Relationship Between Properties Bought and Football Pitches in Dublin Area Codes in 2015

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*Abstract*—Dublin is well known for having a big appetite for sport and three sports stick out particularly – Football, GAA, and Hurling. These three sports are the backbone of Dublin sport culture, from Dublin winning five All-Ireland GAA titles in a row, to our national football team playing in the Aviva Stadium, Dublin loves sport. This paper aims to conduct an analysis of public datasets of properties bought in Dublin in 2015 and the location of sporting pitches/clubs in Dublin from both Dublin City Council and Fingal County Council and to discern whether there is a correlation between where the houses were bought and where these pitches/clubs are located and also if there is any correlation between the properties prices and areas with more playing pitches. An analysis of all of the data shows us that there is no significant correlation between the data.

Keywords—Property register, Property Services Regulatory Authority(PSRA), Dublin City Council(DCC), Fingal County Council(FCC), Dun Laoghaire Rathdown County Council(DLR), South Dublin County Council(SDCC), Gaelic Athletic Association(GAA), football pitch, data analysis, property dataset, park/pitch dataset.

# Introduction

With Dublin being a constantly growing city due to the many industries, education institutions, retail outlets, sporting grounds and many other amenities being located within the county, the demand for housing is always increasing and with house prices rising by 8.5% in 2015 alone [1], the demand seems like it’s growing faster than the city itself. As Dublin is a sports-loving city with many adult sports teams and leagues for both men and women as well as a large amount of local juvenile teams for children and teens. When looking at purchasing a property anywhere in the world it’s important to the majority of people that they have suitable amenities/facilities (e.g. parks, community centres, shops, etc.) in their potential new area and the objective of this analysis is too find out if there is a higher concentration of homes bought in areas where there are more sporting pitches.

While property prices in Ireland haven’t reached the heights pre-crash in 2008, they have steadily rising since their lowest point in 2013 and as of today they are almost 75% of what they were pre-crash [2]. There are a number of economic factors that influence house price like unemployment, inflation, rents, stock market performance, population growth, supply, demand and many other factors [3], as well as physical factors like location, garden, neighbourhood, infrastructure and amenities like parks, schools and sports clubs [4].

However due to growing demand in Dublin outweighing supply, could it be argued that people will settle for less than ideal infrastructure, location or amenities? This analysis into data provided by the Property Services Regulatory Authority(PSRA) of Ireland on properties purchased in Dublin in 2015 [5] aims to discover if there is a correlation between the properties bought in Dublin in 2015 and registered sports clubs and pitches in Dublin, the data of which being provided by Dublin City Council [6], Fingal County Council [7], Dun Laoghaire Rathdown County Council [8] and South Dublin County Council [9]

With the GAA being the largest sports organisation in Ireland [10] with there being over 130 GAA clubs in Dublin as well as famous football clubs like Shamrock Rovers, Bohemians, Shelbourne and St. Patricks Athletic [11] there are many sporting options available in Dublin. Looking at all of the data obtained from the county councils within Dublin, it shows over 500 registered pitches across a number of parks and pitches which are across 25 postal codes within Dublin. Although Dublin postal codes only go from Dublin 1 to Dublin 24, I had to include County Dublin which encompasses a number of areas like Swords, Lucan, Malahide, Skerries and many other commuter towns on the outskirts of Dublin which are areas with a lot of newly built houses and apartment but may not have access to a great number of amenities and solid infrastructure just yet.

This analysis requires a deep dive into the collected datasets and mapping of the values within to discern any patterns and noticeable trends. The key attributes that we will be looking at will be property postal codes, pitch/park postal codes and property prices and the mappings will be displayed in the ideal format for analysis as well as comparison. The property data chosen from 2015 is also significant and not chosen at random. 2015 was chosen as this is just two years after the lowest point in property prices in Dublin and reflects the market and price growth of the time and was last updated in 2019 so it is reasonable to assume that this data is refined and accurate however some cleaning and pre-processing was done to make sure that only relevant information was kept in the dataset with irrelevant columns being removed.

The properties dataset contained rows like address, date purchased, price, etc. which were retained but the set contained columns like property description, VAT exclusive, property size description, etc. which were totally irrelevant to this analysis and were left out of the final processed dataset, similar to this the park/pitch datasets contained columns for the leagues, latitude, longitude and other information that was irrelevant to the analysis.

The rest of this paper is structured as follows: Section 2 contains any similar studies as well details on the datasets and predicted outcomes. Section 3 details the research methodology and approach taken. Section 4 presents the findings of this research. Section 5 concludes the paper.

# Related Work

## There have been a number of studies into property prices in Dublin as well as Ireland overall in regards to the market before and after the economic downturn in 2008 and the importance of sport in Dublin. I will be highlighting some relevant papers to this one, as well as other studies uses of the same datasets as this paper.

## Dublin Residentitial Property Price Register

With this dataset being open for anyone for anyone to access and use online it was not hard finding other papers and studies it has been used for. In an analysis conducted by Brendan O’Connor and Donal Lynch into rising property prices and the implications on Local Property Tax [12] the PSRA datasets are taken for several years to examine the growth in property prices over time and this is paired with a Residential Property Price Index dataset produced by the Central Statistics Office (CSO). While this study is using similar attributes of the dataset to my own i.e. Price, Postal Codes, the study is heading towards a completely different direction to this paper’s objectives. Another analysis conducted by a former National College of Ireland student uses the PSRA dataset to conduct an analysis into the properties that were sold in 2016 to differentiate between the properties that were newly built or previously owned [13]. While this study is very useful as it was done by an NCI alumni and showcases much of the same technology and methodology that I have used, the analysis is only ultimately done as a subsection of a software development project and so doesn’t utilise many more advanced comparisons and graphing techniques and uses only the single PSRA dataset without a complimentary dataset.

*B. Playing Pitches in Dublin*

A number of pieces have been published on the importance of amenities in both newly built and older housing developments. We can see from a report from Terry Prendergast on behalf of Dublin Institute of Technology (DIT) [14] shows that in their new Grangegorman development which includes a large range of facilities for students to avail of, including playing pitches, and with more on campus accommodation getting approved for development [15], these facilities will be very beneficial and incentivising to any future students who would be seeking accommodation as they weigh up their options. Similarly, University College Dublin (UCD) submitted a proposal for a new student residence on campus [16] which included brand new buildings, car parking facilities and playing pitches. I think from these two documents we can safely say that when these developments plans are being drawn up they do take into account the demand for suitable facilities that prospecting students will have use for and it is also not too far to stretch that beyond the student market and into the normal housing market of Dublin and it’s suburbs. As the city continues to expand and new towns and estates are built over the years new facilities will need to be kept in mind and considered carefully for the thousands of people who will eventually populate these areas.

## C. Influences on Property Prices

Properties have an uncountable number of factors that influence their valuations on the market, it can range from the smallest problem in the garden, to the name of the road and to the name of the area. In a study conducted by Corrado Zoppi into the valuation of property in Cagliari, Italy [17], he explains that each area and property has both positive and negative aspects and it is the compounding of these aspects onto a property that drives up or down the valuation. These positives and negatives can include the neighbourhood, infrastructure, history, public spaces and many other factors. The same logic for this Italian study can be applied to any city in the world, and in turn can be applied to Dublin. You have to break these kind of overviewing aspects down into layers, for example with areas there would be many layers like county, post code, neighbourhood, right down to the street and the same units of measurement for the quality of each layer can be applied across the board, like history, infrastructure, public spaces, etc. In a 2008 analysis on the impact of green spaces on house valuations in Dublin it was concluded that overall closer proximity to a green space like a park or forest could add 7-9% more onto the value of the property [18]. This study proves that these areas that have access to green areas are more highly in demand, hence the higher value. While this study is pre-economic crash, using data from 2002-2006 when property prices in Ireland were at an all time high. This study provides a great insight into the “Celtic Tiger” era when mortgages were easy to obtain and housing was being bought and sold all over the country. While Ireland and it’s property market has moved on from this part of it’s history, it will be interesting to see if the same 7-9% added value for a green space still applies today or whether it is a higher or lower figure. As green spaces and sports facilities go hand in hand, another 2008 study investigating the economic impact of sports facilities on residential property values [19] returned with results that sports facilities had a positive effect on both local property prices and the local economy in Columbus, Ohio. The study found that for each 1% increase in distance from the sports grounds, property values fell by 0.14%. While 0.14% seems insignificant when you add it up with the distance the property may be from the home and on the valuation of the property you could be talking thousands in the difference of a price that could be a 5-10 minute drive. It would be highly coincidental if the 0.14% drop in price also applied in Dublin, but it does show that buyers are willing to pay a little extra to be closer to their sporting grounds in their local area.

# *Methodology*

The Knowledge Discovery in Databases (KDD) methodology is followed in this research

## Data Selection & Description

The datasets I chose for my analysis work well for my topic as they contain all relevant information that is required, have easily readable attributes, clear data and had some small missing pieces of data that was easily retrievable through other resources. In particular the playing pitches datasets only required a small amount of corrections and changes to be merged together to compile a larger dataset that was more representative of the whole county and was not just restricted to one county councils data. The pitches and properties datasets complement each other as the data in both sets is primarily address data and with a little bit of tweaking, have common attributes which can be easily compared to each other. There were a number of similar datasets available on properties in Dublin and Ireland from several different years. I decided to choose the 2015 version of the PSRA set as it was an interesting time in the Irish property market as I discussed and it is not too far back in time that it is irrelevant to today. All datasets were downloaded from data.gov.ie in the csv file format. The PSRA dataset contained 15430 rows of data with 9 attributes before it was processed. The Dublin City Council playing pitches dataset before processing contained 250 rows with 4 attributes, the Fingal County Council dataset contained 96 rows with 5 attributes, the Dun Laoghaire Rathdown County Council data contained 61 rows with 5 attributes and the South Dublin County Council data contained 161 rows with 10 attributes. After processing the details of the data can be seen in Table 2. The ‘AllPitches’ data file is a combination of the DCC Playing Pitches, FCC Playing Pitches, DLR Playing Pitches and SDCC Pitches after they were processed.

## Data Processing and Transformation

The three original datasets were semi-structured and required some cleaning and processing before they were suitable for analysis. The 2015 PSRA data contained a number of attributes which were irrelevant to this analysis like the property size description and if they were VAT exclusive, these attributes were removed from the overall data. The postal code data was shortened from ‘Dublin 1’ down to ‘D1’ to make categorizing easier, as well as adding a ‘CoDub’ postal code for any properties that were lacking a traditional postal code as they are located in County Dublin and not one of the D1-24 zones, these areas includes Lucan, Swords, Malahide, Skerries and others, due to the amount of areas that are located in the County Dublin area a large number of records were assigned to the ‘CoDub’ post code. The playing pitches datasets didn’t require much cleaning due to the smaller number of attributes and records, attributes like latitude, longitude, club name, facility type and name and league were removed from all datasets. Due to there being no postal code data for the pitches, a new attribute was added for the pitch postal code and the information for each pitch/park was obtained online [20]. After all of the playing pitches datasets were processed separately they were then merged into the ‘AllPitches’ table as seen in Table 2.

## Implementation

Figure 1 and Figure 2 below show the methodology used from the perspective of implementation. The four pitch files were downloaded as separate csv files from data.gov.ie, all provided by the respective county councils. The files were all imported into R Studio for processing and transformation using the R programming language and the tidyverse package. The tidyverse package was chosen due to it being a collection of R packages like ggplot, dplyr, readr, etc. and there were many resources and tutorials on syntax and how to implement the functions contained in these packages. While processing the data functions like sub(), gsub() and rename() were used to process and transform the data so it could be suitably analysed. Some new columns were added to the pitch files to make the data uniform so it could then be combined using the rbind() function with this new dataset containing 545 records. The PSRA data was also imported, processed and transformed using the same methods and the tidyverse package as well as similar functions.

# Results

This papers objective is to analyse Dublin properties and football pitch locations to come to a conclusion as to whether there is a correlation between the number of properties purchased in a particular area in Dublin and the number of playing pitches in that area, as well as analysing if there is a correlation between the prices of properties in areas where there are more pitches.

## Number of Properties v Number of Pitches

## As can be seen in Figures 4 and 5, the County Dublin (CoDub) postal code has the most properties purchased and the most playing pitches out of any of the post codes within Dublin with an average of 27 properties for every pitch. Some other interesting observations:

* The Dublin 1 and 18 post codes has no playing pitches, which could be due to it mostly being made up of the city centre.
* Dublin 24 has the second most pitches in Dublin after County Dublin but this doesn’t translate into the properties data, on average for every pitch there is 10 properties bought
* Dublin 15 has the second most properties bought but one of the lowest numbers of pitches with 140 properties for every pitch.

Overall from reading the graphs there is no clear correlation between the data. Although County Dublin has an even distribution in each set of data, the other data does not have an equal distribution. The data in the properties data is a little more equally distributed than the pitch data but there is no clear correlation between the two sets.

## Property Prices v Number of Pitches

From Figures 5 and 6, Dublin 6, 14 and 15 have the highest average property price from all of the postal codes with Dublin 1, 9 and 10 having the lowest average property prices.

Interesting observations:

* Dublin 6, 14 and 15 despite having the most expensive average prices have some of the lowest number of pitches from all of the postal codes.
* Dublin 5 has a below average mean property price at €302898.88 and an above average number of pitches.
* Despite Dublin 24 and County Dublin having the most pitches they only have slightly above average property price.

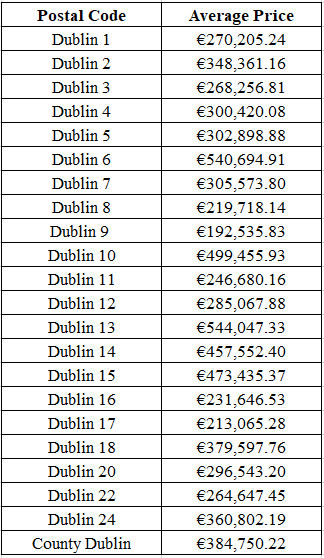
Again from reading the below graphs there is little to no correlation between the property prices and number of pitches. Some postal codes with lower average property prices have slightly above average number of pitches but no clear cut evidence that there is a correlation between the data.

## Analysing Average Property Prices in Dublin Postal Code

From looking at Figure 5 it is clear to see there is huge difference between some areas average property price. Dublin 10 has the lowest average property price out of all of the postal codes in Dublin at €136928.56, Dublin 6 has the highest average property price €574389.18. This is a difference of €437460.62. Some observations:

* County Dublin, Dublin 15 and 18 all have above the average number of properties purchased as well as above average mean property prices.
* Dublin 1, 10, 17 all have below the average number of properties purchased as well as below average mean property prices.
* Dublin 14 has the lowest number of properties purchased but has the second highest average property price.

There is some correlation between the property prices and number of properties bought in some areas. In some areas the correlation is stronger like Dublin 1, 10, 17 and 18 and less so in areas like Dublin 14.



# Conclusions and Future Work

While the results of this research are disappointing I learned some valuable insights into data analytics projects and the methodology behind projects of this nature. One of my biggest lessons during this research was on the R programming language and how innovative it is and the sheer amount of capabilities that are available through the language and how many tutorials and resources are available through R Studio and online. Learning the practical aspect of the KDD methodology and how easy it is to follow when working on a project of this nature. For future projects I would like to go into machine learning and I would be very interested in applying this to some future work. If I were to do this research again or if I had a longer timeline I would definitely compile property data from over a number of years and not just 2015 maybe from over 5-10 years in the hopes of maybe getting some new insights and results, or perhaps use the same property data but compare it against other community data like community centres, schools, bus routes, etc. which would be of interest to any average person from Dublin or elsewhere.

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