

Multiple Linear Regression Project

Predicting Wine Revenue for Vintessa Cellars: A Data-Driven Approach to Customer Insights

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9th April, 2025

Introduction- Vintessa Cellars: Where Tradition Meets Taste

In a highly competitive wine industry, understanding customer preferences and behaviour is a key factor to remaining relevant, creating targeted marketing strategies and increasing revenue.

This regression model is for Vintessa Cellars is a premium wine company that offers a selection of refined red, white and sparkling wines.

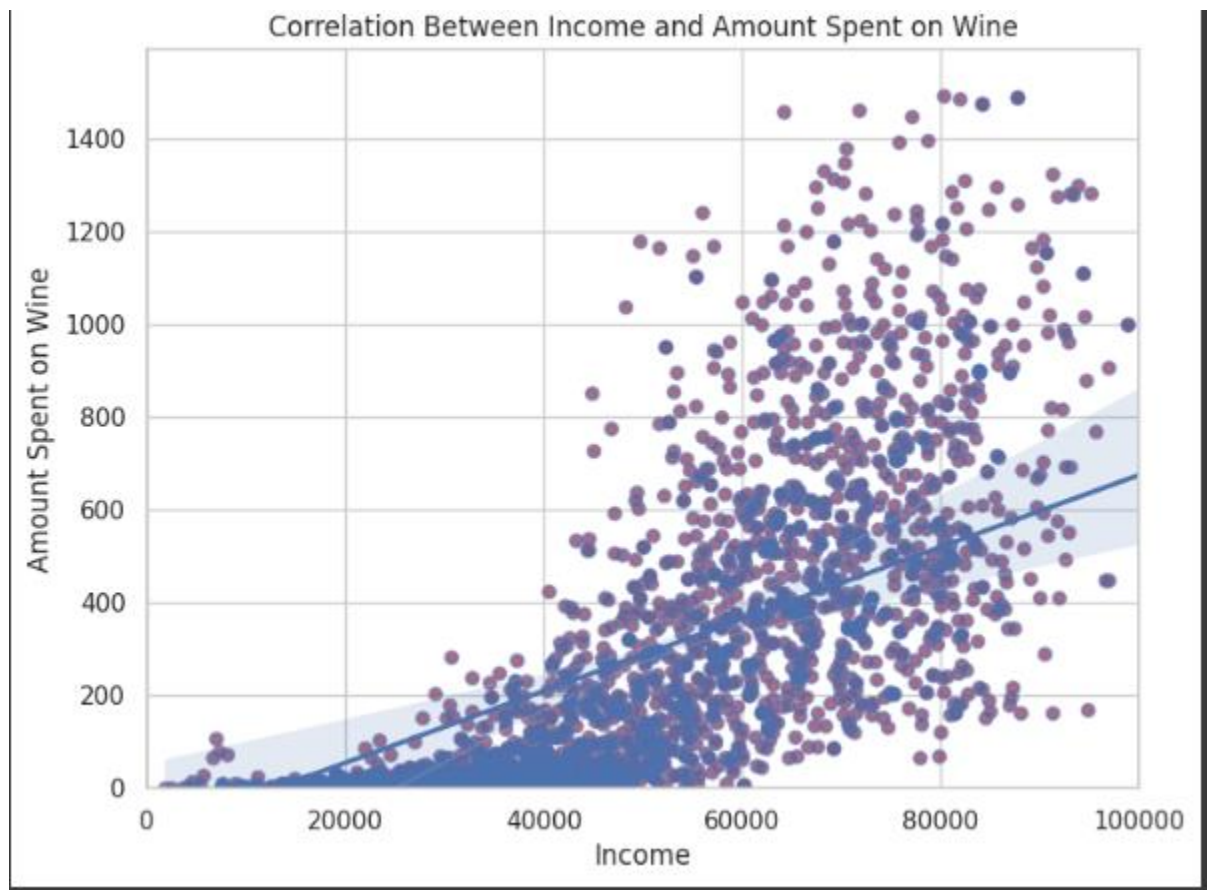
This analysis aims to uncover key insights about customer demographics and buying habits. The main objective is to determine which factors influence wine spending (represented by MntWines) in the dataset and identify the characteristics of Vintessa's high-value wine customers. With these insights, Vintessa can then focus marketing and production efforts to suit these customers.

Data Exploration and Insights

To get general insights into the data and discover any key factors that could help Vintessa Cellars achieve their goal of increasing wine revenue, data exploration was done to see key relationships and gain conclusions.

Correlation Between Income and The Amount Spent on Wine in the Last Two Years

The correlation coefficient of 0.57 shows that there is a moderate to high correlation between income and the amount a customer spent on wine in the last two years. This means that as customer's income increases, they tend to spend more on wine, therefore Vintessa's main customer base are rich or live comfortably. The moderate relationship shows that there are definitely other factors that affect this relationship, for instance, a high earning customer may not like wine and so, would not invest time into buying more wine.



Correlation between the amount spent on wines and other variables

When it comes to the amount spent on wines, variables that have a high positive correlation include the amount spent on fish, meat and fruits. This means that as the amount spent on wines increase, the amount spent on fruit, fish and meat. This could mean that customers are gourmards, individuals who enjoy cooking or gourmet meals, possibly enjoy entertaining guests and hosting dinner parties and could be passionate about food and wine paring.

Determining Key Influences on Wine Spending Using Multiple Linear Regression (MLR)

To determine what influences wine revenue among Vintessa Cellars' customers, a multiple linear regression model was developed with amount spent on wines as the dependent variable and variables such as income, number of kids in the home, marital status, number of purchases made on the website, number of purchases made in-store, number of purchases made with a discount and the number of days since their last purchase (recency).

A new data frame was created using only the selected and all missing entries were cleaned. Categorical variables were one-hot encoded to make them numerical in order to fit in the regression model. The multicollinearity was performed using Variable Inflation Factor (VIF).

This test was to make sure that none of the features were closely related to each other, which could cause misleading results. Only features with a VIF lower than 3 were kept and used in the resulting regression model.

The regression model gave the following insights;

- There is a good, positive relationship between income and the amount spent on wine. Both the p-values and correlation coefficient show that as income increases, the amount spent on wine increases.
- There is a strong, negative correlation between the number of kids in the home and amount spent on money, indicating that with each additional child in the home, the amount spent on wine decreases by \$137.8.
- Recency, number of purchases made with deals and being single had no statistical impact on the amount spent on wine.
- The number of purchases made on Vintessa's websites had a strong, statistical relationship with the amount of spent on wines. For each additional web purchase, the amount spent on wine increases by approximately \$28.8.
- The number of teenagers in the home also significantly impacts the amount spent on wine. As the number of teenagers increase, the amount spent on wine decreases by \$52.1
- Finally, the number of store purchases also has a significant effect on the amount spent on wine. For additional store purchases, the amount spent on wine increases by \$26.8.

Model Insights

The model's results point to the ideal customer of Vintessa Cellar as a 'sophisticated home entertainer'. They are 35-50 years old, in the upper-middle to upper class, with no or few children (including teenagers). They prefer shopping online and in physical stores and have enough money to not be swayed by discounts and promotions. They enjoy hosting, cooking and purchasing premium items regularly.

The insights show that all of Vintessa's marketing strategies and focus should be on individuals without kids, mostly empty-nesters and couples with dual-income and no kids. A stronger online and in-store experience will also yield good results for the business.

Model Refinement

To further refine the model's output, variables with statistically insignificant p-values were dropped. The final model was tested for homoscedasticity using the Breusch-Pagan Test. The model showed signs of heteroscedasticity, which means that its rate of variance of errors is high. To resolve this, robust error handling was included in the model and a new model was built.

Recommended Strategy: Curated Wine Experiences for the Modern Sophisticate

For Vintessa Cellars to remain competitively relevant, it should offer more than wine but a lifestyle. The insights show that by blending premium positioning with curated food experiences and targeting a specific, high-value customer base, Vintessa Cellars can create long-lasting memories and increase their customer base and wine revenue. The following suggestions can Vintessa Cellars help achieve this goal;

- **Collaboration with gourmet brands**

Vintessa Cellars can adopt a strategy similar to the collaboration between Laithwaites Wines and The Cheese Society in the UK. Laithwaites partners with premium food brands to offer cheese and wine hampers. Vintessa can do same and create giftable bundles for its customers, especially since its most profitable customer base enjoy hosting and entertaining guests.

- **Newsletters and campaigns suggesting different wine pairings**

The insights show that that Vintessa's customers purchase wines frequently online, indicating that they are very conversant with the Internet. Vintessa can then have a weekly, personalized newsletters, offering diverse food and wine pairings based on their purchase history. Vivino, an online wine marketplace does this, running email and in-app campaigns suggesting pairings based on wine types and popular cuisines.

- **Curated pairing boxes, offering different kinds of wine and food pairings**

Vintessa Cellar's prime customer base enjoy socializing, therefore would enjoy curated packages they can share as party favours for guests or use as refreshments for their events. The boxes could come with gourmet snack samples or suggested food pairings, perhaps based on wine regions. E.g. an Italian Wine box with various Italian wines and samples of popular Italian foods like bruschetta and other palate cleansers.

- **Strengthen online and in-store sales channel**

Vintessa can run an omnichannel strategy, where both their in-store and website experiences are in sync and offer customers a unique, synchronized experience. For example, they can have an e-commerce platform while offering in-store experiences like wine tasting events, and workshops.

Conclusion

Vintessa Cellars has a strong, unique opportunity to grow wine revenue by focusing on curated experiences that align with their customer's lifestyles. By implementing strategies like gourmet collaborations, premium packaging, Vintessa Cellars can become the number one maker and distributor of fine wines.

Appendix

Colab file-

https://colab.research.google.com/drive/1tmxsA2S48kg1w_GATiZW-U6BWSpnt_FF?usp=sharing