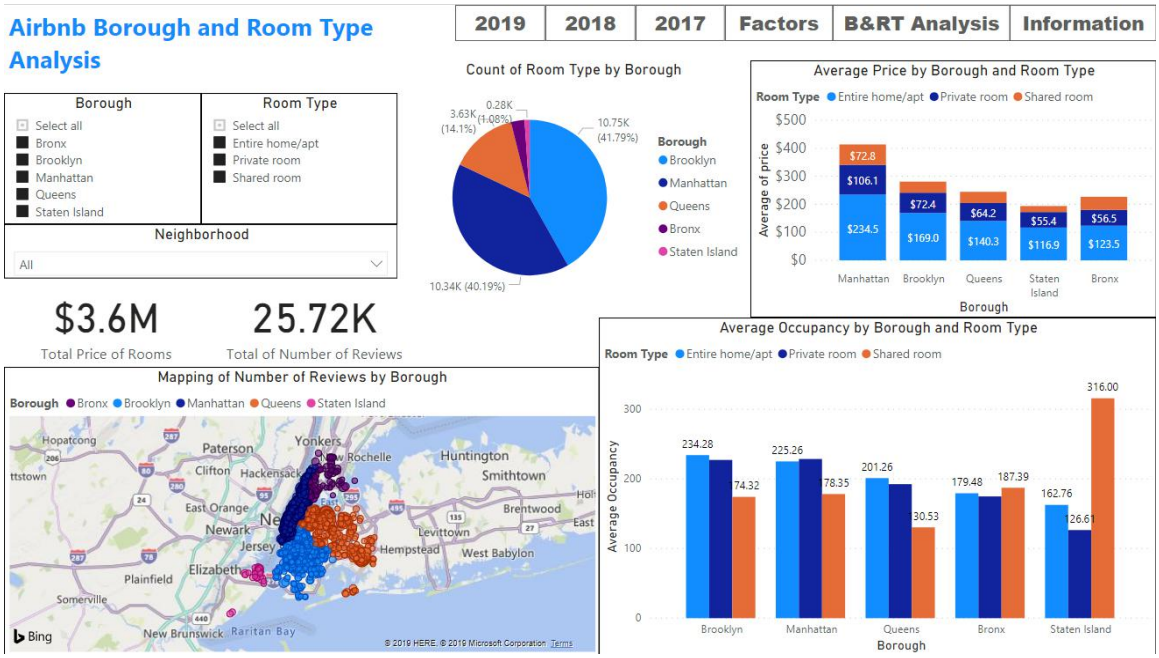

Figure 11: Airbnb Borough and Room Type Analysis

Scenario

Big Picture

You want to rent a room or a place to list on Airbnb platform and become a Airbnb host, and you need a dashboard which showcases the trends of the most successful and popular room types along with its location. The dashboard will be created using the downloaded Airbnb datasets to analyze the statistics of each room type in different boroughs, and show which areas are performing the best and the factors that may relate to it.

Specifics

- You want to know what type of rooms in which borough or neighbourhood gets the most number of reviews.
- You want to know which room types are earning the most profit and in favor to the public.
- You want to know the average price of different room types in its residing boroughs and neighborhoods.
- You want to know which rooms are being occupied most in its residing boroughs and neighborhoods.
- You want to know the factors that may increase the chances of getting more profit for the listing.
- You want to be aware of the least performing factor to avoid unnecessary loses.

Related Scenario

- You are a property agent, and you want to know what type of properties are being sold or rented in which location, the public feedback of the property, and overall best performing property in which location.

How people use the dashboard

The user will review this dashboard at some regular interval, such as monthly or quarterly, or as needed on demand. The dashboard gives an overview of the key statistics to allow hosts or business owners to understand the performance of its property. The location of the listings with most number of reviews indicates whether the listing is performing good or bad and whether it is making as much profit as the number of reviews increases.

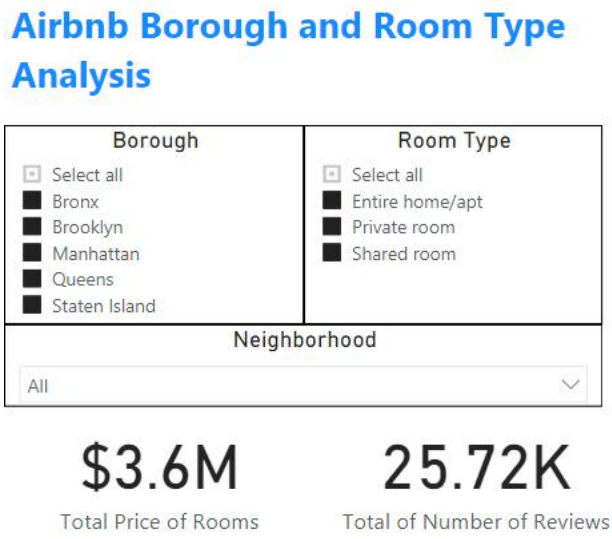

Figure 11.1: Drop-down Slicers and Cards

The left top section of the dashboard in Figure 11, showcased three dropped-down slicers to help users to select and filter the type of rooms, boroughs in which neighbourhood to highlight different areas in the visualization by clicking on it. Under the slicers, two cards; the total price of rooms and total number of reviews, were displayed as seen in FIgure 11.1. Similarly, the cards will change accordingly to what the users have filtered using the slicers. These cards will provide users an overall figured visualization on the chosen criteria.

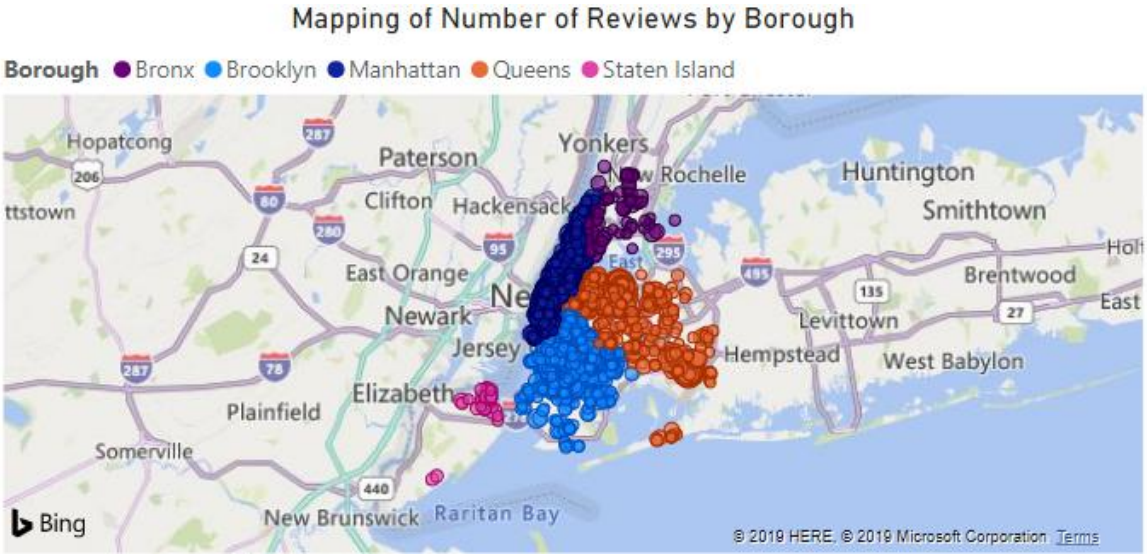

Figure 11.2: Map of New York City bubbled by the number of reviews.

The map in Figure 11.2 shows the location of the listings in New York City bubbled with the respective number of reviews. Each borough is shown to be differentiate with different colors to help users to identify which borough they are observing. Also, each bubble is shown to contain the latitude, longitude, and number of reviews of each listing. The dropped-down slicers allowed users to see the number of reviews in each borough based on the selected filter. Furthermore, the mapping allows users to zoom, pan, and even search for cities or neighborhoods.

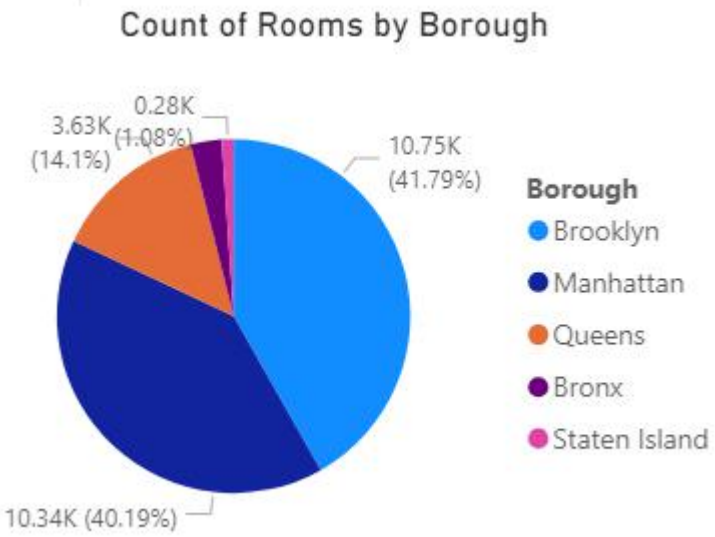

Figure 11.3: Pie chart of total counts of rooms by boroughs

The pie chart in Figure 11.3 shows the total count of rooms by boroughs. The pie chart was created simply to visualize the overall total number of rooms present in each borough along with its percentage. Data labels are added to the pie chart for easier visualization. The big takeaway from this chart shows Brooklyn and Manhattan were filled with the most number of rooms and Staten Island is considered to have the least number of rooms as of 2019.

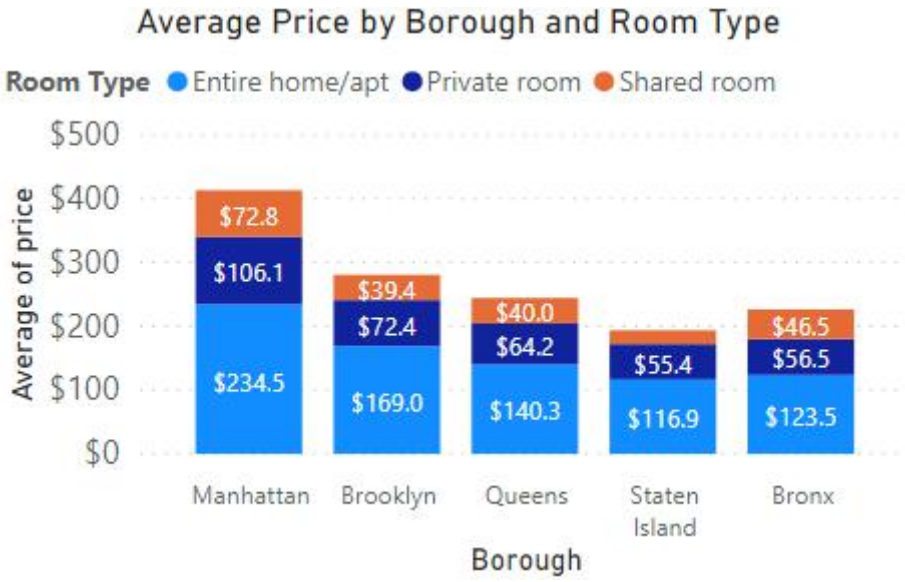

Figure 11.4: Stacked column bar chart of average price by borough and room type

The stacked column bar chart in FIgure 11.4 is used to show the average price of each room type in its respective boroughs. Depending on what the user would like the see, it shows average prices of the type of room in which borough or neighbourhood. The data labels of the chart also provides better visualization of each room type instead of the total average price for a borough. However, whenever the price is too low, the data label will not be shown.

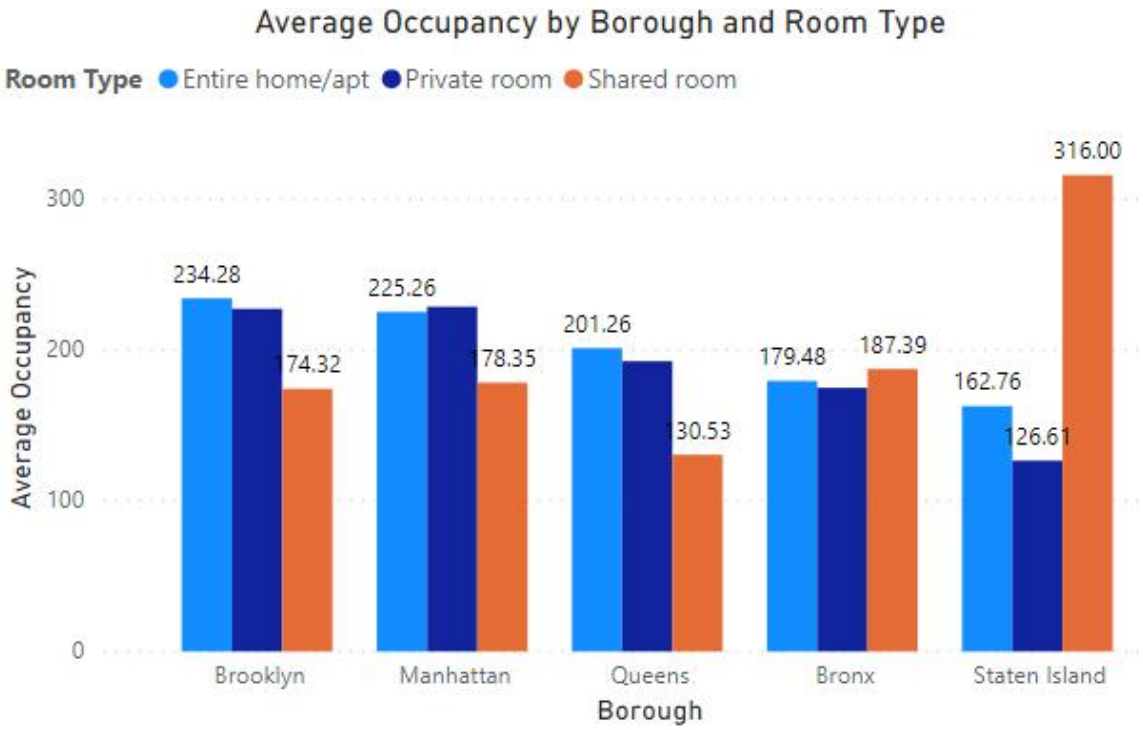

Figure 11.5: Clustered column bar chart of average occupancy by each borough and room type

The clustered column bar chart in Figure 11.5 is used to show the level of average occupancy of each room type in different boroughs. The vertical axis allows business owners to see the performance of the listing based on the average occupancy. By observing Figure 11.5, the user can understand which type of room in which borough are occupied the most throughout the year.

Why This Works

Simple and Helpful Visualization

This dashboard focuses on different matrices which will provide useful insights on the different room types in their respective boroughs and neighbourhoods. Each chart from this dashboard is different and showcases different matrices such as average price, average occupancy, total room count, and total number of reviews. The only other item on the dashboard is the map diagram which shows the listing's location with latitude, longitude, and total number of reviews.

Discussion & Findings

The dashboard was analyzed using the data gathered uptill the month of August, 2019 only. The cards showed that the total price of all the rooms combined crossed the 3

million dollar mark. This was as expected because New York City, known as the city of dreams, is one of the most expensive states in America with millions of visitors gathering from around the world. The mapping showed that Queens and Brooklyn could be considered as the boroughs having the most number of reviews, which could also indicate there are many listings surrounding those areas. However, the pie chart confirmed that it was Brooklyn and Manhattan that had the most listings which covered more than 80% of all the listings in New York City. All the listings across different room types was shown to have the highest average price in Manhattan. This could be the fact that Manhattan is the most expensive, popular, and rated the best borough in terms of living environment in New York City as of 2019 (Warren, 2019). On the flip side, Staten Island was indicated as the lowest average price for all room types and also the lowest number of listings were present. This is unfortunate as Staten Island is the only borough that does not have a subway to Manhattan and transportation to Staten Island is more troublesome compared to the other boroughs (McKee, 2019). which also indicates that transportation is key in driving a business. Surprisingly, Staten Island was occupied or booked the most times in a year, which could be correlated to the lowest cost compared to all the other boroughs.

5.1.4 Dashboard 4

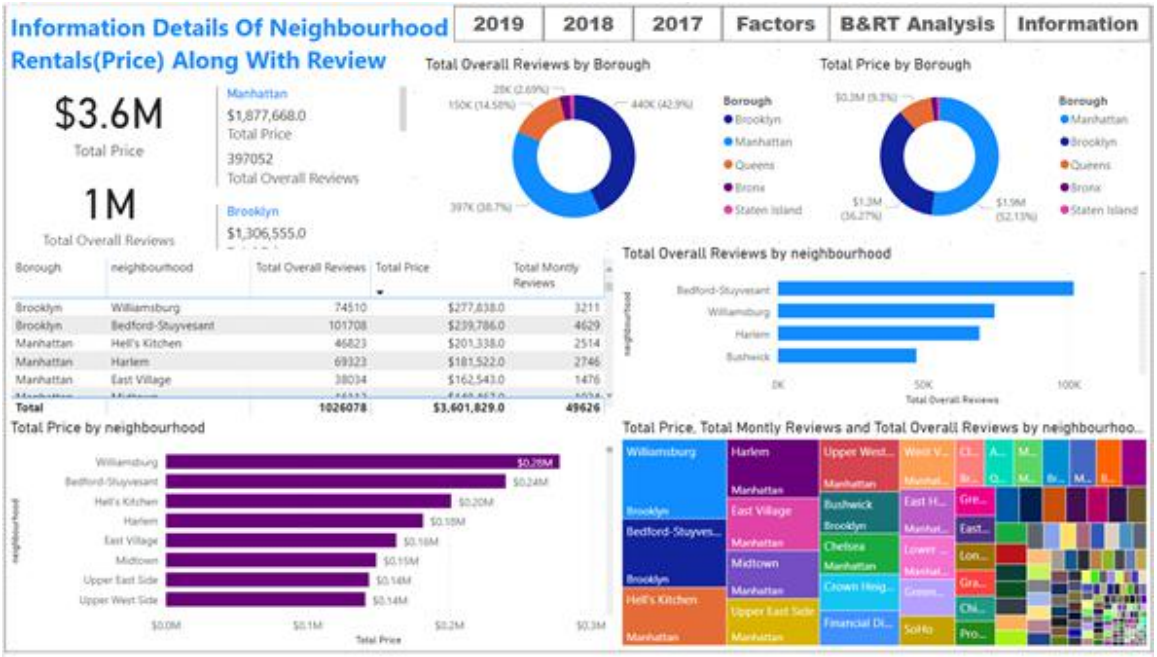

Figure 12: Airbnb Information Details of Neighbourhood/Borough Rentals(Price) along with Reviews

Scenario

Big Picture

THE VISUALIZING FACTORS OF AIRBNB:
WHY DO PEOPLE CHOOSE TO STAY WITH AIRBNB?

You are a data analyst at Airbnb New York Office, and you need to create a reporting analysis to analyze the price along with review. The dashboard is used to analyze mainly the correlations of price and review viewing, whether it increases or decreases given a particular neighbourhood.

Specifics

- You want to know which neighbourhood or borough has higher or lower rentals and reviews.
- You want to see which borough earned the most money.
- You want to see the best location where visitors are staying often due to high or low prices and reviews.
- You want to know if the review or price factor affects each neighbourhood.
- You want to know does a high or low price in a particular borough affect the reviews in a neighbourhood.

Related Scenario

- You need to track does a factor correlate with another on an aggregated basis, showing the top or low rankings and the geographic location of a particular factor. For example, you are a data analyst at a popular at a coffee shop and you want to analyze whether the food prices caused any bad or good reviews, and whether will the customer be returned to the desired area after leaving based on price and review.

How people use the dashboard

The dashboard provides specific details for each neighbourhood, prices along with the review. User may click on any part on the donut chart to display information on the selected borough. All graphs in this dashboard are responsive and will react to whatever the user selects. For example, if the user selects Williamsburg from the tree map, it will show the neighbourhood, borough along with total price, total, monthly and overall reviews. Doing so allows the user to examine and rank out the best and worst location to live in a neighbourhood.

Figure 12.1: Buttons are displayed at the top for users to navigate to different dashboard. Cards at below shows the key information of the business.

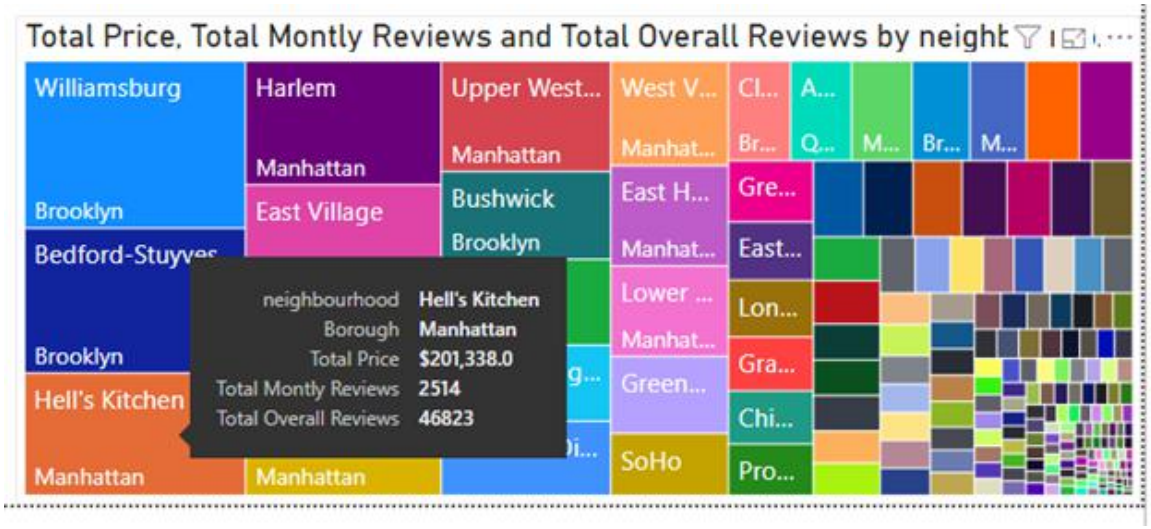

Figure 12.2: Treemap showing boroughs with information regarding neighbourhood, borough, total price , monthly reviews along with total overall reviews.

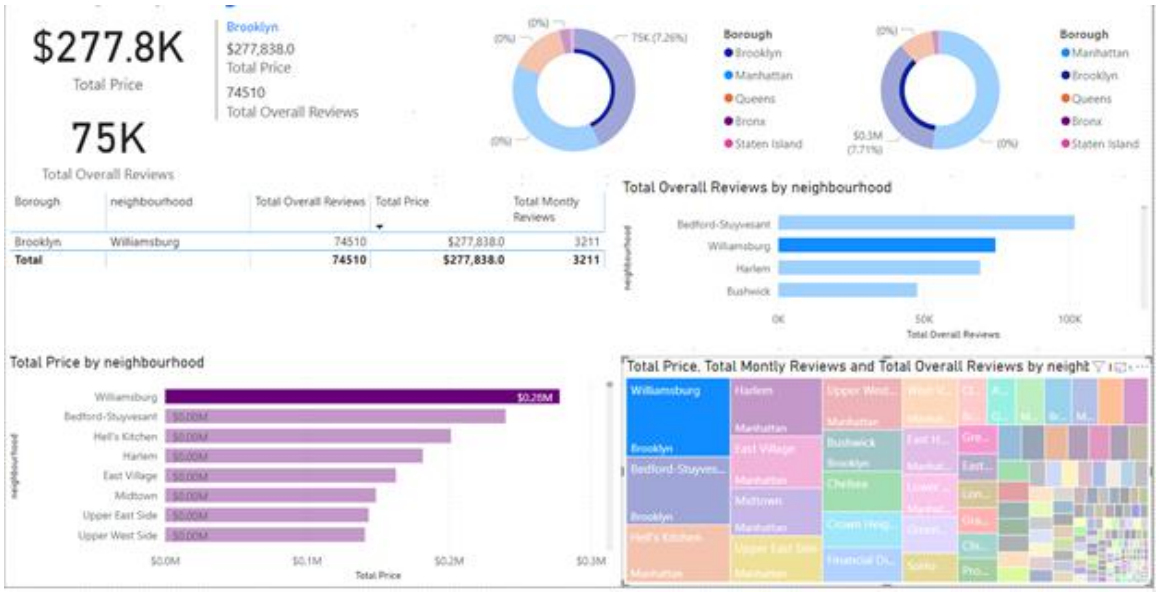

Figure 12.3: The sorted bar chart shows the total price along with review in the borough and each review is affected along with price based on a particular location.

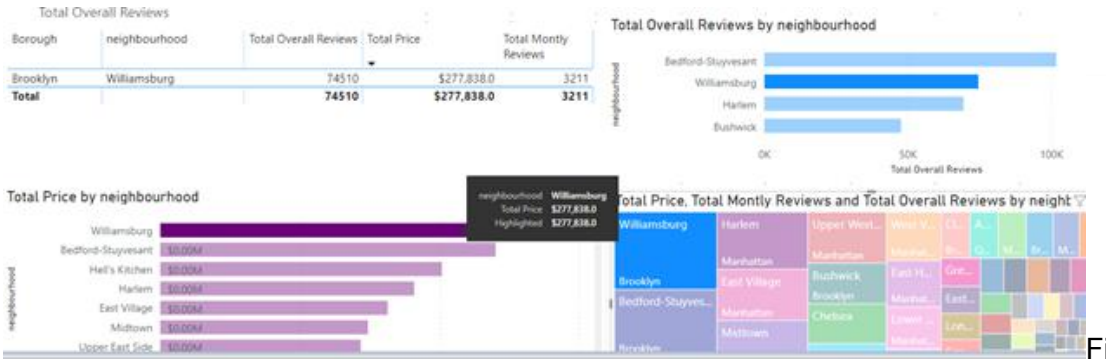

Figure 12.4: The sorted bar chart shows visualization of total rental price at which neighbourhood.

Figure 12.5: The sorted bar chart shows visualization of total overall reviews at which neighbourhood.

Why This Works

A few Key Metrics Tracked in a Simple Way

This dashboard has only a few key metrics, price and reviews being the primary metrics. The sorted barchart, treemap, and donut chart. The sorted barchart encodes the price and review data along with borough and neighbourhood to show correlations of price and review. The treemap however encodes data through size and color and is usefulness for hierarchical data or when a large number is viewed to be used for comparison. Therefore, an overall comparison between price, neighbourhood, neighbourhood rentals, monthly reviews, and overall reviews were viewed to see which had the highest values ranked among all. The donut chart encoded data using arcs and areas to show a part or whole comparison of an area, in this case, borough's area of price and review.

Discussion & Findings

Based on the dashboard, there are a few insights that we see from this dashboard as it reports and compares prices and reviews among each other. As we can see, a highly regulated area with high reviews and high prices indicate that this neighbourhood responds well to the public as people enjoy staying at that area. This could be due to reasons such as social welfare where the neighbourhood is strategic in a macro standpoint view. For example, a visitor/tourist would choose to stay there because that area is popular, clean and etc. Moreover, it indicates areas where the prices and reviews

are low. This could be due to that area having unethical political chain of events happening at that area such as high crime rate or lack of facilities and etc.

6. Conclusion

6.1 Concluding Remarks & Future Research

Nowadays, Airbnb is having such a huge effect on the travel industry settlement, and it is essential to analyze the purchasing patterns along with what drives these patterns. There still exists the subject of why individuals in general will pick Airbnb instead of a customary settlement. Therefore, what will be the future effect of it for the conventional convenience in the industry? This study has been attempted to discover a few responses to these inquiries by uncovering the inspirations that lay behind the decision of Airbnb as a substitute for customary tourist lodging. This is why this visualization report uncovers the absolute most significant inspirations to be valued as this visualization outcome is addressing or at least helps to indicate purchasing patterns along with reviews based on where tourist/visitors would prefer to stay. In contrast, this Airbnb study showed various potential outcomes for future inquiries in terms of the micro and macro scale in marketing.

6.2 Limitations

One of the many important limitations is the fact that the data was gathered through the Airbnb website. In this case, the dataset from the website had a lot of data inconsistencies. In the end, when the results from Excel were checked, an encounterment where there were many missing values and some values did not make sense in the dataset. Therefore, it resulted in the deletion and imputation of some observations. The second limitation is demonstrated as the dataset lacked sufficient variables because the targeted sample for the study is limited to a specific subgroup of the population which was determined price, review along with overall availability of a listing. Due to its relatively new entrance in the market, Airbnb still represents a relatively new topic for some people. Thirdly, the sampling frames would had led to an almost exclusively European final sample, meaning that other Airbnb users from various geographic areas could use the online server for alternative purposes than Europeans users. In that sense, a good example is represented by the Tussyadiah and Pesonen (2015) research about the dissimilarities between users regarding the which peers are likely to go for short-term rentals.

6.3 Future Recommendations

Airbnb Point of View

From Airbnb's point of view, Airbnb should ensure that all of their current or future Airbnb hosts are keeping their prices reasonable to be able to continue to compete with other rivals company such as HomeAway which provides the same accomodation services as Airbnb or to compete with hotel prices in New York City. Airbnb may also set new regulation for Airbnb host to follow such as having complimentary amenities in every Airbnb to increase the customer stay experience which then would allow them to give review that can attract more future customers. Airbnb may also change their pricing

based on demand, for example if during July of every year there is a giant peak in tourist booking Airbnb may decrease the price for all booking in July to allow more tourists to use their service. Airbnb may also award customer who uses the services for a long period of time a special membership which then entitled them to a discount on all Airbnb premium room, this would attract more customers in using their service.

Data Analyst Point of View

Therefore, based on our overall findings from the data explanation point of view, we find that it is seemly fit that Airbnb should have a Record Inventory Database System to help track Airbnb's records. As it is, we can see that Airbnb's records that were examined by us contained a few data inconsistency issues such as missing value and by making this system, Airbnb will be able to better provide data for analysts, thus achieving a higher rate of validation while analysing the data's findings in its model. Currently, the system's username and password metrics are keyed in as Airbnb(username) and 12345(Password) respectively. These metrics can be changed so that while Airbnb uses this system, it better ensures data privacy as not everyone would be able to access these records except the data analyst and whomever are granted access to.

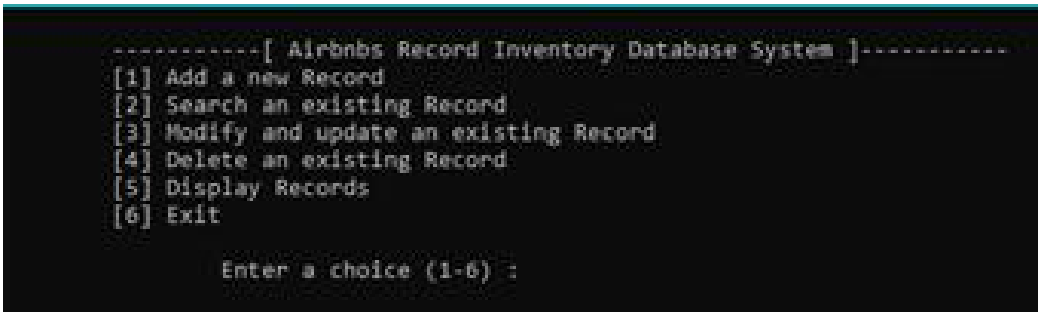

Figure 13: C++ System derived using Visual Studio

System Functions

The following below are the key functions of how this system is used:

Add a new record	Collect new records through adding them and choosing to save it into its database.
Search an existing record	Search an existing record in its database so that analysts can easily filter the data.
Modify and update an existing record	Perform Imputation for records that required to be done.

Delete an existing record	Delete existing records for data analysts whom do not wish to use a particular record while making validations in their analysis.
Display Records	Filter all the records according to what data analysts wish to search for.
Exit	Exit the system once the user does not wish to use it.

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Appendix

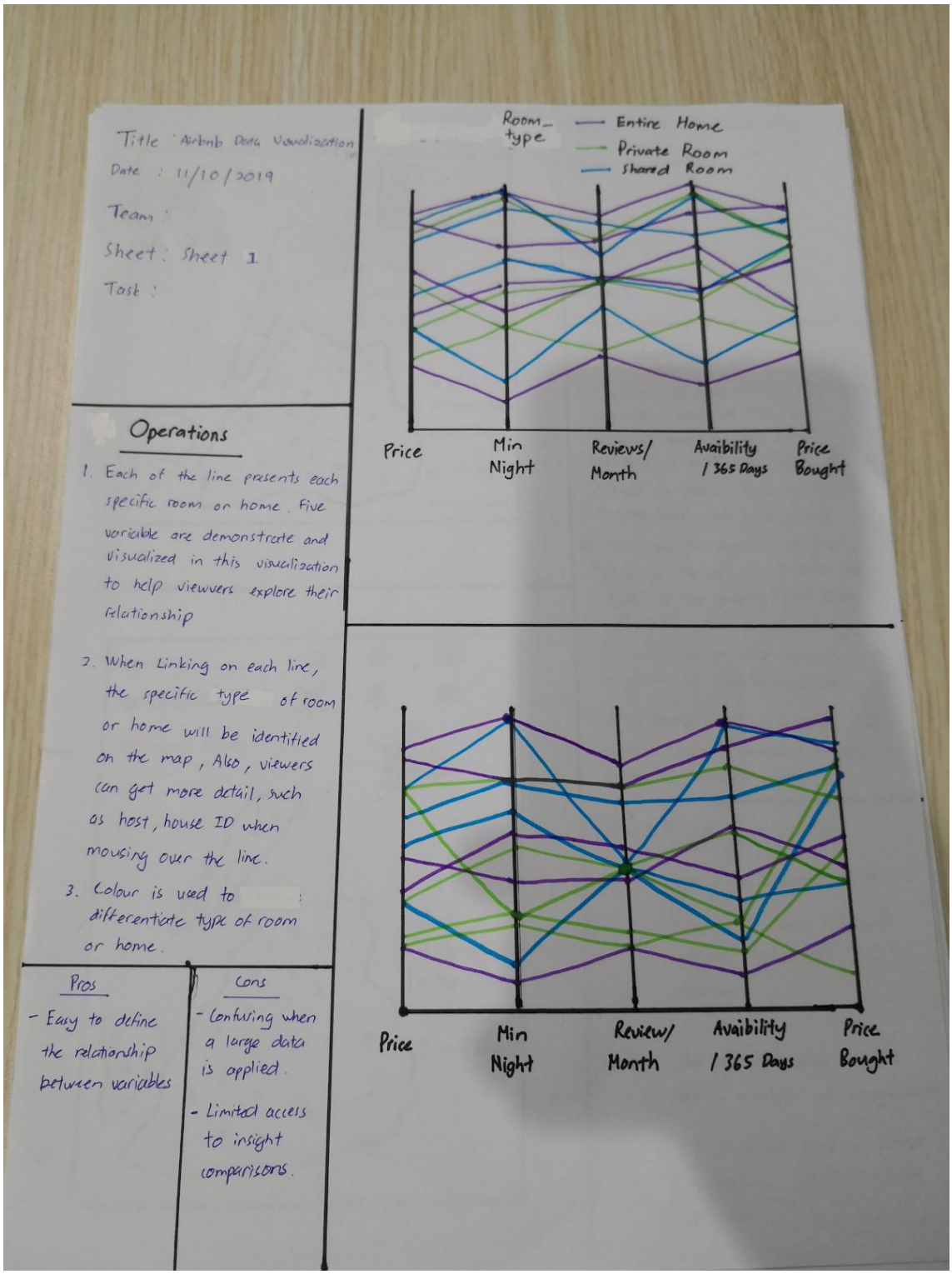

Figure 4: Slopegraph

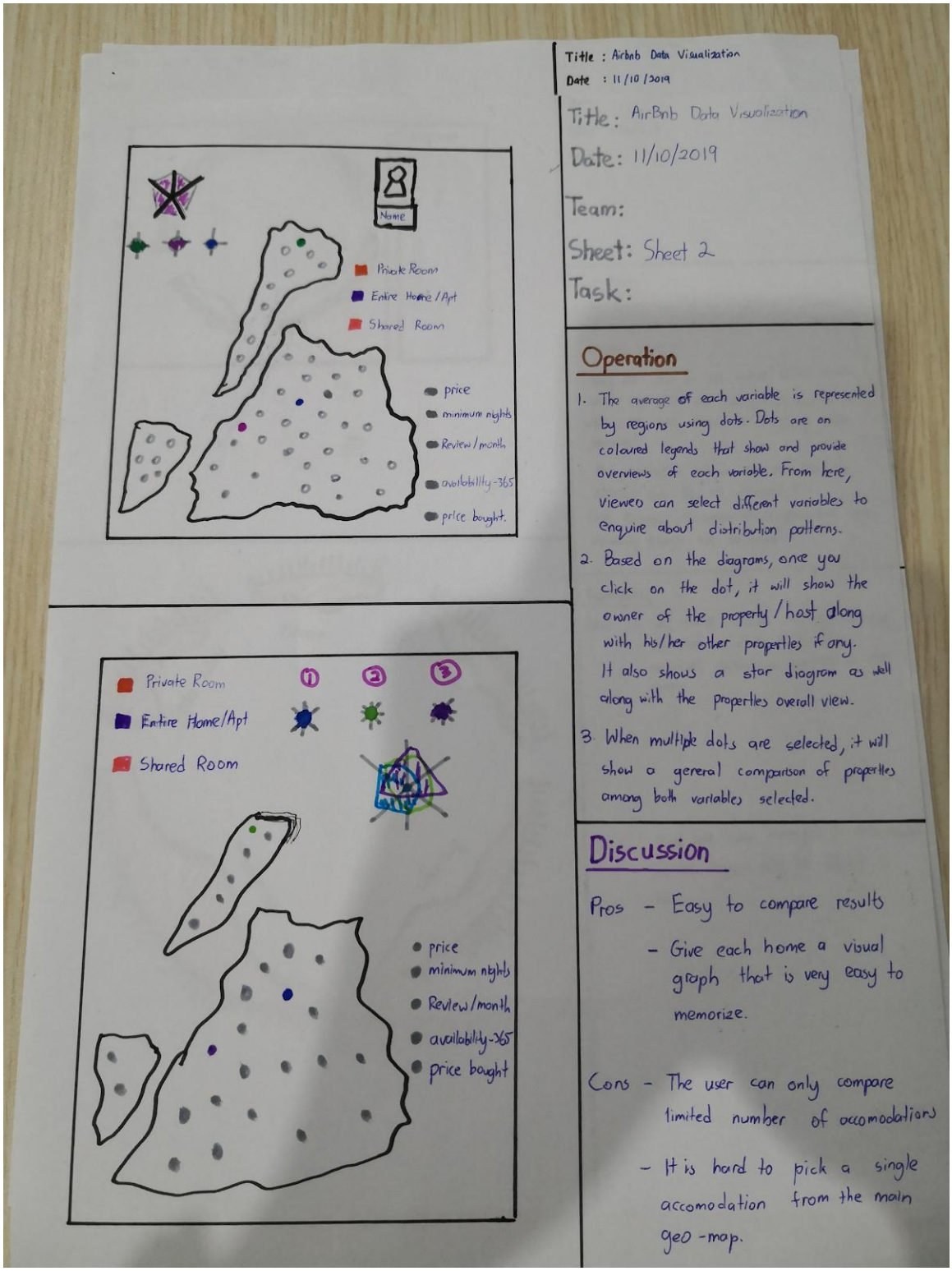

Figure 5: Geographical Map

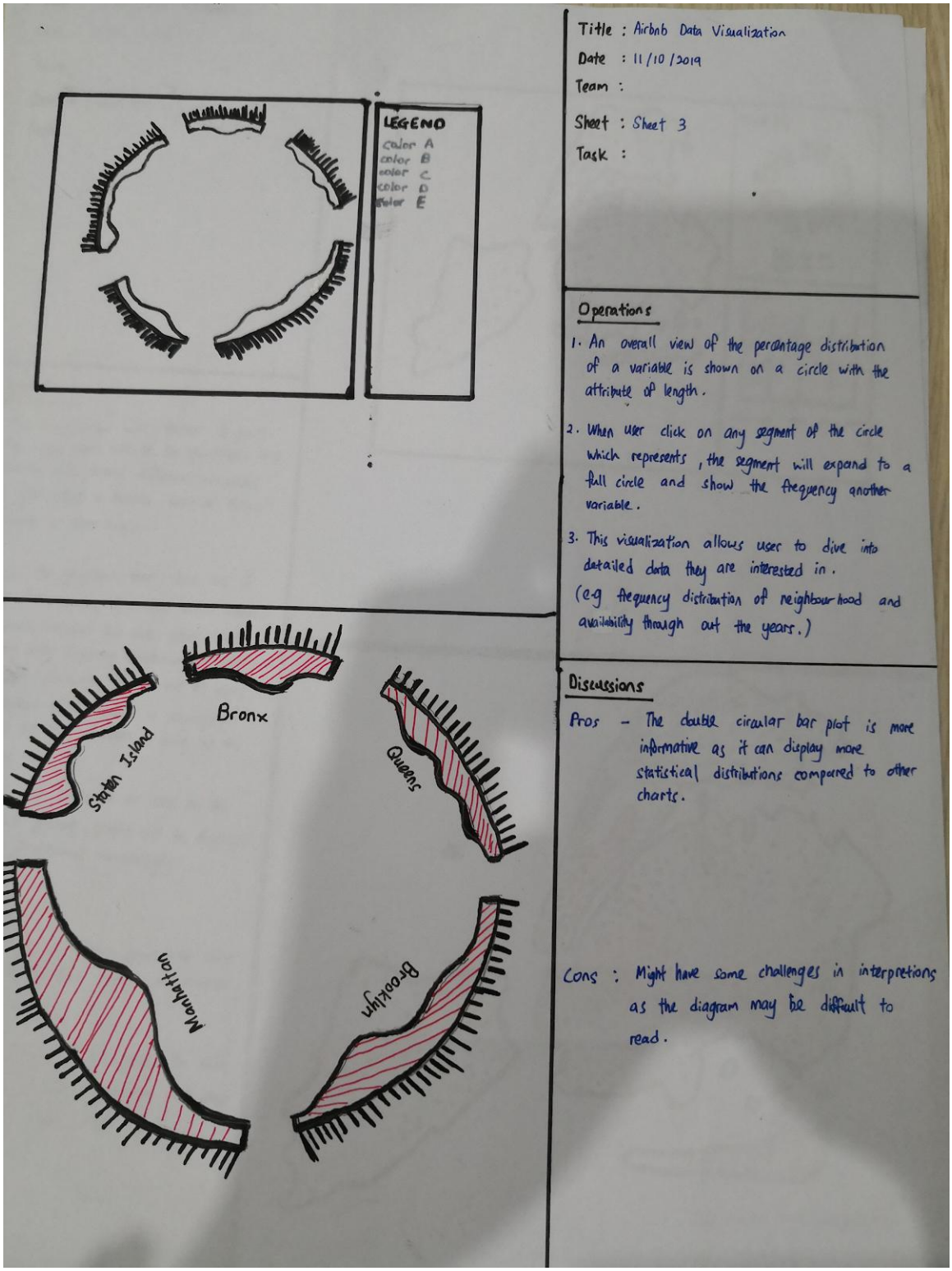

Figure 6: Double Circular Bar plot

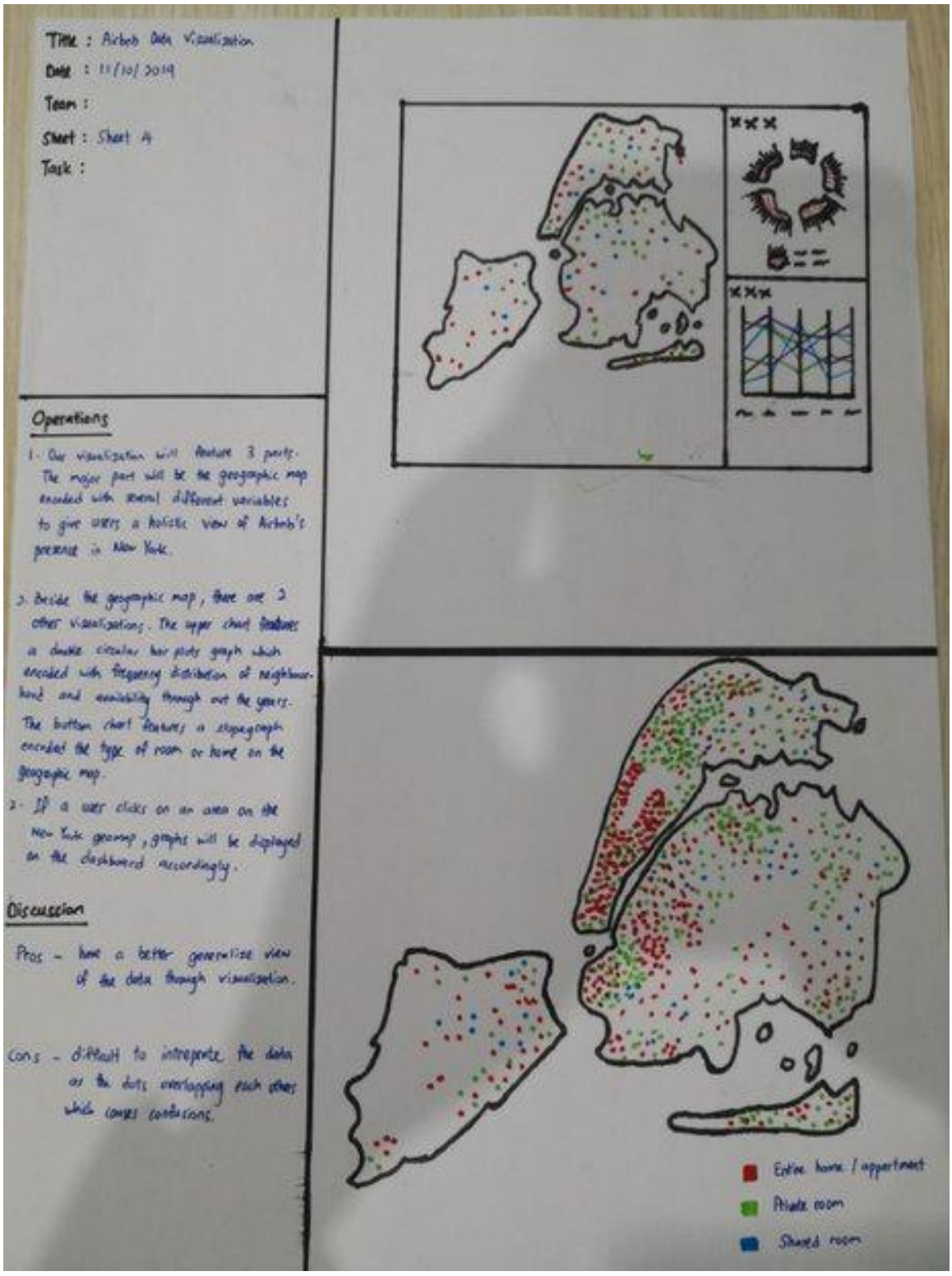

Figure 7: Geographical Map

Visual Analytics Techniques For Business And Science
(IST2234)
Business Scenario And Storyboard

First Draft (Project Proposal)

Title: The Visualizing Factors Of New York Airbnb Sales

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Airbnb Specifications

SPECIFICATION:	Airbnb, Inc. operates an online marketplace for hospitality services. The Company offers lodging, homestays, and tourism services via websites and mobile applications. Airbnb's consumer market serves clients worldwide.
SECTOR	Communications
INDUSTRY	Media
SUB-INDUSTRY	Internet Based Services
FOUNDED	06/27/2008
WEBSITE	www.airbnb.com

DATASET	New York City Airbnb Dataset
SOURCE	http://insideairbnb.com/get-the-data.html

Introduction

New York City is a city of renters where vacancy rates are at crisis levels, and rents are continuously rising. Income levels for the average New Yorker haven't kept pace, and affordability are at low records. This occurs frequently especially during festive seasons. This causes homelessness levels, food insecurities, economic and racial inequality rates to increase in New York City. It's at this time that short term rental platforms, dominated by Airbnb, have entered the market, and have grown to have listings of tens of thousands of rooms and entire apartments. Therefore, Airbnb addresses the demand for tourist accommodation and creates an income stream for "hosts," and ignores both the need for and loss of housing.

Variable specifications in Dataset (listings.csv)

Variables	Specifications
Id	The ID of the record
Name	Name of each AIRBNB business venue (stay)
Host_id	The ID'S HOST
Host_name	The host's name
Neighbourhood _group	The state where the AIRBNB business resides
Neighbourhood	The area in the STATE where host is from
Latitude	latitude coordinate
Longitude	longitude coordinate
Room_type	Room type of stay
Price	Price of Room per night
Minimum_nights	Minimum nights of stay in that particular room
Number of reviews	Number of Reviews obtained from previous people staying

	there
LastReview	Last Review DATE of host
Reviews_per month	Percentage of Reviews in a month
Calculated hostlistings count	Number of additional hosts that the host staying at the moment can facilitate
Availability_365	Availability of AIRBNB business area throughout the year

Table 1: Variable specifications

Variable data types in dataset

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
16	availability_365	Num	8	BEST.		availability_365
15	calculated_host_listings_count	Num	8	BEST.		calculated_host_listings_count
3	host_id	Num	8	BEST.		host_id
4	host_name	Char	35	$35.	$35.	host_name
1	id	Num	8	BEST.		id
13	last_review	Num	8	MMDDYY10.		last_review
7	latitude	Num	8	BEST.		latitude
8	longitude	Num	8	BEST.		longitude
11	minimum_nights	Num	8	BEST.		minimum_nights
2	name	Char	303	$303.	$303.	name
6	neighbourhood	Char	26	$26.	$26.	neighbourhood
5	neighbourhood_group	Char	13	$13.	$13.	neighbourhood_group
12	number_of_reviews	Num	8	BEST.		number_of_reviews
10	price	Num	8	BEST.		price
14	reviews_per_month	Num	8	BEST.		reviews_per_month
9	room_type	Char	15	$15.	$15.	room_type

Figure 1: Variable data type

History of Airbnb

The company was founded by Brian Chesky, Joe Gebbia, and Nathan Blecharczyk in San Francisco during 2008 where they became one of the first to peer-to-peer services that specialized in housing accommodations. The founders were traveling to a conference in 2007 but couldn't pay for their housing, so two of the founders decided to rent out part of their apartments in order to help pay for the cost of the trip. This sparked their idea. The founders wanted to change the way that people thought about travel. In

2009 they partnered with Y Combinator and expanded its limited offerings. They continued their expansion and capital raising efforts to eventually grow its operations internationally by acquiring Accoleo. Airbnb now has operations in 191 countries and is able to rent out a room, a home, or even a castle for a night or longer.

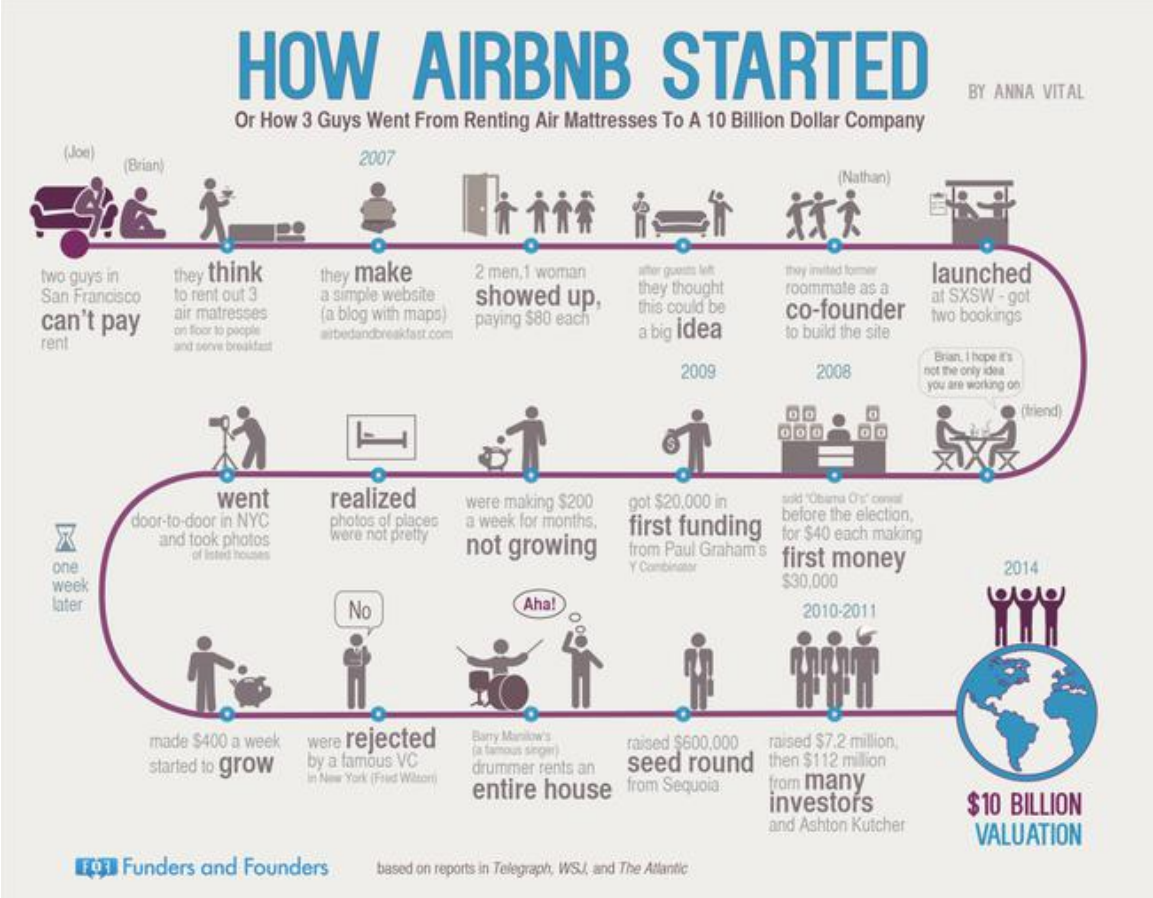

Figure 2: How AirBNB Started

Where AirBnb has expanded

Figure 3: World Wide Listing

Figure 4: Infographics

Today, Airbnb is located in over 191 countries and continues to expand internationally. They have even been able to establish operations in Cuba and other countries where its legality might be in question. By doing this they have created a niche that caters to travelers; including: high spenders, penny pinchers and everyone in between.

The Advantages of Airbnb

- **Wide Selection**

Airbnb hosts list many different kinds of properties—single rooms, a suite of rooms, apartments, moored yachts, houseboats, entire houses, even a castle—on the Airbnb website.

- **Free Listings**

Hosts don't have to pay to list their properties. Listings can include written descriptions, photographs with captions, and a user profile where potential guests can get to know a bit about the hosts.

- **Hosts Can Set Their Own Price**

It's up to each host to decide how much to charge per night, per week or per month.

- **Customizable Searches**

Guests can search the Airbnb database—not only by date and location, but by price, type of property, amenities, and the language of the host. They can also add keywords (such as "close to the Louvre") to further narrow their search.

- **Additional Services**

In recent years Airbnb has expanded its offerings to include experiences and restaurants. Besides a listing of available accommodations for the dates they plan to travel, people searching by location will see a list of experiences, such as classes and sightseeing, offered by local Airbnb hosts. Restaurant listings also include reviews from Airbnb hosts.

- **Protections for Guests and Hosts**

As a protection for guests, Airbnb holds the guest's payment for 24 hours after check-in before releasing the funds to the host.
For hosts, Airbnb's Host Guarantee program "provides protection for up to $1,000,000 in damages to covered property in the rare event of guest damage, in eligible countries."

The Disadvantages of Airbnb

- **What You See May Not Be What You Get**

Booking accommodations with Airbnb is not like booking a room with a major hotel chain, where you have a reasonable assurance that the property will be as advertised. For example, individual hosts may create their own listings, and some may be more honest than others. However, previous guests often post comments about their experiences, which can provide a more objective view.

- **Potential Damage**

Probably the biggest risk for hosts is that their property will be damaged. While most stays go without incident, there are stories of entire houses being trashed by dozens of party-goers when the Airbnb hosts thought they were renting to a quiet family. Airbnb's Host Guarantee program, described above, provides some assurance, but it may not cover everything, such as cash, rare artwork, jewelry, and pets. Hosts whose homes are damaged may also experience considerable inconvenience.

- **Added Fees**

Airbnb imposes a number of additional fees (as, of course, do hotels and other lodging providers). Guests pay a guest service fee of 0% to 20% on top of the reservation fee, to cover Airbnb's customer support and other services. Prices display in the currency the user selects, provided Airbnb supports it. Banks or credit card issuers may add fees if applicable. And, while listings are free, Airbnb charges hosts a service fee of at least 3% for each reservation, to cover the cost of processing the transaction.

Business Scenario

As of now, an Airbnb host currently has low bookings on his/her own properties. The host would like to know how he/she can improve their booking rates. The host property currently resides in a condominium in New York City where there are multiple Airbnb host in that same building. The competition is high in that building. To understand how the host can improve the booking rates he/she started looking into other more successful Airbnb host properties to understand how he/she can achieve the same amount of success. To understand more on how to improve on the host booking rate the host

started looking into the dataset that were published by Airbnb yearly to understand more on how to attract more people to his property. To accomplish this the host is required to use a storyboard to observe other more successful condominium AirBnB unit in the same building. The storyboard will consist of info such as price for all units within the same building where the host may easily compare and see how does price affect the attraction of customers. With this, the host is able to see why other Airbnb host are more successful and how he can adjust the price to attract more bookings in the future.

Next, the host may also use the storyboard to observe review given by people who had stayed in other condominium airbnb unit in the same building to further understand what do customers look for when they are staying in an Airbnb unit. With this, the host is able to improve his Airbnb services and attract more customers. The host may also view on which month the review has the highest count which means that more customers are using Airbnb on that particular month the owner then can lower his price to be more competitive with other Airbnb in the same building, therefore increasing the owner sales.

THE END