Hamoye Data Science Internship 2022

BUSINESS CASE

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TABLE OF CONTENTS

1 PROJECT OVERVIEW

2 BACKGROUND

3 BUSINESS PROBLEMS AND OPPORTUNITIES

3 PROJECT OBJECTIVES

3.1. Goal

3.2. Objectives

4 PROBLEMS AND OPPORTUNITIES

4.1 Problems

4.2. Opportunities

5 ALTERNATIVE CONCLUSIONS

5.1. Conclusion

5.2. Conclusion

6 RECOMMENDATIONS TO MANAGEMENT

1. PROJECT OVERVIEW

In this project a consumer complaint database is being investigated to recognize patterns between various variables to help produce models that will help financial organizations make better business decisions that will profit the organization.

We will first look at the background of the dataset to understand the data being worked with. We will then use exploratory data analysis initially to look at any obvious errors in the data to aid with the data preprocessing.

Before any further analysis and exploring of data is completed, we will outline the goal of the project and outline the direction of our investigation by outlining the important questions in the project objectives.

After this step is complete we will use exploratory data analysis to look at the data, gain meaningful insight, understand the structure of the data set and understand the relationship between various variables and note any trends.

Afterwards we will consider the summaries and visualizations to identify relevant business problems and the impact it has on the business. We will then analyze the problems and identify business opportunities which refer to new and innovative ways of doing business that would be made evident by this project.

Through using sophisticated algorithms, some modelling will be performed on a sample of the dataset, and the conclusions from these models will be documented

Lastly, there will be some recommendations to these financial institutions regarding new and innovative ways of doing business that would be made possible by the insights made in this project.

2. BACKGROUND

This dataset is real world complaints received about financial products and services. Each complaint is related to a specific product. These complaints represent specific issues, and these occur at specific companies in certain areas. The value of analyzing the relationship between all these different variables between November 2011 to May 2019 will give us information that will help us identify, predict future scenarios and make better business decisions.

3. PROJECT OBJECTIVES

3.1. Goal

Through the implementation of this project the business hopes to gain insight on the data that will give companies leverage and reduce customer complaints and customer dissatisfaction and increase profits.

3.2. Objectives

The following are areas in which we would specifically like to investigate the dataset as we believe it will bring the most value to the business.

1. Identify the distribution of issues across the various states.

    - With this insight it will become clear in which states financial products with issues are more prevalent.

2. Identify the distribution of financial products.

    - This information will show which types of financial products according to consumers have the most issues.

3. Identify the distribution of timely responses.

    - This information is a factor in the level of customer satisfaction and competence of the customer support staff.

4. Identify the distribution of types of responses to consumers.

    - This distribution allows executives to see the effort put in by employees to help the consumers when complaints have been sent through. The distribution is also indicative of the possible need to increase customer support staff.

5. Identify the distribution of customer disputations.

    - This information will give stakeholders insight on the level of revenue because of consumers rejecting, returning products or refusing to settle balances. This is an indicator of customer dissatisfaction.

6. Identify the distribution of the medium of submission of complaints.

    - Insight on this data gives stakeholders an idea of the necessary distribution of consumer support employees across different platforms that consumers complain about.

7. Identify the general trend of the number of complaints per year.

    - This information will give stakeholders insight on the level of revenue because of consumers rejecting, returning products or refusing to settle balances. This is an indicator of customer dissatisfaction.

4. PROJECT PROBLEMS AND OPPORTUNITIES

4.1 Problems

1. Uneven spread of issues across states - this insinuates a plausible external factor affecting the amounts of issues in a state.

2. High concentration of issues with specific products, meaning certain products generate higher customer satisfaction than others.

3. The increasing trend in distributions of complaints per year is increasing year by year, pointing to a real concern of increased consumer disputes, decreasing revenue.

4. The fact that 20% of consumers that complain end up terminating services is a shocking number as it means that stakeholders lose a fifth of the money from consumers that they get complaints from.

4.2. Opportunities

1. The varying amounts of issues per state may lead to analysts inquiring if there are possibly certain products that are more popular in certain states, and if there is a correlation between type of financial product and state in which the issue originates from.

2. The indication of mortgages generating the most amount of complaints allows financial institutions to leverage this information to their benefit. Financial institutions could assign more employees to complaints to do with mortgages, or upskill the employees so that they are more capable to assist consumers.

3. The increasing trend in distributions of complaints seems to be increasing per year, but the sales executives will now ask if the rate of growth in sales of financial products is slower or faster than the growth in complaints per year to see if the proportion of consumer dissatisfaction is indeed increasing or slowing down

4. It is clear that a large proportion of consumers that complain end up terminating services. Since this statistic is indicative of customer satisfaction, executives ought to take a look at the distribution of timely response and types of responses to consumers and look at ways to try to improve them, as these play a role in level of customer satisfaction.

5. ALTERNATIVE CONCLUSIONS

5.1. Conclusion 1

To investigate the business concern of a possible correlation between type of financial product and issues consumers complain about, the correlation coefficient and p-value were considered. Using a regression plot, the slight positive linear correlation between Product and Issue is evident. The very small p-value also suggests that there is great evidence to reject the null hypothesis on no relationship between product and issue.

Afterwards a mean shift function was used to locate the different modes of the data and shift every data point towards the mean clusters. This is useful to locate the main areas of commonality within 3D spaces, or multiple dimensions.

5.2. Conclusion 2

To investigate the business concern of a possible correlation between issue and timely response to possibly try to decrease consumer dissatisfaction by decreasing untimely responses, the correlation coefficient and p-value were considered. Using a regression plot, it is clear that there is only a very slight positive linear correlation between timely responses and issues. This suggests that there is a small chance that certain issues take longer to respond to, but the evidence is not very convincing.

6. RECOMMENDATIONS TO MANAGEMENT

In this document a goal was outlined to investigate the dataset, find problems, and make conclusions that would add business value to the financial institution.

Due to the regression analysis and mean shift functions mentioned in the conclusion, it has been made clear that certain issues are more common with certain products. In this way further investigation can be done to know which specific issues are more common with which financial products, allowing consumer support employees to be better prepared to support consumers, and reduce the amount of consumer disputations.

This will increase consumer satisfaction, and increase revenues for these financial institutions.