E-Commerce Customer Behavior & Sales Analysis Project

This presentation will explore the insights gained from an analysis of customer behavior and sales data in an e-commerce platform.

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Project Platform & Tools

Jupyter Notebook: Used for data analysis and visualization. Allows interactive code execution, making it ideal for exploring datasets and generating insights.

MySQL: A powerful relational database management system, employed to store and manage the cleaned data effectively.

Excel: Utilized for data manipulation and creation of informative charts and graphs to visually represent key findings.

Data Ingestion & Preparation

Import necessary libraries:

```
import pandas as pd
import numpy as np
```

Load data from a CSV file:

```
a = pd.read_csv(r'C:\Downloads\sale.csv')
```

```
a.dtypes
```

```
customer_id              int64
age                      int64
gender                  object
loyalty_member          object
product_type            object
sku                     object
rating                   int64
order_status            object
payment_method          object
total_price            float64
unit_price             float64
quantity                 int64
purchase_date           object
shipping_type           object
add-ons_purchased       object
add-on_total           float64
grand_total            float64
dtype: object
```

Change date type

```
a['purchase_date'] = pd.to_datetime(a['purchase_date'])
```

```
a.dtypes
```

```
customer_id                     int64
age                             int64
gender                         object
loyalty_member                 object
product_type                   object
sku                            object
rating                          int64
order_status                   object
payment_method                 object
total_price                   float64
unit_price                    float64
quantity                        int64
purchase_date          datetime64[ns]
shipping_type                  object
add-ons_purchased              object
add-on_total                  float64
grand_total                   float64
dtype: object
```

MySQL Integration

Importing Cleaned Data: Transferring the preprocessed data from the Pandas DataFrame into the MySQL database for efficient querying and analysis.

Database Analysis: Leveraging the power of SQL to extract, transform, and load data from the MySQL database, enabling in-depth analysis of customer behavior and sales trends.

Order Fulfillment Analysis

Cancellations vs. Completed Orders: Analyzing the rate of order cancellations compared to completed orders. This helps identify potential areas for improvement in the order fulfillment process.

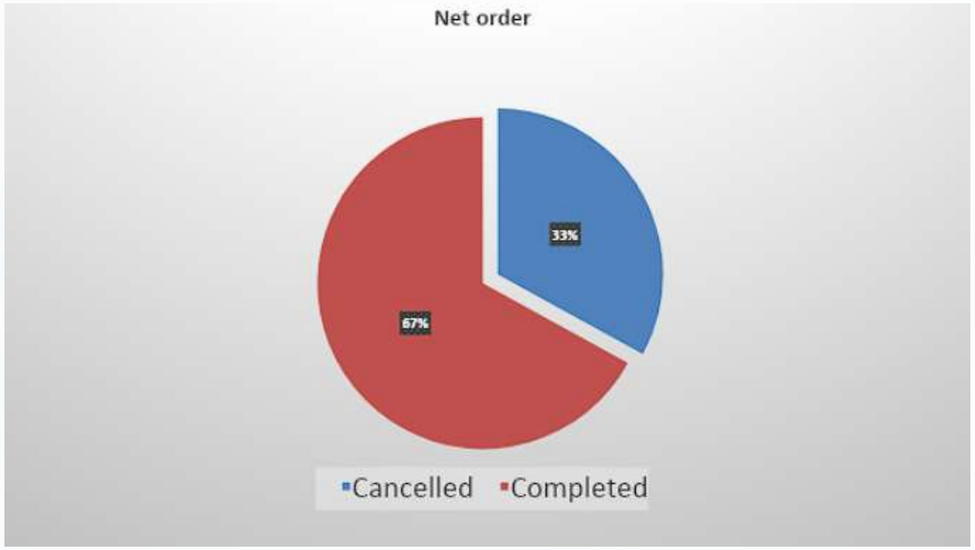
```sql
SELECT * FROM project1.my_project848415;


-- safe mode off
SET SQL_SAFE_UPDATES = 0;



-- delete all cancell order details(i also clean it in pandas jupyter notebook)
SELECT * FROM project1.my_project848415 WHERE order_status = 'Cancelled';
DELETE FROM project1.my_project848415
WHERE order_status = 'Cancelled';
```

order_status	price
Cancelled	21382354.52000011
Completed	43465210.81000009



Data visualized by excel

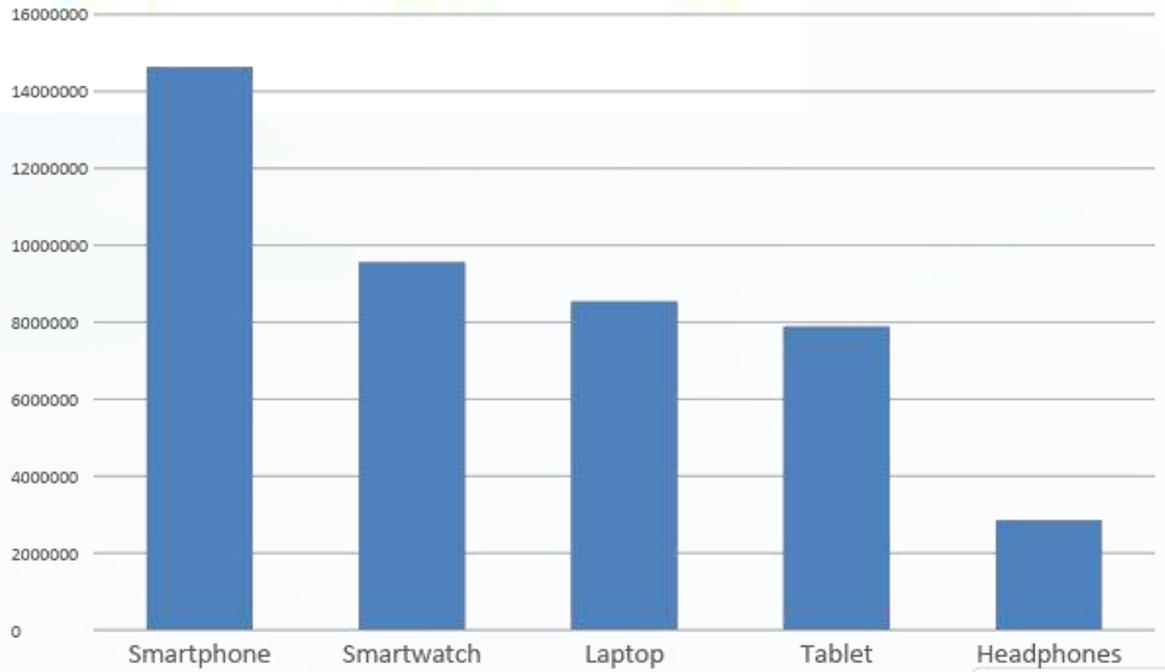
Segment-Specific Sales Leaders

Top 5 Products per Market Segment: Identifying the best-selling products within different market segments, such as electronics goods.

```
SELECT * FROM project1.my_project848415;
```

```
-- QUESTION_NO-1>>>>>>>top5 total sell of each segment
select product_type,sum(grand_total) as total_sell from project1.my_project848415 group by product_type order by total_sell desc;
```

product_type	total_sell
Smartphone	14630325.529999968
Smartwatch	9557416.020000027
Laptop	8536583.029999977
Tablet	7893431.510000016
Headphones	2847454.719999998



Top 10 customer with highest buy

```sql
-- QUESTION_NO-2>>>>>>> top 10 customer with highest buy
with cte as (
select customer_id,loyalty_member,sum(grand_total) as total_sell
from project1.my_project848415
 group by customer_id,loyalty_member)
 select * from (
 select *
 ,row_number() over(order by total_sell desc) as top_customer
 from cte) A
 where top_customer <=10;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

customer_id	loyalty_member	total_sell	top_customer
11476	No	30136.35	1
13635	No	28481.390000000003	2
16357	No	27838.76	3
13534	No	26261.21	4
17236	No	25167.95	5
14436	No	25014.730000000003	6
13797	No	24949.25	7
18631	No	24820	8
15679	No	24754.22	9
15399	No	23009.8	10

Payment Method Performance

Revenue Breakdown by Payment Gateway: Analyzing the revenue generated through different payment methods, such as credit cards, debit cards, or mobile wallets.

```
select payment_method,sum(grand_total) as price
from project1.my_project848415
group by payment_method
```

Result Grid | Filter Rows: | Export:

payment_method	price
Paypal	12915808.460000023
Credit Card	12828999.890000023
Cash	4466765.079999995
Debit Card	4614956.389999994
Bank Transfer	8638680.99000001

Total revenue generated

Identifying High-Growth Segments: Analyzing the sales growth of different market segments over time, identifying areas with significant potential.

```sql
-- QUESTION_NO-3>>>>>>>find total sell
select product_type,sum(grand_total) as sell  from project1.my_project848415 group by product_type order by sell desc ;
SELECT
SUM(CASE WHEN order_status = 'Completed' THEN grand_total ELSE 0 END) -
SUM(CASE WHEN order_status = 'Cancelled' THEN grand_total ELSE 0 END) AS total_difference
FROM project1.my_project848415;
```

Summary

ANALYSIS:

Smartphone and ***Smartwatch***
are the two most popular product categories of selling,
showing that people done their payment from "***PayPal***" and "***Credit Card***" the most.

INSIGHT

Segment-Wise Performance: **Smartphone is the top buying segment in this sale**

:***Sales Trends*** **: Credit Card is the emerging payment method in the upcoming day**

Opportunities for Growth: ***Laptops and credit cards are emerging as the most profitable product and payment method, respectively, in the coming days.***