
SMDM PROJECT

BUSINESS REPORT

Prepared By : Sahid
COURSE : DSBA
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1. Introduction

- **1.1 Purpose of the Report**

This report aims to provide a comprehensive analysis addressing two critical business challenges faced by Austo Motor Company and GODIGT Bank. Leveraging data analytics, the report seeks to uncover insights into customer behaviors and preferences, identify key variables affecting business outcomes, and propose actionable strategies to enhance both customer experience and profitability.

For Austo Motor Company (Problem 1), the intent is to dissect customer data to understand preferences and buying behaviors around various automobile types. The analysis focuses on exploring demographic influences, purchase patterns, and the impact of financial decisions such as loans on automobile purchases. Insights gained will direct strategies to improve marketing approaches, tailor product offerings, and ultimately drive sales growth by aligning more closely with consumer demands.

For GODIGT Bank (Problem 2), the focus shifts to examining credit card usage data to recognize patterns and variables that influence card usage, retention, and attrition. By identifying these key factors, the report will offer recommendations aimed at enhancing customer retention strategies, personalizing banking services, and maximizing the profitability of the bank's credit card portfolio.

Overall, the report endeavors to merge analytical findings with strategic recommendations, offering a dual perspective that not only addresses the specific needs of Austo Motor Company and GODIGT Bank but also models how data-driven decisions can propel business objectives forward. By analyzing these distinct issues within a single narrative, we underscore our commitment to harnessing analytics for comprehensive business improvement.

- **1.2 Background Information**

Austo Motor Company

Austo Motor Company, a renowned leader in the automotive industry, specializes in manufacturing SUVs, Sedans, and Hatchbacks. Despite its success, the company has encountered challenges in its marketing campaigns, raising concerns about their effectiveness in reaching and persuading the target customer base. The automotive industry is rapidly evolving, with shifts in consumer preferences and buying behaviors, driven by factors such as technological advancements, environmental concerns, and changing socio-economic conditions. Against this backdrop, Austo Motor Company seeks to understand these dynamics better to refine its marketing strategies, enhance customer experience, and ensure its product offerings meet the evolving demands of the market.

GODIGT Bank

GODIGT Bank, a mid-sized private banking institution, plays a significant role in the financial sector by offering a range of products, including credit cards, to its customers. Despite its strong product portfolio and commitment to customer service, the bank faces challenges concerning high credit card attrition rates. This phenomenon highlights potential gaps in customer satisfaction, product fit, and the effectiveness of communication channels used for cross-selling. In reevaluating their credit card policy, GODIGT Bank aims to ensure that customers receive the right card offerings, aligned with their spending habits and financial needs, to foster more profitable and enduring customer relationships.

Overall

For both Austo Motor Company and GODIGT Bank, the imperative to adapt to changing consumer landscapes and enhance strategic decision-making processes is clear. Leveraging data analytics offers a pathway to gaining in-depth insights into customer preferences, behaviors, and the effectiveness of current business strategies. By examining specific challenges faced by each entity through a data-driven lens, this report aims to uncover actionable insights that can guide future business decisions, marketing strategies, and product offerings, ensuring both companies remain competitive and responsive to customer needs.

2. Methodology

2.1 Data Collection and Analysis Methods

- **Data Collection**

The data for both segments of this study was sourced and compiled through a combination of primary and secondary research methods:

Austo Motor Company: Data was collected from the company's sales and customer service databases, focusing on customer demographics, purchase histories, product preferences, and financial transactions related to automobile purchases. Secondary data were gathered from market research reports and industry publications to understand broader market trends and consumer behaviors.

GODIGT Bank: Customer data related to credit card usage, account activities, and transaction histories were extracted from the bank's internal databases. Information on customer engagement, product holdings, and financial profiles were also included. Market benchmarks and customer satisfaction indices from industry sources provided additional context for comparison.

- **Analysis Methods**

The analysis for both problems was conducted through a systematic approach using statistical software and data analytics tools. The methods applied include:

Descriptive Analytics: Initial data exploration to understand the basic features of the data, including distributions, central tendencies, and variability of critical variables. This step provided an overview of the data landscape and identified any anomalies or data quality issues.

Univariate Analysis: Focused on single variables to summarize and find patterns in the data. This included frequency analysis for categorical data and measures of central tendency and dispersion for numerical data.

Bivariate and Multivariate Analysis: Examined relationships between two or more variables to identify correlations, patterns, and potential causations. Techniques used included cross-tabulations, correlation coefficients, and multiple regression analysis where appropriate.

- **2.2 Tools and Software Used**

Statistical software such as Python (Pandas, NumPy, Matplotlib, Seaborn) for data manipulation and visualization,
Advanced Excel features for preliminary data analysis and visualization.

3. Problem 1 Analysis

3.1 Introduction to Problem 1

Enhancing Marketing Strategy and Customer Experience at Austo Motor Company

Context

In a fiercely competitive automotive market, Austo Motor Company stands out as a leading manufacturer known for its diverse lineup of vehicles, including SUVs, Sedans, and Hatchbacks. Despite its strong brand and product quality, the company has observed challenges in optimizing its marketing campaigns to effectively reach and engage its target

customer segments. This scenario has prompted a need to delve deeper into understanding customer behaviors and preferences to drive marketing efficacy and, ultimately, sales.

Challenge

The core challenge Austo Motor Company faces involves the alignment of its marketing strategies with the dynamic preferences and needs of its diverse customer base. With evolving consumer expectations and a marketplace crowded with competitors, traditional one-size-fits-all marketing approaches are proving less effective. This has led to concerns among stakeholders about the efficiency of current marketing efforts and their impact on customer acquisition and retention.

Objective

The primary objective of this analysis is to sift through the customer data to uncover actionable insights that can inform more tailored and impactful marketing strategies. By understanding key aspects of the customer base, such as demographics, purchase behaviors, and preferences, Austo Motor Company aims to:

- Enhance the customization and targeting of its marketing campaigns.
- Improve customer engagement and satisfaction through better-aligned product offerings.
- Drive increased sales and market share by appealing more directly to potential and existing customers' needs and desires.

Approach

This analysis will utilize a comprehensive dataset provided by Austo Motor Company, encompassing customer demographics, purchase history, and financial transactions related to automobile purchases. Through a combination of descriptive, univariate, and bivariate analyses, the study seeks to:

- Identify patterns and trends in customer preferences and purchase behaviors.
- Understand how different segments of customers interact with and respond to various types of vehicles.
- Evaluate the impact of financial factors, such as personal and house loans, on purchasing decisions.

The insights garnered from this analytical exploration are expected to culminate in concrete, data-driven recommendations for refining Austo Motor Company's marketing initiatives, enhancing the customer journey, and ultimately securing a more significant competitive edge in the automotive market.

3.1.1 Overview of the Business Context

Austo Motor Company

In the rapidly evolving automobile industry, the Austo Motor Company distinguishes itself through a diverse array of vehicles, including SUVs, Sedans, and Hatchbacks, catering to a wide-ranging customer base with varied preferences and needs. Despite a strong market

presence and high-quality product offerings, the company encounters challenges in adapting its marketing strategies to the dynamic consumer landscape, where technological advancements and changing socio-environmental values increasingly influence buyer decisions. The recent concerns raised in board meetings about the existing marketing campaign's efficiency highlight a broader industry issue: the need to deeply understand and respond to consumer behavior to enhance customer satisfaction and loyalty. The backdrop of this challenge is a marketplace witnessing intensified competition and a shift towards personalized marketing and product customization as key differentiators. Addressing this challenge through data analytics is crucial for Austo to refine its marketing approaches, tailor its offerings, and ensure business resilience and growth in a sector marked by relentless innovation and change.

3.2 Data Overview

3.2.1 Data Cleaning and Preparation

In this section, we describe the data cleaning and preparation process conducted on the Austo Automobile dataset to ensure it is suitable for analysis.

Missing Values:

- We observed missing values in the columns 'Gender' and 'Partner_salary'.
- For the 'Gender' column, we replaced missing values with the mode (most frequent value), as this is a categorical variable.
- For the 'Partner_salary' column, we replaced missing values with the mean, as this is a numerical variable without significant outliers.

Data Corrections:

- We identified spelling errors in the 'Gender' column, such as 'Femal' and 'Femle'.
- These were corrected to 'Female' to standardize the data.

Outlier Analysis:

- An analysis of the box plot of 'Partner_salary' indicated no significant outliers in the data.
- Therefore, we proceeded with imputing missing values using the mean without concern for the impact of extreme values.

Consistency and Accuracy:

- We checked the data for duplicate rows and found none.

- We verified the consistency of other categorical columns such as 'Profession', 'Marital_status', and 'Education' for accuracy.

Data Quality Checks:

- We performed quality checks to confirm data accuracy and consistency across variables.

Observations and Insights

- Through the data cleaning and preparation process, we achieved a complete and accurate dataset suitable for further analysis.
- By handling missing values and correcting data errors, we improved data quality and the reliability of our analysis.
- The corrections and imputation methods used were chosen to minimize bias and maintain the integrity of the dataset.

3.3 Univariate Analysis

In this section, we provide an overview of the distribution and characteristics of the individual variables in the dataset. This analysis offers insights into the underlying data and identifies any anomalies or key trends.

3.3.1 Gender:

Observations: There is a significant difference in the proportion of male (1252) and female (329) customers, with males representing the majority of the dataset.

Insights: This gender imbalance should be considered when planning targeted marketing strategies, as different genders may have varying preferences.

3.3.2 Profession:

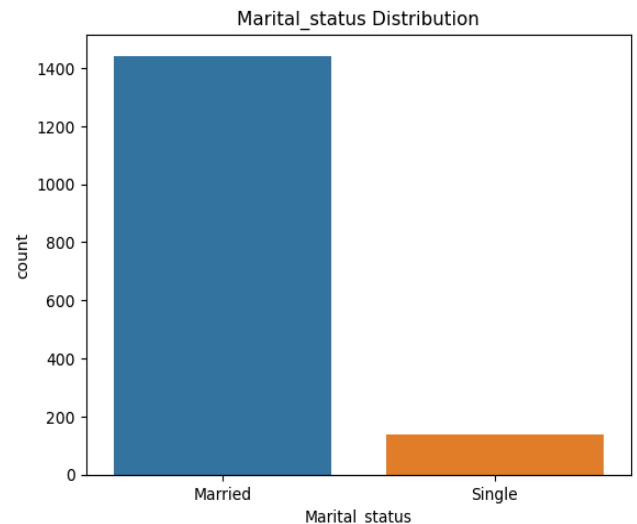
Observations: The majority of customers are 'Salaried' (896), with a smaller proportion in 'Business' (685).

Insights: Understanding the different spending habits and purchase patterns of these groups could be beneficial for targeted marketing efforts.

3.3.3 Marital Status:

Observations: Most customers are married (1443), with a smaller proportion being single (138).

Insights: Marital status could play a role in consumer preferences and purchasing power, with married individuals potentially having more financial responsibilities and a need for larger vehicles.



3.3.4 Education:

Observations: The majority of customers hold a post-graduate degree (985), with the remainder holding a graduate degree (596).

Insights: A higher level of education may influence purchasing decisions and preferences, as well as expectations of customer service and quality.

3.3.5 Personal Loan:

Observations: There is a nearly equal distribution between customers with personal loans (792) and those without (789).

Insights: Personal loans may affect purchasing capacity and decision-making, and it may be beneficial to analyze how these customers' choices differ.

3.3.6 House Loan:

Observations: Most customers do not have a house loan (1054), while a smaller portion does (527).

Insights: This distribution may influence financial obligations and affect purchasing decisions.

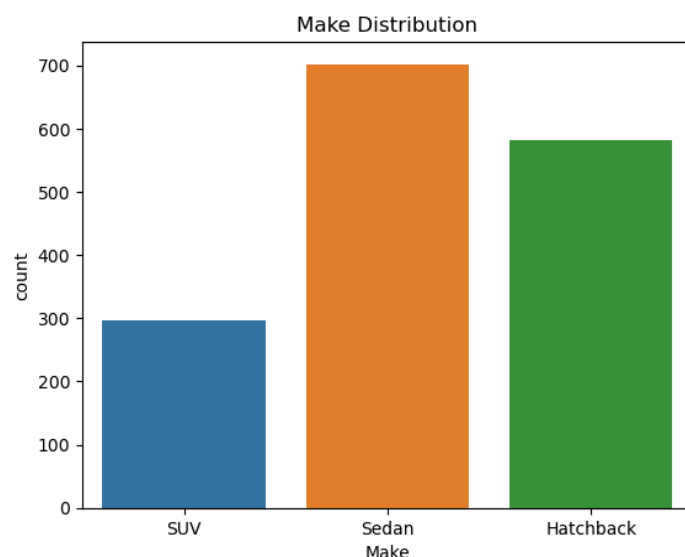
3.3.7 Partner Working: **Observations:** A slight majority of customers have a working partner (868), while a smaller proportion do not (713).

Insights: Having a working partner could influence household income and may correlate with purchasing capacity and decision-making.

3.3.8 Make:

Observations: Sedans are the most common vehicle type (702), followed by Hatchbacks (582), and then SUVs (297).

Insights: The preference for Sedans and Hatchbacks suggests these vehicle types are more popular among the customer base. SUVs may be less common, but may represent a high-potential market segment.



Observations and Insights Summary

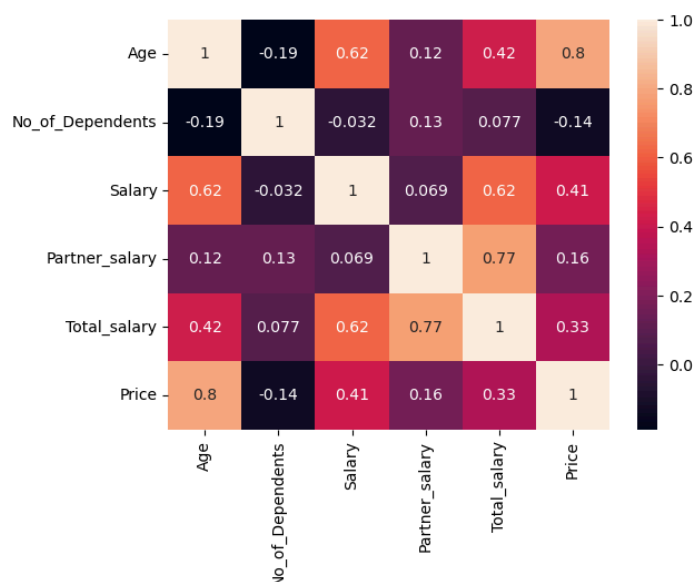
- Through univariate analysis, we identified several trends, including a gender imbalance favoring males, a majority of married customers, and a preference for Sedans and Hatchbacks over SUVs.
- These observations suggest that customer demographics and preferences are diverse, which can inform targeted marketing strategies and product offerings.
- Understanding individual variable distributions helps establish a foundation for more complex analyses and decision-making.

3.4 Bivariate/Multivariate Analysis

In this section, we examine the relationships between the numerical variables in the dataset, including Age, No_of_Dependents, Salary, Partner_salary, Total_salary, and Price. We used a correlation matrix and a heatmap to visualize these relationships, and the analysis provided us with valuable insights.

Key Findings:

Fig : Heatmap to visualize the correlation matrix of our numerical variables.



Strong Positive Correlation:

Salary and Total_salary: There is a strong positive correlation between Salary and Total_salary (0.6199), which is expected as Total_salary includes Salary. This suggests that as an individual's salary increases, their total household income also rises.

Moderate Positive Correlation:

Age and Salary: We found a moderate positive correlation (0.6169) between Age and Salary, indicating that older individuals tend to earn higher salaries. This is consistent with the general expectation that salaries increase with age and experience.

Weak or No Correlation:

No_of_Dependents and Partner_salary: There is a weak or negligible correlation (-0.0317) between the number of dependents and partner's salary. This suggests that the number of dependents does not significantly impact the partner's salary.

Price and Age: The analysis shows a strong positive correlation (0.7978) between Price and Age, indicating that older individuals may be more likely to purchase higher-priced cars.

Price and Total_salary: There is a moderate positive correlation (0.3288) between Price and Total_salary. This suggests that higher household income may influence individuals to purchase more expensive cars.

3.4.1 Observations and Insights

Age and Salary: The relationship between Age and Salary can be leveraged to tailor marketing strategies to specific age groups, focusing on the higher purchasing power of older individuals.

Price and Total_salary: The correlation between Price and Total_salary indicates that individuals with higher household income may be more likely to purchase premium vehicles. This insight can guide targeted promotions and offers.

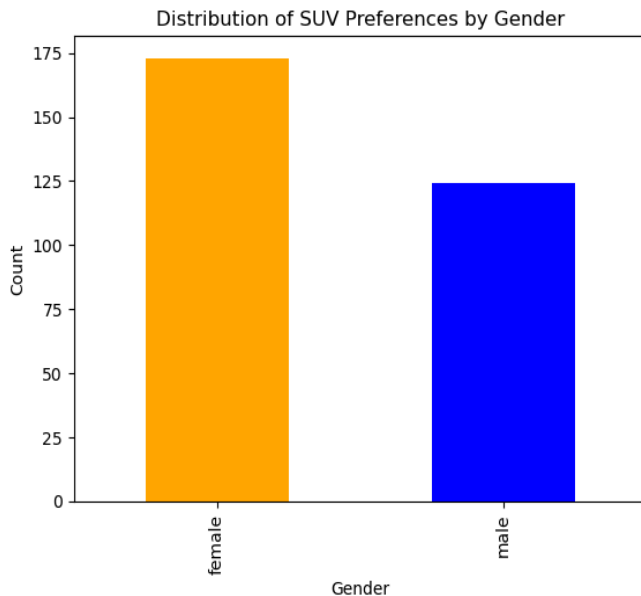
No_of_Dependents and Partner_salary: Given the weak correlation, it seems that having more dependents does not significantly impact the partner's salary. This may suggest that decisions about car purchases are more influenced by individual or combined salaries rather than the number of dependents.

Overall, the bivariate and multivariate analysis provides actionable insights into the relationships between key variables. These insights can guide strategic decisions in marketing, sales, and customer targeting, focusing on variables such as age, salary, and total household income to optimize product offerings and promotional strategies.

3.5 Key Questions Exploration

3.5.1 Do men tend to prefer SUVs more compared to women?

Based on the data provided, it appears that women tend to prefer SUVs more than men:



Gender Counts:

There are 173 women who prefer SUVs, compared to 124 men.

This means there are more women who have chosen SUVs.

Gender Percentages:

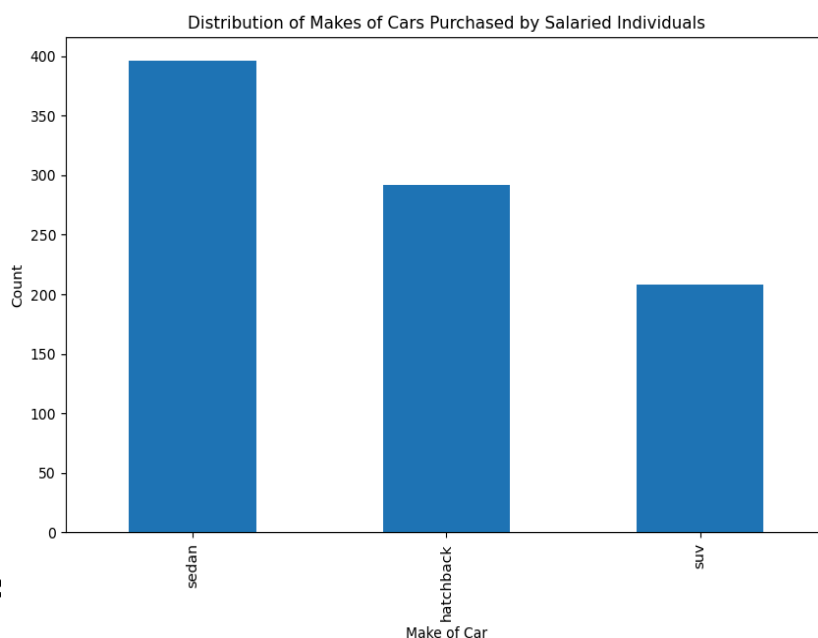
58.25% of the individuals who prefer SUVs are women, while 41.75% are men.

This shows that women represent a higher proportion of those who prefer

SUVs.

In summary, the data indicates that women are more likely to prefer SUVs compared to men.

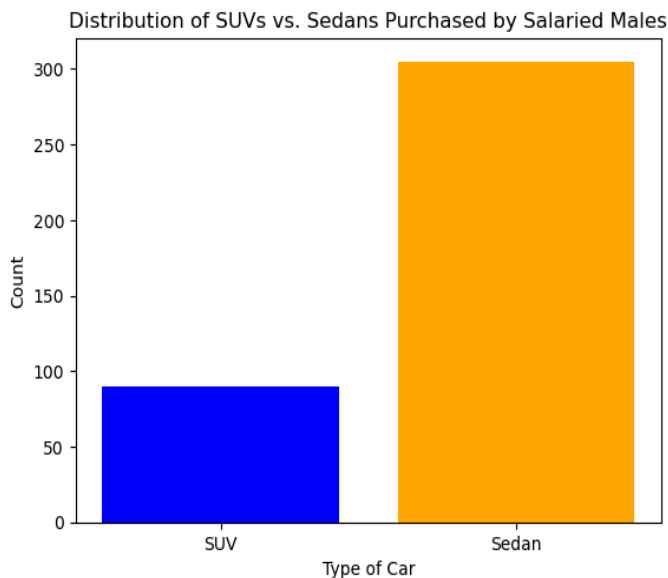
3.5.2. What is the likelihood of a salaried person buying a Sedan?



The provided data and calculations indicate that the likelihood of a salaried person buying a Sedan is approximately 44.20%.

(396 out of 702) sedans as in data.

3.5.3. What evidence or data supports Sheldon Cooper's claim that a salaried male is an easier target for a SUV sale over a Sedan sale?



The Make Counts Suggests that there are : sedan = 396 , hatchback = 292 & suv = 208 counts of make of the Car

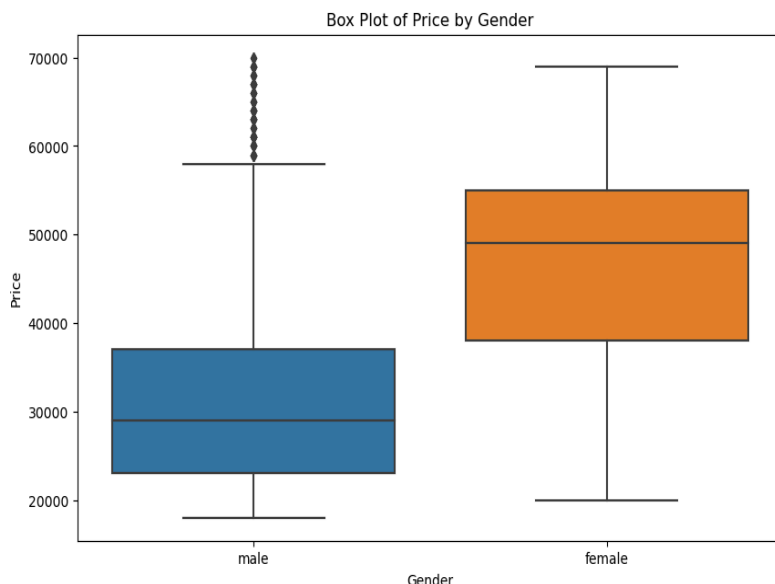
Of which (90 suvs , 305 sedans) for Male Counts

The results indicate that sedans make up a much higher proportion of the cars purchased by salaried males (305) compared to SUVs (90). This data suggests that salaried males are not necessarily easier targets for SUV sales over sedan sales, which is contrary to Sheldon Cooper's claim.

3.5.4. How does the the amount spent on purchasing automobiles vary by gender?

Gender	Price Mean	Median	std	
Male	47705.167173	49000.0	11244.836378	
Female	32416.134185	29000.0	12366.253107	

**table above showing the statistical summary of Gender by price*

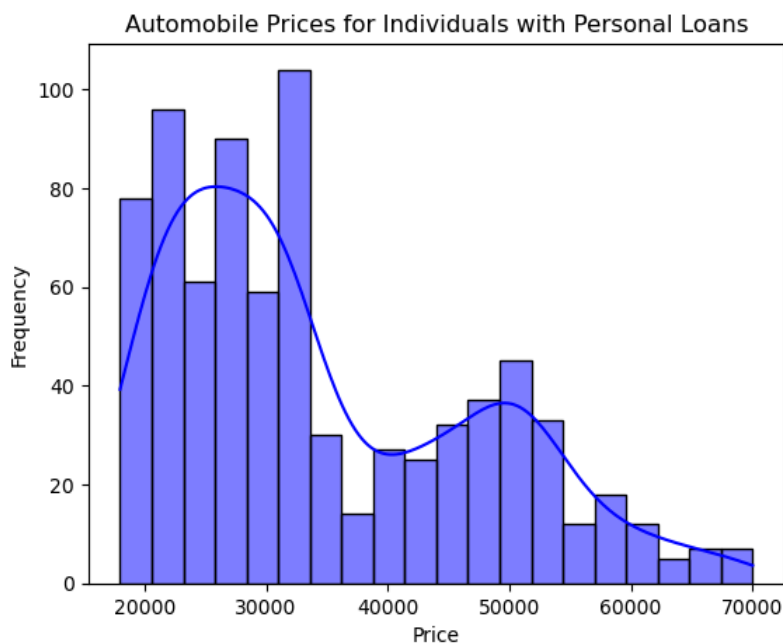


- Based on the provided descriptive statistics, there is a notable difference in the spending patterns on purchasing automobiles between genders. The mean price of automobiles purchased by females is significantly higher at approximately 47,705, compared to the mean price of 32,416 for

males. This indicates that, on average, females are spending more on automobiles than males.

- However, despite the lower mean price for males, the standard deviation of male spending is higher at approximately 12,366, compared to 11,244 for females. This suggests that there is more variability in the amounts males spend on automobiles. The higher standard deviation in male spending could be due to the presence of several outliers in the male gender group, indicating that some males are making purchases significantly higher or lower than the average.
- The median price for females is 49,000, while for males, it is 29,000. This substantial difference between the median prices further supports the conclusion that females are generally spending more on automobiles than males.
- Given the higher mean price and lower variability in female spending, along with the presence of outliers in male spending, the evidence suggests that females are likely purchasing higher-priced automobiles more consistently, while males exhibit a wider range of spending, including outliers. This could indicate different purchasing patterns and preferences between the genders.

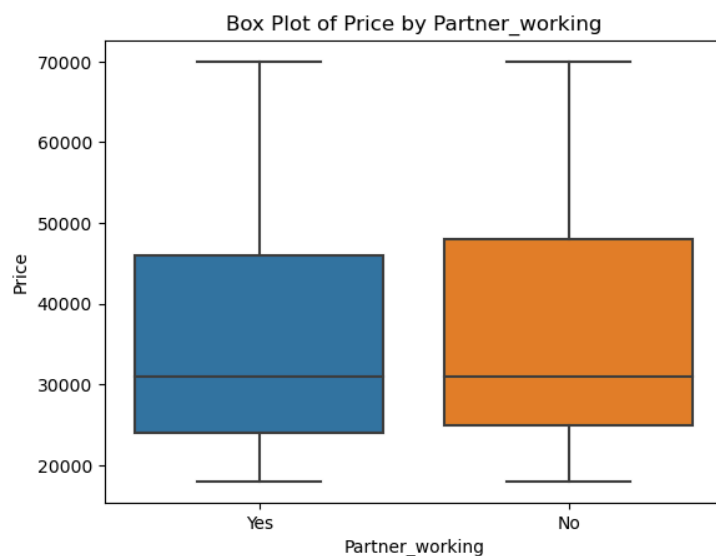
3.5.5. How much money was spent on purchasing automobiles by individuals who took a personal loan?



Individuals who took out a personal loan spent a total of \$27,290,000 on purchasing automobiles. This figure represents the cumulative amount spent by all customers in our dataset who financed their automobile purchases using a personal loan. This significant expenditure highlights the importance of personal loan offerings for customers in supporting automobile purchases, as well as a potential area of focus for future marketing and

financing strategies."

3.5.6. How does having a working partner influence the purchase of higher-priced cars?



- **Similar Spending Patterns:** Both groups have similar mean and median prices, indicating that there isn't a significant difference in the average amount spent on purchasing cars between individuals with and without a working partner.

- **Slightly Higher Variability for Those Without a Working Partner:** The slightly higher standard deviation for individuals without a working partner indicates a bit more variability in their spending on cars, suggesting that there might be a

wider range of prices in the cars they purchase.

- Overall, while there is not a major difference in the average or median prices of automobiles between the two groups, there is a slightly greater variability in the prices of cars purchased by individuals without a working partner. This might indicate different spending priorities or financial constraints among individuals in this group.

3.6 Actionable Insights and Recommendations for Problem 1

Actionable Insights:

- **Targeted Marketing for Sedans:** Since sedans make up a much higher proportion of the cars purchased by salaried males compared to SUVs, Austo Motor Company can target this demographic with customized marketing campaigns focusing on the benefits and features of sedans.
- **Female-Oriented Premium Vehicles:** The mean price of automobiles purchased by females is significantly higher than that of males. This suggests a preference for premium or higher-priced vehicles among female customers. Austo Motor Company could introduce more luxury options tailored to female buyers or emphasize the luxury features of existing models.
- **Personal Loan Offers:** A significant amount of money (27,290,000) was spent on purchasing automobiles by individuals who took a personal loan. Austo Motor Company could consider collaborating with financial institutions to offer attractive financing options to customers, particularly those in the market for personal loans.
- **Promote SUVs to Female Customers:** There are more females who prefer SUVs (173) compared to males (124). Austo Motor Company can focus on this trend and

create targeted promotions highlighting the benefits of SUVs for female customers, such as safety features and versatility.

- Partner-Working Insights: Since both groups (with and without working partners) have similar mean and median prices, it seems having a working partner does not significantly impact car purchasing decisions. This suggests that Austo Motor Company can focus on other factors such as vehicle features and financing options when marketing to customers.

Recommendations:

- Customer Segmentation: Austo Motor Company should segment customers based on gender, profession, and financial behavior to create more personalized marketing strategies and tailor offerings to meet the unique needs and preferences of each group.
- Financing and Loan Programs: Develop and offer competitive loan and financing programs, particularly targeting salaried professionals and individuals who utilize personal loans. This can boost sales and customer loyalty.
- Enhance Customer Experience: Provide excellent customer service and a seamless purchasing experience for all demographics, but especially for high-value segments such as female buyers and salaried professionals.
- Promote Fuel-Efficient Vehicles: Given the preference for SUVs and sedans, Austo Motor Company could promote the fuel efficiency and cost savings of these vehicle types to appeal to eco-conscious customers and those looking for long-term savings.
- Monitor and Adapt to Market Trends: Continuously monitor market trends, customer preferences, and financial behaviors to adapt strategies as needed. This can include adjusting vehicle offerings, pricing, and promotions based on evolving market dynamics.

By incorporating these actionable insights and recommendations into its strategic planning, Austo Motor Company can enhance its market positioning, improve customer satisfaction, and drive sustainable growth.

4. Problem 2 Analysis

4.1 Introduction to Problem 2

- **Addressing Credit Card Attrition at GODIGT Bank**

In the face of a rapidly evolving banking sector, marked by increasing competition, changing customer expectations, and the relentless pace of technological innovation, GODIGT Bank finds itself grappling with a significant challenge - a rising credit card attrition rate. This issue not only threatens a key revenue stream for the bank, derived from interest and transaction fees associated with credit card usage, but also highlights potential gaps in customer

satisfaction and engagement strategies. The situation is made more urgent by the broader industry trends towards digital banking services and personalized financial products, where customer loyalty is both increasingly valuable and volatile.

- **The Critical Challenge**

As GODIGT Bank examines its portfolio, the high attrition rates among credit card holders stand out as a critical area for immediate attention. The loss of customers in this segment not only represents a direct financial loss but also raises broader concerns about the bank's ability to meet customer needs effectively, maintain competitiveness, and capitalize on cross-selling opportunities. In an industry where customer retention is significantly more cost-effective than customer acquisition, understanding and mitigating the factors leading to credit card attrition becomes paramount.

- **Objective of the Analysis**

This analysis aims to delve deep into the data surrounding GODIGT Bank's credit card customers to uncover the underlying drivers of attrition. By identifying key variables that influence customer decisions to discontinue their credit cards, the bank seeks to develop targeted strategies to improve customer retention, enhance product offerings, and ultimately, foster a more profitable and sustainable relationship with its clientele. This task involves examining various aspects of customer behavior and product interaction, from usage patterns and financial behavior to engagement with bank's communication channels and satisfaction with the product features.

The outcome of this analysis is expected to equip GODIGT Bank with actionable insights, enabling the formulation of strategic interventions to reduce attrition rates, boost customer loyalty, and strengthen its position in the competitive banking landscape.

4.1.1. Overview of the Business Context for Problem 2: GODIGT Bank

GODIGT Bank operates within the dynamic and highly competitive banking sector, offering a spectrum of financial products to its diverse clientele. A significant pillar of the bank's revenue model is its credit card offerings, which recently have been marred by high attrition rates. This trend is alarming for multiple reasons, primarily because it directly impacts the bank's profitability and challenges its customer engagement strategies. The banking industry, already in a state of flux due to technological advancements and evolving customer expectations, necessitates banks like GODIGT to innovate continuously and adapt their product offerings to better meet customer needs. With the loss of credit card customers, the bank faces the urgent task of reevaluating its credit card policies, with an emphasis on ensuring that card offerings align with customer lifestyles, spending behaviors, and financial goals. This context of high attrition rates not only reflects the challenge of maintaining customer loyalty but also underscores the broader sectoral issue of how to remain relevant and preferred in a market where customers are increasingly spoilt for choice. Through a comprehensive analysis of customer data, GODIGT aims to uncover insights that can help to

revamp its credit card policies, enhance customer satisfaction, and ultimately, foster more profitable customer relationships.

4.2 Data Overview

4.2.1 Data Cleaning and Preparation

Data Overview

The dataset contains information about GODIGT Bank customers, including their credit card usage, limits, account activity, and spending patterns. This data offers insights into customer behavior and preferences.

The data consists of several variables that capture customer characteristics such as credit card limit (cc_limit), bank vintage (bank_vintage), high net worth status (high_networth), average credit card spends over the last three months (avg_spends_l3m), and future credit card activity (T+1_month_activity).

Data Cleaning and Preparation

Missing Values:

We observed missing values in the Transactor_revolver column, which were filled using the mode (most frequent value) of the column.

Data Quality Checks:

After cleaning and preparing the data, the dataset had no remaining missing values, ensuring that it was complete and suitable for analysis.

Feature Engineering:

As part of the data cleaning process, necessary transformations and encoding have been applied to prepare the data for analysis and modeling.

Data Integrity:

Throughout the data cleaning and preparation process, we ensured the data maintained its integrity and quality to provide reliable insights for analysis.

4.3 Key Variables Identification

4.3.1 Top 5 Important Variables and Justifications

The 5 key variables that have a vital impact on the analysis which will help the company to improve the business

- **cc_limit (Current credit card limit):**

Justification: The credit card limit can influence how much a customer can spend. Customers with higher limits may be more engaged and have higher spending capacity, directly impacting the bank's revenue. Adjusting limits based on customer needs and spending patterns can lead to more profitable relationships.

- **bank_vintage (Vintage with the bank in months):**

Justification: Customers who have been with the bank for a longer period tend to be more loyal and have established trust with the bank. A higher bank vintage can be associated with lower attrition rates and increased likelihood of using multiple banking products, which can boost profitability.

- **high_networth (Customer category based on their net-worth value):**

Justification: Customers with higher net worth may have greater financial stability and spending potential. Targeting high-net-worth customers with tailored offers and products can enhance loyalty and drive higher usage and profitability.

- **avg_spends_l3m (Average credit card spends in the last 3 months):**

Justification: This variable directly reflects recent customer activity and engagement with their credit card. Higher average spending indicates active usage, which can be a predictor of future spending and profitability. It can also signal satisfaction with the credit card and may help in identifying high-value customers.

- **T+1_month_activity (Whether customer uses credit card in T+1 month - future usage):**

Justification: Predicting future credit card usage can provide valuable insights for customer retention strategies. If a customer is likely to use their card in the next month, the

bank can engage them with personalized offers and incentives to maintain their activity and loyalty.

Actionable Insights

- **High Correlation Between Credit Limit and Average Spending:** The high correlation (0.855799) between credit limit (cc_limit) and average spending (avg_spends_l3m) suggests that customers with higher credit limits tend to spend more. This relationship highlights the potential for GODIGT Bank to focus on high-potential customers who are likely to generate more revenue.
- **Bank Vintage and T+1 Month Activity:** The negative correlation between bank vintage (bank_vintage) and T+1 month activity (T+1_month_activity) suggests that long-tenured customers may be using their credit cards less frequently. GODIGT Bank could encourage these customers to use their cards more through targeted promotions.
- **Minimal Impact of High Net Worth on Future Activity:** The low correlation (0.068690) between high net worth (high_networth) and T+1 month activity suggests that high-net-worth status does not directly impact future credit card activity. This finding indicates that promotions targeting high-net-worth customers may not lead to significant changes in their credit card usage.

Recommendations

- **Targeted Strategies for High-Potential Customers:** Rewards Programs and Incentives: Offer rewards programs, cashback incentives, or higher-tier cards to high-potential customers (those with higher cc_limit and avg_spends_l3m), encouraging them to continue spending and engage more with the bank.
- **Personalized Offers:** Tailor credit card policies to better suit these customers, such as offering increased credit limits, exclusive card options, or specialized promotions.
- **Loyalty Programs for Long-Term Customers:** Since bank vintage is negatively correlated with T+1 month activity, consider introducing loyalty programs for long-standing customers to boost their card usage. Exclusive deals, discounts, or incentives may encourage these customers to use their credit cards more frequently.
- **Promotions for High Net Worth Customers:** Although the direct impact of high-net-worth status on future activity is minimal, high-net-worth customers still present opportunities for the bank. Consider creating personalized promotions and exclusive offers to engage them and potentially increase their credit card usage.
- **Monitor Trends and Adjust Policies:** Regularly review customer spending patterns and credit usage trends to identify changes in behavior. This information can guide adjustments to the bank's credit card policies and targeted marketing strategies for optimal performance.
- **Evaluate Credit Limits for High Net Worth Customers:** Reassess the bank's policy on credit limits for high-net-worth customers due to the negative correlation

between cc_limit and high_networth (-0.986518). Offering higher credit limits to these customers may incentivize greater spending and increase revenue.

By implementing these recommendations, GODIGT Bank can optimize its credit card policies and marketing strategies to drive customer engagement, enhance profitability, and build strong relationships with its customers. Let me know if you need additional information for further recommendations.

5. Combined Insights and Strategic Recommendations

Insights Summary from Both Problems

Austo Motor Company:

- **Customer Preferences:** The analysis revealed that sedans are the most popular type of car, especially among salaried individuals. Meanwhile, SUVs are preferred by women, and those with personal loans spend significant amounts on purchasing automobiles.
- **Gender and Spending Patterns:** Female customers tend to purchase more expensive automobiles compared to their male counterparts.
- **Loan Impact:** A substantial amount of money was spent by individuals who took out personal loans, indicating a strong connection between loan accessibility and automobile purchases.

GODIGT Bank:

- **Credit Limit and Spending:** Customers with higher credit limits tend to spend more, suggesting that increasing credit limits could boost average spending.
- **Bank Vintage and Customer Activity:** Customers with longer tenure with the bank tend to use their credit cards less frequently, indicating potential areas for improvement in customer retention and engagement.
- **High-Net-Worth Customers:** The impact of high-net-worth status on future credit card usage is minimal, suggesting the need for alternative strategies to engage these customers.

Strategic Recommendations for Austo Motor Company and GODIGT Bank

Austo Motor Company:

- **Target Marketing Efforts:** Use customer insights to target specific demographics, such as offering more SUV options and promotions for female customers.
- **Loan Incentives:** Create promotions for customers taking personal loans to encourage purchases, given the significant spending associated with this group.

- **Product Diversification:** Focus on product offerings that cater to different demographics, particularly the salaried individuals and those seeking personal loans.

GODIGT Bank:

- **Optimize Credit Limits:** Consider increasing credit limits for high-potential customers to encourage higher spending and increased usage.
- **Enhance Loyalty Programs:** Introduce loyalty programs for long-standing customers to increase their engagement and credit card usage.
- **Tailor Promotions for High-Net-Worth Customers:** Provide personalized promotions and card options for high-net-worth customers to engage them more effectively.

Limitations and Scope for Further Analysis

- **Data Limitations:** Both datasets may have limitations in terms of representativeness and completeness. For instance, missing values or incorrect data entries could affect the analysis results.
- **External Factors:** Market conditions, economic changes, and customer preferences can impact the outcomes, and future analyses should consider these external influences.
- **Longitudinal Analysis:** Current analyses are based on a single snapshot in time. Future studies could benefit from longitudinal data to track trends and changes over time.
- **Additional Variables:** Including more variables or customer feedback in future analyses could provide deeper insights into customer behavior and preferences.
- **Advanced Techniques:** Further analysis using advanced statistical or machine learning methods may yield more robust insights and predictive capabilities.

By considering these limitations and exploring areas for further analysis, Austo Motor Company and GODIGT Bank can continue to refine their strategies and better serve their customers.

Conclusion

Austo Motor Company:

- Understanding customer preferences can guide targeted strategies, such as promoting sedans to salaried individuals and SUVs to female customers.
- There is potential in offering promotions and incentives to customers using personal loans for automobile purchases, as these individuals demonstrate significant spending habits.

GODIGT Bank:

- Targeting high-potential customers with higher credit limits and tailored offers can increase engagement and drive profitability.

- Implementing loyalty programs for long-term customers and personalized promotions for high-net-worth individuals can enhance customer retention and spending.

General:

- While the analysis provides valuable insights, it's important for both companies to monitor changes in customer behavior and external factors.
- Further research and continuous monitoring of customer trends can help the companies adapt strategies and optimize outcomes.
- Staying flexible and responsive to changing market dynamics will allow both companies to capitalize on opportunities for growth and maintain competitive advantages.

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7. References

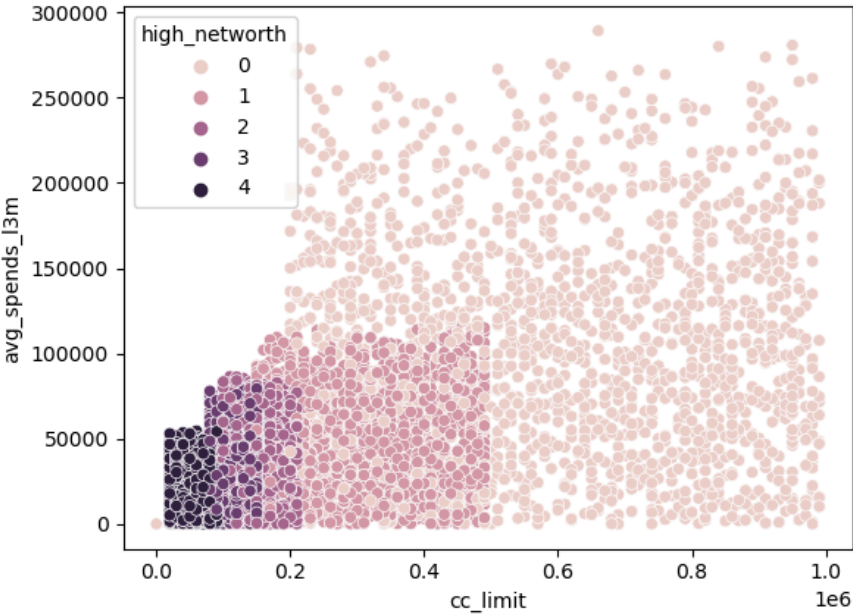
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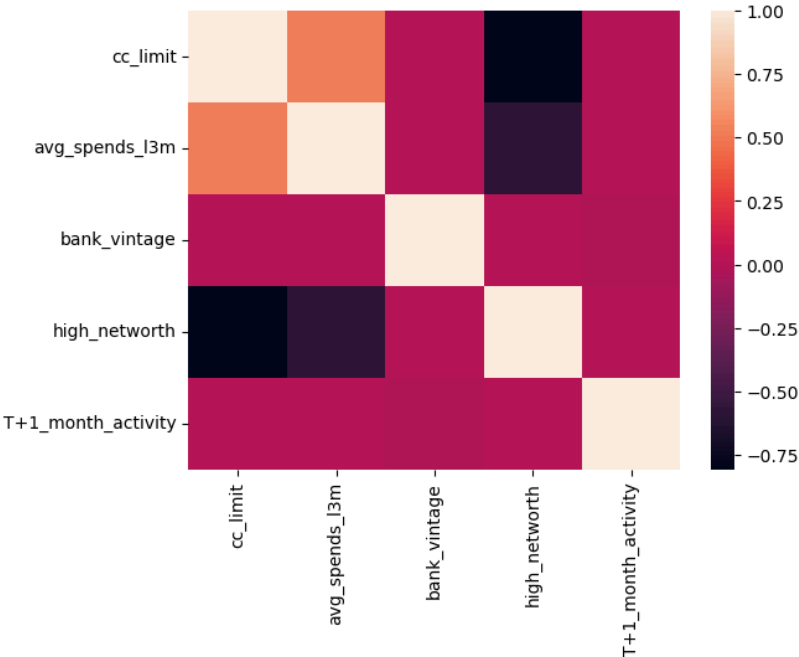
Course materials

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8. Appendices



Scatterplot showing the concentration of high network individuals with less limits and avg spends.



Heatmap showing the correlation between the given variables that provides insight into the relationships between different aspects of customers' credit card usage and financial behavior.

THANK YOU