2024

BUDGET SALES ANALYSIS

Project Report

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1. Problem Statement :-

Our "**Domain Sale**" process is structured to help potential buyers purchase the domain they want immediately without the hassle of contacting the seller directly.

A seller lists a domain for sale at a specific price in our Marketplace. An interested buyer sees this domain for sale and decides to buy it.

2. Objective :-

- The collection includes records for sales orders, customer information, product information, and geographical data.
- In order to deduce important metrics and patterns in the dataset, this project will use the provided data to perform ETL and data analysis.
- Additionally, several visualizations and reports are created to represent significant linkages.

3. Benefits :-

- Help in making wiser business decisions.
- Aid in customer satisfaction and trend monitoring, which can serve current consumers and attract new ones.
- Greater client base understanding is provided.
- Facilitates seamless resource management flow.

4. Data Attributes

Customer

CustomerKey	FullName	Birthdate
Maritalstatus	Gender	YearlyIncome
TotalChildren	NumberChildrenAtHome	Education
Occupation	HouseOwnerFlag	NumberCarsOwned
DateFirstPurchase	CommuteDistance	

Product

ProductKey	ProductName	Subcategory
Category	ListPrice	DaysToManufacture
ProductLine	ModelName	ProductDescription
StartDate		

Territory

SalesTerritoryKey	Region	Country
Group		

Sales

ProductKey	OrderDate	ShipDate
CustomerKey	PromotionKey	SalesTerritoryKey
SalesOrderNumber	SalesOrderLineNumber	OrderQuantity
UnitPrice	TotalProductCost	SalesAmount
TaxAmt		

4.1 Dataset Information :-

- **CustomerKey:** Primary key for customer dataset
- **Birthdate:** Birthdate of the customer
- **MaritalStatus:** M- Married / S - Single
- **Gender:** M – Male / F – Female
- **TotalChildren:** Total number of children
- **NumberChildrenAtHome:** Number of children staying along with their parents
- **Education:** Education qualification
- **Occupation:** Present occupation
- **HouseOwnerFlag:** 1– Owns house / 0- Doesn’t have a permanent address
- **NumberCarsOwned:** Number of cars owned by the customer
- **DateFirstPurchase:** First date of order by the customer
- **ProductKey:** Primary Key for the product dataset
- **ProductName:** Product name with color of the product
- **Subcategory:** Sub category name of the product
- **Category:** Category name of the product
- **ListPrice:** Sale price of the product
- **DaysToManufacture:** Days to manufacture the product after receiving the order
- **ProductLine:** Product line name
- **ModelName:** Model name of the product
- **ProductDescription:** more details about the product
- **SalesTerritoryKey:** Primary Key of the Territory dataset
- **Region:** Region name of the order
- **Country:** Country name of the order

- **OrderDate:** Date of the order received
- **ShipDate:** Date when the order left the factory for export
- **SalesOrderNumber:** Invoice number of the order
- **OrderQuantity:** Number of quantities ordered for a product
- **UnitPrice:** Per unit sale price of the product
- **TotalProductCost:** Cost of the product
- **SalesAmount:** Total sales price of the product
- **TaxAmt:** Tax collected for the product sold

5. Architecture :-

1. **Collect Raw Data -** This step involves extracting the data from different sources relevant to the problem statement or obtaining data from the client.

2. **Importing Libraries -** Import analysis related python libraries. example – Pandas, Numpy, Plotly, datetime etc.

3. **Data Wrangling -** Contains following steps gathering data, assessing data, handling missing data and adding columns**.**

4. **Exploring Data -** Once the data is loaded and preprocessed, I perform data analysis using python libraries and Business Intelligence tools like Power BI.

5. **Data Modelling -** Data Modelling is one of the features used to connect multiple data sources in BI tool using a relationship.
   A relationship defines how data sources are connected with each other and you can create interesting data visualizations on multiple data sources.

6. **Deployment -** The prepared visualizations are deployed on the powerbi.microsoft.com site. Where they will be available publicly.

6. Insights:-

1. Product Price per unit Distribution

★ According to the distribution plot we can conclude that the maximum of the product unit price is below $1000.

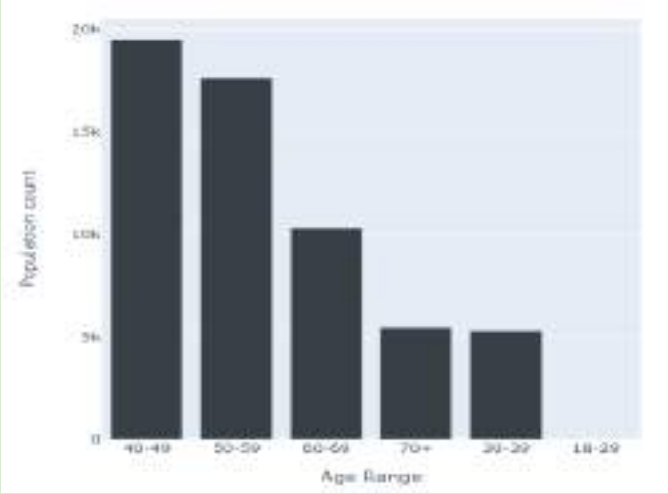
2. Sales order line number distribution

★ Most of the time three to two products are ordered in a single order

3. Sales order quantity distribution

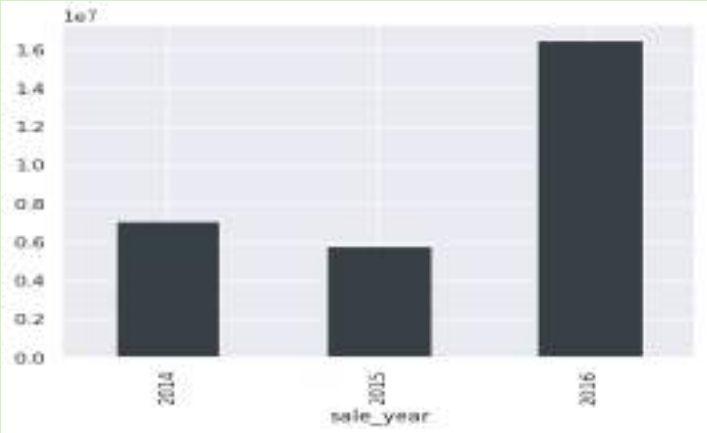
★ Maximum quantity ordered for a product is below 5.

4. Age distribution



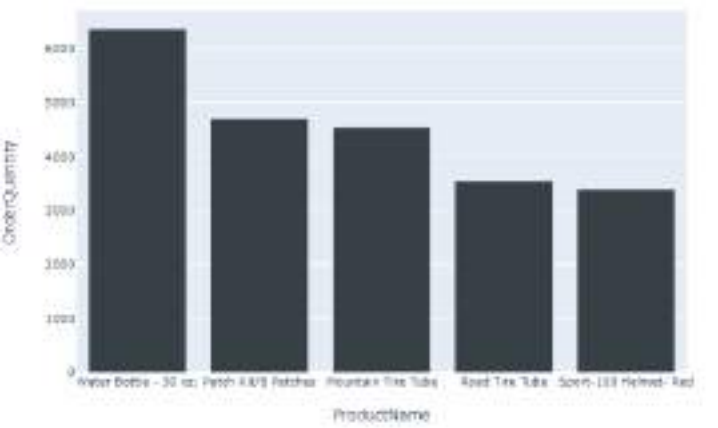
★ A sizable portion of the clientele is made up of people between the ages of 40 and 59.

5. Year wise sales



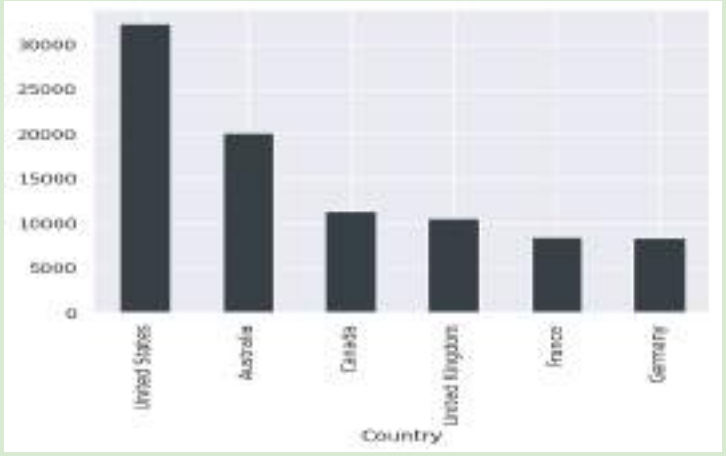
★ The year 2016 saw an exponential surge in sales.

6. Top 5 selling products



Category	SubCategory	ProductName	OrderQuantity
Accessories	Bottles and Cages	Water Bottle - 30 oz.	6370
	Tires and Tubes	Patch Kit/8 Patches	4705
		Mountain Tire Tube	4551
		Road Tire Tube	3544
	Helmets	Sport-100 Helmet- Red	3398

7. Country wise quantity ordered



★ High quantities of products are ordered from **Australia and the United States.**

8. Quantity ordered based on category and subcategory from 2014 to 2016

sale_year	Category	SubCategory	OrderQuantity
2014	Bikes	Mountain Bikes	616
		Road Bikes	2876
2015	Bikes	Mountain Bikes	1661
		Road Bikes	3284
	Accessories	Bike Racks	493
		Bike Stands	394
		Bottles and Cages	12055
		Cleaners	1381
		Fenders	3239
		Helmets	9685
		Hydration Packs	1124
		Tires and Tubes	25518
2016	Bikes	Mountain Bikes	5490
		Road Bikes	6535
		Touring Bikes	3410
	Clothing	Caps	3178
		Gloves	2143
		Jerseys	5068
		Shorts	1491
		Socks	856
		Vests	824

9. Overall profit based on order year, category and subcategory

sale_year	Category	SubCategory	profit
2014	Bikes	Mountain Bikes	586874.557600
		Road Bikes	2256280.998300
2015	Bikes	Mountain Bikes	1019388.334900
		Road Bikes	1375064.915000
	Accessories	Bike Racks	23136.960000
		Bike Stands	23689.092000
		Bottles and Cages	34448.978300
		Cleaners	4299.868800
		Fenders	27711.633000
		Helmets	135167.732700
		Hydration Packs	24303.132200
		Tires and Tubes	144793.083200
2016	Bikes	Mountain Bikes	2907361.198000
		Road Bikes	1905953.736400
		Touring Bikes	1454872.695900
	Clothing	Caps	4331.831500
		Gloves	20895.744100
		Jerseys	37965.228300
		Shorts	41973.524600
		Socks	3055.841100
		Vests	20948.777000

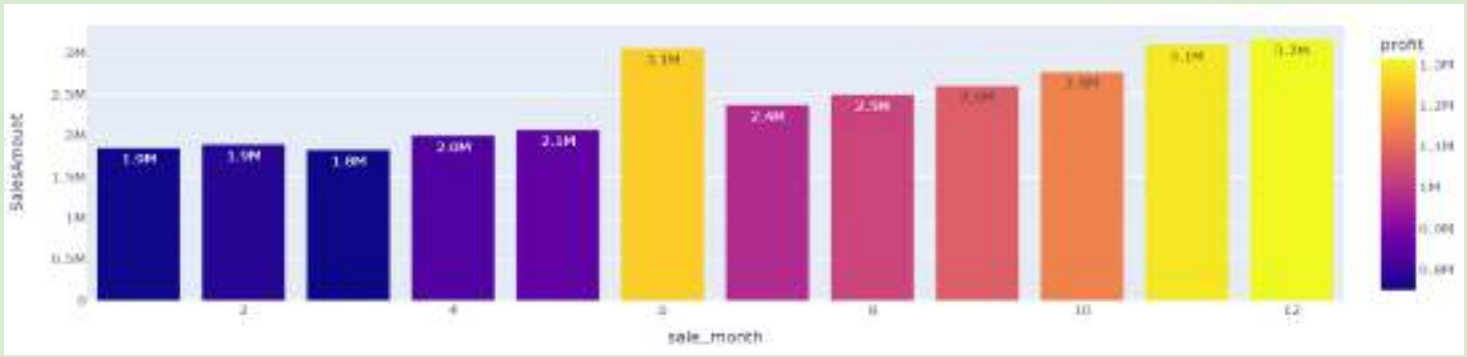
★ Major Profit is contributed by the Bike Category

10. How efficient are the logistics?

★ The average order has a gap of 7 days between the day the order is ready for export from the factory and the date it was shipped.

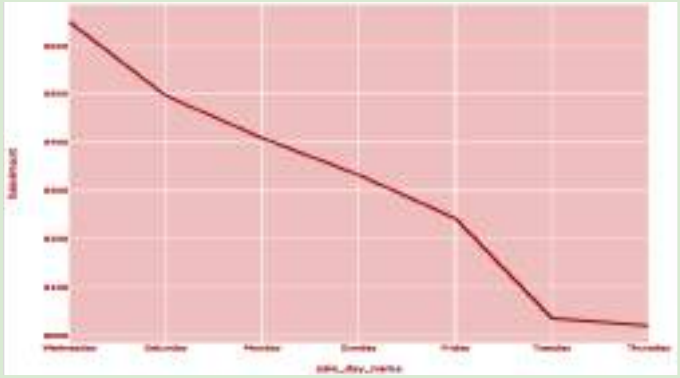
★ Management must work to reduce this gap toward 3 days.

11. What was the best month for sales? How much was earned that month?



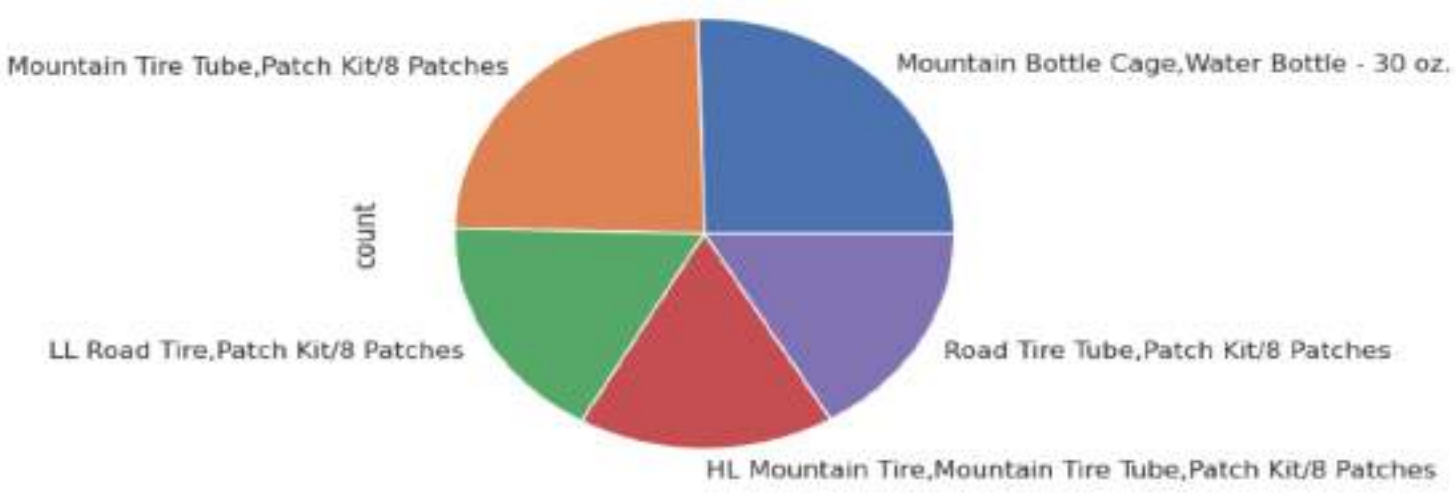
★ Maximum profit earned in the months of **June, November, and December.**

12. What time should we display advertisements to maximize the likelihood of customers buying a product?



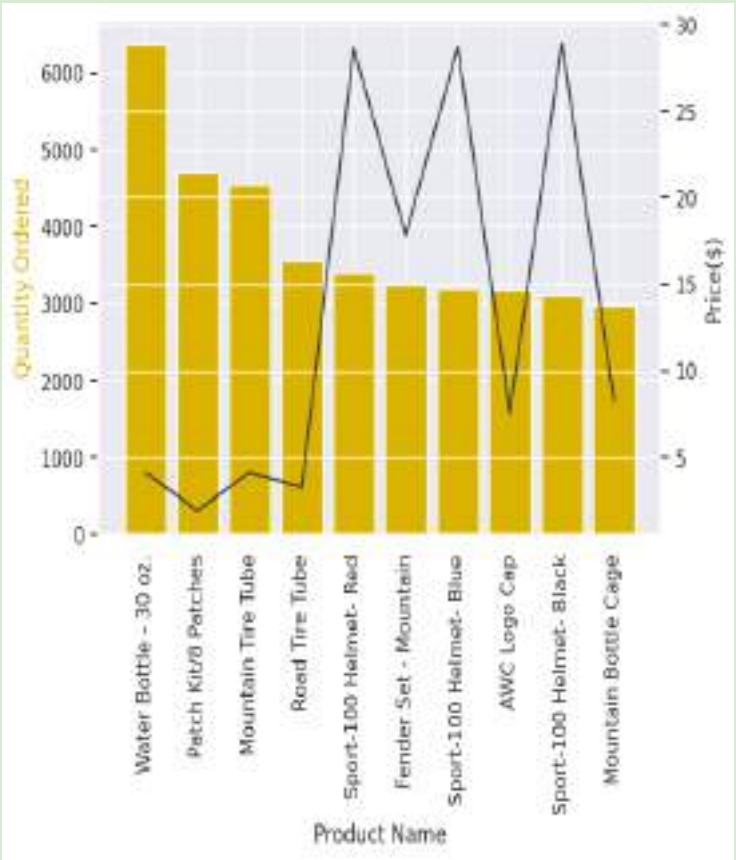
★ High sales orders are seen on **Wednesday and Saturday**; therefore, we can promote our product during these workweek.

13. Which products are most often sold together?



★ The above product can be sold in a bundle or a combined package for a discount.

14. Which product sold the most? Why do you think it sold the most?



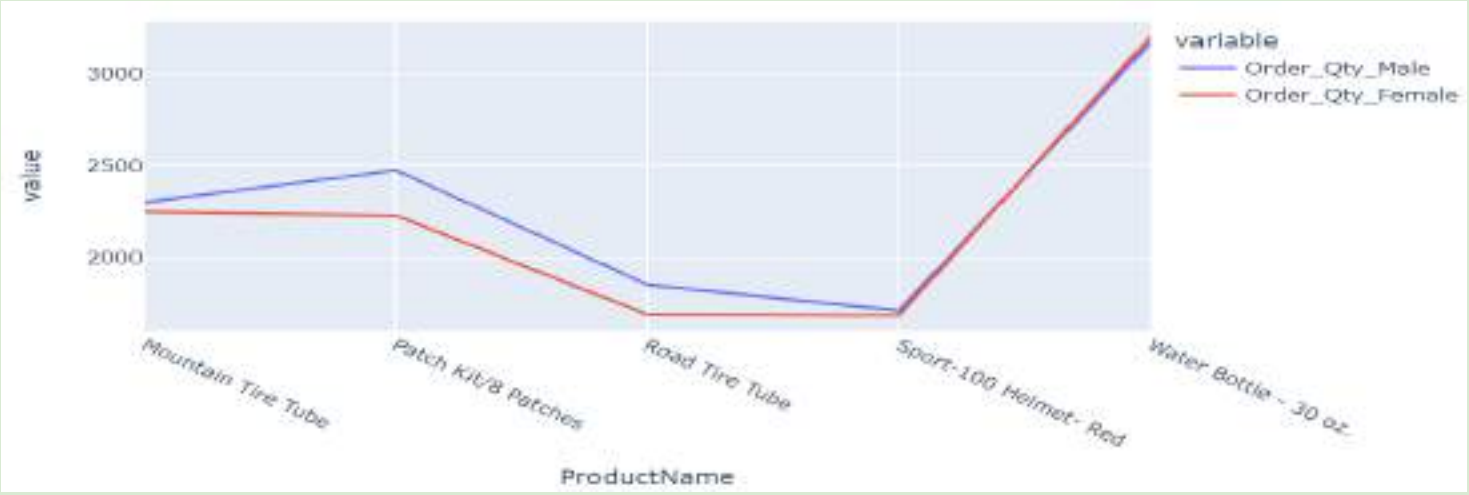

```
prices.corr(quantity_ordered)
```

```
-0.5333019792658484
```

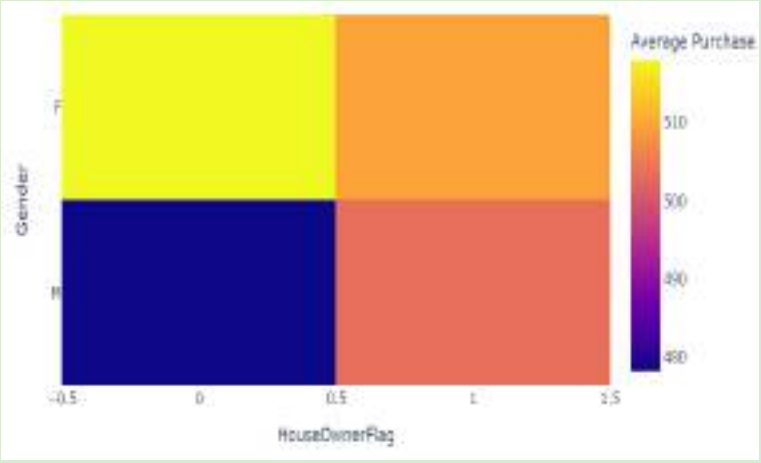
★ There is a high negative correlation between Price and number of Quantity orders.

★ We can conclude that low price products has high demand.

15. Compare most ordered product by gender

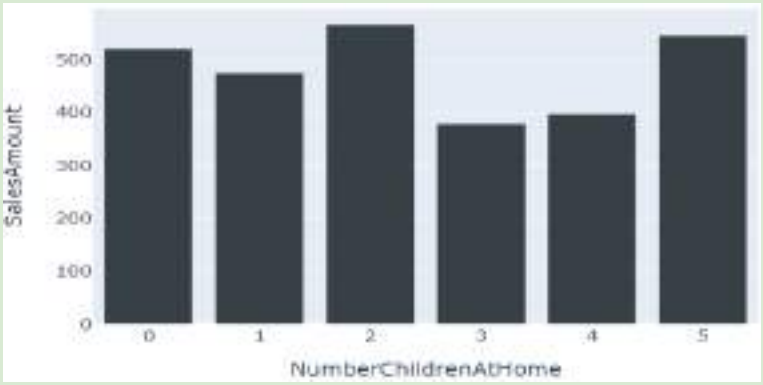


16. Does Gender and home ownership matter in order purchasing



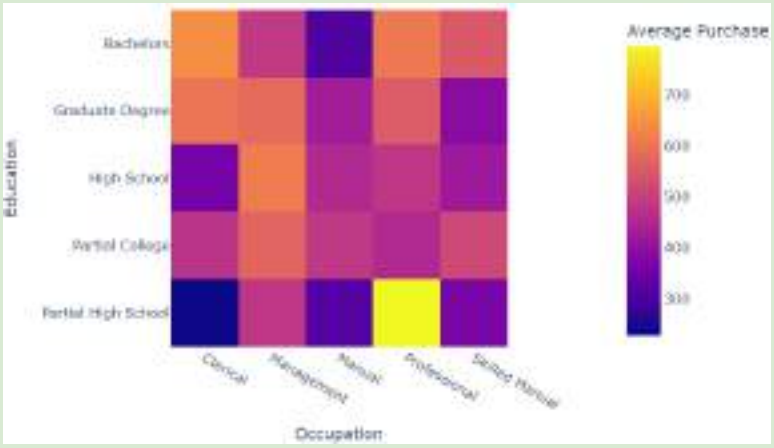
★ It's interesting to note that the average amount spent by men without permanent addresses is low, whilst the average amount spent by women without permanent addresses is higher.

17. Number of children and Purchase correlation



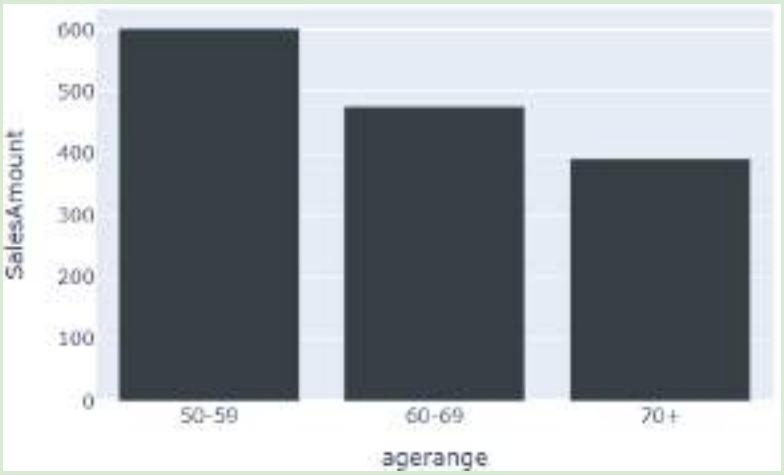
★ Purchases among customers with the number of children, 2 and 5, are high.

18. Occupation and purchase correlation



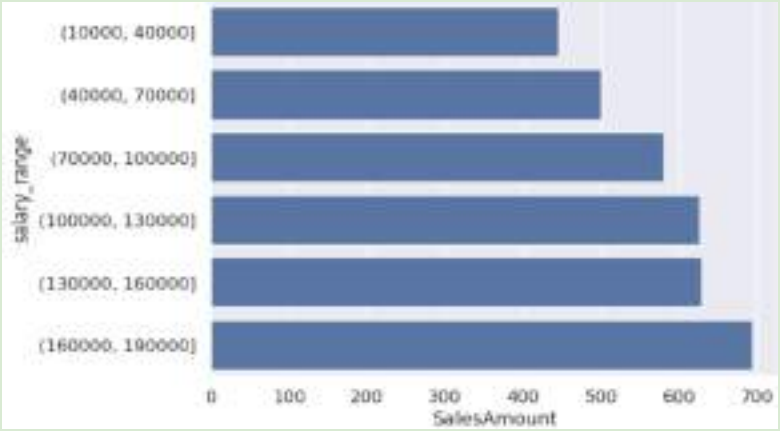
★ Purchases by Professional and Management customers are comparatively high.

19. Which age group has produced the most revenue?



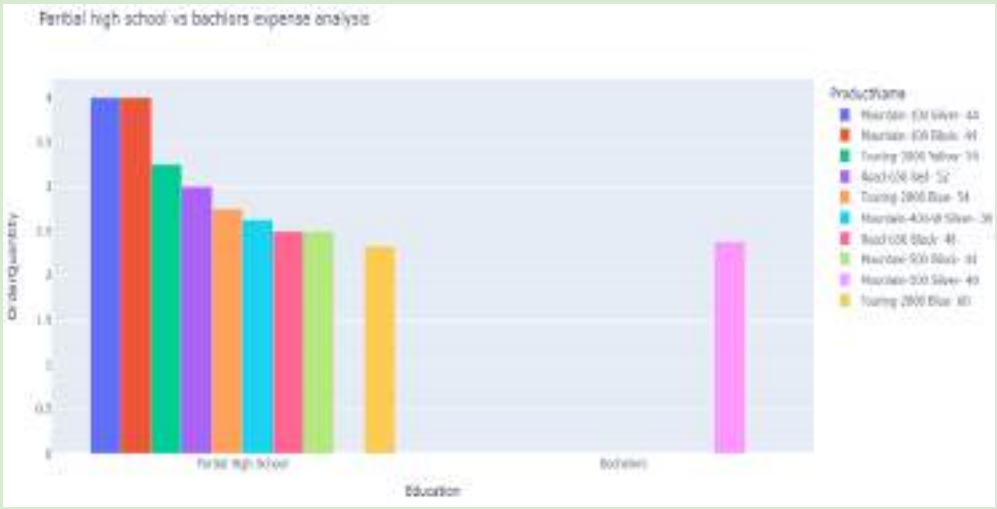
★ Age range of 40-49 and 50- 59 is shows high demand compared to other age groups.

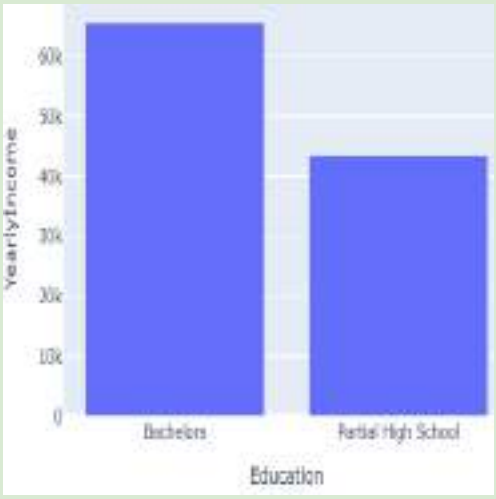
20. Yearly income range and purchase correlation



★ High salary range leads to an increase in revenue.

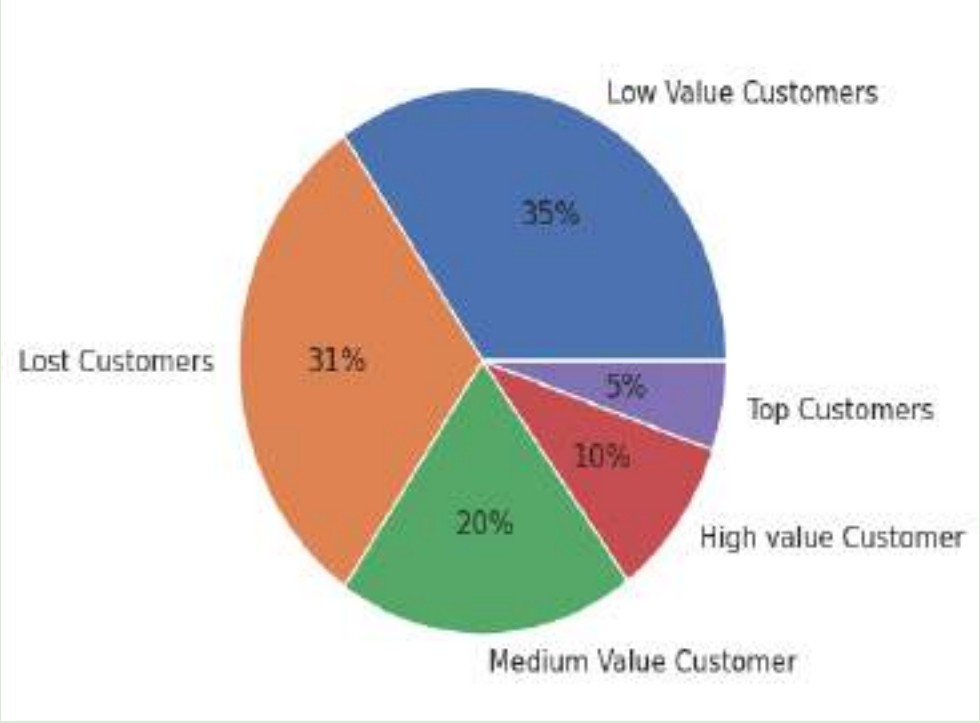
21. Partial high school vs bachelors income mean and most ordered Product





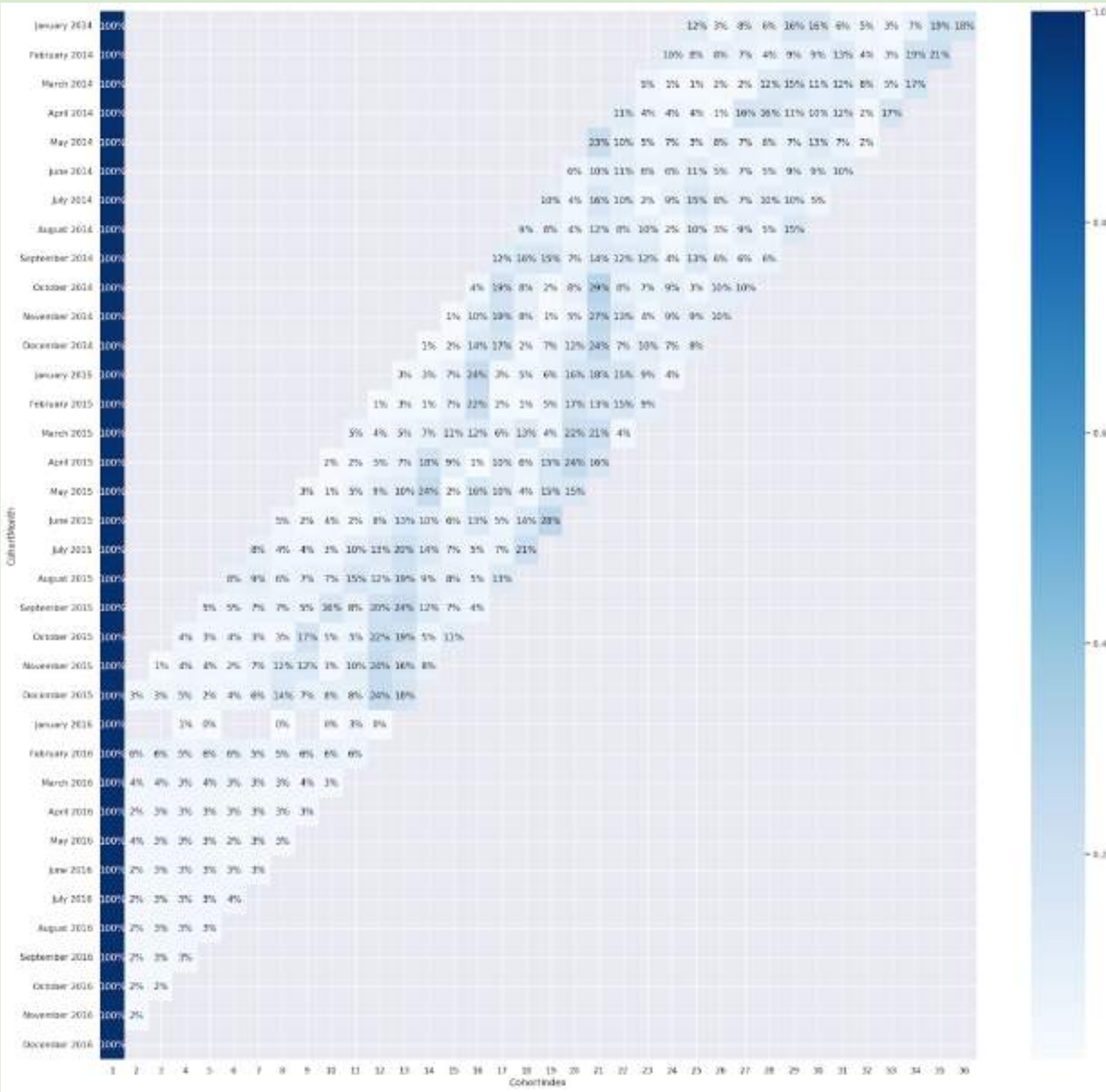
★ Customers with a high school diploma and modest annual income buy more products than people with bachelor's degrees.

22. Customer segmentation



- According to the customer segmentation described above, approximately **15% of our clients are high value clients**, whereas the **majority of our clientele are low value and lost clients.**

23. Cohort Analysis

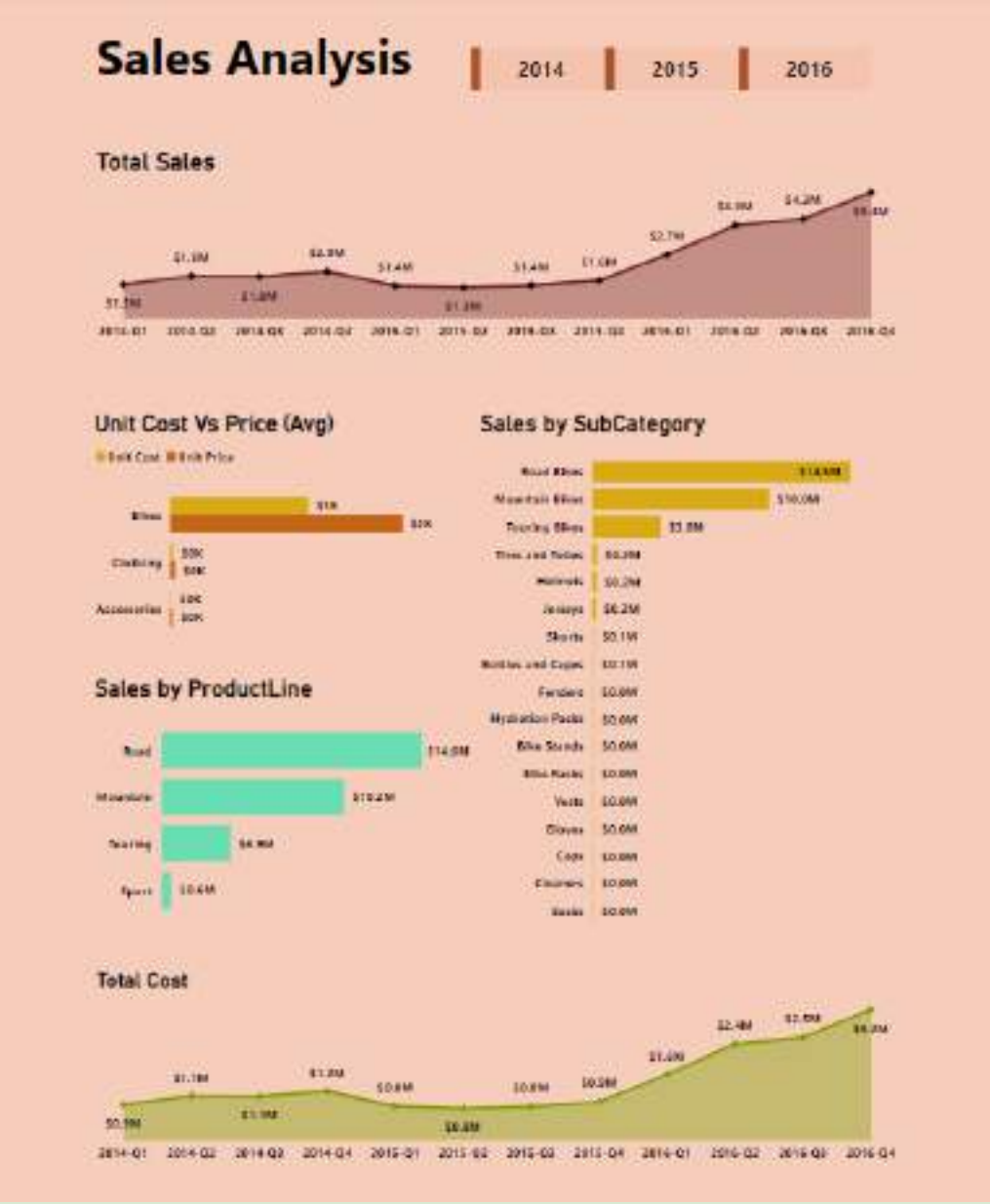


★ We can infer from the heatmap above that client retention in 2014 was subpar.
★ Since August of 2015, we have noticed some customers returning, though not in large numbers.
★ 2016 brought about a slight improvement in retention.

7. Report Documentation :-

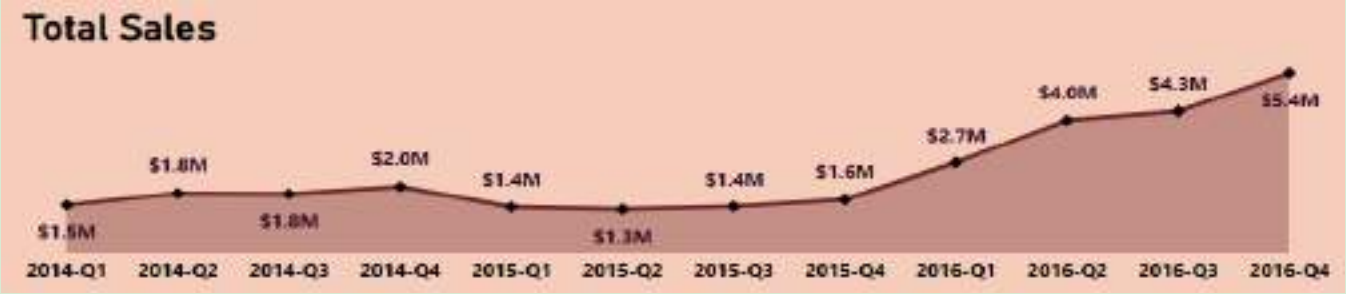
As per the problem statement, we have divided analysis into four sections: -

1. Sales Analysis



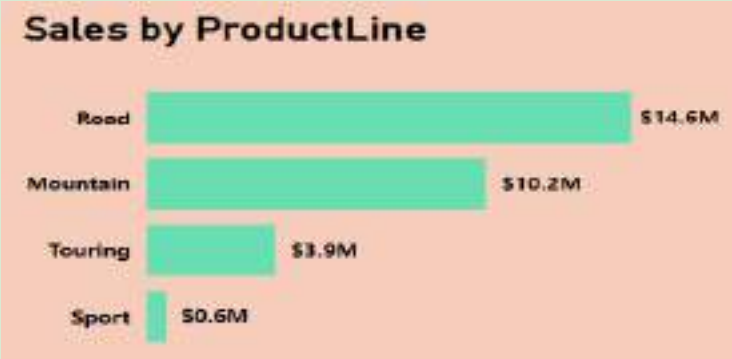
In this section we designed our first dashboard and tried to interpret the followings: -

★ Sales trend over the year



★ Comparison of Average cost and Average Price by Product category.

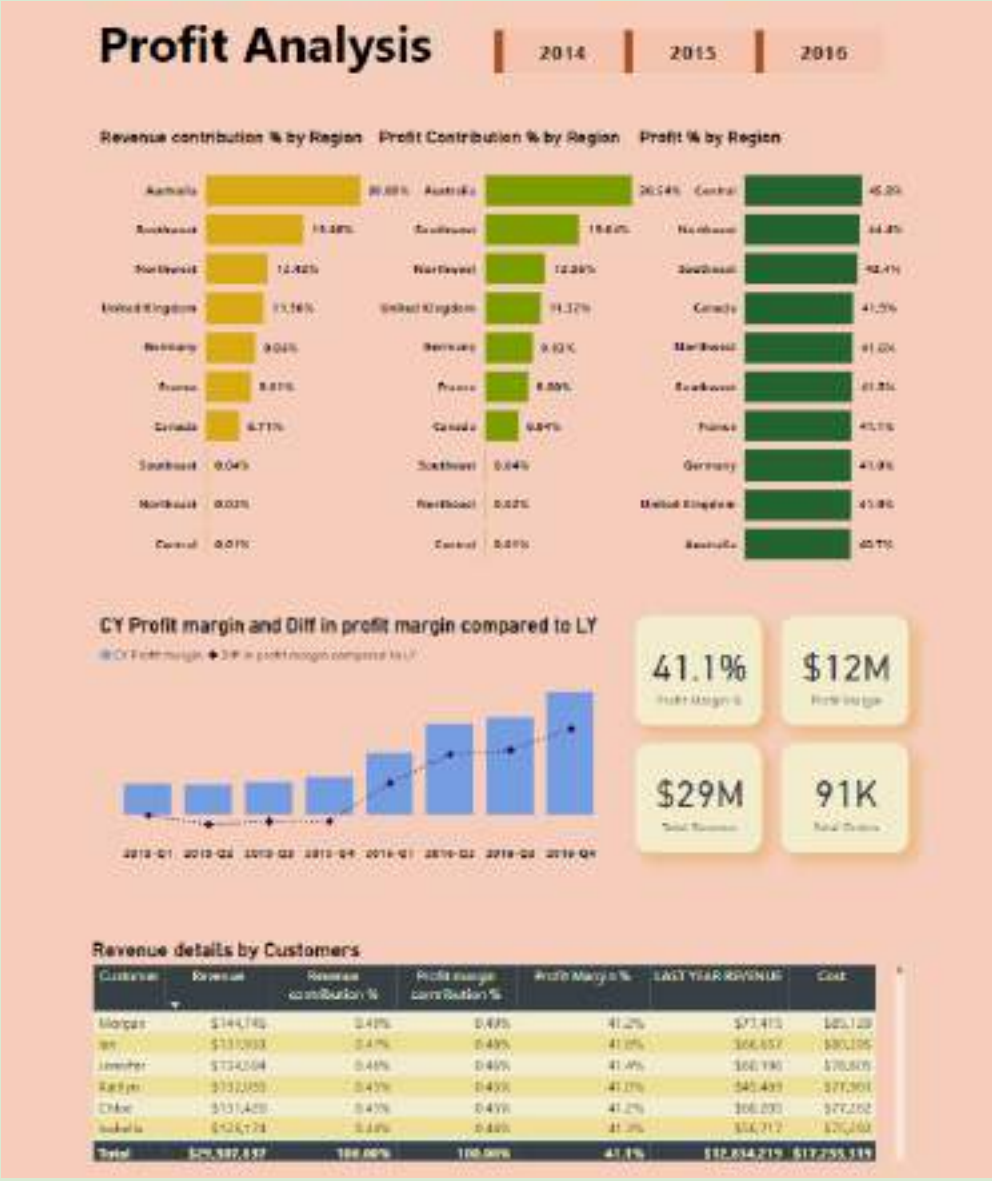
★ Revenue generated by Product line.

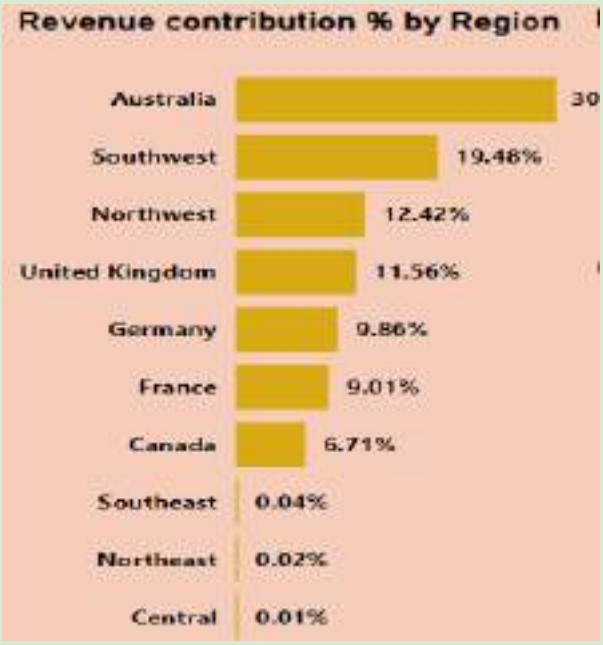


★ Product cost over the year

★ Turnover Generated by Product Subcategory.

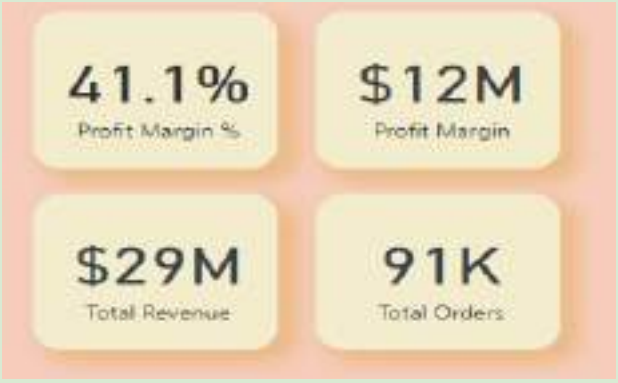
2. Profit Analysis



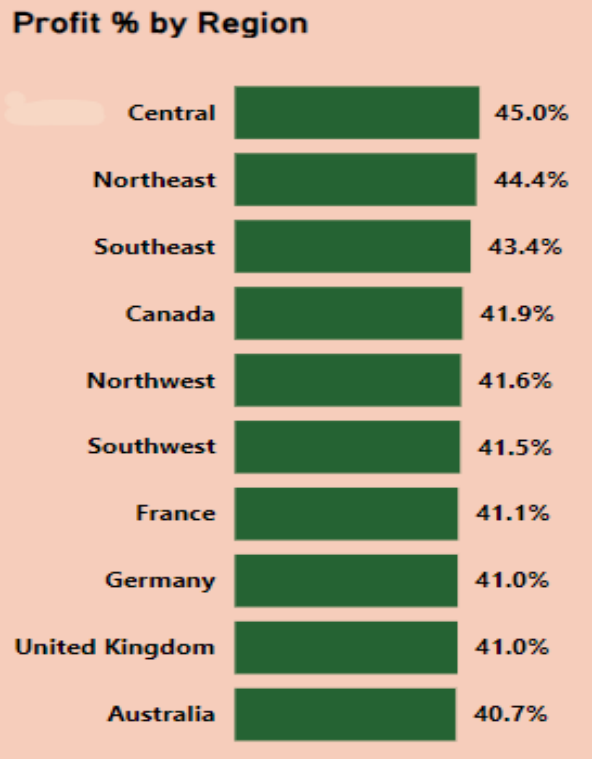


★ Stacked bar chart of revenue contributed by region in percentage.

★ Stacked bar chart of profit contribution by region in percentage.



★ Key performance indicators.



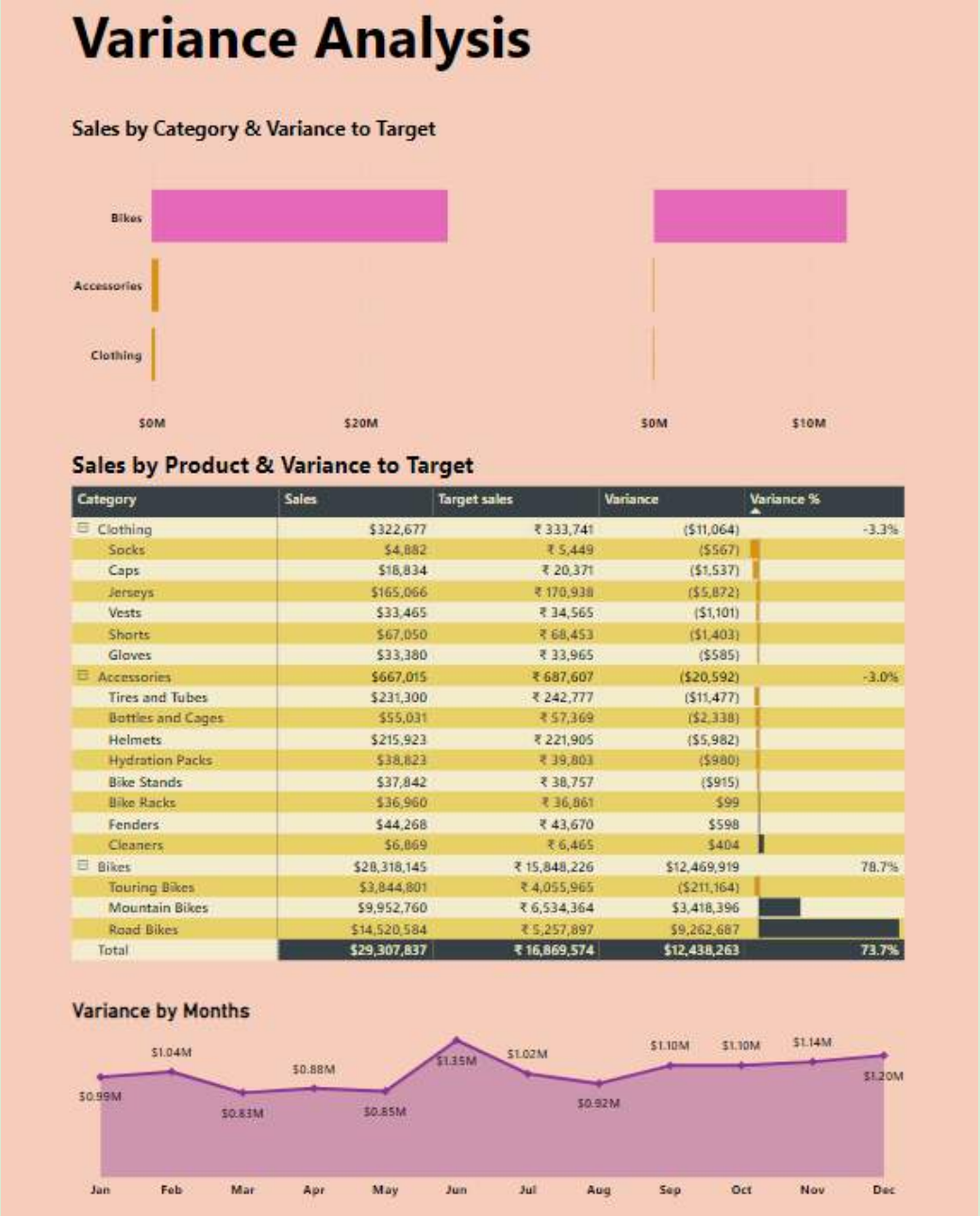
★ Stacked bar chart of profit by region in percentage.

★ Comparison between current year profit margin and last year profit margin.

★ Revenue details by customer

Customer	Revenue	Revenue contribution %	Profit margin contribution %	Profit Margin %	LAST YEAR REVENUE	Cost
Morgan	$144,745	0.49%	0.49%	41.2%	$77,415	$85,129
Ian	$137,933	0.47%	0.48%	41.8%	$66,657	$80,295
Jennifer	$134,594	0.46%	0.46%	41.4%	$60,196	$78,805
Kaitlyn	$132,035	0.45%	0.45%	41.0%	$45,469	$77,961
Chloe	$131,420	0.45%	0.45%	41.2%	$60,205	$77,262
Isabella	$128,174	0.44%	0.44%	41.3%	$56,717	$75,292
Total	**$29,307,837**	**100.00%**	**100.00%**	**41.1%**	**$12,834,219**	**$17,255,319**

3. Variance Analysis



Category	Sales	Target sales	Variance	Variance %
Clothing	$322,677	₹ 333,741	($11,064)	-3.3%
Socks	$4,882	₹ 5,449	($567)	
Caps	$18,834	₹ 20,371	($1,537)	
Jerseys	$165,066	₹ 170,938	($5,872)	
Vests	$33,465	₹ 34,565	($1,101)	
Shorts	$67,050	₹ 68,453	($1,403)	
Gloves	$33,380	₹ 33,965	($585)	
Accessories	$667,015	₹ 687,607	($20,592)	-3.0%
Tires and Tubes	$231,300	₹ 242,777	($11,477)	
Bottles and Cages	$55,031	₹ 57,369	($2,338)	
Helmets	$215,923	₹ 221,905	($5,982)	
Hydration Packs	$38,823	₹ 39,803	($980)	
Bike Stands	$37,842	₹ 38,757	($915)	
Bike Racks	$36,960	₹ 36,861	$99	
Fenders	$44,268	₹ 43,670	$598	
Cleaners	$6,869	₹ 6,465	$404	
Bikes	$28,318,145	₹ 15,848,226	$12,469,919	78.7%
Touring Bikes	$3,844,801	₹ 4,055,965	($211,164)	
Mountain Bikes	$9,952,760	₹ 6,534,364	$3,418,396	
Road Bikes	$14,520,584	₹ 5,257,897	$9,262,687	
Total	$29,307,837	₹ 16,869,574	$12,438,263	73.7%

★ Comparing actual sales with Variance in budgeted sales.

★ Matrix Table for comparing sales with target category wise.

Category	Sales	Target sales	Variance	Variance %
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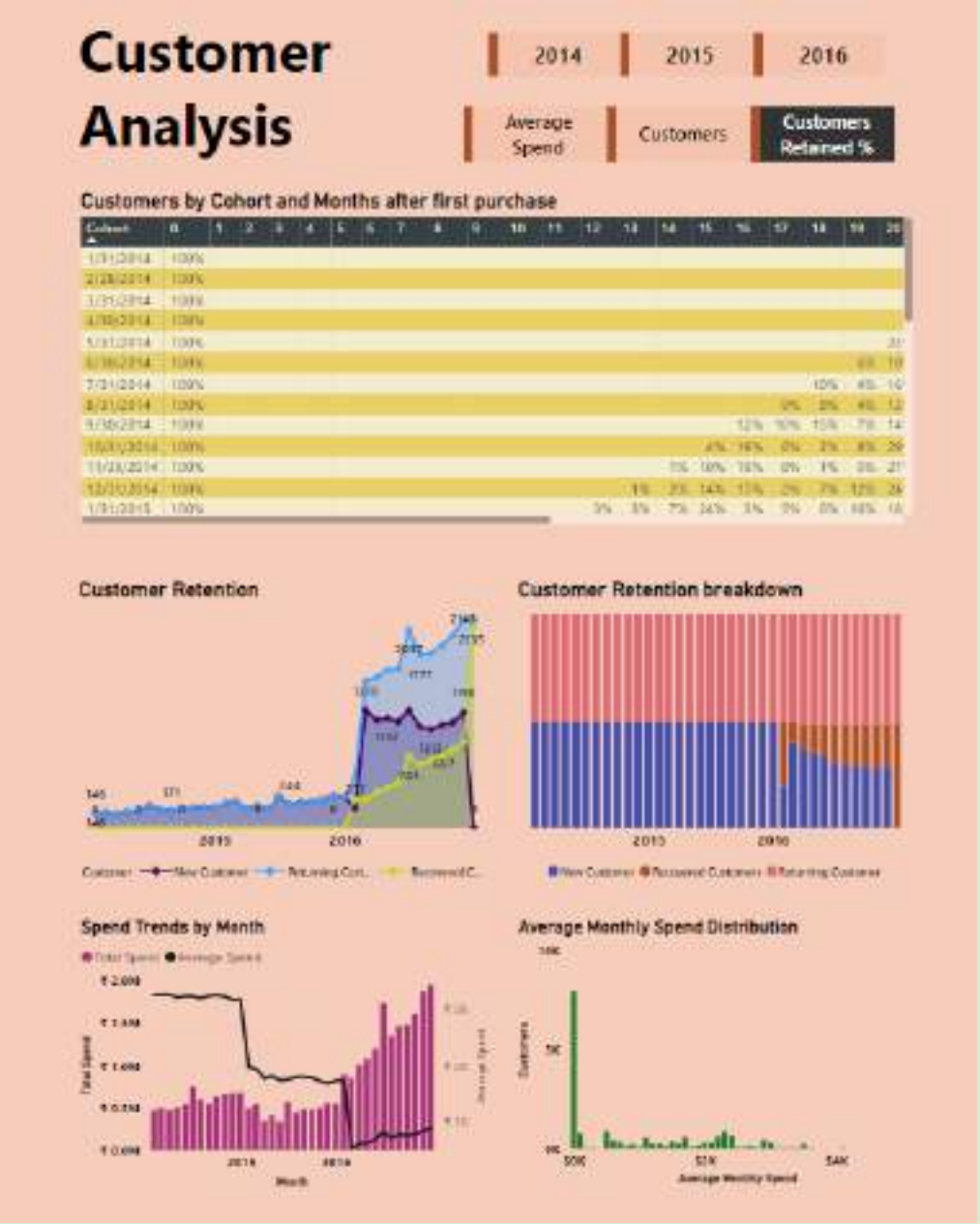
Total	$29,307,837	₹ 16,869,574	$12,438,263	73.7%

★ Line chart showing monthly variance in 2016.

4. Customer Analysis



★ Cohort Analysis matrix

Cohort	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1/31/2014	100%																				
2/28/2014	100%																				
3/31/2014	100%																				
4/30/2014	100%																				
5/31/2014	100%																				23
6/30/2014	100%																			6%	18
7/31/2014	100%																		10%	4%	16
8/31/2014	100%																	9%	8%	4%	12
9/30/2014	100%																12%	16%	15%	7%	14
10/31/2014	100%															4%	19%	8%	2%	8%	29
11/30/2014	100%														1%	10%	19%	8%	1%	5%	27
12/31/2014	100%													1%	2%	14%	17%	2%	7%	12%	24
1/31/2015	100%												3%	3%	7%	24%	3%	5%	6%	16%	18

★ Slicer with option to view average customer spending, customer retention in absolute value and customer retention in percentage.

★ Line chart to check Cohort yearly trend.

★ Stacked column chart to show Yearly customer breakdown.

★ Line and stacked column chart to check trend in total spending and customer average spending.

★ Histogram to show Average customer spending.

7. Key Performance Indicator :-

- Sales trend line
- Cost trend line
- Average unit cost and price
- Revenue generated by Subcategory
- Sales by Product Line
- Revenue contribution by region
- Profit contribution by region
- Profit % by region
- Current year profit margin vs difference in last year’s profit margin
- Total orders
- Total revenue
- Variance to target comparison by category
- Variance by month line chart
- Actual sales and target sales matrix
- Cohort analysis table
- Customer retention line chart
- Monthly spending trend
- Average monthly spend distribution

8. Conclusion :-

- A sizable portion of the clientele is made up of people between the ages of 40 and 59.
- The year 2016 saw an exponential surge in sales.
- High quantities of products are ordered from Australia and the United States.
- Major Profit is contributed by the Bike Category.
- The average order has a gap of 7 days between the day the order is ready for export from the factory and the date it was shipped.
- Maximum profit earned in the months of June, November, and December.
- High sales orders are seen on Wednesday and Saturday, when compared to other weekdays.
- There is a high negative correlation between Price and number of Quantity orders.
- The average amount spent by men without permanent addresses is low, whilst the average amount spent by women without permanent addresses is higher.
- Age range of 40-49 and 50-59 shows high demand compared to other age groups.
- High salary range leads to an increase in revenue.
- Customers with a high school diploma and modest annual income buy more products than people with bachelor's degrees.
- According to the customer segmentation described above, approximately 15% of our clients are high value clients, whereas the majority of our clientele are low value and lost clients .
- Client retention in 2014 was subpar.
- 2016 brought about a slight improvement in retention.

9. Q & A :-

Q1) What's the source of data?

➢ The Dataset was taken from the GitHub Public Data.

➢ Data Link

Q2) What was the type of data?

➢ The data was the combination of numerical and Categorical values.

Q 3) What's the complete flow you followed in this Project?

➢ Refer page 4 for better understanding.

Q4) What techniques were you using for data?

➢ Removing unwanted attributes.

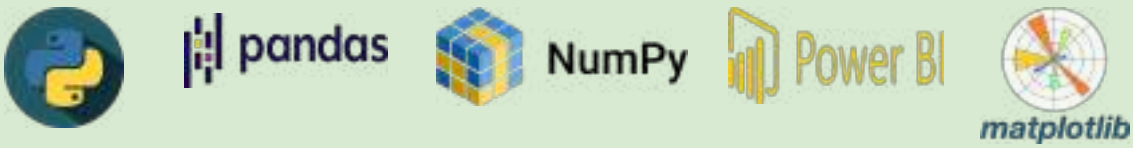
➢ Visualizing relation of independent variables with each other

➢ Cleaning data by removing columns with missing values.

➢ Converting Numerical data into Categorical values

Q 5) What were the libraries that you used in Python?

➢ I used Pandas, NumPy, Matplotlib, Seaborn and Plotly libraries.



Q 6) Who developed this project?

➢ This is developed by Alok Choudhary.

➢ Linkedin