2023

# Detailed Project Report

BUDGET SALES ANALYSIS

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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. Objectives:

- 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 visualisations 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 colour 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

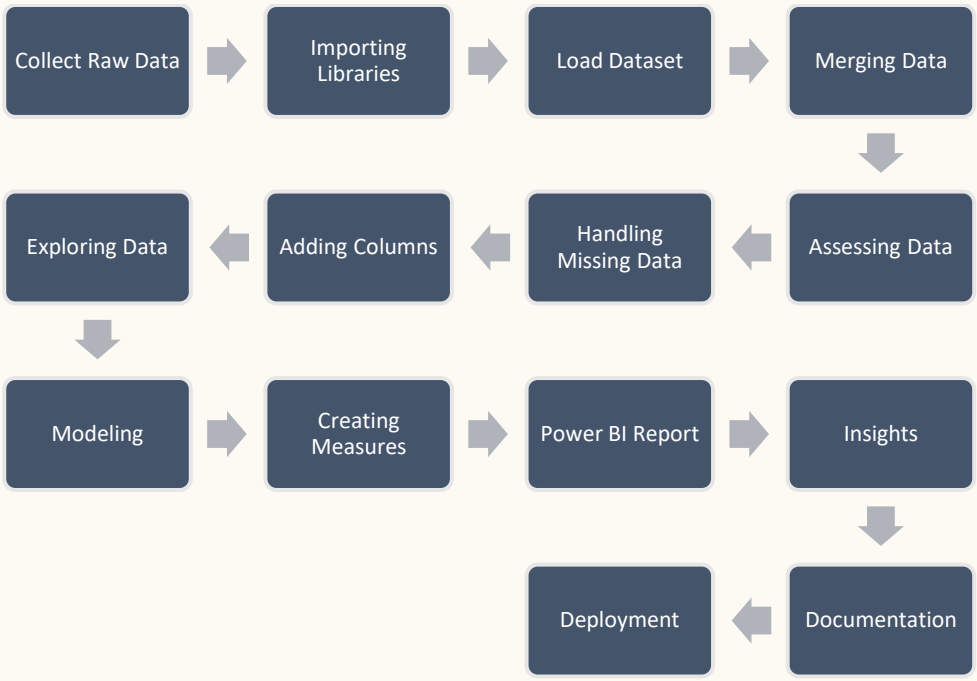
**UnitPrice:** Per unit sale price of the product

**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

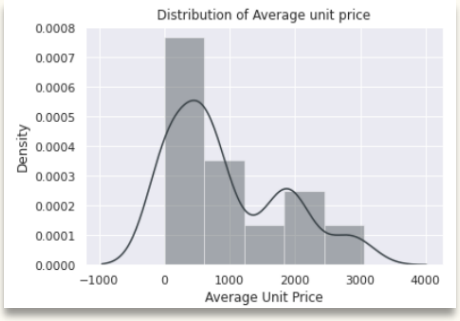
3. **Data Wrangling –** Contains following steps gathering data, assessing data, handling missing data and adding columns

4. **Exploring Data –** Once the data is loaded and pre-processed, we preform 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

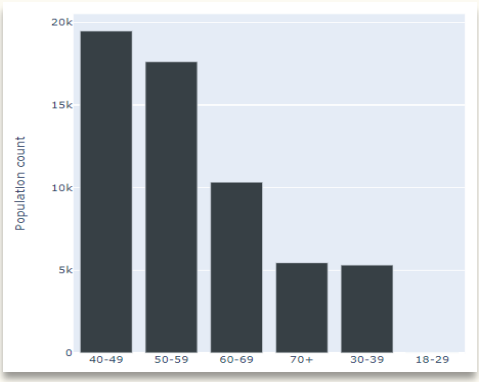
## 6. Insights

| 1. **Product Price per unit Distribution** | |
|---|---|
|  | ▪ According to the above distribution plot we can conclude that 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**

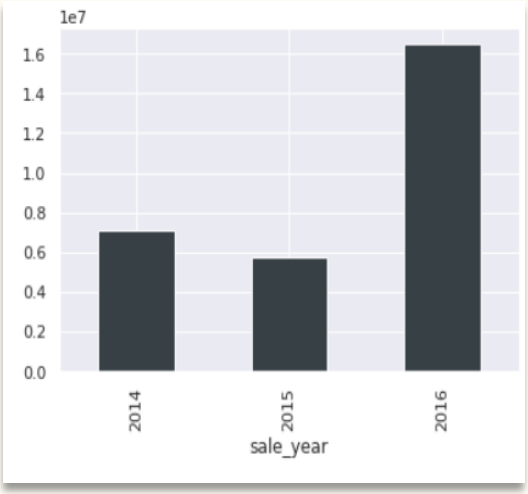

- Maximum quantity ordered for a product is below 5

4. **Age distribution**



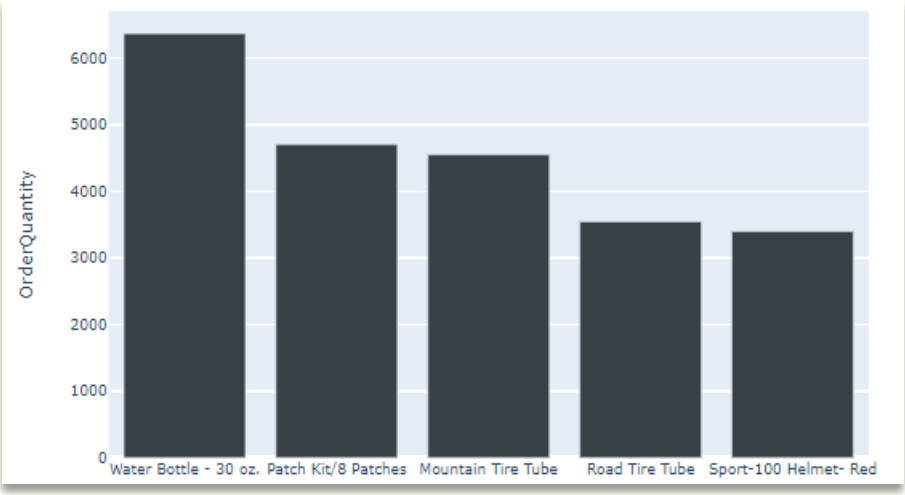

- A sizable portion of the clientele is made up of people between the ages of 40 and 59

5. **Year wise sales**




- The year 2016 saw an exponential surge in sales

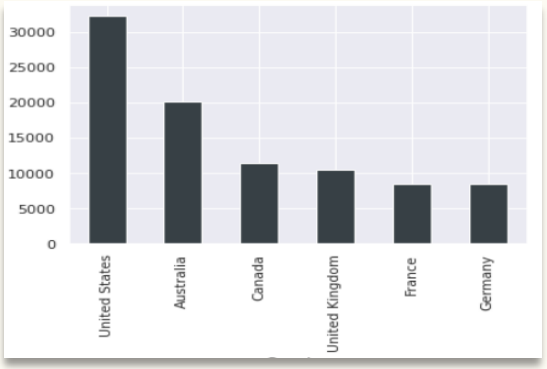
6. **Top 5 selling products**




7. **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 |
| | | Bike Racks | 493 |
| | | Bike Stands | 394 |
| | Accessories | 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 |

8. **Country wise quantity ordered**




- High quantity of products is ordered from Australia and United States

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

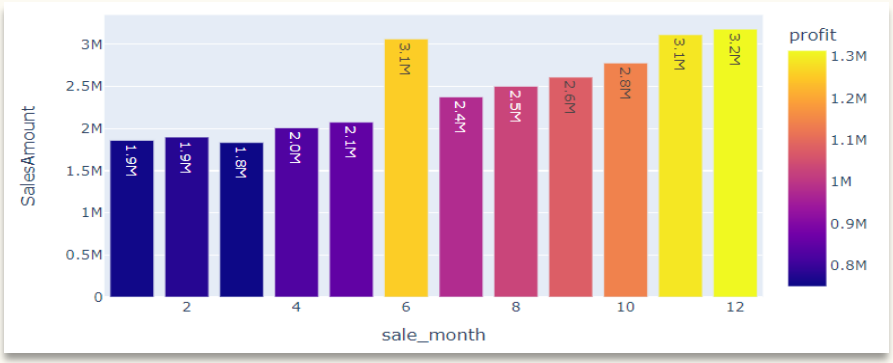
| sale_year | Category | SubCategory | profit |
|---|---|---|---|
| 2014 | Bikes | Mountain Bikes | 586874.557600 |
| | | Road Bikes | 2256280.998300 |
| 2015 | Bikes | Mountain Bikes | 1019388.334900 |
| | | Road Bikes | 1375064.915000 |
| | Accessories | Bike Racks | 23136.960000 |
| | | Bike Stands | 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?**

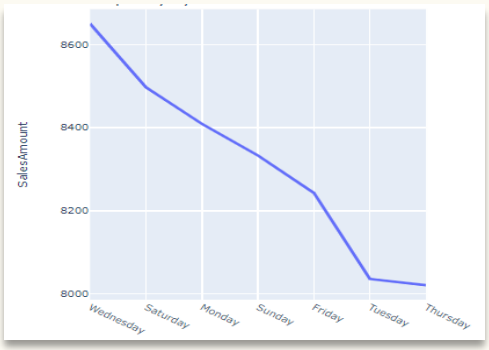

- The average order has a gap of 7 days between the day the order is ready for export from the factory and the date it was shipped
- Management must work to reduce this gap toward 3 days

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



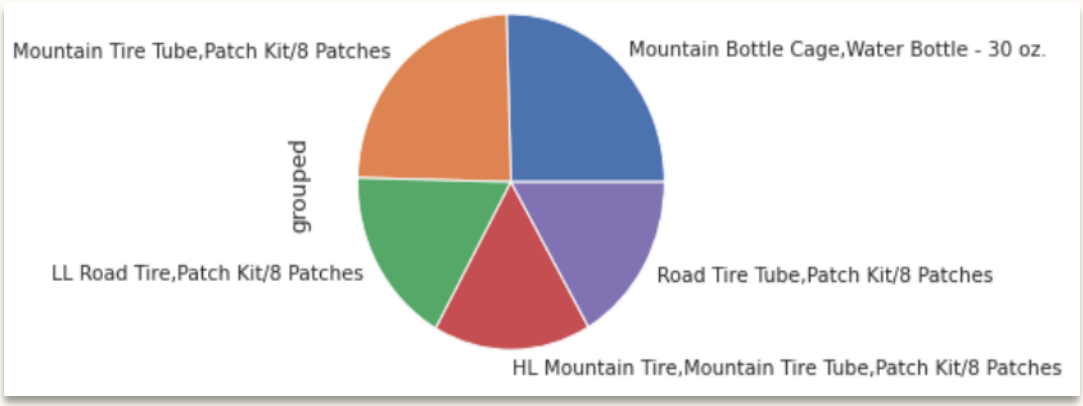

- Maximum profit earned in the months of **June, November, and December**

12. **What time should we display advertisement to maximize likelihood of customer is buying product?**



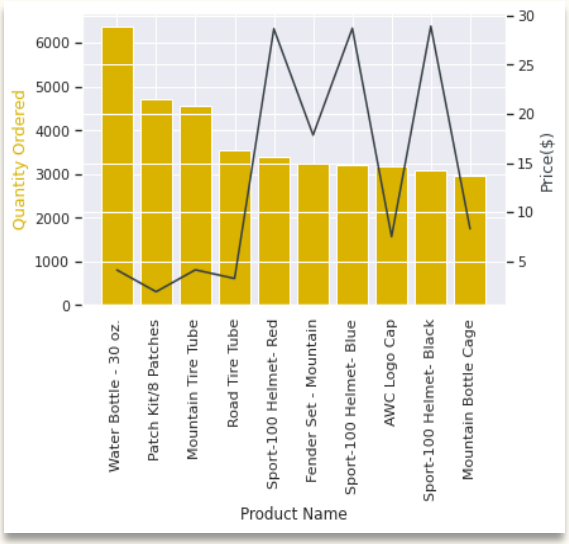

- High sales orders are seen on **Wednesday and Saturday**; therefore, we can promote our product during these workweek

13. **Which products are most often sold together?**




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

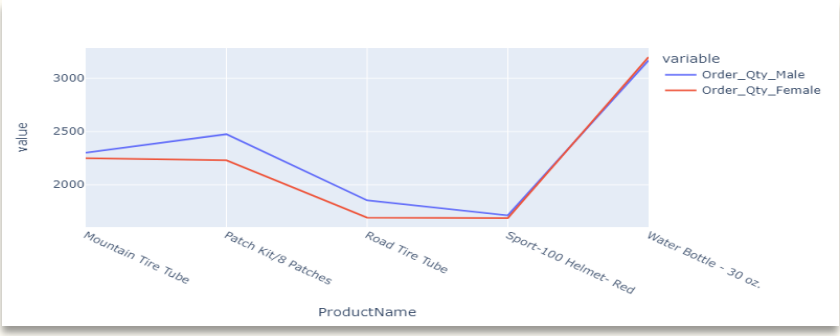
## 14. Which product sold the most? why do you think it sold the most?



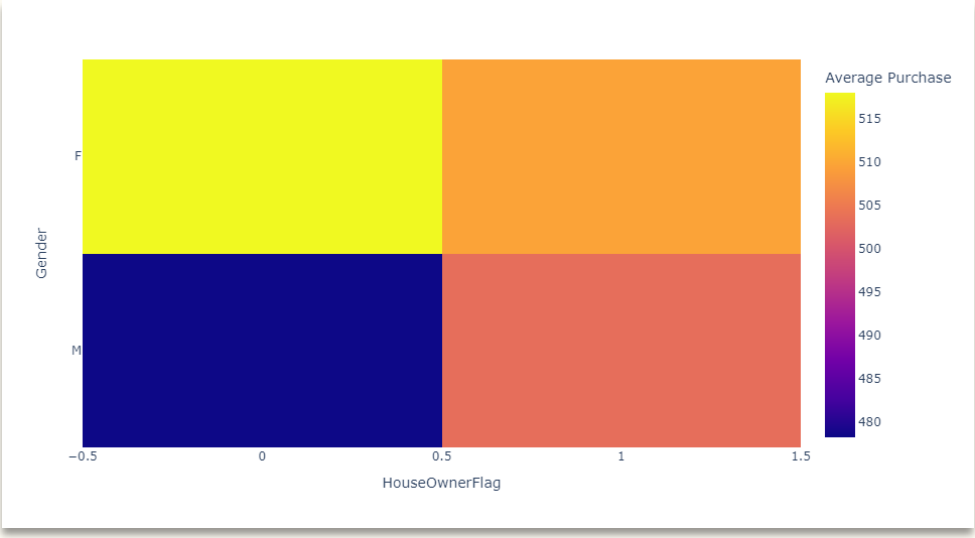

```
prices.corr(quantity_ordered)
-0.5333019792658484
```

- There is a high negative correlation between Price and number of Quantity ordered
- we can conclude that low price product has high demand

## 15. Compare most ordered product by gender

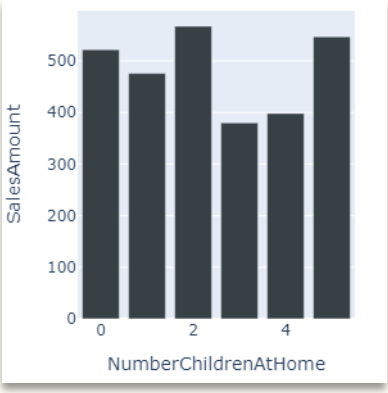


16. **Does Gender and home ownership matter in order purchasing**



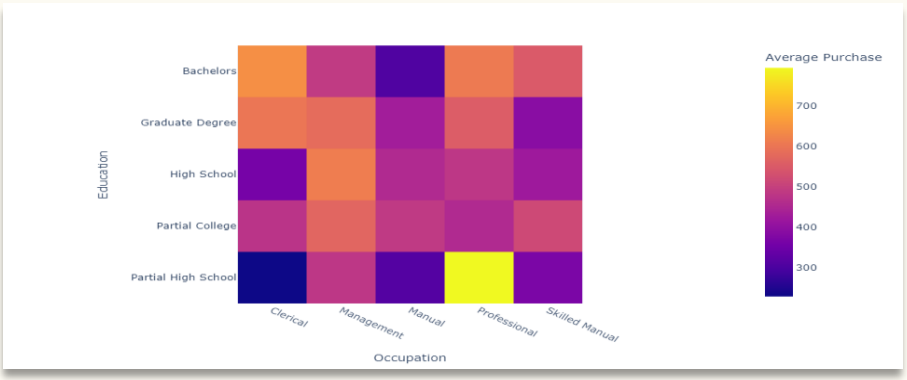

- It's interesting to note that the average amount spent by men without permanent addresses is low, whilst the average amount spent by women without permanent addresses is higher

17. **Number of children and Purchase correlation**



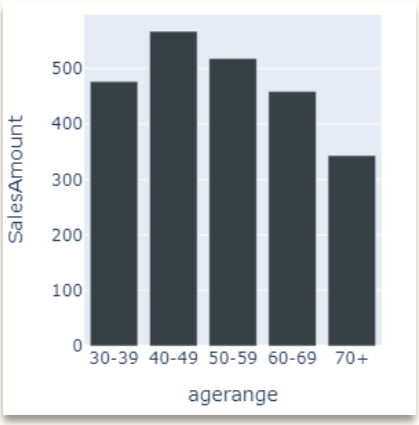

- Purchase among customers with number of children, 2 and 5, are high

18. **Occupation and purchase correlation**



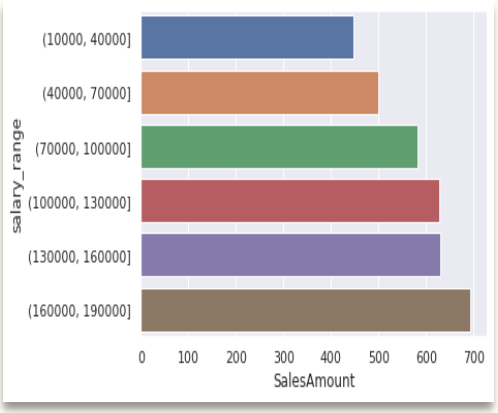

- Purchases by Professional and Management customers are comparatively high

19. **Which age group has produced the most revenue?**



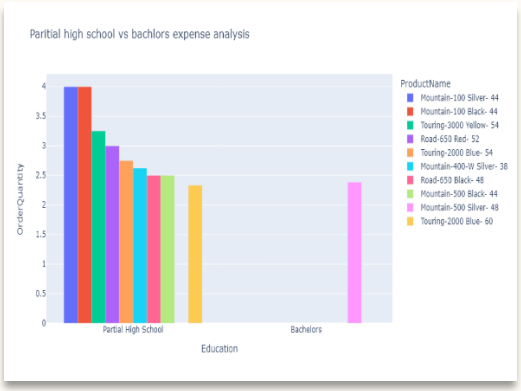

- Age range of 40-49 and 50-59 is shows high demand compared to other age group

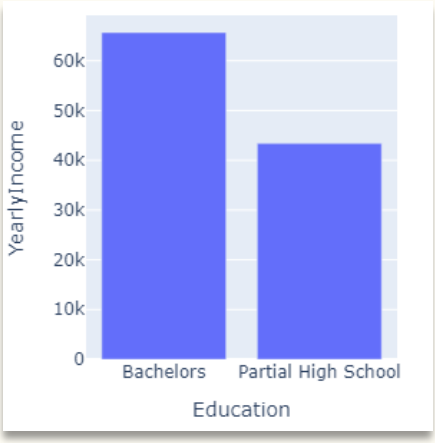
20. **Yearly income range and purchase correlation**




- High salary range leads to increase in revenue

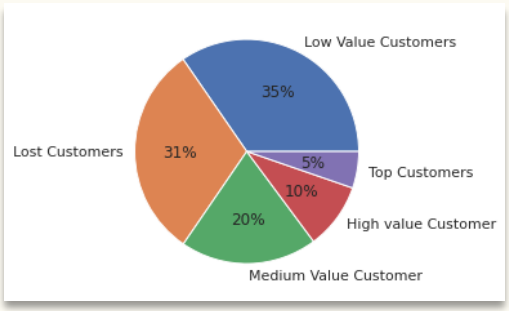
21. **Partial high school vs bachelors income mean and most ordered product**



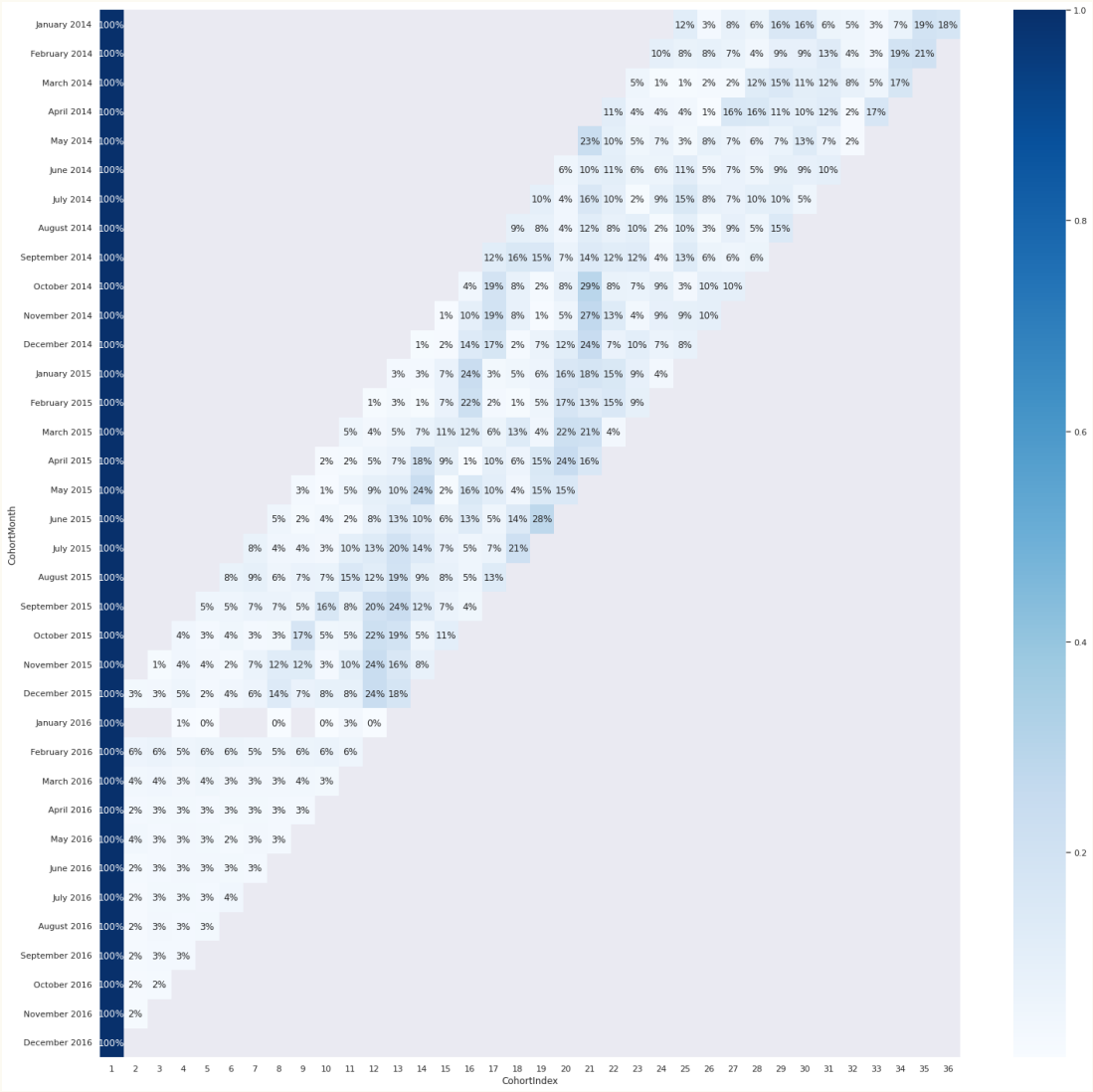

- Customers with a high school diploma and modest annual income buy more products than people with bachelor's degrees

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. 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 quantity of products is ordered from Australia and 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 ordered

- 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 is shows high demand compared to other age group
- High salary range leads to 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 iNeuron's Provided Project Description Document
- 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 Understandings

Q4) What techniques were you using for data?

- Removing unwanted attributes
- Visualizing relation of independent variables with each other
- Cleaning data by removing column with missing values
- Converting Numerical data into Categorical values

Q 6) What were the libraries that you used in Python?

- I used Pandas, NumPy, Matplotlib, Seaborn and Plotly libraries