Data Visualization

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Final Project Report

Sales and Customer Analysis- A Comprehensive Analysis of Sales Performance and Customer Behavior for Strategic Decision-Making

By

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Executive Summary

In the landscape of rapidly evolving market conditions, organizations are increasingly reliant on data-driven insights to steer their strategic directions. This project was initiated to equip sales managers and executives with advanced tools for deep diving into sales performance and customer behavioral analytics. By developing interactive dashboards that present a dual perspective—focusing on both sales metrics and customer interactions—this analysis facilitates an enhanced understanding of market dynamics and consumer patterns. The outcomes of this project are expected to guide tactical and strategic decisions, optimizing performance and customer satisfaction.

1. INTRODUCTION

Background

Understanding the intricacies of sales trends and customer behavior is paramount for businesses aiming to optimize their operations and increase profitability. Recent advancements in data visualization technologies have paved the way for more sophisticated analytical approaches, allowing companies to harness their data effectively to gain competitive advantage.

Objectives

This project aims to create a robust analytical framework that:

- Provides a clear visualization of sales and customer data through interactive dashboards.
- Enables stakeholders to make informed decisions based on comprehensive data analysis.

Research Questions

This report addresses the following critical business questions:

1. How do sales trends across different timescales (monthly, yearly) and product categories compare between the current and previous years?
2. What can be learned about customer loyalty, engagement, and profitability from detailed customer behavior metrics?

2. METHODOLOGY

Data Collection

Data was meticulously collected from the organization's CRM and sales databases, covering a span of four years. This data includes detailed records of sales transactions, customer interactions, and product information, ensuring a rich dataset for analysis.

Data Processing

Data integrity was ensured through rigorous cleaning processes, removing anomalies and ensuring consistency across the dataset. This stage also involved structuring the data in a manner suitable for dynamic visualization and quick updates.

Tools and Technologies

The project utilized state-of-the-art data visualization tools such as to develop the dashboards. This tool was chosen for it's robustness, flexibility, and widespread industry acceptance.

Dataset-1: orders.csv

It supports the analysis of sales by different dimensions such as date, shipping method, customer segment, and profitability, among others. This could be used to derive insights into sales performance, customer buying patterns, and operational efficiency.

Columns:

a. Order ID- A unique identifier for each order. Multiple items within the same order share this ID.

b. Order Date- The date when the order was placed by the customer.

c. Ship Date- The date when the order was shipped out to the customer.

d. Ship Mode- The shipping method or class used for the delivery of the order.

e. Customer ID- A unique identifier for each customer who placed the order.

f. Segment- The market segment to which the customer belongs (e.g., Consumer, Corporate).

g. Postal Code- The postal code to which the order was shipped.

h. Product ID- A unique identifier for each product included in the order.

i. Sales- The total sales amount for the items in the order.

j. Quantity- The number of units of the product ordered.

k. Discount- The discount applied to the sales, if any.

l. Profit- The profit made from the order after all costs and discounts are accounted for.

Abc Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Segment	Postal Code	Product ID
CA-2022-152156	11/8/2022	11/11/2022	Second Class	CG-12520	Consumer	42420	FUR-BO-10001798
CA-2022-152156	11/8/2022	11/11/2022	Second Class	CG-12520	Consumer	42420	FUR-CH-10000454
CA-2022-138688	6/12/2022	6/16/2022	Second Class	DV-13045	Corporate	90036	OFF-LA-10000240
US-2021-108966	10/11/2021	10/18/2021	Standard Class	SO-20335	Consumer	33311	FUR-TA-10000577
US-2021-108966	10/11/2021	10/18/2021	Standard Class	SO-20335	Consumer	33311	OFF-ST-10000760
CA-2020-115812	6/9/2020	6/14/2020	Standard Class	BH-11710	Consumer	90032	FUR-FU-10001487

Product ID	Sales	Quantity	Discount	Profit
FUR-BO-10001798	261.96	2	0.000000	41.91
FUR-CH-10000454	731.94	3	0.000000	219.58
OFF-LA-10000240	14.62	2	0.000000	6.87
FUR-TA-10000577	957.58	5	0.450000	-383.03
OFF-ST-10000760	22.37	2	0.200000	2.52
FUR-FU-10001487	48.86	7	0.000000	14.17

Dataset-2: Customers.csv

The Customers dataset contains information about individual customers, including unique identifiers (Customer ID) and their corresponding names (Customer Name), facilitating customer-centric analysis and relationship management.

Columns:

a. Customer ID- Each customer is assigned a distinct alphanumeric code or identifier, allowing for efficient data organization and retrieval.

b. Customer Name: This column stores the names of the customers associated with their respective IDs.

Abc Customers.csv Customer ID (Customer...	Abc Customers.csv Customer Name
AA-10315	Alex Avila
AA-10375	Allen Armold
AA-10480	Andrew Allen
AA-10645	Anna Andreadi
AB-10015	Aaron Bergman
AB-10060	Adam Bellavance

Dataset-3: Location.csv

The Location dataset provides comprehensive geographical information, including postal codes, cities, states, regions, and countries/regions, facilitating detailed analysis and mapping of customer distribution and sales territories.

Columns:

a. Postal Code: Numeric or alphanumeric codes specifying specific geographical areas for mail sorting and delivery.

b. City: Names of urban or metropolitan areas corresponding to postal codes.

c. State: Indicates the states or provinces associated with the cities.

d. Region: Categorizes locations into broader geographical regions for analysis and segmentation.

e. Country/Region: Specifies the country or territory to which the locations belong.

⊕ Location.csv Postal Code (Location.c...	⊕ Location.csv City	⊕ Location.csv State	⊕ Location.csv Region	⊕ Location.csv Country/Region
76106	Fort Worth	Texas	Central	United States
53711	Madison	Wisconsin	Central	United States
68025	Fremont	Nebraska	Central	United States
77095	Houston	Texas	Central	United States
75080	Richardson	Texas	Central	United States
77041	Houston	Texas	Central	United States

Dataset-4: Products.csv

The Products dataset contains information about individual products, including unique identifiers, category and sub-category classifications, and descriptive names, enabling comprehensive analysis of product performance and assortment management.

Columns:

a. Product ID: Unique identifiers for individual products, facilitating inventory management and sales tracking.

b. Category: Broad classification of products into main categories such as furniture, electronics, office supplies, etc.

c. Sub-Category: Further categorization of products within specific categories, providing detailed classification for analysis and organization.

d. Product Name: Descriptive names of individual products, aiding in product identification and customer engagement.

Abc Products.csv Product ID (Products.csv)	Abc Products.csv Category	Abc Products.csv Sub-Category	Abc Products.csv Product Name
FUR-BO-10000112	Furniture	Bookcases	Bush Birmingham Collection ...
FUR-BO-10000330	Furniture	Bookcases	Sauder Camden County Barr...
FUR-BO-10000362	Furniture	Bookcases	Sauder Inglewood Library Bo...
FUR-BO-10000468	Furniture	Bookcases	O'Sullivan 2-Shelf Heavy-Dut...
FUR-BO-10000711	Furniture	Bookcases	Hon Metal Bookcases, Gray
FUR-BO-10000780	Furniture	Bookcases	O'Sullivan Plantations 2-Doo...

3. ANALYSIS

Sales Analysis-

1. How do sales trends across different timescales (monthly, yearly) and product categories compare between the current and previous years?

Trend Analysis: The dashboard provides a comparative view of sales over the current and previous years, broken down by month and product category. This helps in identifying patterns and predicting future sales trends.
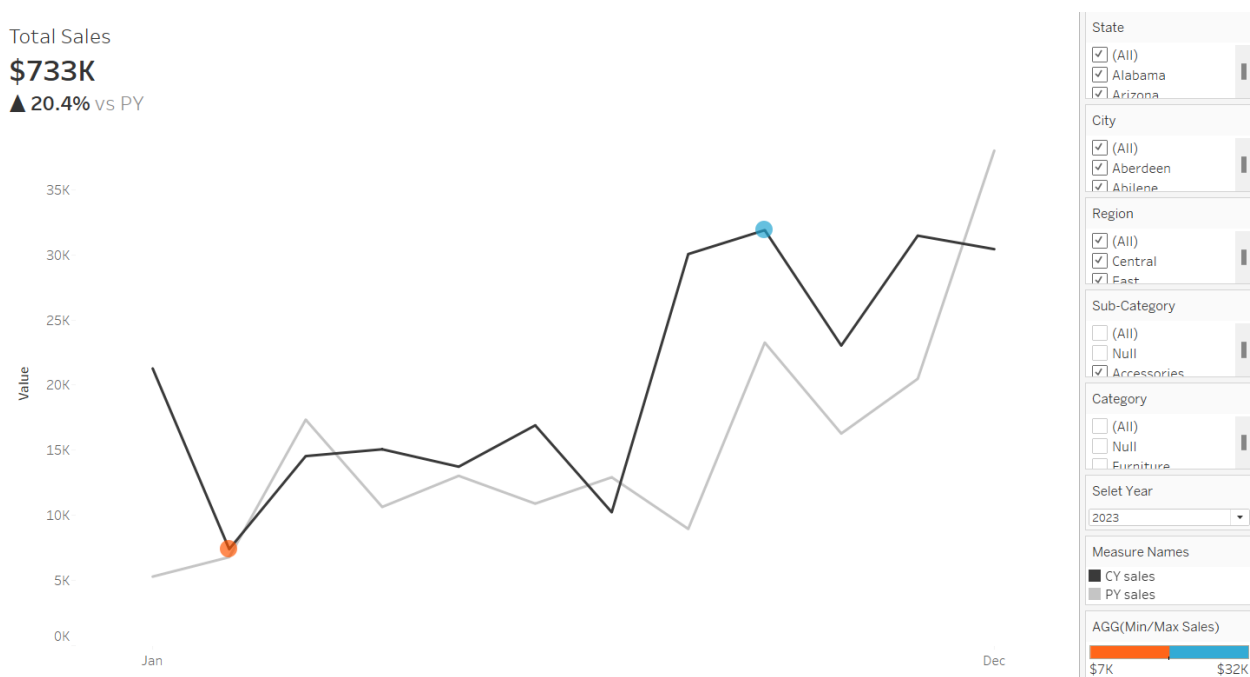
Product Performance: Detailed analysis of each product subcategory allows for assessment of sales effectiveness and profitability, enabling targeted adjustments in marketing and sales strategies.


Weekly Performance Metrics: Visualization of weekly sales and profit data helps pinpoint weeks that significantly deviate from the average, directing attention to underlying causes and potential adjustments.
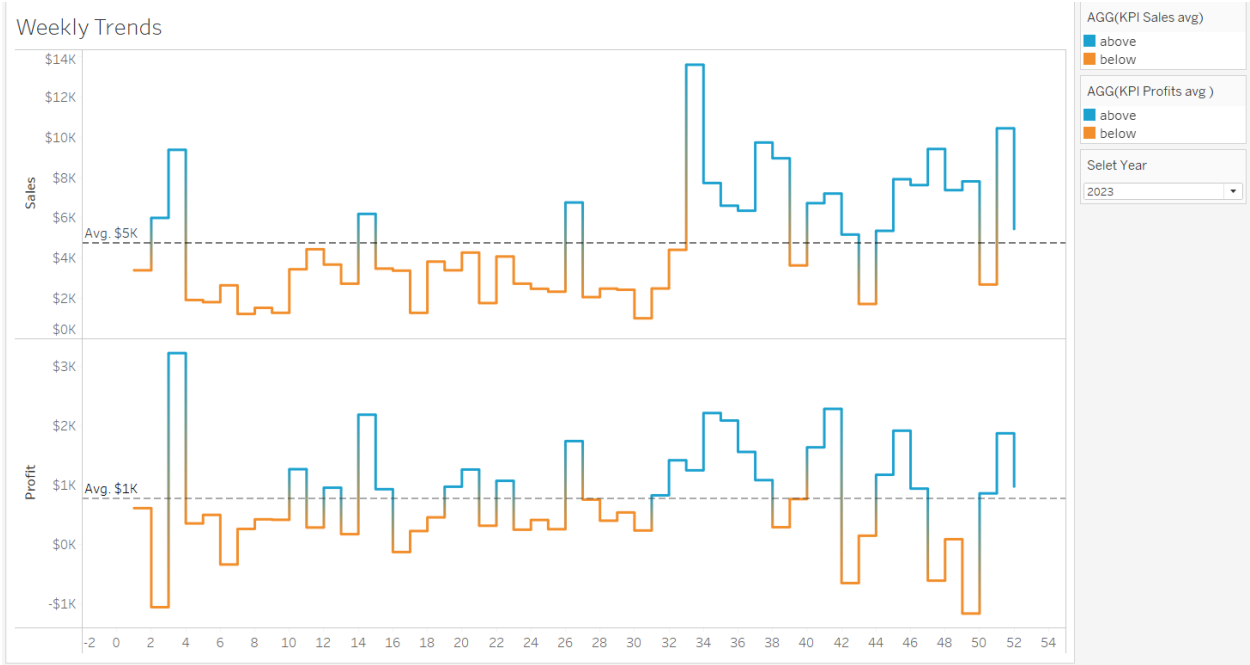
State-wise reflection of total profits, sales and quantity:

Here, in this map visual, we can check the state-wise amounts of total sales, quantity and profits, with a filter on Year, products and its sub-categories.
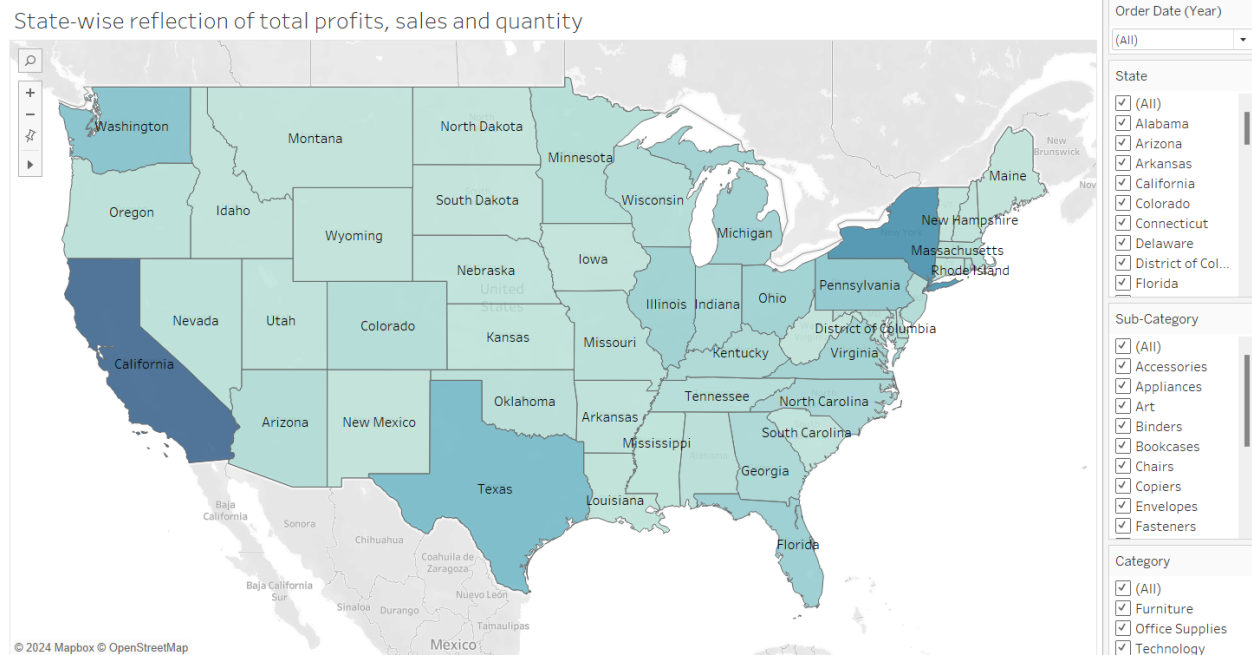
SALES DASHBOARD

The Sales dashboard serves as a comprehensive tool for stakeholders, offering a bird's-eye view of sales performance and trends. It includes multiple visualizations covering key metrics such as total sales, profits, and quantity sold, allowing for easy comparison between current and previous years.

Additionally, features like sales trends by month, product sub-category comparison, and weekly trends highlight actionable insights, enabling users to make informed decisions regarding inventory management, pricing strategies, and resource

allocation. The interactive nature of the dashboard, with filters for year, product, and location, enhances usability and customization, empowering users to drill down into specific data points and uncover deeper insights.

Overall, the sales dashboard facilitates data-driven decision-making and strategic planning, ultimately driving business growth and profitability.
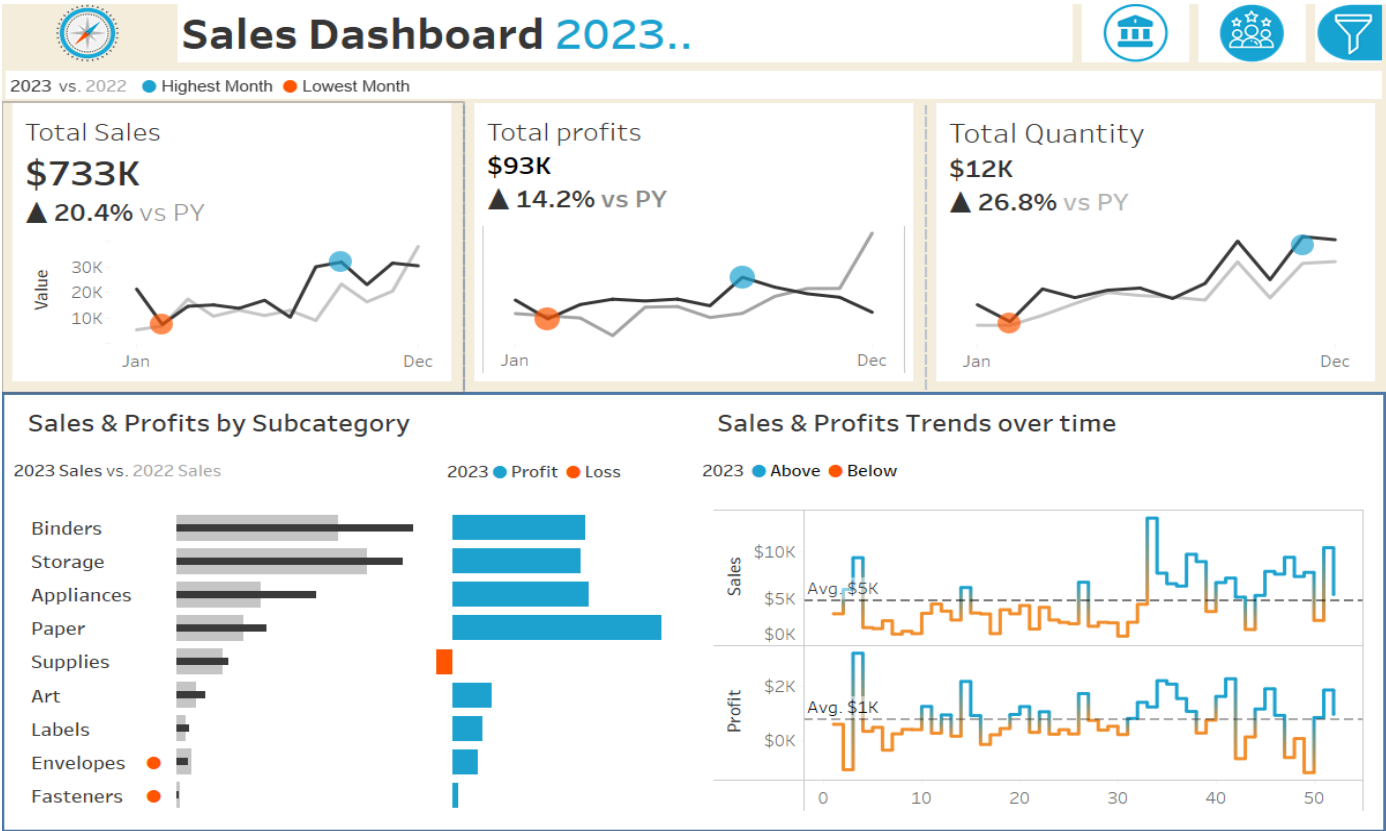
Customer Analysis-

2.   *What can be learned about customer loyalty, engagement, and profitability from detailed customer behavior metrics?*

Engagement and Loyalty: Analysis of order frequency and customer engagement levels offers insights into customer loyalty, helping tailor customer relationship management strategies.
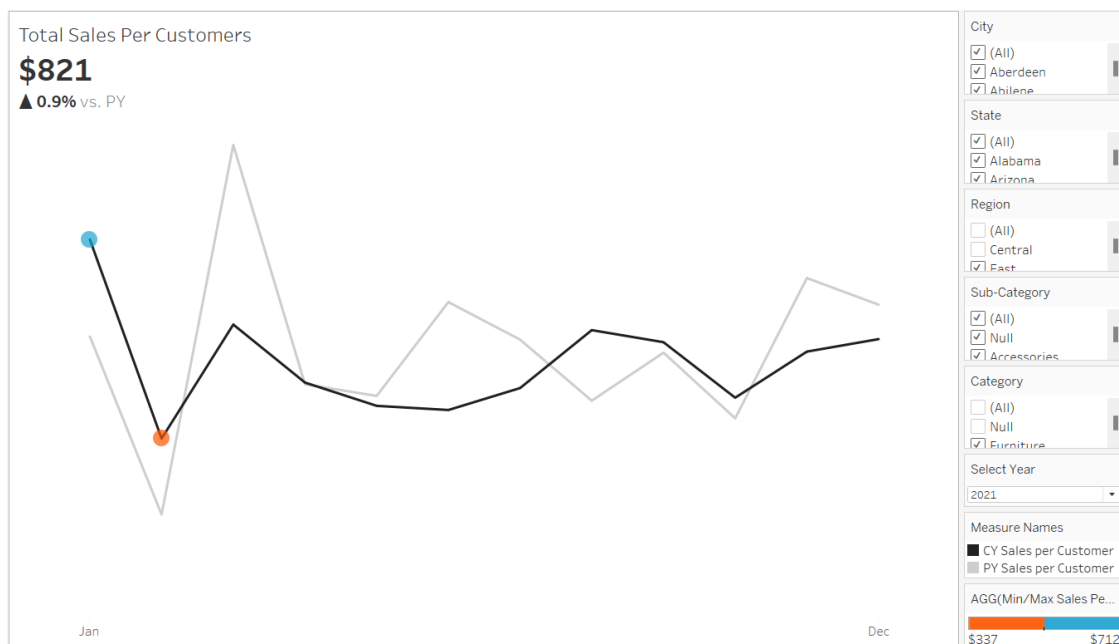
Profitability Segments: The project identifies top customers by profitability, allowing for focused marketing efforts and personalized customer engagement strategies.

Top Customers

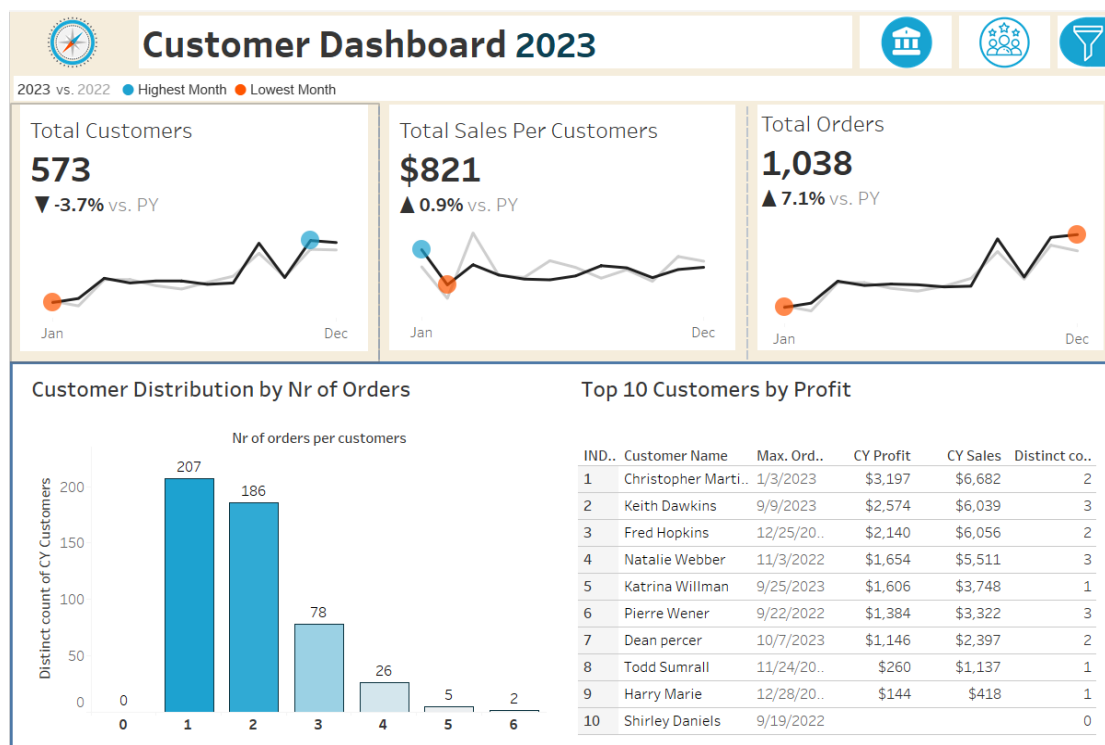| IND..	Customer Name	Max. Order ..	CY Profit	CY Sales	Distinct count of CY Ord..
1	Christopher Marti..	1/3/2023	$3,197	$6,682	2
2	Keith Dawkins	9/9/2023	$2,574	$6,039	3
3	Fred Hopkins	12/25/2023	$2,140	$6,056	2
4	Natalie Webber	11/3/2022	$1,654	$5,511	3
5	Katrina Willman	9/25/2023	$1,606	$3,748	1
6	Pierre Wener	9/22/2022	$1,384	$3,322	3
7	Dean percer	10/7/2023	$1,146	$2,397	2
8	Todd Sumrall	11/24/2023	$260	$1,137	1
9	Harry Marie	12/28/2023	$144	$418	1
10	Shirley Daniels	9/19/2022			0

Behavioral Insights: Seasonal and monthly trends in customer activity are analyzed to optimize marketing campaigns and resource allocation.

Customer Distribution

Nr of orders per customers

CNTD(CY Customers)

0   207

Select Year

2021
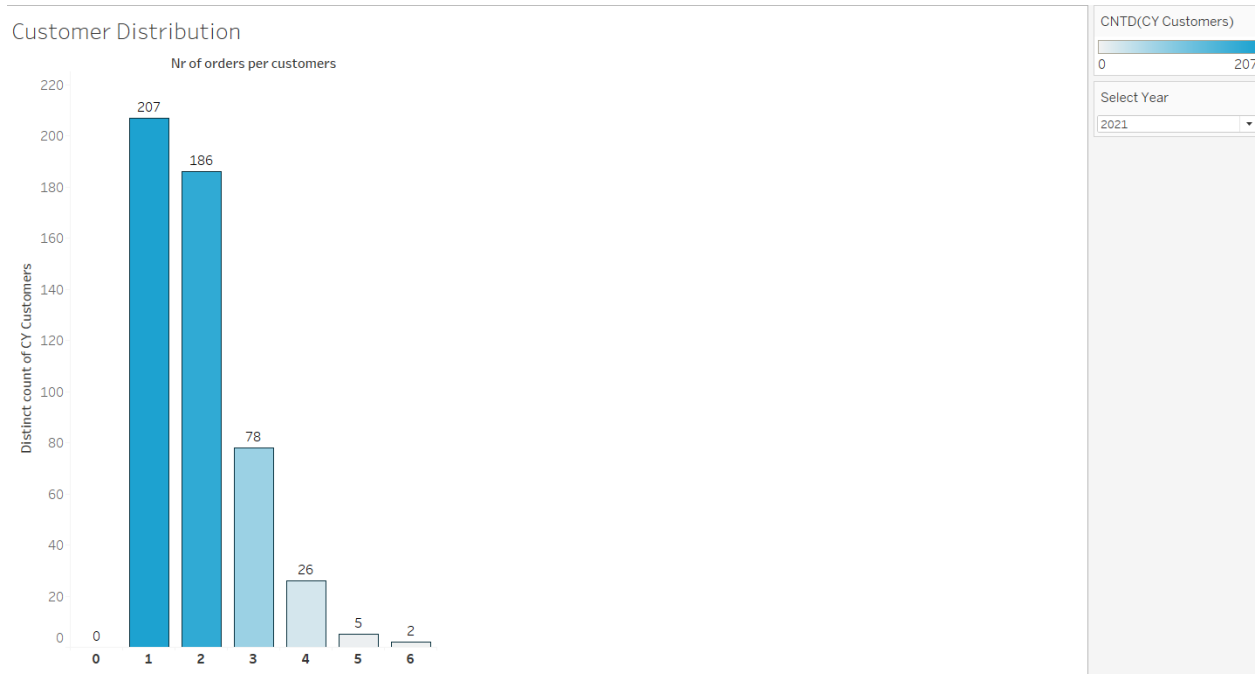
CUSTOMER DASHBOARD:

The Customer dashboard provides a holistic view of customer metrics and behavior, empowering stakeholders to understand and engage with their customer base effectively. It encompasses various visualizations, including total number of customers, sales per customer, and number of orders, facilitating analysis of customer trends and patterns over time.

Additionally, features like customer trends by month, distribution by number of orders, and top 10 customers by profits offer valuable insights into customer loyalty, engagement, and profitability. The interactive nature of the dashboard, with filters for year, product, and location, enables users to tailor their analysis to specific segments and make data-driven decisions regarding customer relationship management, marketing strategies, and revenue optimization.

Customer Dashboard 2023

2023 vs. 2022 ● Highest Month ● Lowest Month

Total Customers	Total Sales Per Customers	Total Orders
573	**$821**	**1,038**
▼ -3.7% vs. PY	▲ 0.9% vs. PY	▲ 7.1% vs. PY

Customer Distribution by Nr of Orders

Nr of orders per customers

Top 10 Customers by Profit

IND..	Customer Name	Max. Ord..	CY Profit	CY Sales	Distinct co..
1	Christopher Marti..	1/3/2023	$3,197	$6,682	2
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9	Harry Marie	12/28/20..	$144	$418	1
10	Shirley Daniels	9/19/2022			0

4. CONCLUSION

Findings

The analysis successfully unveiled critical insights into sales dynamics and customer behavior, highlighting specific areas where strategic interventions can enhance performance. Notably, the ability to visualize data across different dimensions has proven essential in understanding complex patterns and interactions.

Strategic Implications

These insights provide a foundation for refining sales strategies, enhancing customer engagement practices, and ultimately driving higher profitability and market share.

Recommendations for Further Research

Further investigation is recommended in the areas of:

- Impact of external market factors on sales and customer behavior.

- Longitudinal trends in customer data to forecast future market conditions.