CCT College Dublin

Assessment Cover Page

To be provided separately as a word doc for students to include with every submission

Module Title:	Strategic Business
Assessment Title:	Project Business Case
Lecturer Name:	Ken Healy and Muhammad Iqbal
Student Full Name:	Giovanni Andrade Silva, Luciana Teixeira, Marcelle Louise de Souza, Muhammad Shahbaz
Student Number:	2018320/ 2021322/ 2021381/ 2018092
Assessment Due Date:	12/03/2022
Date of Submission:	12/03/2022

Declaration

By submitting this assessment, I confirm that I have read the CCT policy on Academic Misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source. I declare it to be my own work and that all material from third parties has been appropriately referenced. I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

Table of Contents

1. Introduction

For the past decade, owning a property has shown a sign of financial stability. This behaviour comes from the past decades, when our ancestors had in mind that having your own property is the best investment in life. Furthermore, the low cost of properties in the past had an advantage that in future the price would increase, creating an opportunity to sell the property for a much higher price.

The house market has made significant changes with the demand of housing bringing the prices up but also, people looking for properties outside of cities with new opportunities to work from home and possibilities where houses are becoming an investment asset.

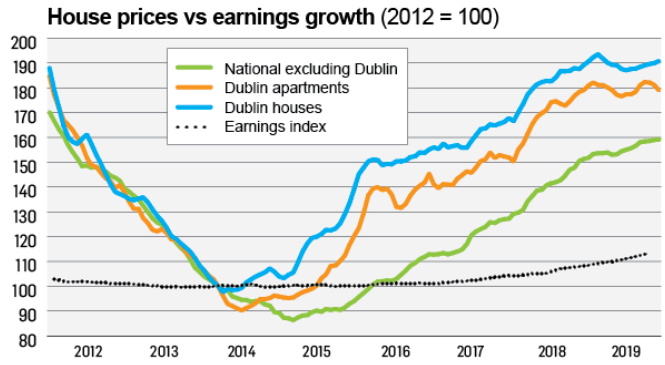

Figure 1: Housing scenario through the years. (The Irish Times 2020).

1.1 Business case

When looking for a property in the market there is a process of searching through plenty of options such as real estate agencies, property advertising websites and similar options. A business becomes famous when addressing a demand or bringing a solution such as the merge of different application processes to one, creating a successful application.

The innovations within applications have become the future of our world, enhancing tools or processes that we need, easy to access and fast to adapt. An example of this is shown with Airbnb which has become a successful company, their approach was to analyse the market for an accessible option. Their application aims to offer stays in hospitality around the world, with a benefit to choose a property to stay somewhere more comfortable and private, reducing the expensive demand of hotels and suiting all budgets.

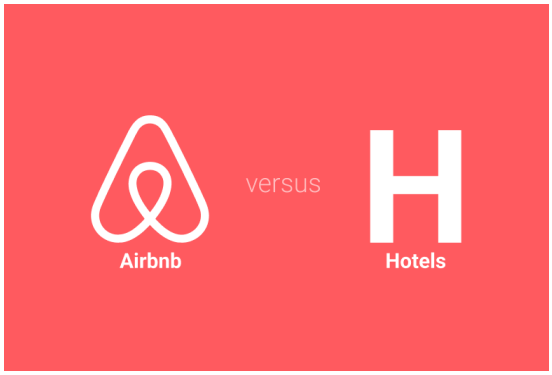

Figure 2: Comparison Example.

The automation of the house market sector is certain to happen, our application aims to provide a solution for when looking to buy a property and the need of accessing many websites or different services to decide an ideal property. Implementing the possibility of predicting places that are going to have a higher demand in the future due to its location or for the area prosperity is the benefit of choosing our application, this creates new opportunities for the market to attract all types of customers, from first time buyers to investors of properties.

1.2 Porter's Five Forces

Porter's five forces is a framework that helps analyse the market through five phases, these phases are important to understand the existing competitors for our application. Thus, it helps to measure the following aspects, how competitive the industry is, how the profit can be analysed and the attractiveness of the customer to choose the application.

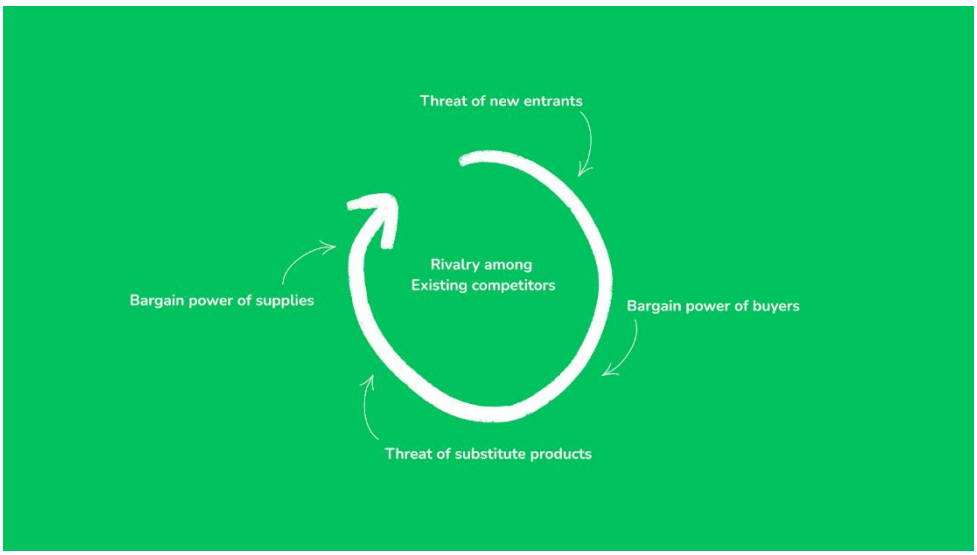

Figure 3: Porter's illustration.

1.2.1 Rivalry among existing competitors

The competitive force for the business is consider small due to the innovation of house market tool, as a new application shows no effect to the rivalry, allowing to gain popularity, even major companies such as Daft that leads the market are not going to spend cost of advertising and decreasing

prices to create a barrier to our business. Allowing the launch of the product to be positive and attract customers.

1.2.2 The threat of new entrants

The threat of new entrants is not present as no new business has a plan with the same purpose, guaranteeing a gain in market share and profit for our application. This leads to increasing the amount of user's attention to the platform within the features of the application, which will be described in a future section. However, it is important to guarantee uniqueness once the application launches to become popular, creating customer loyalty and watching for companies that tend to follow trends in the market creating new entrants.

1.2.3 Bargain power of buyers

To understand the customer's power is when they are the main buyers of the business, analysing all types of customers using this application is essential, as mainly the customers are investors or to first buyers of properties, they can demand a better quality of the product. If the product is not stable before launching, functional and providing the innovation that was promised, users can switch to their previous applications, resulting in losing customers and the profit loss.

1.2.4 Threat of substitute products

The threat of substitutes is when the application becomes popular creating new entrants with the same application purpose, with a main threat of customers switching to alternatives. For this our product needs to guarantee uniqueness looking further where the customer feels the necessity of tools for their property research. The price and performance are where customers will determine which application will be their choice to keep interest in the applications that have new features, which will guarantee a progress against substitutes maintaining and gaining customers but will increase the cost.

1.2.5 Bargain power of supplies

The number of supplies creates the uniqueness of the application as the company will adapt to the growth and demand with the supply's expansion with a small to medium cost price. The supplied power is considered medium as it requires a hosting place to keep the application running, and a team to manage the application and keep developing for new features.

After a deep analysis of the market and the potential that the application has, creating a concept is the next step, so all the processes of commercialisation are established and a clear proposal of the project.

2. Project concept

As modern applications are becoming the future of commercialization, companies are adapting to implement technologies to their business. It is essential for the development of these projects, to have guidance explaining the concept clearly for business investors and the development team.

2.1 Concept

The concept for this project is to create a web application that will use different types of data to analyse properties, for example the data from houses prices in areas in Dublin shows that through the years areas had an uprising price for properties. This gives the prediction of the data

Furthermore, the application aims… to he markets opportunity for our project, as it aims to reach people that are looking for property for different reasons as cited in the *Business Case*. Therefore, for all types of projects a risk assessment is important to understand the market pressure as described in Porter's Five Forces section…

2.2 Goal

The goal of the project is to create a new technology that will be required in the future of house marketing. The cost of the project for a company creates a margin of profit once the product is launched successfully, as cited in Bargain power of supplies, the technology will use suppliers' services as "pay as you go" to find a balance between spending the optimal cost, to running the application for the amount of users. Adjusting the growth of the business with the supplier's demand so the cost has a focus on the quality of the product and marketing.

3. Business Analysis

Many businesses have long recognized the value of data, the opportunities that come with well-structured research and data-driven decisions are gradually becoming standard in many industries, from advertising, marketing, healthcare to financial services.

"In the KPMG Global PropTech Survey 2018, 49% of participants thought that artificial intelligence, big data, and data analysis were the technologies likely to have the biggest impact on the real estate industry in the long term." (5 Ways to Apply Data Science to Real Estate, 2022).

This project depicts predictive analysis in real estate investments in a full and detailed approach. This initiative aims to demonstrate the commercial viability of data services by analysing property-related data in Ireland, spotting patterns and outliers, and applying machine learning and other algorithmic approaches to define financial risks and market trends in order to define the best option with the best return on investment for the investor.

3.1 Business Analysis Methodology

Business solutions that successfully meet current needs becoming promising ventures require a thorough analysis and a deep understanding of the environment, this process is called business analysis. Business analysis is an activity that requires a lot of ideas, expertise, and information to identify business problems and solutions.

Choosing the right approach for determining what are the company's needs, goals, or objectives is crucial; in this situation, PESTLE is the method of choice (Political, Economic, Social, Technological, Legal and Environment). This technique is comprehensive and useful for the proposed project; it can assist in understanding influences and achieving readiness when dealing with factors that can have a significant impact on the business; it can also assist in assessing threats and opportunities and making wise strategic decisions.

The project proposal involves creating a data analysis solution to identify lucrative opportunities in the property investment sector.

3.1.1 Political

This refers to the political component that has a strong impact on the business, this can include taxation policies, trade and political regime. To ensure long-term profitability, one should take into consideration how these factors can be levied around the year. In regards to investments in Europe, having a democratic governance provides greater stability and attracts more investors as well as promotes entrepreneurship as it demonstrates transparency in policies and tax regulations.

3.1.2 Economic

This refers to the economical components and includes various variables, for instance inflation, exchange and interest rates, demand and supply of labour as well as the efficiency of the market and its growth rates. Investing in a country with high economic growth rates provides more opportunities to pursue long-term objectives and revenue growth.

3.1.3 Social

This refers to the social components that represent societal values, norms, and customs, as well as consumption behaviour that is strongly linked to economic factors; when it comes to real estate, investors should carefully consider this factor in light of the socio-cultural environment, as failure to do so could result in irreversible damage. Investors should examine spending habits and develop marketing strategies based on their findings. Understanding the population's attitude toward migration and varied backgrounds is an important factor to consider when investing internationally; countries with a positive past are more likely to have an open market with more favourable chances.

3.1.4 Technological

This refers to the framework's technology component, and it takes into account the rate at which enterprises are heavily investing in development. To maintain a long-term profitable business, real estate investors must anticipate current and future trends. They should select countries with well-developed technical infrastructure because knowing these patterns will be advantageous.

3.1.5 Legal

This is the legal section, which offers a broad overview as well as more detailed and specific information on numerous laws and regulations, primarily employment, health and safety, intellectual property, and consumer protection laws. Real estate investors should research the rules relating to refunds, discounts, credit terms, quality, misleading advertising, and maximum pricing in order to have a complete awareness of the laws and to comply with them.

3.1.6 Environment

This refers to the environmental component; in order to avoid lawsuits and damage to their reputation in the market, real-estate investors must be well-versed in environmental legislation. Renewable technologies have arisen as a significant trend in numerous industries, and real-estate investments should analyse the extent to which a country's technological infrastructure supports the employment of renewable technologies in order to capture this environmental trend.

4. Technologies

To create a powerful online presence, researching and outlining the best technologies is highly recommended to ensure that we use the right tools for this project. Based on the business goals, budget, and team members' skills, we divided the technologies into five sections. Despite the analysis presented here, the technologies may be replaced if the team members agree on a better option once the deployment and testing phase begins.

4.1 Platform for Data Analysis and Development

Jupyter Notebook is the original web application for creating and sharing computational documents. (*Jupyter.org, 2019*). Given that projects require active communication, adopting a platform like Jupyter allows group members to have access to the source code and contribute at all times once the code is shared through GitHub. Its interface allows you to see both the code and the results, which can be beneficial to showcase your work and gather relevant data more efficiently.

Jupyter runs on a local server so that team members can work on their projects offline regardless of their internet connection. In contrast, by simply hosting the server on AWS you can collaborate on the notebooks directly and interactively. Because it provides these two alternatives, the platform is versatile and can adapt to different scenarios of the development phase.

Project Jupyter is a non-profit, open-source project, born out of the IPython Project in 2014 as it evolved to support interactive data science and scientific computing across all programming languages. Jupyter will always be 100% open-source software, free for all to use and released under the liberal terms of the modified BSD license (*Jupyter.org, 2019*). Considering that this project needs constant iteration, choosing a code editor that is open source lowers our budget while also guaranteeing a safe and robust development environment. For the reasons presented, Jupyter Notebook is the chosen code editor for this project.

An alternative to Jupyter Notebook is Google Colab. Built on the open-source project Jupyter, it enables you to use and share Jupyter notebooks with others without the need to download, install, or execute any software, which could be favourable to any team members who are not familiar with GitHub or other tools. However, since Colab is a Google Web App, you must have an Internet connection to access and run the code at all times, which can be difficult to manage if any team members do not have a good wi-fi connection.

4.2 Programming Language for Data Analysis and Exploration

Python is a clear and powerful object-oriented programming language that focus on simplicity and readability, while boasting a gradual and relatively low learning curve. Given the limited time available to complete this project, selecting a programming language that is simple to learn, understand and that all team members are familiarised with is essential.

Python is open-source, which means it is free and uses a community-based development model. There are numerous open-source Python libraries available, including Data Manipulation, Data Visualisation, Statistics, Mathematics, Machine Learning, and Natural Language Processing, to name a few.

An alternative programming language is R. Although they are both open-source programming languages with a large community, R is mainly used for statistical analysis, while Python provides a more general approach to data science. Python gives programmers the advantage of using fewer lines of code to accomplish tasks than older languages, which is useful when dealing with tight deadlines. Python codes are also easier to maintain and more robust than R. In fact, because the application will be developed for the web, Python is a better choice since we will need to use the results of the analyses in the website.

4.3 Code Collaboration and Application Availability

Considering that all members must work together constantly, choosing a tool that allows us to collaborate at the same time is crucial. According to statistics collected in October 2020, GitHub is the most prominent source code host, with over 60 million new repositories created in 2020 and boasting over 56 million total developers (Simplilearn.com, n.d.). Developers from all over the world can collaborate on GitHub.

By using GitHub in this project, all members can coordinate, track, and update their work so that any changes are transparent and stays on schedule, which helps everyone to stay on the same page and organised. Open-source solutions such as GitHub enable potential developers to contribute and share their knowledge for the benefit of the global community.

However, as programming languages evolve and new features become available, it is important to analyse other tools that could be implemented in this project. Bitbucket is another platform that could deliver similar results: it comes with several attractive features including access control, code workflow, code review with pull requests, Jira integration for issue tracking, and a REST API for implementing custom features. Bitbucket is free to use with the cloud but has different pricing options for unlocking additional features as well as server and data centre deployments for a large software project.

Even though the project is in its early stages and code development has not yet started, using a solid platform such as GitHub with multiple free features may hopefully avoid future migration, which can have a direct impact on the budget. With this in mind, GitHub is a better choice in this situation.

4.4 Software Development

Front-end web development, also known as client-side development, is the practice of producing HTML, CSS, and JavaScript for a website or Web Application. However, nowadays there are numerous approaches to developing modern web applications, as well as numerous tool options. To create this app, we intend to use HTML, CSS, ReactJS (JavaScript), and Bootstrap. HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices (W3C, 2008).

Bootstrap is an open-source frontend framework maintained by Twitter for developing responsive websites and web applications that can be used to include items such as navigation bar, icons, carousal, badges, and many more. React is a JavaScript open-source toolkit that provides a display for data presented as HTML. It is quite efficient in updating the HTML text when data changes, and it provides a clear separation of components on a modern single-page application. By integrating these tools into this application, we may save time during the development process and ensure the system is strong enough to handle data updates at all times.
These open-source technologies can provide fast and reliable code that can be easily made and shared on GitHub.

By analysing different aspects, we can also conclude that there are alternative tools available that can be used to develop this web app. Instead of focusing on other programming languages that already use HTML as a foundation, it would be more interesting to focus on template engines or website builders, because the objective is to generate code and structure.

One of these tools is WordPress, a content management system (CMS) written in PHP that uses a MySQL database to build websites through templates, plugins, and HTML and CSS code. The software itself is available for free download and usage, but for website hosting and domain name it requires a monthly or annual paid subscription. This is an excellent alternative for those who wish to improve their design skills but do not yet know how to code.

However, choosing WordPress for this project would mean a bigger challenge and compromise: more research on data handling, maintenance and updates would be needed, as well as plugins and coding approaches in order to connect the dataset and code to the website, which requires more time. As a result of these considerations, HTML, CSS, ReactJS, and Bootstrap appear to be a better fit for this project.

4.5 Data Storage

Cloud storage is a cloud computing model that stores data on the Internet through a cloud computing provider who manages and operates data storage as a service. It's delivered on demand with just-in-time capacity and costs and eliminates buying and managing your own data storage infrastructure. This gives you agility, global scale and durability, with "anytime, anywhere" data access (Amazon, 2019). Recently, another decision-making criteria has been the amount of built-in analytics tools accessible on these platforms. These technologies assist in the faster completion of analytics tasks.

Since the project is in its initial phases and there aren't too many restrictions, we can set up an account for free to gain access to the AWS Free Tier and try their products for 12 months. It also gives access to multiple features, such as Storage Management, Access Management and Security, Data Processing, and Performance, which will be useful to handle big data. On the AWS website there is a Pricing Calculator that can be used to find an estimated price according to your architecture needs and business goals, so further pricing details will be covered in the following report.

On the other hand, AWS and Azure provide essentially the same fundamental features in terms of configurable compute, storage, networking, and price. Both have autoscaling, self-service, pay-as-you-go pricing, security, compliance, identity access management features, and fast provisioning in common.

Although introducing new technology into a project may be desirable, learning a brand-new tool within this deadline is not worth risking project success. Minimising time, costs, ensuring code quality and safety are our primary concerns at the moment, and we can meet these requirements by utilising AWS.

Conclusion

This proposal outlines a solution for real estate investments that employs modern technologies to support investors in general in making data-driven decisions. The real estate business has witnessed a major development in the use of data in recent years (Williams,D., 2022) , and purchases must be thoroughly analysed, with comprehensive analysis and evaluation of the best investment according to the investor's needs or preferences.

Many forward-thinking investors are now looking into the possibilities for superior investments, and data science has a wide range of applications, where millions of observations are translated into detailed knowledge about the past, present, and future.

The research that will be conducted in response to this proposal will look at and analyse a variety of data sets in the areas of rental patterns, customer behaviour during the pandemic, security, and financial issues such as inflation and mortgages to uncover valuable insights hidden in large data sets.

References

Nielsen, B. (2022). *Why Housing Market Bubbles Pop*. Investopedia. Available at: https://www.investopedia.com/articles/07/housing_bubble.asp [Accessed 28 Feb 2022].

Ferrer, R. (2020). *What's happening in Europe's property market ?* Caixa Bank Research. Available at: https://www.caixabankresearch.com/en/sector-analysis/real-estate/whats-happening-europes-property-market [Accessed 28 Feb 2022].

Nath, T. (2022). *Airbnb vs. Hotels: What's the Difference?* Investopedia. Available at: https://www.investopedia.com/articles/investing/112414/airbnb-brings-sharing-economy-hotels.asp [Accessed 01 Mar 2022].

O'Loughlin, E. (2022). *6 Steps to Building a Bulletproof Business Case for Project Management Software.* Capterra. Available at: https://blog.capterra.com/6-steps-to-building-a-bulletproof-business-case-for-project-management-software-with-free-template/ [Accessed 01 Mar 2022].

McWilliams, D and Taylor, C. (2020). *Ireland's housing crisis in five revealing graphs*. The Irish Times. Available at: https://www.irishtimes.com/life-and-style/homes-and-property/ireland-s-housing-crisis-in-five-revealing-graphs-1.4150332 [Accessed 01 Mar 2022].

Bruin, L. (2019) *Porter's 5 Forces EXPLAINED* [video] Available at: https://youtu.be/Dfp23xSqpdk [Accessed 02 Mar 2022].

Healy, K. (2022). *IT and Competitive Advantage*. [PDF] CCT College Dublin [Accessed 03 Mar 2022].

Spacey, J. (2017). *15 Types of Project Branding.* Simplicable. Available at: https://simplicable.com/new/project-branding [Accessed 03 Mar 2022].

Spacey, J.(2018). *12 Examples of a Project Concept.* Simplicable. Available at: https://simplicable.com/new/project-concept [Accessed 03 Mar 2022].

Spacey, J.(2018). *3 Examples of a Concept Statement.* Simplicable. Available at: https://simplicable.com/new/concept-statement [Accessed 03 Mar 2022].

Financier Worldwide. 2022. *Optimal data commercialisation: transforming raw data into revenue-generating insights — Financier Worldwide*. [online] Available at: <https://www.financierworldwide.com/optimal-data-commercialisation-transforming-raw-data-into-revenue-generating-insights#.YiT1npPP23I > [Accessed 4 March 2022].
Simmons-simmons.com. 2022. *Simmons & Simmons*. [online] Available at: <https://www.simmons-simmons.com/en/publications/ck2khnckly0pu0b480rrwmwnz/getting-started-creating-a-data-commercialisation-strategy-that-works > [Accessed 3 March 2022].

Medium. 2022. *5 Ways to Apply Data Science to Real Estate*. [online] Available at: <https://towardsdatascience.com/5-ways-to-apply-data-science-to-real-estate-e18cdcd0c1a6 > [Accessed 6 March 2022].

Williams, D., 2022. How Big Data Will Impact Real Estate Buying, Selling and Developing. [online] Mansionglobal.com. Available at: <https://www.mansionglobal.com/amp/articles/how-big-data-will-impact-real-estate-buying-selling-and-developing-210771 > [Accessed 08 March 2022].

Jupyter.org. (2019). *Project Jupyter*. [online] Available at: <https://jupyter.org/ > [Accessed 09 March 2022]

Google.com. (2019). *Google Colaboratory*. [online] Available at: <https://colab.research.google.com/ > [Accessed 10 March 2022]

Simplilearn.com. (2019). *Python for Data Science and Data Analysis*. [online] Available at: <https://www.simplilearn.com/why-python-is-essential-for-data-analysis-article#:~:text=Thanks%20to%20Python > [Accessed 10 March 2022]

Johnson, D. (2020). *R Vs Python: What's the Difference?* [online] Available at: <https://www.guru99.com/r-vs-python.html#:~:text=R%20provides%20flexibility%20to%20use > [Accessed 10 March 2022]

Simplilearn.com. (n.d.). *What is GitHub And How To Use It?* [online] Available at: <https://www.simplilearn.com/tutorials/git-tutorial/what-is-github > [Accessed 11 March 2022]

W3C (2008). HTML & CSS - W3C. [online] W3.org. Available at: <https://www.w3.org/standards/webdesign/htmlcss > [Accessed 11 March 2022]

Amazon (2019). *What is Cloud Storage? | AWS*. [online] Amazon Web Services, Inc. Available at: <https://aws.amazon.com/what-is-cloud-storage/ > [Accessed 11 March 2022]