



Customer Insights and Sales Analysis: Electronics Market Sep2023-Sep2024

Data Analysis Project

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Tools of Analysis: python & Power BI

INTRODUCTION PURPOSE OF THE REPORT

This report includes an analysis of customer behavior, sales performance, and product trends for electronics market for season sep2023 to sep2024.



AGENDA

1. Data Processing (Python)
2. Data Modeling (Power BI)
3. Data Visualization (Power BI)



Data Processing (Python)

Handle missing values and Replacing certain missing values to maintain data integrity.



```
In [5]: missing_value = pd.DataFrame(data.isna().sum().sort_values(ascending=False)).reset_index().rename(columns = {'index':'column',0:'Missing Values'})
missing_value = missing_value.loc[missing_value['Missing Values']>0]
missing_value
```

```
Out[5]:
```

	column	Missing Values
0	Add-ons Purchased	4868
1	Gender	1

```
In [6]: Most_frequently = data['Gender'].mode()[0]
Most_frequently
```

```
Out[6]: 'Male'
```

```
In [7]: data['Gender'].fillna(Most_frequently,inplace=True)
```


Removing duplicates to ensure the uniqueness of the dataset.

```
In [9]: duplicated_rows = pd.DataFrame(data.duplicated()).rename(columns = {0:'duplicated_rows'})
duplicated_rows[duplicated_rows['duplicated_rows']==True]
```

```
Out[9]: duplicated_rows
```

Create some necessary columns to make them primary keys for some entities.

```
In [15]: data.insert(5,'ProductTypeID',data['Product Type'])
data.loc[data['ProductTypeID']== 'Smartphone','ProductTypeID']= 1
data.loc[data['ProductTypeID']== 'Tablet','ProductTypeID']= 2
data.loc[data['ProductTypeID']== 'Laptop','ProductTypeID']= 3
data.loc[data['ProductTypeID']== 'Smartwatch','ProductTypeID']= 4
data.loc[data['ProductTypeID']== 'Headphones','ProductTypeID']= 5
```

```
In [16]: data['Order Status'].unique()
Out[16]: array(['Cancelled', 'Completed'], dtype=object)
```

```
In [17]: data.insert(9,'StatusID',data['Order Status'])
data.loc[data['StatusID']== 'Cancelled','StatusID']= 1
data.loc[data['StatusID']== 'Completed','StatusID']= 2
```

```
In [18]: data['Payment Method'].unique()
Out[18]: array(['Credit Card', 'Paypal', 'Cash', 'Debit Card', 'Bank Transfer',
               'PayPal'], dtype=object)
```

```
In [19]: data['Payment Method'] = data['Payment Method'].str.replace('Paypal','PayPal')
```

```
In [20]: data['Payment Method'].unique()
Out[20]: array(['Credit Card', 'PayPal', 'Cash', 'Debit Card', 'Bank Transfer'],
               dtype=object)
```

```
In [21]: data.insert(11,'PaymentMethodID',data['Payment Method'])
data.loc[data['PaymentMethodID']== 'Credit Card','PaymentMethodID']= 1
data.loc[data['PaymentMethodID']== 'PayPal','PaymentMethodID']= 2
data.loc[data['PaymentMethodID']== 'Cash','PaymentMethodID']= 3
data.loc[data['PaymentMethodID']== 'Debit Card','PaymentMethodID']= 4
data.loc[data['PaymentMethodID']== 'Bank Transfer','PaymentMethodID']= 5
```

```
In [22]: data['Shipping Type'].unique()
Out[22]: array(['Standard', 'Overnight', 'Express', 'Same Day', 'Expedited'],
               dtype=object)
```

```
In [23]: data.insert(17,'ShippingTypeID',data['Shipping Type'])
data.loc[data['ShippingTypeID']== 'Standard','ShippingTypeID']= 1
data.loc[data['ShippingTypeID']== 'Overnight','ShippingTypeID']= 2
data.loc[data['ShippingTypeID']== 'Express','ShippingTypeID']= 3
data.loc[data['ShippingTypeID']== 'Same Day','ShippingTypeID']= 4
data.loc[data['ShippingTypeID']== 'Expedited','ShippingTypeID']= 5
```

```
In [24]: data.insert(16,'DateKey',data['Purchase Date'].dt.strftime('%Y%m%d'))
```



Dropping unnecessary columns to streamline the dataset.

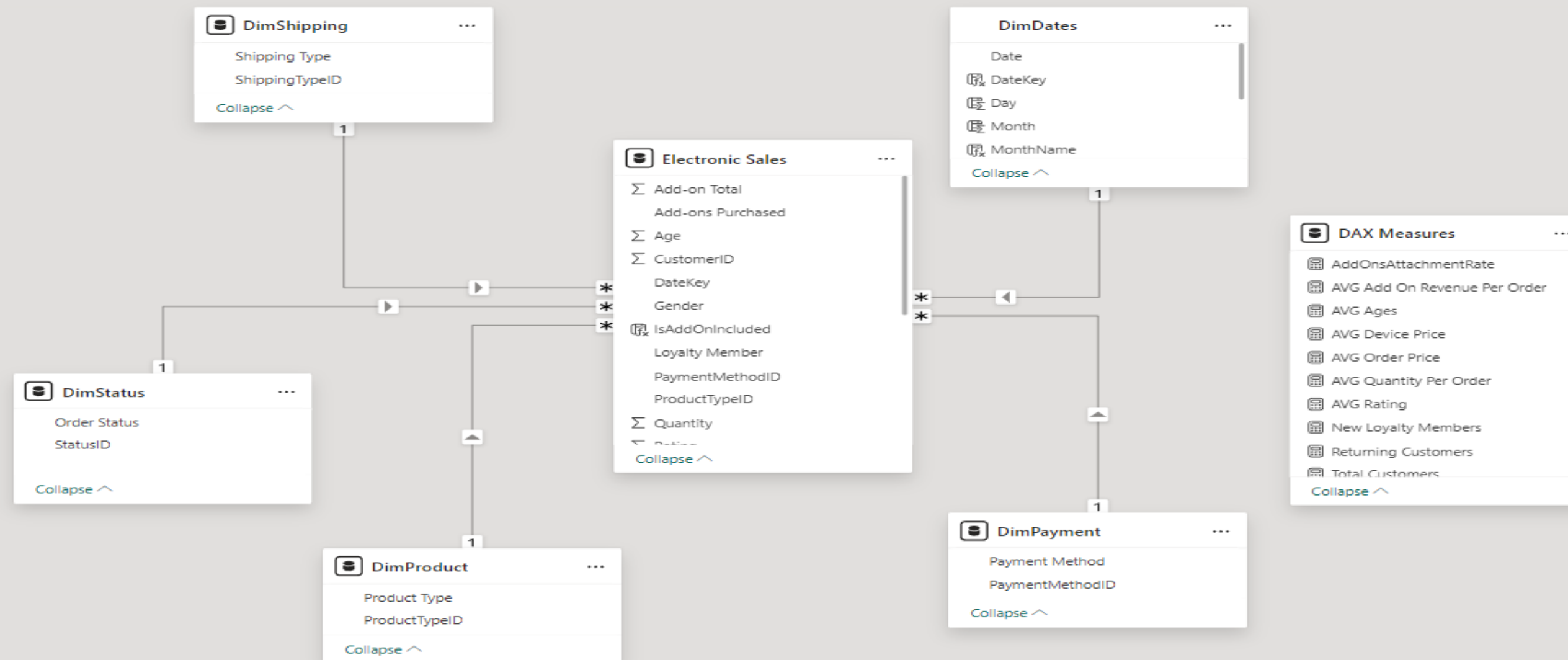
```
In [26]: data.drop(columns=['Purchase Date'],axis=1,inplace=True)  
data
```

Uploading the final cleaned data to Power BI for visualization.

```
In [27]: data.to_csv('D:\programming\Projects\BI Projects\Customer purchase behavior - Electronic Sales Data\Electronic Sales ETL.csv')
```

Data Modeling (Power BI)

Create Star Schema with determine Fact Table.



A photograph showing several people's hands in business attire interacting with large wooden gears on a table, symbolizing teamwork and business processes. The image is partially obscured by a blue diagonal overlay.

Data Visualization (Power BI)

Customers

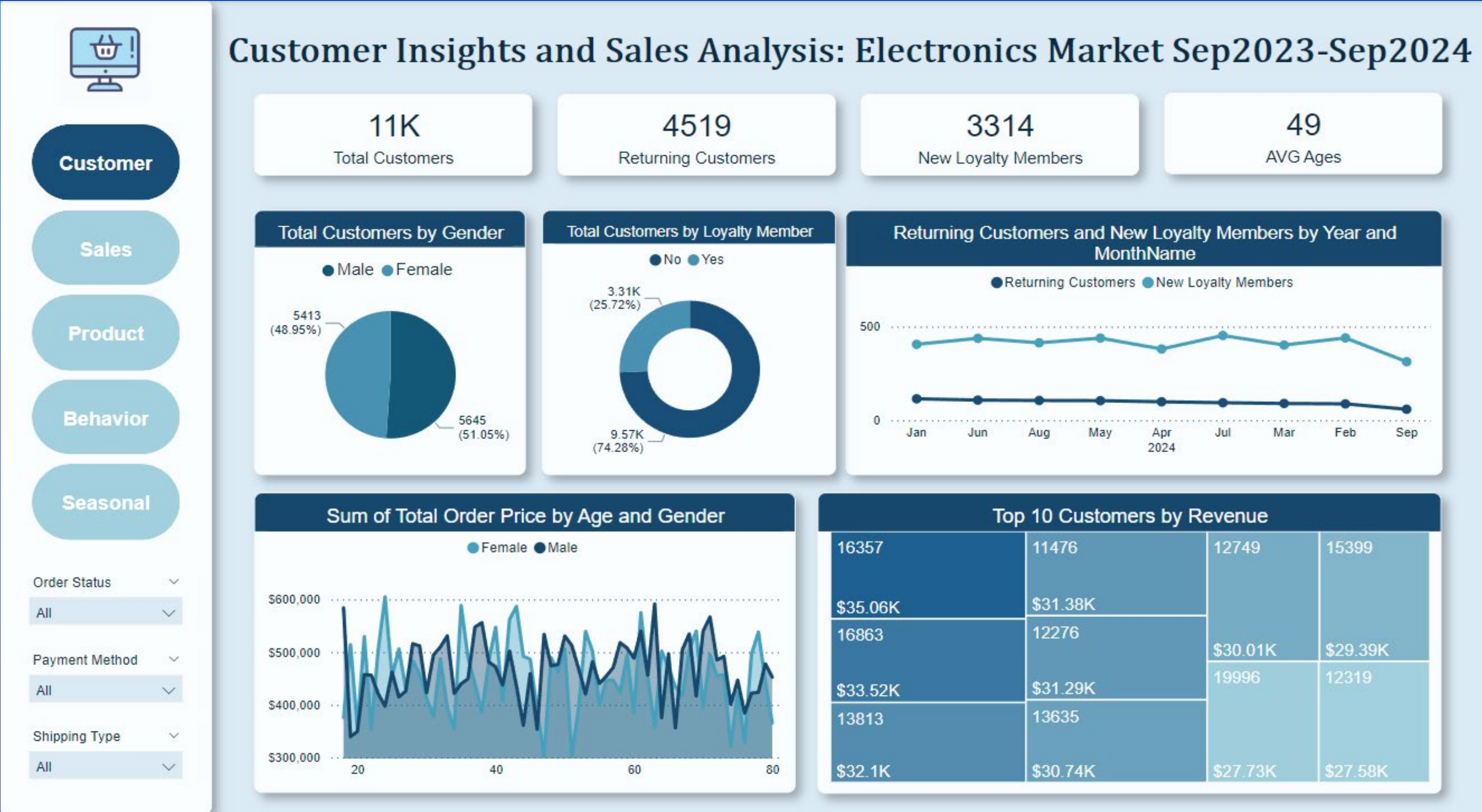
Sales

Product

Behavior

Seasonal

Customers Dashboard Overview

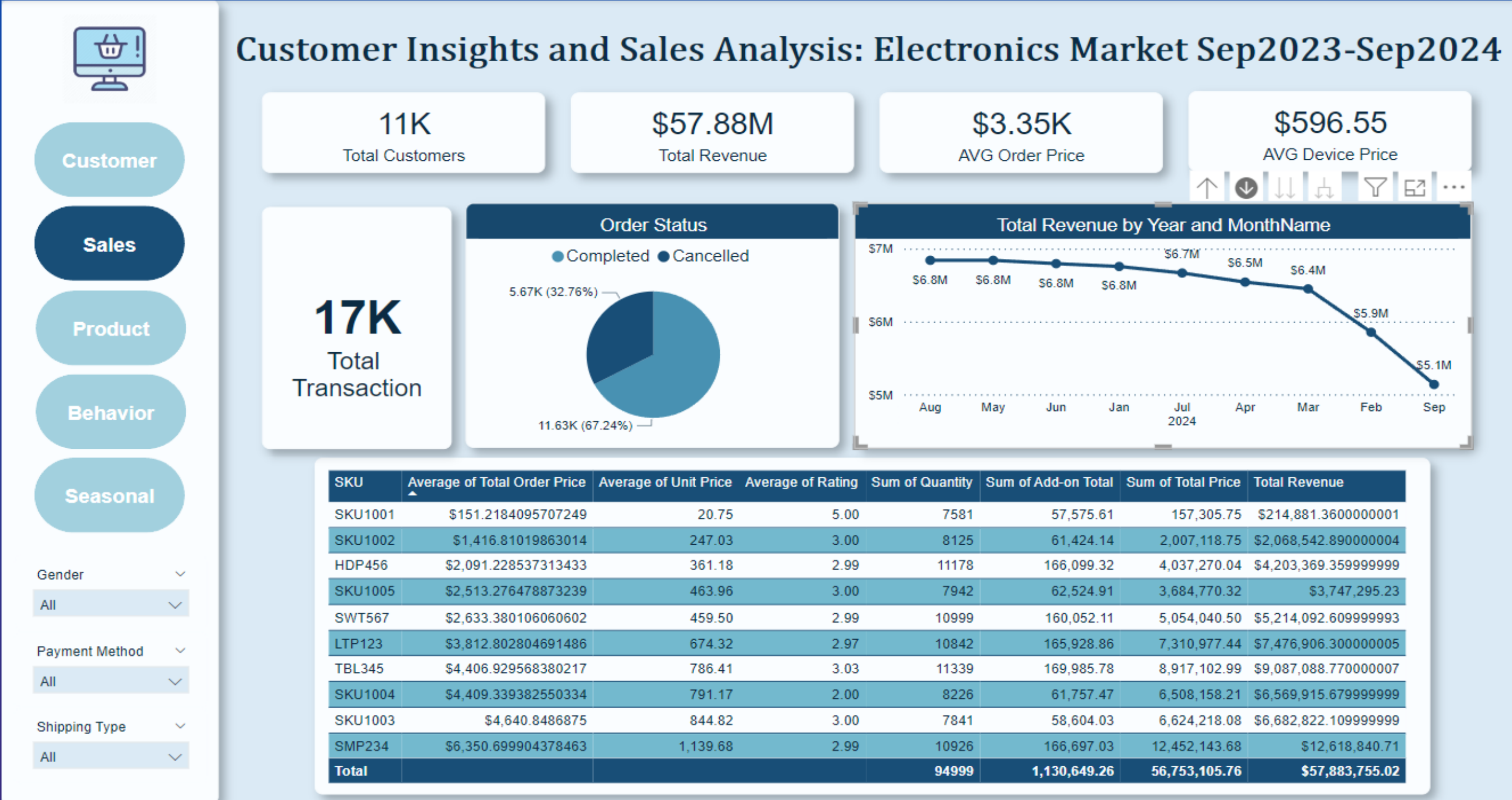


Overall Conclusions:

- The electronics market benefits from a well-established customer base, with a strong retention rate and effective loyalty program.
- Gender and age are well-distributed among customers, but opportunities may exist to increase spending in specific demographics.
- Strategies to attract new loyalty members and nurture high-spending customers could further enhance growth and profitability.

This dashboard provides a strong foundation for data-driven decision-making, helping stakeholders focus on customer retention, loyalty program growth, and targeted marketing efforts.

Sales Dashboard Overview

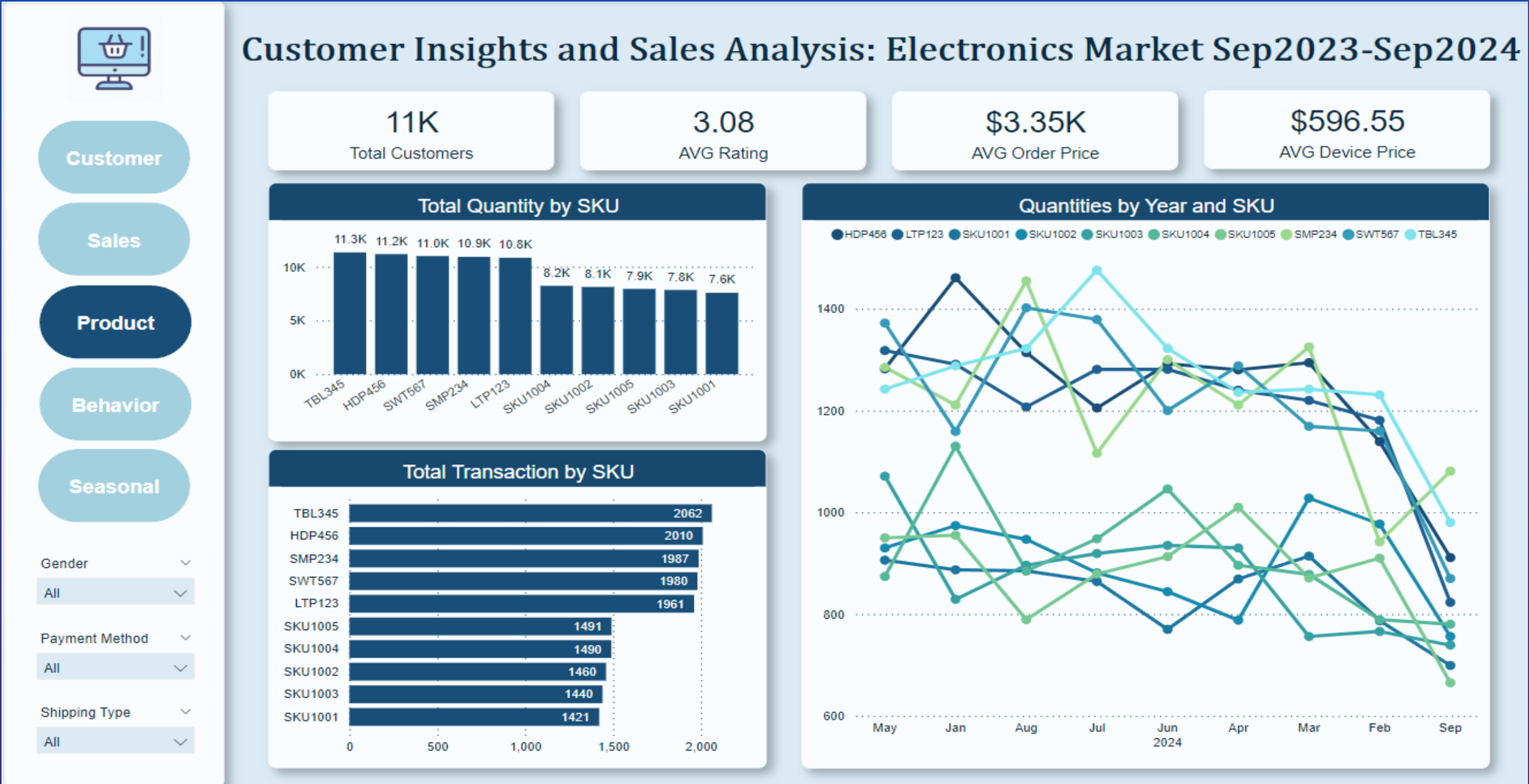


Overall Conclusions:

- The electronics market is strong, but high cancellation rates and seasonal revenue dips may present challenges.
- Focusing on reducing cancellations and increasing customer satisfaction could enhance revenue.
- There is an opportunity to drive add-on sales, particularly for top-performing products, which could further increase average order value and profitability.

This dashboard provides a clear overview of sales performance and customer purchasing behavior, allowing for targeted improvements in product offerings, customer satisfaction, and revenue management.

Products Dashboard Overview



Overall Conclusions:

- Products TBL345 and HDP456 are strong performers both in terms of quantity sold and transaction count, which makes them essential items in the electronics portfolio.
- The moderate average rating (3.08) suggests room for improvement in customer satisfaction, potentially by addressing common product or service issues.
- Seasonal and monthly quantity fluctuations emphasize the need for dynamic inventory and marketing strategies to capture peak demand periods and manage slowdowns.

This product-focused dashboard provides valuable insights to prioritize high-performing items, address customer satisfaction, and adjust for seasonality in sales and inventory.

Behaviors Dashboard Overview



Customer

Sales

Product

Behavior

Seasonal

Female

Male

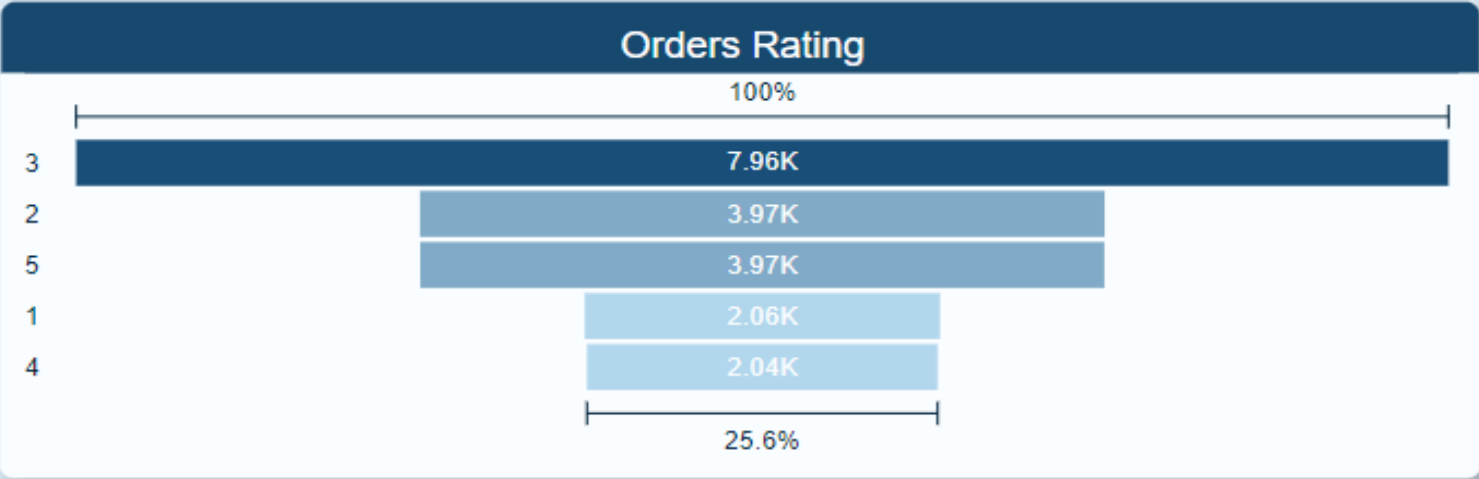
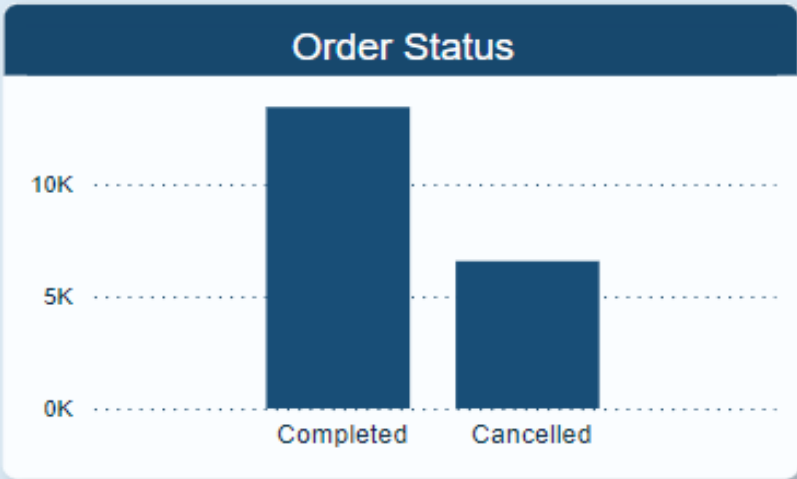
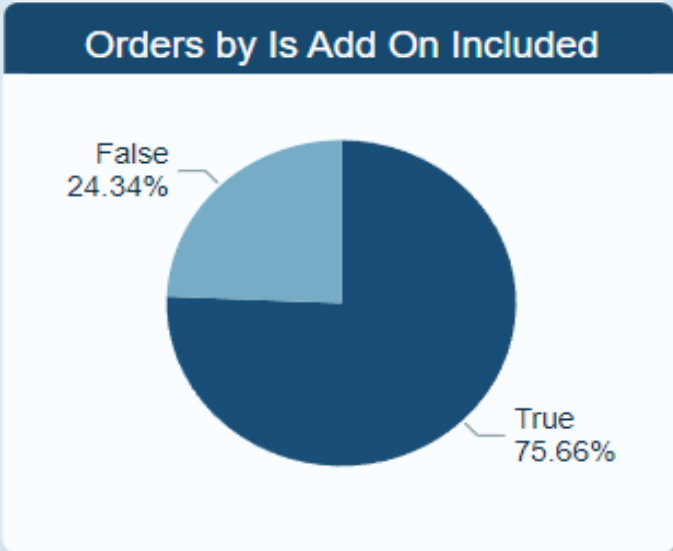
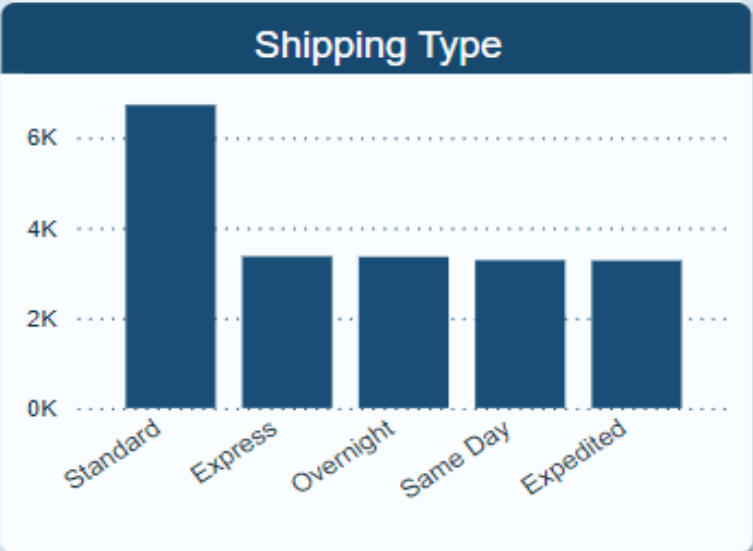
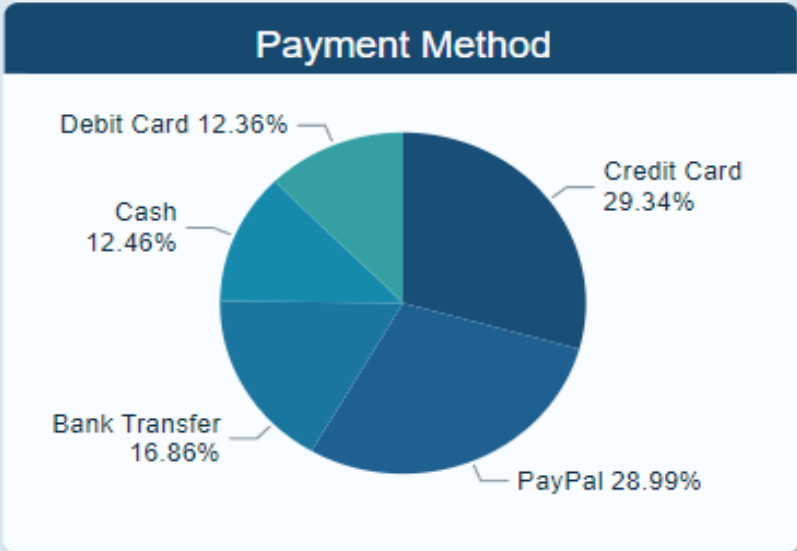
Customer Insights and Sales Analysis: Electronics Market Sep2023-Sep2024

12K
Total Customers

5
AVG Quantity Per Order

82.27
AVG Add On Revenue Per Order

49
AVG Ages



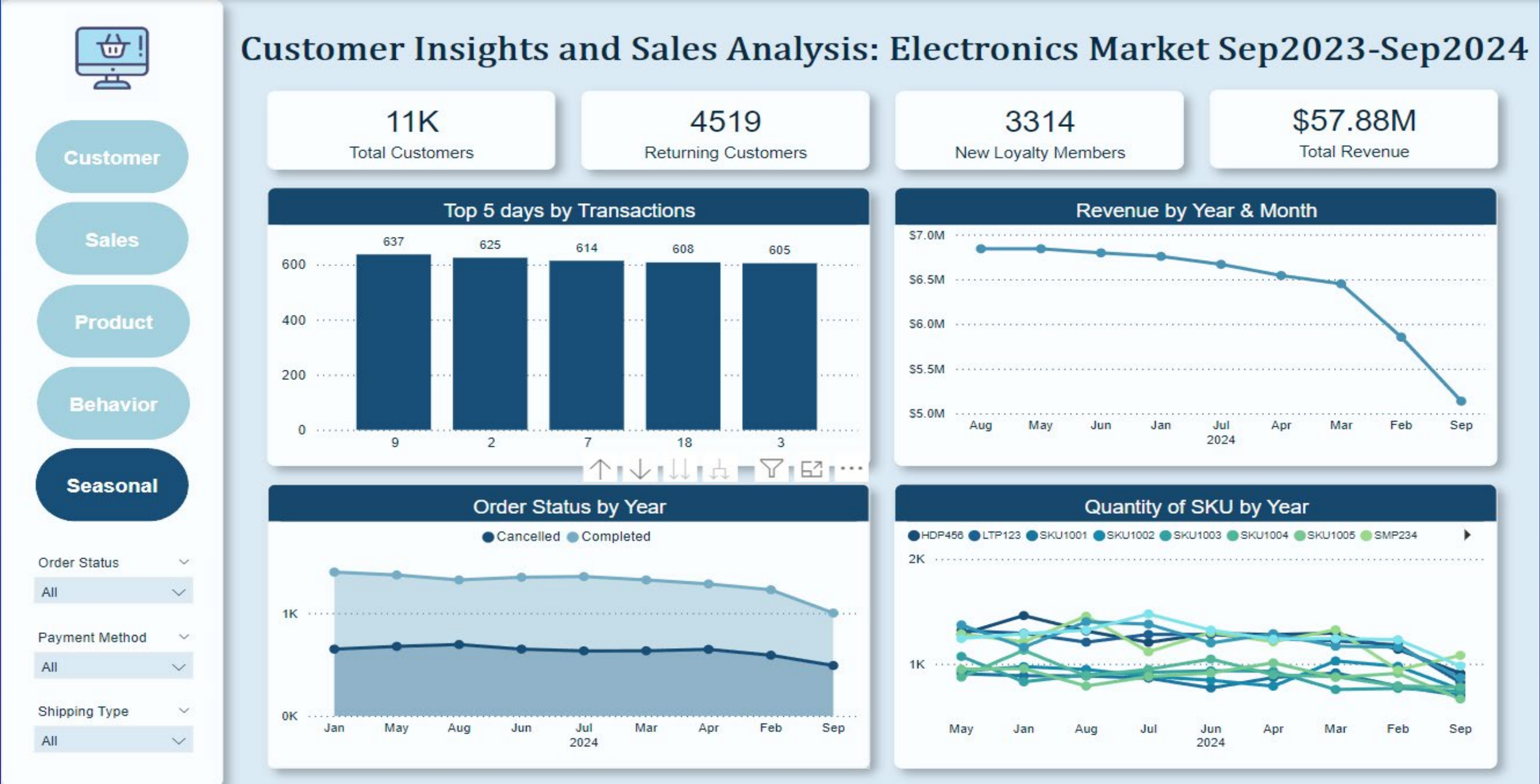
Overall Conclusions:

- High Engagement with Add-Ons: With 75.66% of orders including add-ons and an average add-on revenue of \$82.27, add-ons significantly enhance revenue. Maintaining a strong selection of add-ons and strategically marketing them could further increase this benefit.
- Preference for Standard Shipping: The prevalence of standard shipping highlights customer cost sensitivity. Offering competitive shipping options or promotions could encourage more customers to opt for faster methods.
- Payment Method Flexibility: The popularity of credit card and PayPal payments reflects a modern, digitally enabled customer base, though other methods like cash are still used. Expanding electronic payment options may further streamline the process.

- Customer Satisfaction but Some Cancellation Issues: High order ratings suggest overall satisfaction, but a notable cancellation rate indicates areas for improvement in the customer journey or order fulfillment.

This dashboard section effectively captures behavioral insights, providing direction for optimizing payment, shipping, and add-on strategies, as well as opportunities for reducing cancellations and enhancing customer satisfaction.

Seasonal Dashboard Overview



Overall Conclusions:

- **Strong Customer Retention and Loyalty:** With a substantial number of returning customers and new loyalty members, the business benefits from a solid foundation of loyal customers. Continuing to engage with loyalty programs and targeting repeat buyers could further strengthen customer retention.
- **Seasonal Revenue Decline:** The decrease in revenue and SKU quantity toward the end of the period indicates a need for targeted strategies to combat seasonal slumps. Implementing strategic promotions, holiday campaigns, or product launches in these slower months could help stabilize revenue.
- **Peak Sales Days Optimization:** The insight into top transaction days reveals opportunities to maximize sales around these periods through timely promotions and ensuring sufficient inventory.

- Opportunity to Reduce Cancellations: Although order completions are high, maintaining a focus on reducing cancellations through better order management and customer service could contribute positively to revenue and customer satisfaction.

This seasonal dashboard provides valuable insights into customer loyalty, sales trends, and operational performance, supporting data-driven decision-making to optimize future sales strategies.

THANK YOU

Hopefully, this year's report can make our
company even better

