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A Roof Over Our Heads: Homeownership Challenges in Ireland

CA 2 – Capstone Report

Link GitHub: <https://github.com/CCT-Dublin/ca1-capstone-project-proposal-C2022188.git>

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**Assessment Cover Page**

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# Introduction

The housing crisis is one of the most talked-about problems in Ireland today. Property prices continue to rise, affecting both rent and the dream of owning a home. Families paying rent, especially in Dublin, one of the most expensive cities in Ireland, find it very difficult to save enough money to buy their own homes. For single people, the challenge is even greater, as reaching the income level needed for mortgage approval can feel impossible without additional support.

This project will explore the main barriers to affordable housing by analysing rent costs across regions and comparing them with income levels. It will also look at house prices in different areas, highlighting how they have consistently increased year after year. To structure the work, the report will follow the CRISP-DM framework, covering Social Understanding, Data Understanding, Data Preparation, Modelling, Evaluation, and Deployment.

# Business Understanding

The first stage of the CRISP-DM framework focuses on understanding the problem and the needs of the project. Since housing prices are a social issue, this stage is called Social Understanding. The goal is to identify the main objectives of the project and understand the challenges related to the crisis.

Ireland is experiencing a serious housing crisis caused by high demand and a lack of available homes. This imbalance has led to rising house prices and rents, making housing less affordable, especially for low-income families. Many people cannot save enough money to buy a home because of the high cost of living and strict mortgage rules. According to Hearne (2017), this crisis is linked to economic inequality. Housing policies often treat homes as investments rather than a basic human need, making homeownership even harder to achieve for many people.

The crisis is not just about the shortage of homes. Potts (2020) explains that the real issue is affordability. While everyone needs a place to live, people can only live where they can afford it. Gillespie (2018) points out that private housing developments tend to focus on higher-income groups, leaving lower-income families with very few options. This housing crisis affects not only individuals and families but also society as a whole. Hansen (2013) states that affordable and secure housing is essential for physical and mental health, children’s education, and family stability. However, Hearne (2020) argues that weak tenant protections and treating housing as a financial asset have made it even harder for many people to find safe and affordable homes.

The housing crisis is a complex issue that affects not only individuals and families but also the overall stability of society. Understanding the financial barriers and regional disparities is essential to address this problem effectively. This project will focus on identifying these challenges, analyzing the social and economic impacts of the crisis, and providing data-driven insights to propose potential solutions for making housing more affordable and accessible in Ireland.

# Data Understanding

The data understanding phase of CRISP-DM involves taking a closer look at the data available for mining. This step is critical in avoiding unexpected problems during the next phase--data preparation--which is typically the longest part of a project (IBM, 2021.). The data for this study was collected from reliable sources, mainly the Central Statistics Office (CSO) in Ireland. The datasets cover important aspects of the housing crisis, such as rent, house prices, disposable income, and inflation. These datasets are key to understanding the current situation and finding solutions.

The tools and technologies that will be used in the project are:

o   Pandas

o   Matplotlib

o   Seaborn

One dataset, *"Rent as Percentage of Disposable Income"*, shows how much of their income tenants spend on rent. It highlights the financial pressure of rent in different regions. By using the .info() function, it is possible to observe that the dataset contains 124 entries and 5 columns: Statistic Label, Rental Year, Local Authority, Unit, and Value, and there are no missing values.

A screenshot of a computer

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Figure - Info of dataset "Rent as Percentage of Disposable Income"

Another key dataset is the "RTB Average Monthly Rent Report," which provides detailed information on average monthly rents across various regions. The dataset consists of 393,372 entries with 7 columns. During the data cleaning process, it will be necessary to address missing values by imputing them with the average for each region. Overall, the dataset is reliable, offering strong coverage across both time periods and locations.

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Figure - Info of dataset "RTB Average Monthly Rent Report"

The *"House Prices"*  dataset contains information about average house prices over time. It helps identify trends and changes in the housing market. Using the .info() it is possible to see that the dataset contains 334,656 entries and 8 columns:

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Figure - Info of dataset "House Prices"

It is observed that in the column “VALUE” are 826 missing values, which will be dropped in the next stage of data cleaning process. Overall, this dataset is well-organized by year, regions and value, with no significant missing data relative to the total number of entries.

All the data has been carefully prepared to ensure consistency across sources and suitability for analysis. With this strong foundation, the next step will be to explore these patterns further and connect them to the housing challenges faced in Ireland.

# Data Preparation

According to Conroy (2023), data preparation involves selecting, cleaning, merging, formatting, and transforming data to make it suitable for use in a data product. This phase focuses on resolving issues and errors in the dataset to ensure it is clean and ready for machine learning model implementation.

The first step in cleaning this dataset “House\_Prices” is to remove rows that have missing values, as they do not contribute to the analysis: