Data Analysis on Global Car Sales Report

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# 1.Introduction

In the current context of growing competition among automotive manufacturers and dealers, it is essential to be informed about the sales profile of the vehicles, the consumers, dealers, and preferences to make sound managerial decisions. Using this dataset, an analysis can be made on key factors affect car sales as a guideline for car salespersons. In order to find answers to questions like whether a specific make has gained or lost ground over the timespan under observation or whether income group ‘x’ has been purchasing more cars as compared to income group ‘y’; owning patterns of specific makes and models over the period; dealing patterns of dealers over the given period and so on; we are going to analyze the trends in total number of car sales over the period of time, income of the customer its findings will aid automotive businesses to fine-tune their marketing campaigns, liaise more efficiently with dealers, and match product portfolios with consumer wants in order to improve overall sales and customers’ satisfaction.

## 1.1 Dataset:

**The dataset used in this analysis contains detailed information about car sales, including variables such as:**

* Car\_id: normally used to refer to a car sale with another car, function as a reference number for a specific car sale.
* Date: this is the date that the item was sold for cash which enabled the preparation of the balance sheet.
* Customer name: the first name for the customer.
* Gender: the nationality of the customer.
* Annual income: income of the customer for the year.
* Dealer\_name: it is the name of the dealer.
* Company: the car manufacturer.
* Model: the car model.
* Engine: type of engine.
* Transmission: automatic/manual shift (transmissions).
* Color: make of the car.
* Price ($): price for which the car is to be sold if selling is intended.
* Dealer\_no: dealer number.
* Body style: type of the car’s body, such as: SUV, hatchback etc.
* Phone: phone contact of the customer.
* Dealer\_region: it is the region where the above-mentioned dealer can be found.

These variables are an essential part of assessing the sales trends in cars, the customers’ characteristics, dealers’ efficacy and efficiency, and consumers’ preferences.

## 1.2 Key points for Data selection:

**For this visualization project, the following key data points were chosen:**

* Total sales over time: to identify cyclical movements of sales volume of the product.
* Monthly sales comparison for top models: to enable the analysis of the monthly sales of the various models of the cars offered in the market.
* Revenue contribution by dealer: to rank the dealers in terms of their performance with specific reference to their revenues.
* Gender distribution of customers: for the management to comprehend the ratio and distribution of the gender of their customers.
* Average annual income by gender: accordingly, the current analysis aims to compare the income level of the customers divided between males and females.
* Correlation between annual income and car price: specifically, the research goal can be stated as follows to investigate the correlation which exists between the car prices and customers’ income.
* Top 10 dealers by number of sales: finally, to use dealer feedback as the basis for pinpointing those dealers who are already truly successful.
* Sales distribution by dealer region: to examine the regional patterns of automobiles sales.
* Most popular car models: the first information objective is towards knowledge of specific car models that are most preferred by customers.
* Most popular car colors: from the perspective of color, to better understand the primary colors of customer’s choice in automobiles.
* Transmission type preference: in this case, the objective of the study is to compare the preference of automatic and manual transmission.
* Sales by car body style: to identify which car body style is the most frequently used.

**The selected data points provide a comprehensive view of car sales performance from multiple perspectives:**

* Sales trends: sales analysis is helpful in determining seasonal trends in the business and the effects that its marketing strategies will have.
* Customer insights: age and gender segmentation take care of the selling techniques while income segmentation is important in determining the right products to offer in the market.
* Dealer performance: dealer ranking, and regional sales distribution information assist in the optimization of the support given to dealers and resources invested in them.
* Car preferences: car manufacturer and dealers should also be aware of the most preferred car models, colors, and body types to help guide their stock and available products.

1.3 Problem Statement:

**The first research question that forms proposed work stems from the primary issue that considers a need to establish factors that influence car sales.**

**Specifically, the analysis aims to:**

* Determine if there are cyclic patterns regarding car sales.
* In layman’s terms, acquire knowledge on the age, sex, nationality of the clients and their buying patterns.
* Measures the output of car dealers in various areas.
* Identify the preferences of the customers about the models of the cars, their colors, and transmission system.
* Through the analysis of these areas, they aimed at offering strategies on how to enhance sales activities, inventory management, as well as satisfying the customers’ needs.

# 2.Analysis

## 2.1. Sales over time:

**Patterns, trends, and relationships**

* Seasonal peaks:December peaks: analyzing the data, it can be observed that sales are higher in December regarding both 2022 and 2023. This may point out to a rather dominant effect of seasons especially the fourth quarter when sales are intensified due to holidays and end of the year campaigns.
* September peak: There is another large spike in July 2022, and this is followed ‘seasonally’ by another hump in September 2023; these could be due to new models or back-to-school campaigns.
* Growth over time:All in all, the trend of the two-year moving average portrays general increase in sales. This may likely mean positive market trends, effective strategies in the marketing of products, or growing consumer base.

**Impact of external factors**

* The drastic decline in March and September 2022 maybe pointing to other causes unrelated to the banana sales. These could be economic recession that affects demand, availability of materials or competition by other companies.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Seasonal influence: this table shows that December has the highest sales, showing that there are indeed seasonality factors and effective end-of-year promotions. Firms can therefore build on this trend by increasing the marketing efforts during this occasion.
* Market growth: the emerging results of the sales reveal the affirmative market development that might be affected by the appropriate sales mechanisms or strategies, suitable products that integrate into people’s life, or markets opening.
* Focus on low points: it may be possible to stabilize sales throughout the year and ensure steady growth in sales if the reasons for considerable fluctuations in sales, such as in March and September 2022, were eliminated.

Thus, knowing these patterns and trends, companies can adjust their sales, stock, and promotional activities and measures in a way that would bring the greatest return and improve consumer satisfaction.

## 2.2. Gender distribution of customers:

The gender distribution of customers of the organization is as follows:

**Patterns, trends, and relationships**

**Customer composition:**

* Male majority: over 79% of the customers are male, and therefore most of the target group skewed towards the male gender. This trend configures that the automotive market, as presented through this dataset, prefers masculine consumers.
* Female representation: about 21 percent of the customers is female customers. However, it amounts to much lesser compared to male customers, a segment which still suggests considerable volume of business opportunities for enhancement.

**Implications for marketing:**

* Targeted marketing for females: the fact that female customers are less represented indicates that there could be interest out there that is unexplored. Hoping to raise the role of ladies in automotive market, potential strategic directions could be searched to create specific marketing activities according to the demands and wishes of such client base.
* Understanding preferences: thus, knowing more about the particulars in relation to the customers that are female can help create goods and services that would be more appealing to this target group and thus, expand her market share.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Male-dominated market: from the trends established by this dataset, it is quite clear that the automotive market is particularly inclined to males. It was in this light that this trend could be harnessed to market products that may be more appealing to the male clients.
* Growth opportunities among female customers: thus, the best opportunity for growth is revealed in the fact that male customers spend much more than female customers. First, when certain peculiarities of female clients have been studied and targeted, various organizations and companies can reach a new population, which is rather untapped at that.
* Strategic marketing: in market segmentation, market specific appeals like safety features, fuel efficiency and family appeals should be targeted towards the female gender to increase the pool of female buyer and improve the market’s performance.
* Based on the findings on gender distribution of the customers, the business can be able to take important decisions towards proper marketing mix strategies, product development and right targeting strategies to attract as many customers as possible and hence increase sales and high customer satisfaction.

## 2.3. Average annual income by gender:

This research aimed at analyzing the average annual income. To do so, we grouped employees by gender.

**Patterns, trends, and relationships**

**Income disparity:**

* Males earn more: the male customers spend considerably more than the female customers, and even if the female customers are sub-letting the vehicles to third parties, they spend far more than the male customers. These differences of income flow could be attributed to many social and economic factors including employment status, promotion, and sector gazette.
* Impact on car purchases: more commercially aware and wealthier male customers may be associated with type of car they are likely to purchase that is, expensive or premium brands. While for female customers may focus more on the car price since female customers have relatively lower average income than male customers.

**Implications for marketing and sales:**

* Targeted marketing: knowledge of income disparity can assist in segmenting the market as well as the specific targeting of the marketing communication. For instance, there can be a differentiation in the style and characteristics of specific car models and bonuses for male and female clients.
* Product offerings: according to the income level they too can buy all kinds of vehicles and dealers may opt to display all cars that can be afforded by those earning high incomes as well as those earning moderate income.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Income-driven market segmentation: the last demographic characteristic is the customers’ income: $3,322 for males and $2,535 for females, which indicates that income may be a powerful segmentation criterion. Based on these income categories, marketers and product developers can improve on their marketing approaches and products to suit their clients.
* Potential for diverse product ranges: dealerships need to think of the possibility of expanding their product line and offer luxury and economy cars. This keeps on satisfying the market needs of not only the high-income males but also the moderate-income females in the society.
* Strategic marketing campaigns: strategically launching and executing marketing campaigns that can ordinarily be associated with the income status of the customers is very important in enhancing customers’ interest and sales. For instance, the emphasis on the availability of lavish facilities and offering superior services for the male clientele with better endowment and a higher earning capacity as well as stressing on the economics and effectiveness that can appeal to women clients can help improve the penetration strategy.
* Businesses can then be able to provide targeted and specific average annual income by gender marketing strategies hence being able to adjust their products offering and thus enhancing on the sale and consumer satisfaction of their goods in the various income brackets.

## 2.4. Dealers by number of sales:

Segmenting of the dealers based on the number of sales

**Patterns, trends, and relationships**

**Sales distribution:**

* Leading dealers: within the data, there is information on a few dealers who are outliers for the number of car sales per month. The dealers most probably have reputable market positions, suitable marketing techniques and customer preferences.
* Mid-tier dealers: as can be observed, some of the dealers like U-Haul co and suburban ford are closely following the leaders, which suggests the fact that they occupy quite a strong though not dominating position on the market.

**Implications for business strategy:**

* Benchmarking best practices: high-performing dealers laid standards that were expected from other dealers and must be followed when relating to customers. It will be relevant for the other dealers to study the best strategies that Jon and Katherine employed to gain increased sales productivity.
* Support and training: some of the dealers can require more encouragement and training to improve their sales skills, database and innovative methods of marketing that will propel them to better performers.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Strong market leaders: two organizations that without doubt one can easily state are market leaders by virtue of an increased sale are progressive shipper’s cooperative association no and Rabun used car sales. It was due to a good marketing strategy combined with consumer satisfaction and good value chain on selling and distribution.
* Competitive market: this is an indication of intense competition in that there are other mid-tier dealers who have nearly similar sales to those dealers at the upper end of the scale. The above dealers have the potential of achieving increased shares, and thus can become market leaders after enhancing their strategies in the respective areas.
* Opportunities for growth: small dealers can concentrate on imitating the behaviors of the excellent dealers. Specifically, they could improve their verbal and written skills, especially in terms of selling, communication with the clients, and promotion strategies that can lead to expansion of their market share.
* The total sales data by a dealer can enable the businesses to be aware of dealers with high sales productivity, realize the level of competitors’ activity and work out solutions to help the poor performers which, in the end, will positively contribute to the market situation and customer satisfaction.

## 2.5. Sales distribution by dealer region:

It also shows the percentage of sales distribution by each region of the dealer.

**Patterns, trends, and relationships**

**Regional sales performance:**

* Dominant markets: of course, Austin and Janesville are compulsory markets, which are substantially dominating other regions. This may be attributed to issues like population in specific areas, economic situation, efficiency in the choice of dealerships and brand image.
* Stable regions: the dispersal of sales comparable across regions such as the Scottsdale, Pasco, aurora, Middletown, and Greenville probable reveals a steady market where dealership can depend on, and probably has firmly grounded itself.

**Implications for business strategy:**

* Targeted marketing: the regions with evidently low sales should be considered as prospects for creating advertising campaigns and other sales promotions. Some of these markets include the need to understand local culture and adapting the marketing strategies to suit such markets.
* Resource allocation: Austin and Janesville, for instance, seems to sell more than other regions; this means that more resources should be invested in this area like extra inventories, better customer services, and more promotion as a way of exploiting its high sales areas.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Market leaders: when it comes to sales volume, Austin and Janesville are undebatable the market leaders. Thus, the cases also demonstrate that successful dealership strategies, solid regional markets, and powerful customer relations are crucial to success.
* Opportunities for growth: areas with relatively stable but not very high volume of sales, include Scottsdale and Pasco, aurora and Middletown, and Greenville need to continue to grow. To boost the market share within these areas, targeted marketing approaches and specific measures should be applied.
* Strategic focus: this is because formulating priorities that will seek to improve the sale in those areas that are less strong can help in balancing the overall market strength. It means that the experience of regions that indicated high performance can shed light on changes for enhancing the sales approach and, therefore, customers.
* Through understanding the formula used in this case on sales distribution by the dealer region, the businesses realize which areas are more productive, the potential areas for expansion and the strategies needed to increase the company’s sales productivity and market penetration in those regions. Overall, this approach means that resources will be allocated well, customers will be properly addressed, and customers’ sales will go up as desired.

## 2.6. Most popular car models:

**Patterns, trends, and relationships**

**Model popularity:**

* Leading models: the top models are diamante, silhouette, and Prizm. Such high sales indicate high customer demand, and this may be as a result of features, looks, cost, and reputation of the products.
* Close competitors: other models include Passat – 391 sales, ram pickup – 383 sales, Jetta – 382 sales, among others, which again shows a fiercely contested market that has many good models.
* Consistent demand: that is why their activity in terms of selling cars has quite similar figures; therefore, this means that consumers’ needs met by different models are quite diverse.

**Implications for business strategy:**

* Inventory management: some famous car models such as diamante, silhouette, Prizm should always be in stock so that customers do not switch to other brands of cars due to the stockout.
* Marketing focus: the strategies can be done by creating specific marketing towards those models with high popularity rate to capture more clients. Explaining some of these characteristics may help to improve sales even more because these are the models people prefer.
* Product development: knowing these features about the models will help in the development and improvement of the models that are in the market.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Dominant models: among the model names, the most popular are diamante, silhouette, and Prizm, – these proposing buyers the greatest trust. They relate to design, performance, and brand reputation, which are valid enough for the turnover to take place.
* Competitive market: this is an indication that Alger’s pool of customers comprises a very diverse nature since the top ranked models are very close. Thus, businesses should provide a multitude of models that fit customer requirements and understand the differences between them.
* Strategic focus: ensuring availability of most-sold models, creating specific campaigns, and using data on these models for further products’ production improve sales results and therefore customer satisfaction.
* With the identification of the most successful car models, companies can fine-tune the position and promotion of offered products, as well as notify manufacturers about customers’ needs and preferences regarding certain cars.

## 2.7. Most popular car colors:

**Patterns, trends, and relationships**

**Color popularity:**

* Top colors: the fact that pale white and black have been preferred more clearly depicts that most of the customers tend to go for neutral and basic colors which are easy to apply. These colors are considered to be better and more elegant, and consumers tend to think that cars of these colors will be easier to sell used.
* Red as an accent: red, although does not have as many sales as pale white and black, still has some customers meaning a segment of the population prefers bright and conspicuous colors.

**Implications for business strategy:**

* Inventory management: since pale white and black cars are very popular in the market, dealerships need to ensure availability of these colors to avoid running out of stock.
* Customization options: some of the ways to increase the quantity of sales include customizing the product and encouraging the most popular hue. For instance, stressing on the fact that certain colors that are widely used in products are available can tip the balance.
* Targeted marketing: marketing techniques could be applied strategically to stress on the fact that more and more people prefer to buy this small appliance in the basic colors. For instance, regarding recognizable beauty and car resale value, campaigns can underline that pale white and black cars remain the classic and desirable marques.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Color preferences: it is demonstrable that pale white and black have remained as the favorite car colors among customers. Such a preference can be explained by the fact that such shoes are timeless, have a universal fit, and are worthwhile.
* Market trends: a strong indication of this phenomenon can be made from the high degree of preference towards neutral colors, thus the attraction towards timeless and appealing to everyone car designs. Red, although, is used less often, is considered as an opportunity for its clients to choose a decidedly more saturated hue.
* Strategic planning: thus, dealerships need to keep paler white and black cars in stock to maximize these findings. Furthermore, there is a need to go further in its marketing strategy focusing on the advantages that the tennis clothes in these popular color offer and every time an extra emphasis on the aspect of customization should be done in other to attract more customers.
* Knowledge of these colors will help businesses in determining the right stock to display, promoting the right color cars, and especially engaging with their clientele to achieve the best results in terms of sales and customers’ satisfaction.

## 2.8. Transmission type preference:

Characterizing the choice of transmission type

**Patterns, trends, and relationships**

**Transmission popularity:**

* Dominance of automatic: automatic transmission cars top the list in sales which is weekly to global surveys in various countries where automatic transmissions are considered more convenient due to their simplicity especially to urban traffic.
* Steady demand for manual: a significant number of sales of manual transmission cars suggests a steady market for it, may be due to connoisseurs, bargainer or perhaps regions with frequent usage of manual transmission.

**Implications for business strategy:**

* Inventory management: automatic and manual transmission cars must be available in adequate proportions to the specific dealerships it sells. Since there is higher demand for automatics, it would be more reasonable to keep a much higher supply of these models.
* Targeted marketing: marketing appeals can be used to highlight salient features of automatic transmissions for instance, convenience, easy to use transmission. But at the same time, it is necessary to draw attention to pros of manual transmission to appeal to the car lovers and people who prefer to save money on fuel.
* Product offering diversification: it is suggested that the manufacturers should keep on producing the models with both automatic and manual transmission systems because different customer and market needs should be catered to all the time.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Customer preference: let start with affecting variable automatic transmission cars have more demand for their convenience in use. This preference should be incorporated in stocking and advertising as far as customers’ demand is concerned.
* Market segmentation: the fact that there has been a high number of sales in vehicles with manual transmission implies that there is a dedicated market that prefers the feel of personally shifting gears on the road as offered by manual transmissions. This segment should not be neglected when it comes to marketing and stocking on the inventories.
* Strategic focus: apparently, car dealerships and manufacturers should keep a balance by providing models with both types of transmission. This makes them cover a lot of the customers’ tastes and whims, improving customers’ satisfaction and sales, correspondingly.
* Therefore, by examining the choice of the transmission type, businesses will understand their consumer requirements, the usage of the inventory, and create appropriate strategies for marketing in compliance with the existing market trends for sales and customers’ satisfaction.

## 2.9. Correlation between annual income and car price:

Extensive examine of relationship between annual income and price of car

**Patterns, trends, and relationships**

**Income and car price relationship:**

* Higher incomes, higher prices: for instance, customers who earn an annual income of between $8,000,001 and $11,000,000 is noted to be using cars that cost between $25000 and $85000. This may suggest that more of the financially affluent are inclined to spend higher amounts on car purchases, this due, perhaps to factors such as better disposable income and a higher tendency for the well-off to go for the brand name or better models.
* Moderate incomes, moderate prices: the amount of money which customers with moderate income spend on cars range of $14000-$42000; this is with regards to middle income earners and examples of them are customers earning between $6 million and $7 million. This indicates that the mid-income customers want to ensure that everything they want to purchase falls within their joint range of both quality and affordability.

**Implications for business strategy:**

* Targeted marketing: various marketing activities should be targeted towards different income level groups. The customers with higher income can especially be offered the advertising of luxury and high-price models with focus on unique characteristics, powers, and availability. Here, value means the quality that customers get for the price they pay, and marketing’s targeting of moderate-income customers should emphasize these factors.
* Product range diversification: the models of car that one can purchase in a car dealership should be many and these should be able to suit the low-income earners and the wealthy as well. The availability of both luxurious and cheap products may create a prospect for expanding the range of customers and covering the market demand.
* Financing options: flexible financing schemes and options means that these high-ticket models can be a reality in the hands of moderate-income earners hence a possible boost in the sales of these luxurious automobiles.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Positive correlation: analyzing the correlation between the annual income and car price, it is possible to identify a positive relationship in the case of high-income customers. This trend implies the need to target the high-end market by providing the best models.
* Market segmentation: the knowledge of the income-based segmentation of customers can prove useful to businesspeople as companies can align the types of products offered and the kind of promotion to be used in reaching out to customers. The luxury models should be marketed towards the high-income prospects while the mid-tier market should be marketed with the economically budgeted models that are dependable.
* Strategic planning: automobile sellers should incorporate variety of models of cars in their stock that are suitable for low-income earners as well as the high earners. Moreover, the availability of reasonable credit terms should be given to have more people oriented towards purchasing the improved models of cars with noteworthy characteristics, which would contribute to the overall sales and customer satisfaction levels.
* With the help of constant dependence on the connection between annual income and car price, business entities are able successfully conduct the analysis of consumer behavior, identify more effective strategies for offering products and services, create and implement effective advertising campaigns that would improve their positions in the market and increase the sale of their products.

## 2.10. Sales by car body style:

Dissection of the detail, as per the car body style

**Patterns, trends, and relationships**

**Body style preferences:**

* Versatility and space: large numbers of sales from SUV and hatchback are noticeable which reflects that customers prioritize utility and spaciousness. SUV usually comes with a bigger seating capacity and better handling of off-road areas while hatchbacks are loved for their small and manageable bodies.
* Traditional comfort: sedans have been preferred for a long time mainly because of comfort and the style they offer together with performance. They attract clients who want classic car to feel that encompasses ample cabin and a nice, supple ride.
* Niche markets: the passenger car and hardtops’ volumes are comparatively lesser, which might mean that they are models that target exclusive niche markets, possibly because of body design trends or functional requirements.

**Implications for business strategy:**

* Inventory management: car dealerships should dictate change in inventory distribution by stocking more of ‘SUVs’ and the ‘hatchbacks’ as these are more popular. There is an obligation to have as many models as possible in these popular body styles for the reason of appealing to many consumers.
* Targeted marketing: safety concerns should be disseminated as features that should be associated with the SUVs and hatchbacks including the space, versatility and modern manufactured designs. Emphasizing on comfort & performance of sedan models can help to the target those customers feel tradition in car designing.
* Product development: manufacturers can concentrate on improving aspects that are likely to make consumers to opt for SUVs and hatchbacks; for instance, better safety enhancements, efficient fuel consumption, and technology incorporation.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Dominant body styles: SUV and hatchback are the two most used cars and people still prefer the cars that have more comfort and space. Thus, it will be helpful for businesses addressing the need of the market to focus on these body styles.
* Continued appeal of sedans: sedan segment is still popular, which means that people continue to appreciate classic car shapes and comfort. The concern of making sure a variety of sedan models can address this market segment is addressed.
* Strategic focus: possible solutions for the dealerships and manufacturers may be the following: dealerships and manufacturers should focus buying and promoting more body styles that are most bought but at the same time they need to pay attention to the passenger’s cars and hardtops market segments which are not very large but exist. It is evident that the relishing of these dominant body styles can be a determinant of the sales and satisfaction of market customers.
* Therefore, by adopting the use of sales by car body style, businesses can be in a better position to strategies for the management of the automobile inventories, marketing and product planning, thereby improving sales outcomes and meeting the needs of customers.

## 2.11. Monthly sales comparison for top models:

A comparison of monthly sales statistics of the models.

**Patterns, trends, and relationships**

**Monthly sales trends:**

* Diamante: the trend is rather stable and remains at a high level throughout the period; the maximum sales in the period were twenty-one units in October 2023 and 33 units in December 2023. This shows a continuously fixed customer loyalty and maybe the bar can be set high for other seasons and successful marketing promotions during these months.
* Silhouette: has large fluctuations in sales figures: detailed, November 2023: 33 units; December 2023: 36 units.
* Prizm: illustrates a constant rise in sales, and although there is a high number of units sold in December 2023- 33, it has been observed that there is a rise in the number of cars sold at the end of the following September 2023 – 37 cars.
* Passat: good and reliable sales with occasional increases: coincidence in sales growth in November 2023 and December 2023; thirty-one units sold.

**Implications for business strategy:**

* Seasonal marketing: such fluctuation in particular months indicates that when marketing and promotional strategies for a certain product are launched at those times, sales can be greatly affected – positively in this case. Seasonal popular celebrations or the end of the year and launches of new models as a major factor that can stimulate a higher circulation of contracts.
* Inventory management: it is important to have sufficient stock to sale especially during the periods that people make more orders in order not to disappoint the consumers. Besides, accurate historical sales analysis can help to make proper forecasts of further supplies.
* Model popularity: hence, sales strategies that target these models should maximize r: diamante, silhouette, Prizm and Passat has always been in the market and has proved popular among customers. Mentioning them in the promotional tools may bring more clients.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Strong performers: these cars most of the times have high sales showing spikes in certain months; some of the models include diamante, silhouette, Prizm, and Passat. These models should be targeted most when it comes to inventory or market promotions.
* Seasonal demand: a perhaps more evident example is that the level of sales is significantly higher in the months of December, June, September and march, the last being summer holidays and the others being end of the quarters, which confirms that if more attention is paid to the marketing efforts and special offers made during the specific months, the sales figures can drastically increase. Companies should always ensure that they produce their selling strategies basing it on the seasonal nature of products.
* Strategic inventory planning: inventory planning maintaining of accurate database of monthly sale volume may help the dealerships to be fully stocked with the most demanded products thus increasing the satisfaction of the customers and the performance of the dealerships.
* The monthly sales comparison for the top models helps in critically understanding the core marketing strategies, inventory and product actualization to meet customer needs hence improving the sale of products.

## 2.12. Revenue contribution by dealer:

An evaluation on dealership participating revenue.

**Patterns, trends, and relationships**

**Dealer performance:**

* Top revenue dealers: by looking at the annual income statistics, it is evident that the top dealers earn high revenues, implying that they already have stable client niche, good marketing strategies, and may likely have efficient stock control and customer handling manners.
* Mid-tier dealers: suburban ford, for example, with the revenues of approximately $35m can be dubbed the dealers exerting still rather powerful but somewhat less potent impact on the market compared to the leaders.

**Implications for business strategy:**

* Benchmarking success: to further elaborate, it is suggested that success of first tier dealers may be applied as some kind of reference point for other dealers. Studying their activities, customer interaction, and sales approaches can offer critical factors to help boost the general dealers’ performance.
* Resource allocation: thus, anyone would think that providing more resources and support to high achievers such as dealers can increase their sales and revenues. Also, increasing focused attention and support to the mid-stream dealers can improve its capability and make a much larger positive difference to the company’s revenue.
* Marketing and sales strategies: this paper aims to show that the best practices of the successful dealers in generating more revenues can be applied at other dealers with the intention of enhancing their market positions in relation to marketing and sale strategies. These strategies include emphasizing on the satisfaction of the clients, adequate promotion of the products and services as well as efficient stocking of the products.

**Conclusion**

**Based on the analysis, several conclusions can be drawn:**

* Market leaders: thus, Rabun used car sales and progressive shipper’s cooperative association no are considered market leaders in terms of revenue. These companies’ success, thus, provides insight into the key areas of strategic sales management and consumer interaction.
* Competitive landscape: it will be seen that the multiple numbers of dealers generate high revenues, which means the market is finally competitive. The sales and revenues of other dealers can be improved because they can emulate the strategies of the most successful dealers.
* Strategic support: by investing more to these better and middle-level dealers, -pencil sales can be increased. Orientation programs and superior plans can increase the performance and visibility of the dealers.
* It enables businesses to pinpoint good performing dealers who generate large revenues or to track competitors’ market strategy as well as support strategies for poor performers, improving market performance and customer satisfaction.

# 3.Multiple Visualizations:

3.1. Sales over time:

**Insightful analysis and interpretation**

* The ‘’sales over time’’ visualization displays a line that indicates the total sales in monetary in each period. What is more, this visualization assists in the assessment of trends in sales and rapid increase or decrease in its level as well as possible connections to promotions, season, or economic situation.

**Key observations:**

* Fluctuating sales: the sales data is characterized by high and low volatility and is variance occupies all the period. The high amounts are discussed in December 2023 reaching $54m and September 2023 $51m.
* Growth trends: while analyzing the figures, there is a general tendency towards an increase in sales at the end of the specified semester.
* Low points: the least sales were reported in December 2021 and February 2022 equal to $9m each probably due to post holiday sales or market sluggishness.

3.2. Gender distribution of customers:

The gender distribution of customers of the organization is as follows:

**Insightful analysis and interpretation**

The gender distribution of customers is a bar chart that describes how many customers are in each gender printable by a business to analyze the gender of the customer. This visualization is important to analyze the gender distribution of car buying and can be used to adjust the marketing approaches.

**Key observations:**

* Male dominance: this presents alarming features of extreme masculinity in the uptake of the company’s products where there were 19,000 males as against 5,000 females. This implies that the categories with the highest need for the products and services in the dataset are dominate by males.
* Market segment opportunities: this huge gap of gender ratio indicates the possible scope to explore the market, more specifically the feminine segment.

3.3. Average annual income by gender:

This research aimed at analyzing the average annual income. To do so, we grouped employees by gender.

**Insightful analysis and interpretation**

* The “average annual income by gender” chart type is a bar chart displaying the average annual income between the male and female customers. This visualization aids in comprehending the economic position of customers regarding their gender and how this position might affect their purchasing capacity and inclinations in the automobile market.

**Key observations:**

* Higher average income for males: the results also show that male customers have more approximation of annual income $ 851000 while for female customers $ 756000. This means that there are differences in the amount of money men and women earn; it points to the aspect of gender equality in the income earned.
* Economic influence on purchasing: it therefore means that, the difference in average income means that, male and female customers will have different purchasing trends and habits when it comes to the type and pricing of cars they desire.

3.4. Dealers by number of sales:

Segmenting of the dealers based on the number of sales

**Insightful analysis and interpretation**

* The “dealers by number of sales “is a bar chart that displays the number of cars sold by each dealer. The analysis below gives some clues as to the performance of several dealers and which among them are recording higher sales.

**Key observations:**

* Top performers: the company that has sold closest to the maximum is progressive shippers cooperative association no with 1, 318 cars followed closely by Rabun used car sales, who sold 1, 313 cars.
* Consistent performers: about five dealers are high sales dealers posting sales figures above the 1,250 cars mark, thus relating to the industry with vigor and consistency; these are race car help, Ryder truck rental and leasing, Saab-belle dodge, and scrivener performance engineering.

3.5. Sales distribution by dealer region:

It also shows the percentage of sales distribution by each region of the dealer.

**Insightful analysis and interpretation**

* The last view “sales distribution by dealer region” is a bar chart that shows the sales density of car by dealers in various regions. This analysis gives information about the flows in regional markets showing superior regions with maximal sales volumes and possible further development of less significant regions.

**Key observations:**

* Top regions: once again, Austin has the highest number of cars sold, 4,140, while Janesville was at second place with 3,820 cars. These regions perform far better than others, which depict the market dominance and customer’s demand for the products.
* Consistent performers: places like Scottsdale with 3430 cars; as well as other few more places including Pasco, aurora, Middletown, and Greenville with around 3130 cars each indicated steady trends of sales, which reveals that the market in these areas is steady and dependable.

3.6. Most popular car models:

As previously mentioned, to conduct the analysis, the websites were selected based on ranking and topic relevance, which were the most popular car models.

**Insightful analysis and interpretation**

* The “most popular car models” data is described by the bar chart defining the quantity of car sold for each model. This analysis enables the determination of customers’ preferences as well as the most selling car models. Knowledge of the most frequently used models helps make adequate decisions in terms of stocks, promotions, and potential products.

**Key observations:**

* Top models: the bestselling model in the United States is diamante having sold 418 automobiles followed by silhouette with 411 and Prizm with 411 as well. These models are much better than rest models present in the dataset.
* Diverse preferences: thus, it is evident that the focus on the top models’ sales distribution is still quite balanced, and different preferences dominate among clients.

3.7. Most popular car colors:

**Insightful analysis and interpretation**

* The visualization called “most popular car colors” contains a bar chart that describes the count of cars sold in each color. This analysis is very important in establishing the customers’ perception for car looks esthetics and could inform the stocking of vehicles, promotional campaigns, and choices for consumer customizations.

**Key observations:**

* Dominant colors: the most sold car is pale white, with total sales of 11,256, followed by black sold in 7,857 numbers and red with 4,793. This entirely demonstrates a shift towards the preference of more traditional and basic colors of cars.
* Customer preferences: the much higher level of pale white can also suggest that it is preferred by customers due to its relation to conceptions of class or simply the ability to get the car ‘looking brand new’ again quickly.

3.8. Transmission type preference:

Characterizing the choice of transmission type

**Insightful analysis and interpretation**

* The “transmission type preference” contains an illustration in the form of a pie chart with the goal of identifying the manual and automatic car sales. Thus, this analysis gives a guide to the preferred transmission types of customers and helps in inventory, marketing, and product strategies.

**Key observations:**

* Preference for automatic: from the data extracted the automatic transmission cars seem to be more popular in the market with 12,571 sold as opposed to a 11,335 sold for manual transmission cars. This shows that customers prefer the ease and convenience of driving in proportion to the automatic transmits.
* Significant market for manual: while the market share of automatic transmissions for vehicles has been larger than that of manual ones suggesting an even bigger market of those who prefer the shift-lifting sense of manual transmissions, it still represents a large market.

3.9. Correlation between annual income and car price:

Extensive examine of relationship between annual income and price of car

**Insightful analysis and interpretation**

* The ‘correlation between annual income and car price’ insight visualizes the attribute customers self-reported annual income and car price; it is a scatter plot that depicts the customers’ annual income against the price of cars they buy. Thus, the objectives of this analysis are as follows: determine the ways in which income levels can affect the price of cars, with a focus on the car that is being purchased.

**Key observations:**

* Income distribution: the income per year reports can be classified as dispersed, ranging from $6,000,000 to $11,000,000. The car prices are also differ greatly ranging from $14,000 to $85,000.
* Positive correlation: it is possible to observe a general tendency (as it is seen in the graph) that indicates that the more money a person earns annually, the more he or she must pay for a car. Customers who are ranked high in the social class scale are likely to buy high-end cars as opposed to those assigned low ranks who are most likely to go for low-end cars.

3.10. Sales by car body style:

Dissection of the detail, as per the car body style

**Insightful analysis and interpretation**

* The “sales by car body style” view provides the bar chart that displays the quantity of the car sold under different car body style categories. The analysis provides knowledge of which body styles are more appealing to their customers and will be consequently useful in matters concerning stock, promotion, and prognosis of future manufacturing.

**Key observations:**

* Dominance of SUVs and hatchbacks: among them the models that are mostly in-demand are SUVs since 6,374 of such vehicles were sold and second to them are hatchbacks, the sales of which reached 6,128 units. This as a clear signal that customers favor such an income and large and versatile car types.
* Significant sales for sedans: sedan also demonstrate high level of sales, and this is proved by 4,488 quantities sold during the period under analysis, proving its sales relevant for those clients who need rather comfortable and traditionally designed car.
* Moderate demand for passenger and hardtop styles: there is also significantly lower production of passenger cars and hardtops; it sold only 3,945 and 2,971 units respectively which shows that these two types have limited market demand.

3.11. Monthly sales comparison for top models:

A comparison of monthly sales statistics of the models.

**Insightful analysis and interpretation**

* The “monthly sales comparison for top models” displays bar input that gives the sales comparison of specific car models in certain months. Thus, this analysis contributes to identifying the specifics of the car model’s popularity and sales dynamics by months and avails key customer preferences monthly as well as the possible fluctuations throughout the year.

**Key observations:**

* Consistent performers: brands such as diamante, silhouette, Prizm, Passat are known to present good sales for more than one month. Also, high sale volumes are common at this segment, reflecting the initial stage of the diamante model.
* Seasonal peaks: it can be noted that sales of several models are characterized by fluctuations in specific months: for diamante – in October and December 2023, for silhouette – in November and December 2023. These peaks indicate that there are factors that affect the number of page views, and these includes seasonal and promotional factors.

3.12. Revenue contribution by dealer:

An evaluation on dealership participating revenue.

**Insightful analysis and interpretation**

* The “revenue contribution by dealer” is the visualization that provides a clear understanding of the approach of the total revenue among the dealers. It assists in determining which of the dealers offer the highest proportion of the total sales reoccurrence to improve insights into dealer productivity and the general market.

**Key observations:**

* Top performers: there is no leader in terms of revenue generation between Rabun used car sales and progressive shipper’s cooperative association. The later has $37. 5m and $36. 8m respectively. This proves that these dealers are a notch higher than other dealers in the market, and they are probably using effective sales strategies.
* High revenue dealers: other significant dealers are U-Haul co – $35. 9m, race car help – $35. 3m, and Saab-belle dodge – $35. 3m, which also play an important role in creating the overall picture of dealers’ activity and presenting it as a rather competitive field with many dealers who possess high sales figures.

# 4.Dashboards

## 4.1Sales overview:

A screenshot of a graph

Description automatically generated

**Fig:3.1**

## 4.2. Customer demographics :

A screenshot of a computer

Description automatically generated

**Fig:3.2**

## 4.3. Dealer performance :

A screenshot of a graph

Description automatically generated

**Fig:3.3**

## 4.4. Car analysis:

A screenshot of a graph

Description automatically generated

**Fig:3.4**

# 5.Business implications:

**Resource allocation and investment:**

* High-performance dealers: devote more time to better performers as such dealers as Rabun used car sales and progressive shippers’ cooperative association no, through provisions of more stocks, improved promotion and support to the dealership’s facilities. The idea is to build on their demonstrated capacity of raking in lots of revenues and increase this sales potential.
* Mid-tier dealers: thus, supporting even the most profitable yet not part of the top dealers like U-Haul co and Saab-belle dodge and ensuring they receive specific assistance with sales training, marketing help, organizational changes, and so on, can increase their performance. Technological solutions and customer relationship management of systems may be of value as well.

**Strategic marketing initiatives:**

* Top dealers: incorporate marketing strategies that inform the consumers of the success of the top dealers in the market. These dealers can use case studies, patients’ testimonials, and experiences of other customers in promotional literature.
* Cross-promotion: the high performing and middle level dealers should be persuaded to enter joint promotion activities. For example, where a dealer has performed, s/he can teach the strategies to a mid-tier dealer, and these can be sold to the customers as an added value.

**Data-driven inventory management:**

* Dynamic inventory allocation: it is very much necessary to adjust inventory level based on dealer sales rates and demand for a certain product in a specific region. The dealers with high revenue should get privileged access to the most sellable and high-profit-margin automobile models to meet the client’s needs effectively and boost their profits.
* Predictive analytics: one suggestion is to apply the system to predict demand patterns of the products to order for them to be restocked. This will assist in avoiding replenishment or overstock instances, which in return leads to enhanced inventory expenses and satisfied clients.

**Customer experience enhancement:**

* Personalized services: the latter adds that top-performing dealers might increase customer satisfaction through complementary services according to customer profile and buying habits. In general, one can always get better tools and this will help in presenting locally relevant offers and helping customers to remain loyal.
* Feedback mechanism: develop a good channel for feedback from the customers to ensure that service delivery is improved on. Real-time feedback can be quite beneficial in resolving complaints and improving the customers’ satisfaction.

**Competitive benchmarking:**

* Best practices sharing there should be meetings where the expert dealers should be permitted to demonstrate to the other dealers how they do it. This can contain such things as effective sales practices, ways of interacting with consumers as well as activity optimization.
* Performance incentives: with the help of performance-based incentives, dealerships could be stimulated to aspire to the best practices and achieve the desired sales results. This could be in the form of a bonus, token of appreciation, and training and development.

**Technology and innovation:**

* Digital transformation: embrace innovation in sales and marketing strategies and continue automating your business by investing in online marketplace, virtual model house and digital marketing strategies. The mentioned technologies, in turn, will assist the dealers in expanding their reach to a larger audience together with the sales conversion rates.
* Ai and machine learning: big data tools like artificial intelligence and machine learning can be used for analyzing customer data, forecasting the customers’ buying behavior, and targeting them accordingly. This can result into better strategies of selling and increased satisfaction among the customers.
* Thus, by considering such actual-time business consequences, companies from the automotive trade can improve their general gross sales share, optimize the actions of dealerships, and provide their shoppers with a greater experience. The above strategies will assist in keeping competitive advantage in the market and achieving sustainable growth.

# 6.Conclusion:

* The given focus on car sales data reveals the significant benefits for understanding different aspects of the car market, such as sales, customer characteristics, dealer outcomes, and clients’ preferences. Considering the trends and patterns highlighted by the BARSs and other visualizations, the following conclusions might be derived, along with related business recommendations.
* Sales Trends Over Time: The results indicate a very high and rather widespread seasonal variation with December and September as the most popular sales months and with some promotional effectiveness. Companies need to strategies their product launches and merchandising programs and stock their outlets with products that can sell most during this time.
* Customer Demographics: The gender distribution analysis reveals so much dominance of the male gender in the customer scores. However, a large proportion of them involves customers who are ladies, and this call for marketing strategies that would be used to capture Amore of the female consumers in society. However, simple mean estimations also confirm that more affluent customers buy more luxurious cars and thus, the opportunities of developing different segments of products should be provided.
* Dealer Performance: The revenue contribution analysis reveals other dealers as Rabun Used Car Sales and Progressive Shippers Cooperative Association No, which serves as a standard of excellence in sales and customers’ relationship. It is also important to provide mid-tier dealers with special coaching and materials because optimizing their activity will play an important role in the increase of revenues.
* Car Preferences: Thus, the customer has shown a pre-disposition towards SUVs and Hatchbacks mainly due to the accessible and flexible drive-space. Sedans are also steady; it is seen that they are demanded significantly as they ensure a bureaucratic look and feel to the vehicle. It is also important to note that there are preferences that consumers associate to different cars and to have this variety of models is important so that the demand is met and thus boost the sale of cars.
* Transmission Type Preferences: The slightly higher number of orders for automatic transmission instead of the manual one hints to the make sure that stock is as diverse as possible to meet the demand of both kinds of car transmission. Marketing strategies should therefore focus on the need to persuade a wider client base to use the different transmission types.
* Real-Time Business Implications: By using these insights, the strategies aimed to be worked on can boost the performance of a business greatly. This involves financing the dealers who perform well, differentiating products for clients in various categories, and stock distribution based on coming demand.
* From those considerations, automotive businesses can obtain vital information aiming at the reconsideration of sales strategies, dealing with dealer functions, and increasing customer satisfaction rates. The strategies such as being loyal to the targeted market, allocating resources by aiming at producing specific products, and diversification should be implemented as a basis of achieving competitive advantage and long-term growth.

# 7.References:

[**https://www.kaggle.com/datasets/missionjee/car-sales-report**](https://www.kaggle.com/datasets/missionjee/car-sales-report)