



**Ruth Nyakio**

## **DSF Phase 2 Project**

**9th March 2024**





## Group Members

- [steve.abonyo@student.moringaschool.com](mailto:steve.abonyo@student.moringaschool.com)
  - [brian.kariithi@student.moringaschool.com](mailto:brian.kariithi@student.moringaschool.com)
  - [rosaline.mungai@student.moringaschool.com](mailto:rosaline.mungai@student.moringaschool.com)
  - [ruth.nyakio@student.moringaschool.com](mailto:ruth.nyakio@student.moringaschool.com)
  - [lynette.mwiti@student.moringaschool.com](mailto:lynette.mwiti@student.moringaschool.com)
  - [ivan.wawire@student.moringaschool.com](mailto:ivan.wawire@student.moringaschool.com)
-

# 1 Overview

Multiple linear regression of Northwestern County real estate sales data reveal opportunities for home owners to renovate houses and increase their property values:

- **Upgrade the sizes of the living and increase number of bedrooms and bathrooms**
- **Entire house renovations are encouraged** than partial renovations.
- **Improve overall condition of the house by regular maintenance.**



## 2 Outline

- Business Problem
- Data
- Methodology
- Results
- Conclusions
- Recommendations
- Next Steps

# 3 Business Problem

- How does home renovations increase the estimated value of homes, and by what amount?
- How can clients increase their home value?
- What renovations should clients focus on?
- What other factors might affect the price of the house while doing renovations?



# 4

## Data

- Finsco Limited provided King County House Sales data collected from 2014 to 2015.
- 21,597 records
- Main factors affecting the property price are the number of bedrooms, number of bathrooms, size of the living room and condition of the house



# 5

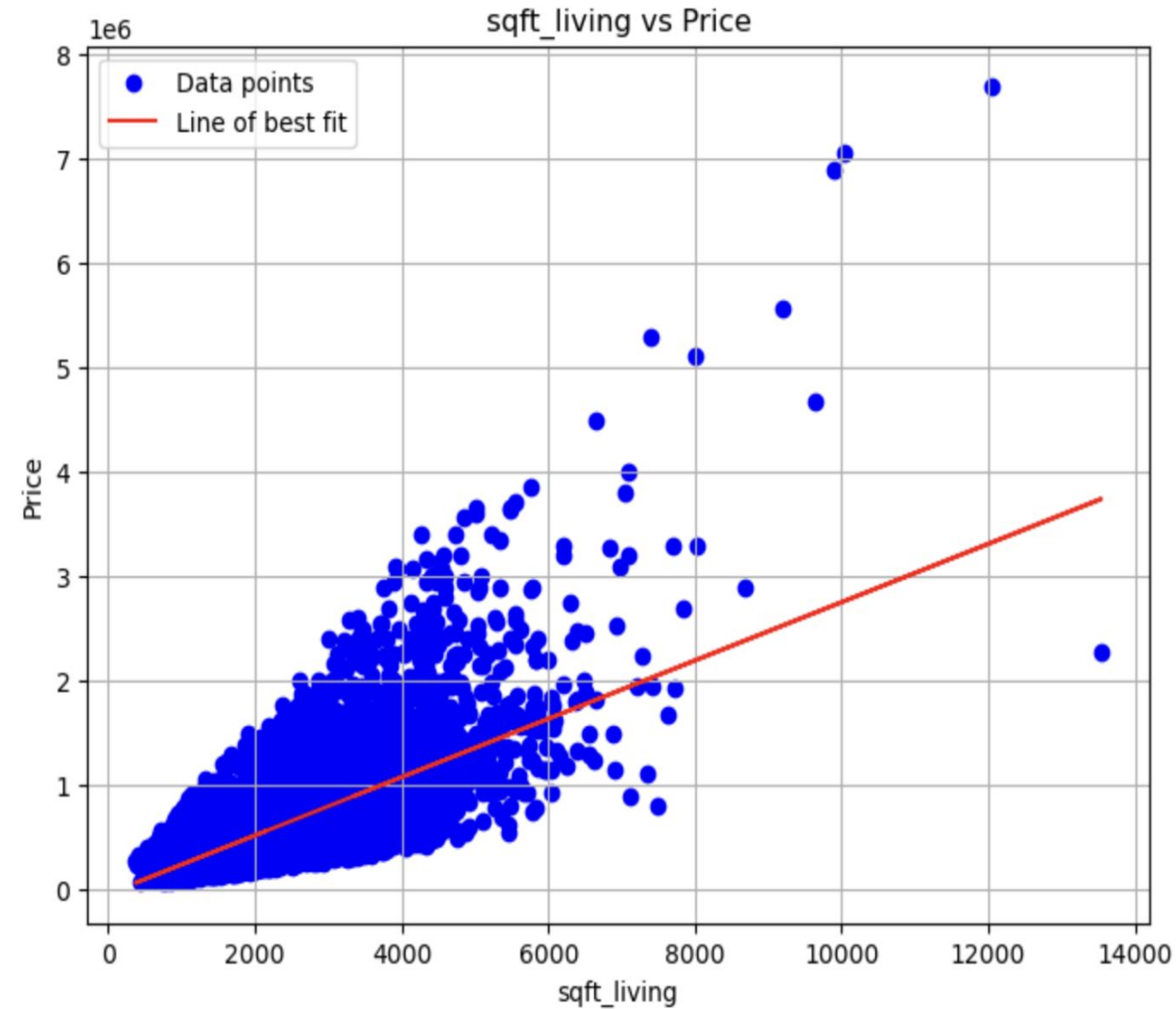
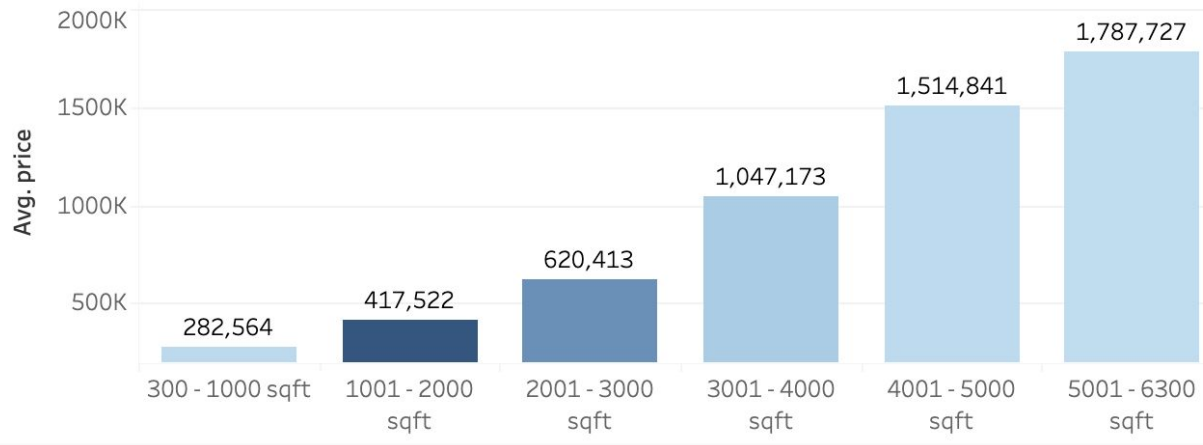
## Methodology

- **Data cleaning:** Handling duplicates, missing, null values and encoding categorical variables
- **Data visualization:** Heatmaps, Histograms, Tableau, scatter plots and linear regression models
- **Simple Regression:** Predicting price variable using one independent variable e.g. sqft\_living, bathrooms, bedrooms
- **Multiple Regression:** Used to predict our price using two or more independent variables e.g. sqft\_living, bathrooms, bedrooms

# 6 Results

- Increase in living area size increases property price
- For 1 additional square feet, the home value increases by USD 279

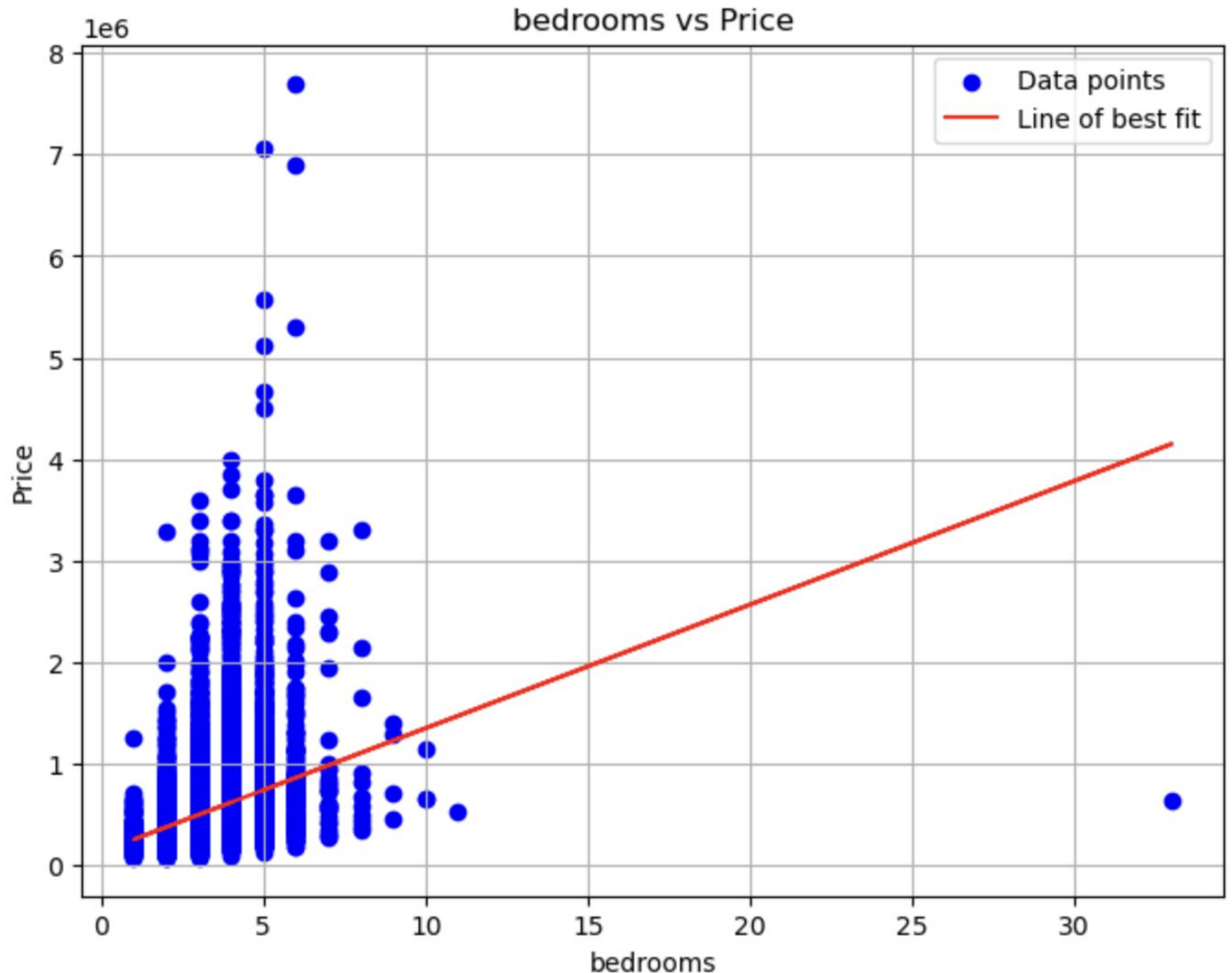
*Average house price vs Sqft\_living*





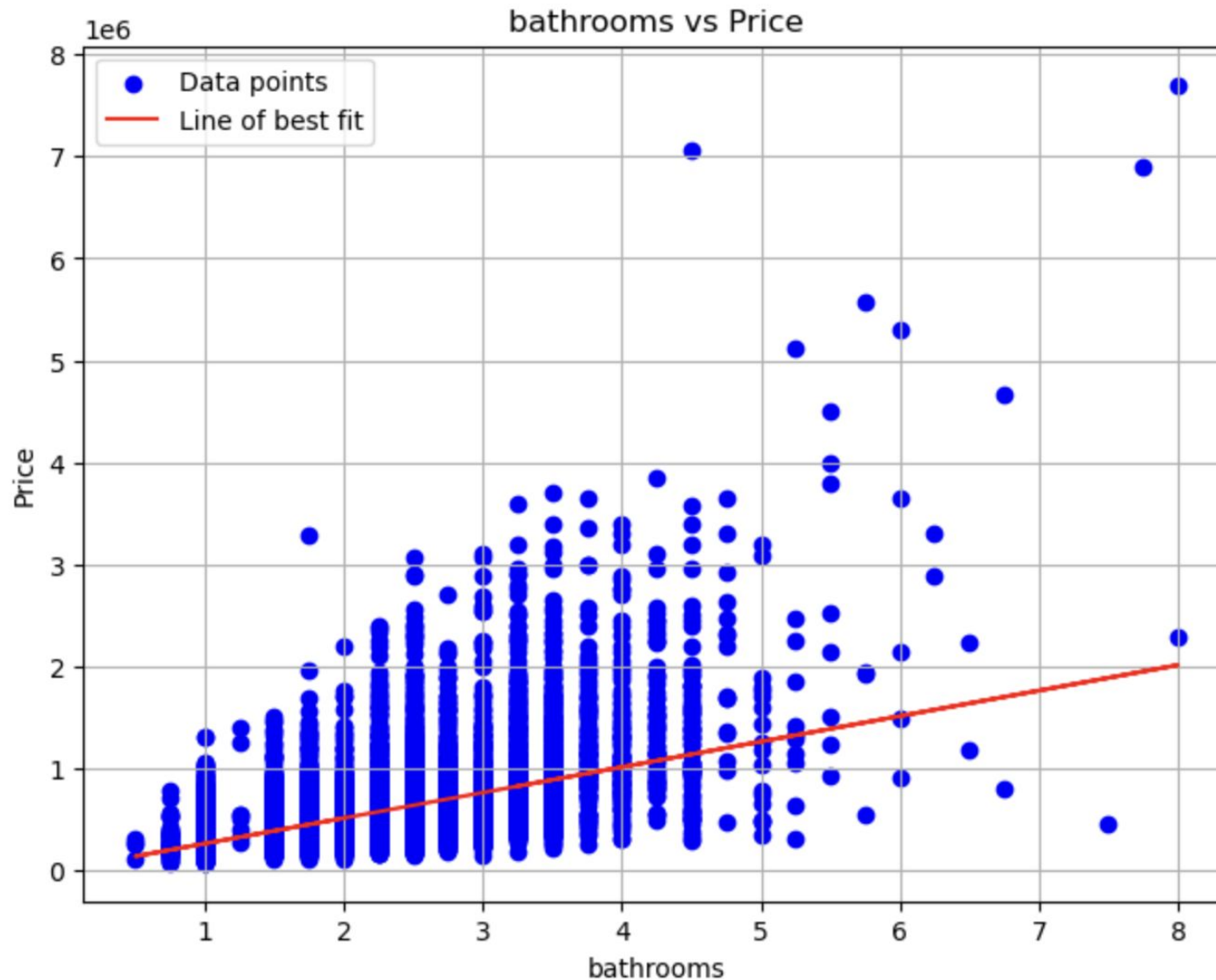
# 7 Results

- Properties with more bedrooms, have a higher price.
- Clients prefer 3 to 6 bedrooms
- 1 additional bathroom, can increase the property price by USD 121,794



## 8

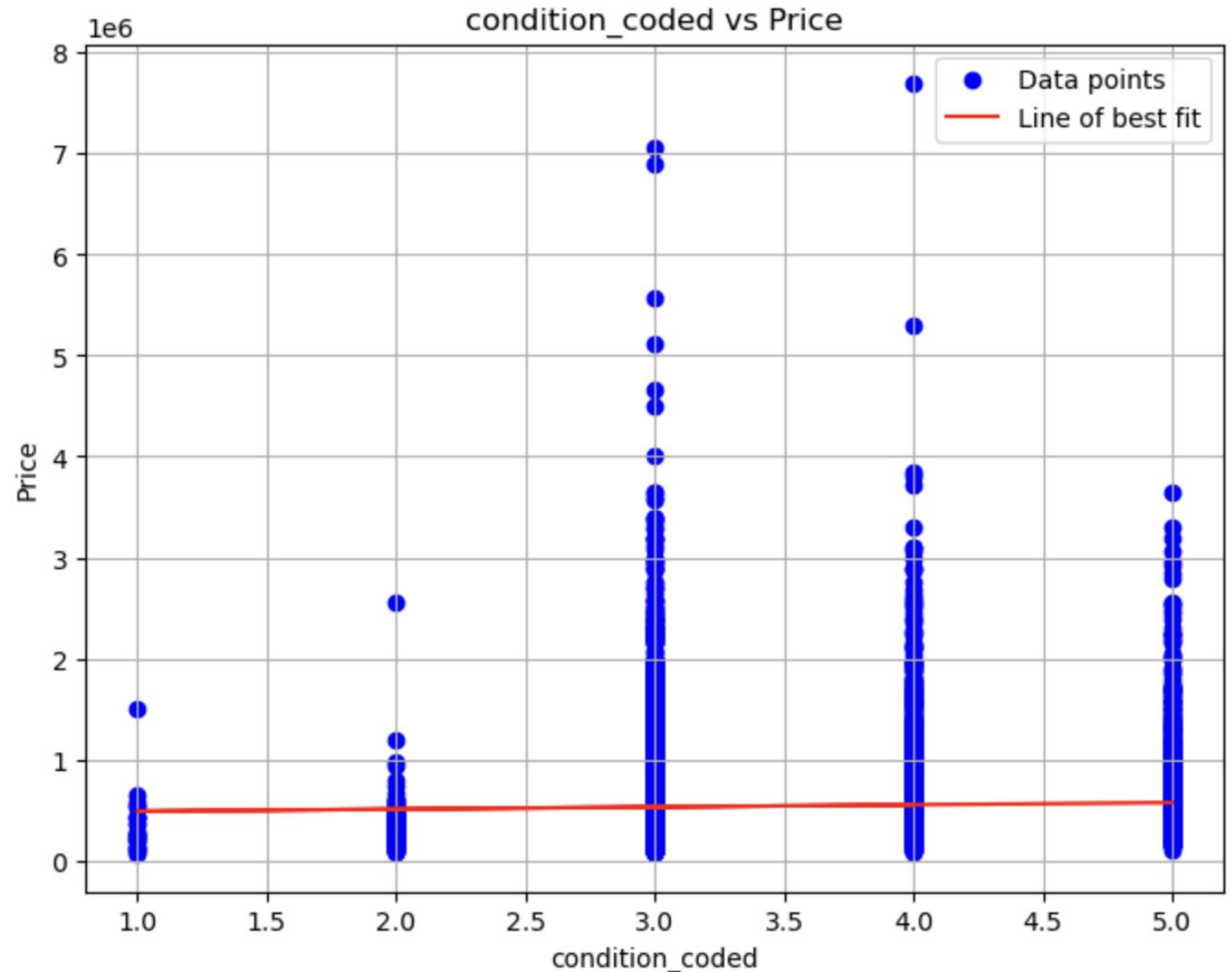
# Results



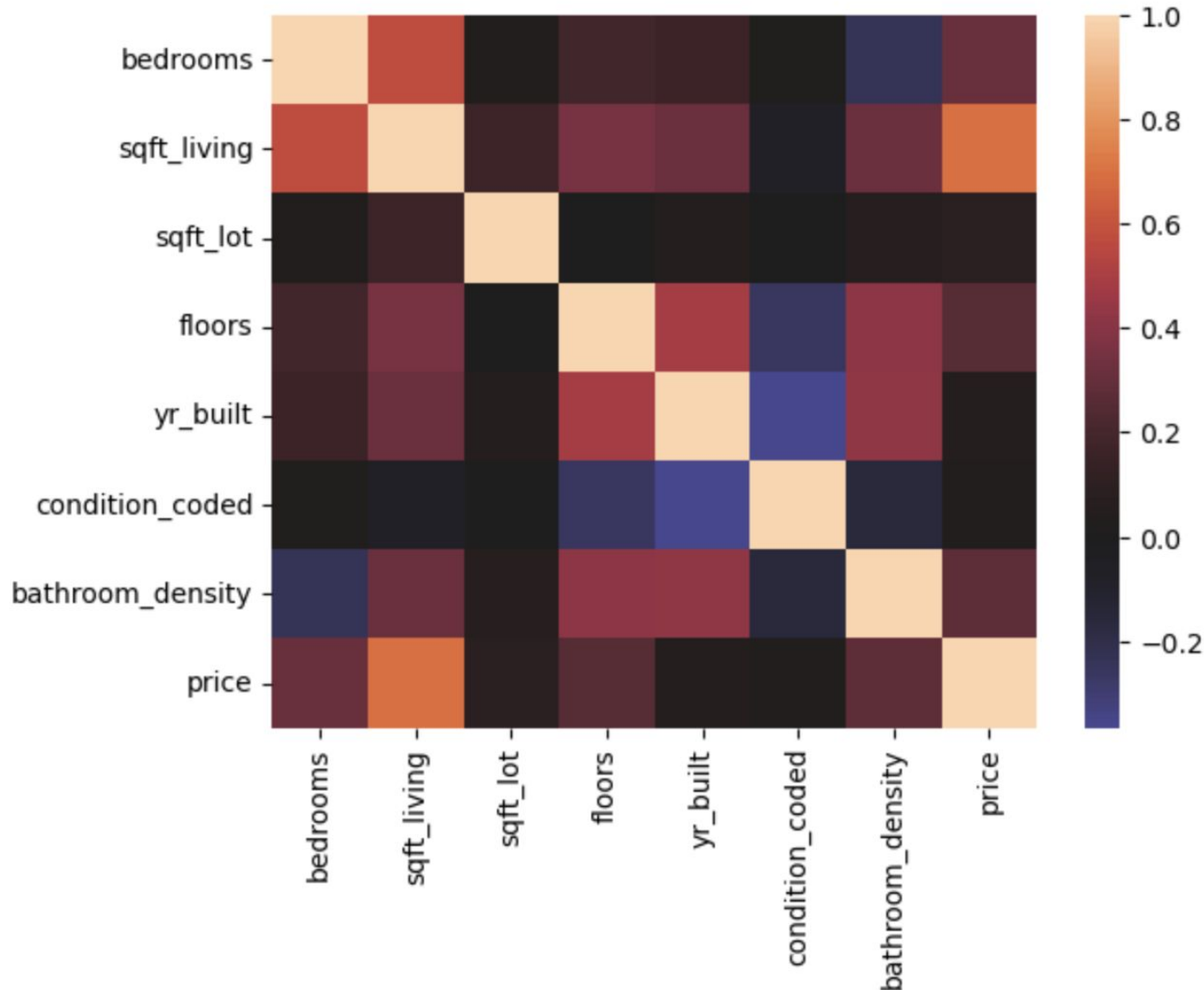
- More bathrooms increase house prices.
- 1 additional bathroom, can increase the price by USD 250,000

# 9 Results

- A well maintained house will have more value
- Improving house maintenance can increase the property value by USD 21, 460

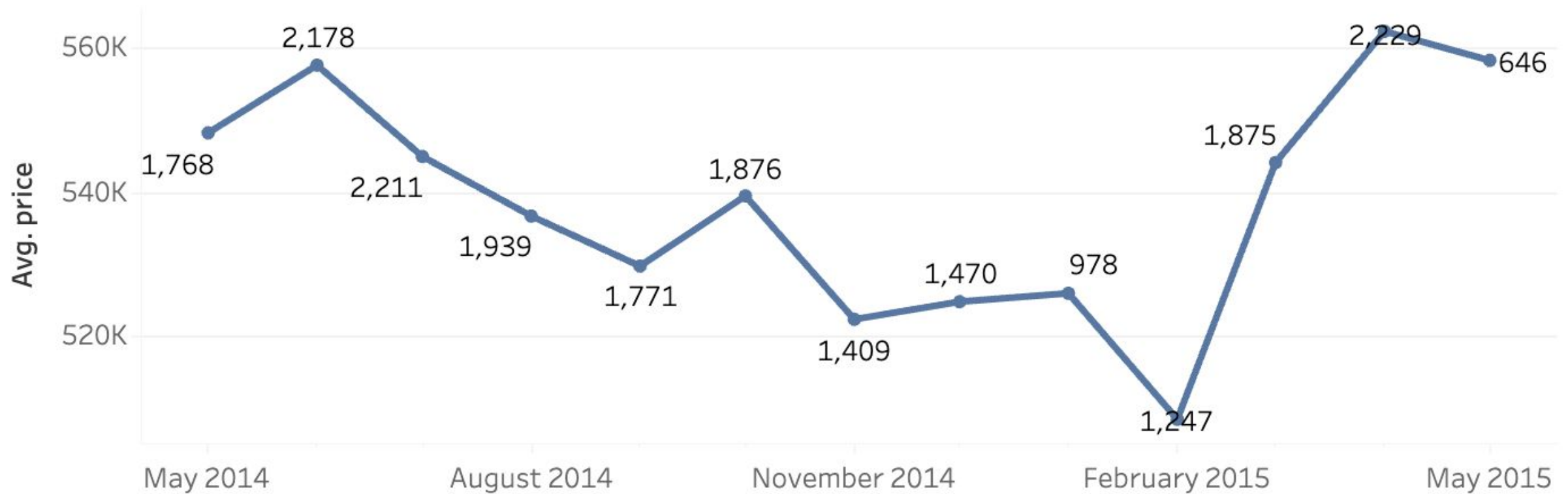


# Results

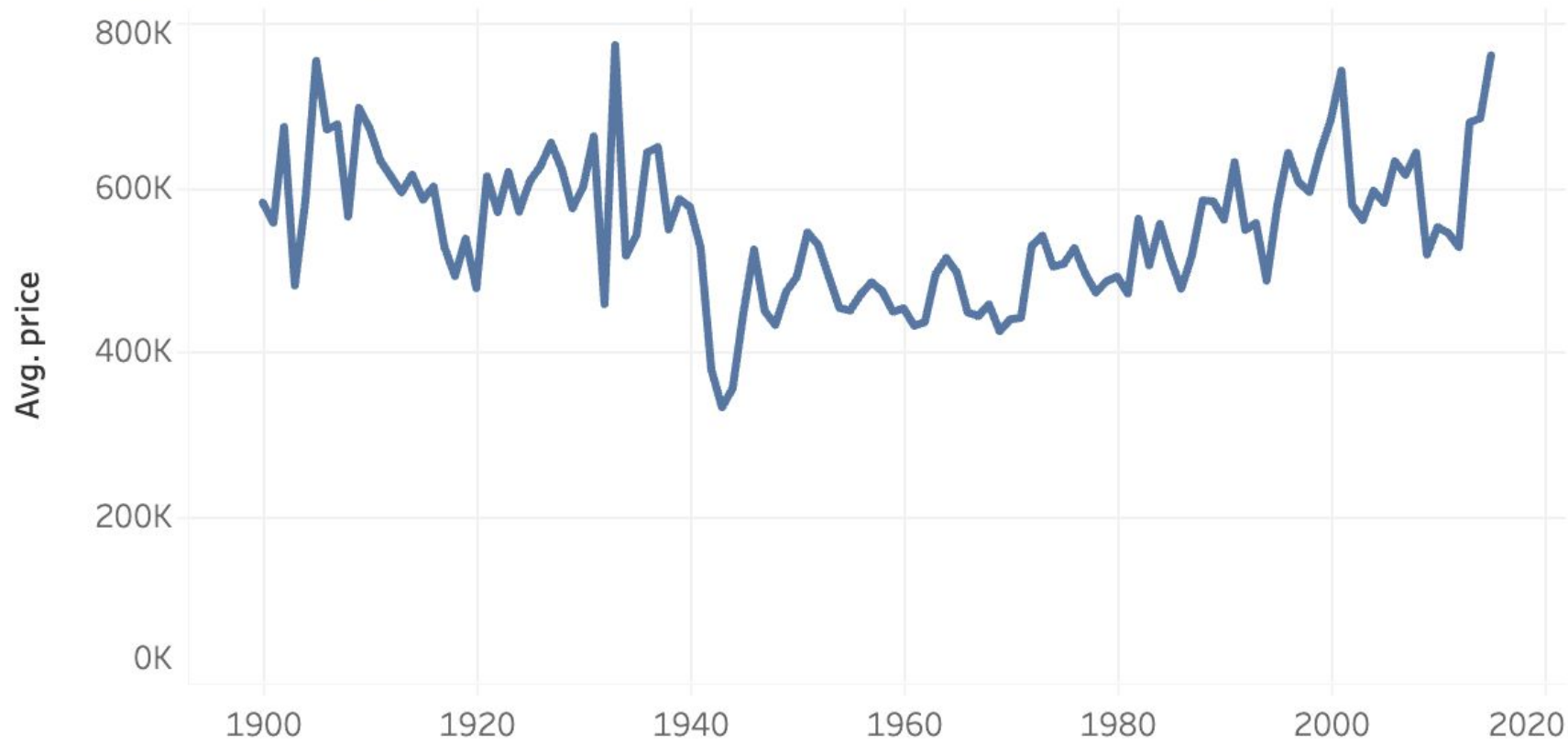


- Living room size and number of bedrooms affect house price more
- The year the house was built and overall condition of the house have the least effect on the price

## *Average sales of houses*



*Average sales by year built*



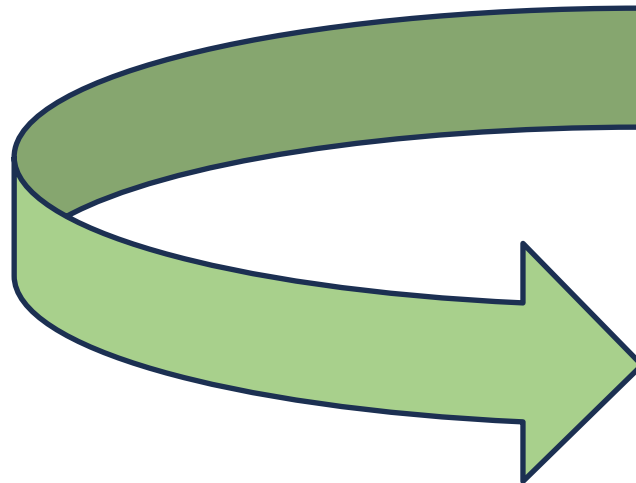
- Houses built around 1930 and in the 21'st century have a high sale value



# 9

## Conclusion

- From the analysis and model summary, it can be concluded that the proposed multiple linear regression model can effectively analyze and predict the housing price.
- Overall house improvements will have a better impact on the value of the property than just renovating part of the house



# Recommendations

- **Renovate and increase the living room sizes:** For every additional square foot of living space, the home value will increase by around USD 279 to USD 322.
- **Upgrade and add more bedrooms.** An extra bedroom can increase the value of the property by USD 121,000
- However, clients should be careful on spending too much money on bedrooms when renovating the entire house. They might lose between USD 40,000 and 65,000.

# Recommendations

- **Improve overall condition of the house.** Good house maintenance can increase property value by USD 19,000 to USD 22,000
- **Add extra bathrooms** to increase property value by USD USD 65,000 to USD 250,000 per bathroom. The ratio of bathrooms to bedrooms also impacted the price of house. Clients might prefer **ensuite bedrooms** to shared bathrooms.
- **Making renovations of the entire house** will significantly increase the value of the property compared to making partial renovations.

## Next Steps

- **Feedback gathering:** Hepta team will gather feedback from the Finsco team for additional requirements and feedback.
- **Market Research:** We will conduct market research to identify trends in the real estate market such as renovations and, property features demands.
- **Data Enrichment:** Gather additional data on other features that affect property values. This may include users' preferences and more sales and renovations data.
- **Model improvement:** Our Data scientists will try other regression algorithms for comparisons and model improvements



**Thank You**

**Group 8 Phase 2 Final Project**

