RETAIL APPAREL COMPANY

Introduction

This analysis explores customer purchase data of the Retail Apparel Company to derive actionable insights essential for evaluating business performance. Their main objectives are :

1. Understand the region that acts as the main catalyst for sales and business growth in retail operation.

2. Gain an in-dept understanding of the retail business's various consumer age groups.

3. Understand product types and how sales vary for each based on specific factors such as region, age etc.

4. Understand the product return status and preferred purchase channel.

The analysis determines essential Key Performance Indicators (KPI) such as product penetration, average invoice spending, product return rates and regional sales growth. These metrics will be visualised through intuitive dashboards, providing clear and actionable insights. By leveraging these insights, the Retail Apparel Company can make informed decisions to improve customer satisfaction, enhance their market presence and boost sales growth.

Data Cleaning

- The dataset comprised 16,898 rows and 12 columns, with 346 null values in the customer age group column. Instead of removing these null values, they were filled with the mode age group to reduce the loss of data. Additionally, it was confirmed that there were no duplicate rows.

- Outliers in the price and total sales column were identified and removed, resulting in a dataset reduced to 13,061 rows and 12 columns.

- Misspellings in the sales channel and product category columns were corrected. For example, "Acessories" was updated to "Accessories" to unify product categories.

- The date-time column was used to identify the days of the week and divide time into intervals like morning(6am-12pm), evening(12pm-6pm) and night(6pm onwards), enabling a detailed analysis of how these factors impact sales.

Key Performance Indicators

1)Product Penetration

- This was calculated by grouping data by product category and determining the percentage of distinct invoices for each category relative to the total number of unique invoices. The results are shown below.

Product Category		
Accessories	Clothing	Footwear
21.34%	34.74%	44.10%
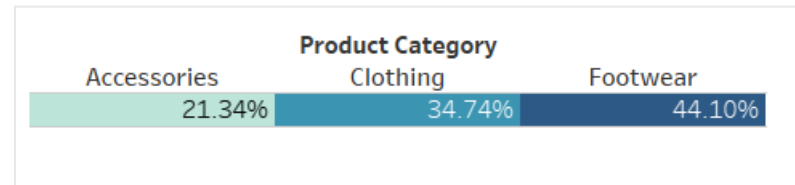
- The results indicate that Footwear was the most invoiced, followed by Clothing, with Accessories being the least.

2)Average Invoice Value

- To calculate this, data was grouped by customer age group and sales channel separately, with average sales computed for each. The number of distinct invoices was also determined for further insights. The results are displayed below.

Customer Age Group

18-25	26-35	36-45	46-55	56+
194.018	192.835	191.036	195.078	195.575

Average sales value for each age group

Sales Channel

In-store	Online
194.0649	193.8716

Average sales value for each sales channel

Customer Age Group	
36-45	▪
18-25	▪
56+	▪
26-35	▪
46-55	▪

Unique invoice values for each age group

| Sales Channel	
In-store	▪
Online	▪

Unique invoice values for each sales channel

- Analyzing the age group, its seen that the average invoice/sales value is almost the same for each age category with the highest for people aged 56+ and the lowest for the age 36-45 . Considering the number of invoices made it's noted that there were more invoices for the people aged from 46-55 and the least was from the age 36-45.

- Moreover, analyzing the sales channel the average sales value is almost the same for online and In-store but higher for In-store than Online. The number of invoices for online is more than In-store. This could be because online is more convenient and faster than going to a physical store as it requires less effort.

## 3)Rate of Returned Products

- The return rate was determined by dividing the number of products returned by the total number of products sold. The number of products returned and not returned are shown below

- A low return rate is a positive indicator of a well-functioning business with satisfied customers, a high return rate signals potential issues that may need to be addressed to improve product offerings and customer satisfaction. High return rate could indicate poor product quality, sizing issues or customer dissatisfaction.

- The return rate for the company is 525/(48,330)= 0.0108 or **1.1%**. Since **1.1%** is low it means it's a positive indicator for the business. To reduce the return rate further, actions could be taken such as monitor and analyze return data or by implementing post-purchase follow ups like surveys.

	Return Status		
Not Returned	Returned		Grand Total
47,805		525	48,330

4)Sales growth by Region
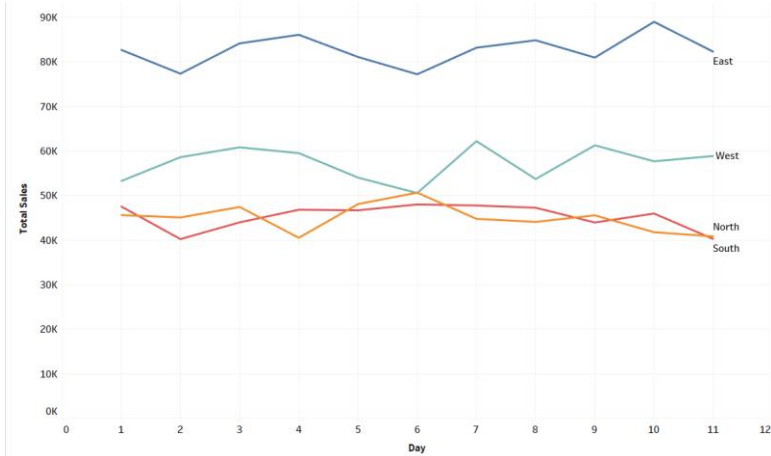
Variation of Total Sales across each Region
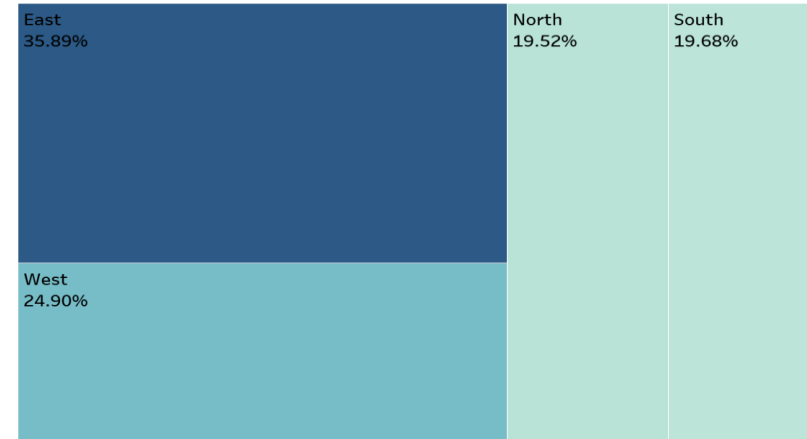
Percentage of Total Sales

- Sales fluctuate across regions without a consistent trend. The East region leads with **35.89%** of total sales. The West region is second, contributing **24.9%** of the total sales. North and South have similar lower sales. Sales in the East and West could be higher due to factors such as population density, market demand or seasonal factors. For instance, more people can lead to higher sales and seasonal trends and events can lead to temporarily boost sales in particular region.

Customer Analysis

Return Status based on Age Category

Return S..	Customer Age Group					Grand Total
	18-25	26-35	36-45	46-55	56+	
Not Returned	8,442	10,013	6,756	13,327	9,267	47,805
Returned	99	102	43	167	114	525
Grand Total	8,541	10,115	6,799	13,494	9,381	48,330

Quantity based on Age and Sales Channel

Sales Channel	Customer Age Group					Grand T..
	18-25	26-35	36-45	46-55	56+	
In-store	3,311	3,904	2,753	5,378	3,815	19,161
Online	5,230	6,211	4,046	8,116	5,566	29,169
Grand Total	8,541	10,115	6,799	13,494	9,381	48,330

Quantity based on Age and Product Category

Product Category / Customer Age Group — Accessories, Clothing, Footwear. Values: 101,707; 113,092; 67,770; 154,131; 105,414; 146,245; 186,844; 120,802; 239,425; 182,774; 199,066; 230,940; 161,596; 314,578; 208,573

- Its noteworthy that most of the products were not returned and the returned rate is only **1.1%** indicating a positive impact on the business as the return rate is low. More products were purchased in the age group 46-55 and most of the products returned and not returned were in the age group 46-55.

- Analyzing the sales channel, for each age group more purchases were made online and most of the customers were aged between 46-55. The In-store purchases were only **39.6%** of the total purchases and this is because shopping online is easier and cost efficient.
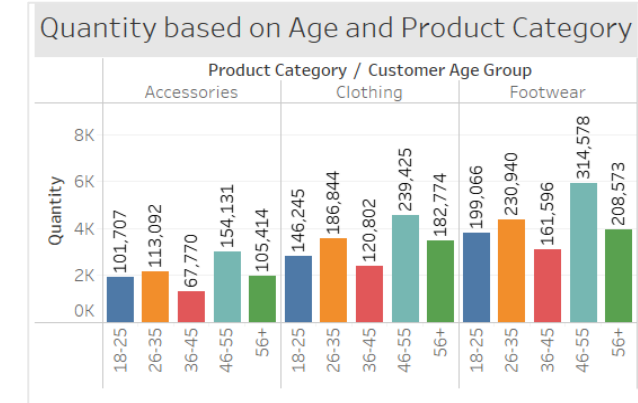
- Looking at the quantity based on age and product category majority of the purchases in each product category were made by individuals from the age group 46-55 followed by 26-35, then 56+, 18-25 and finally 36-45.
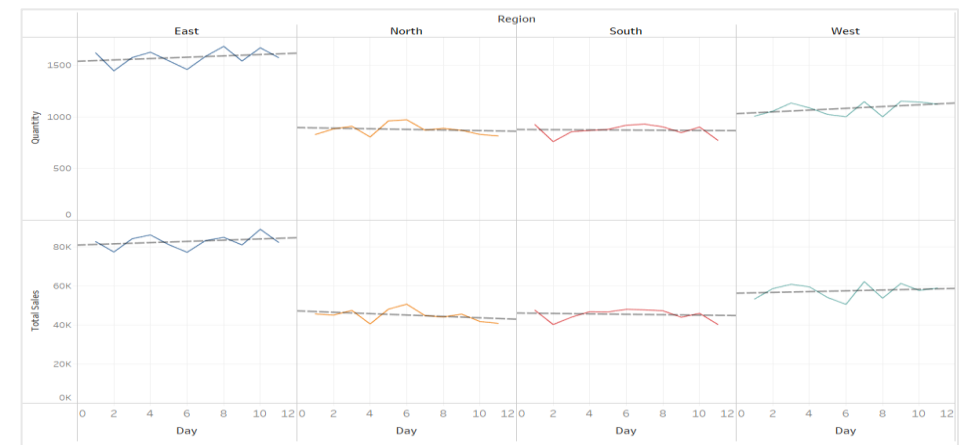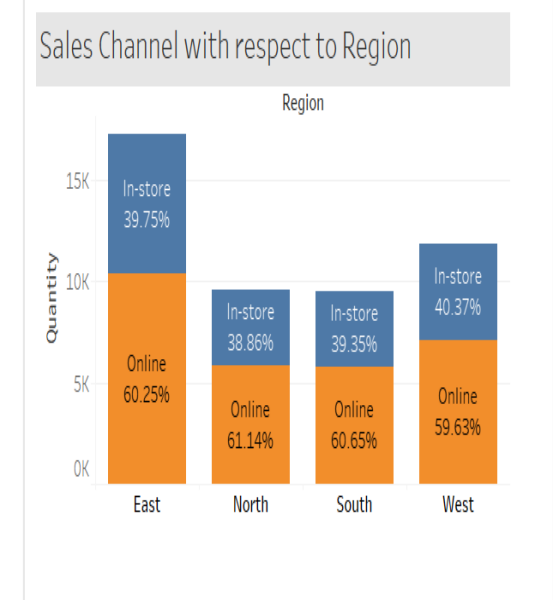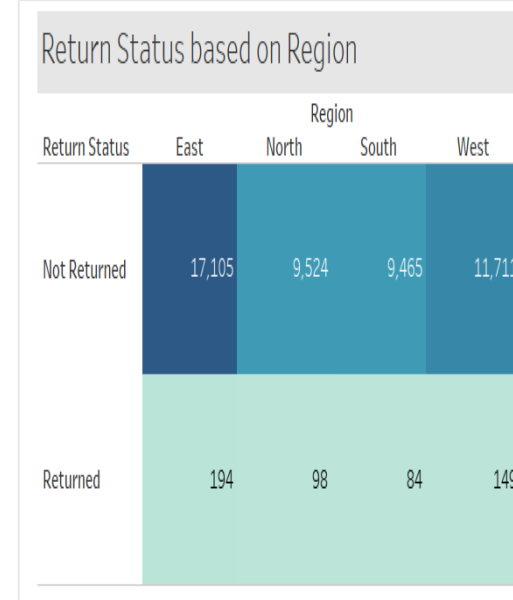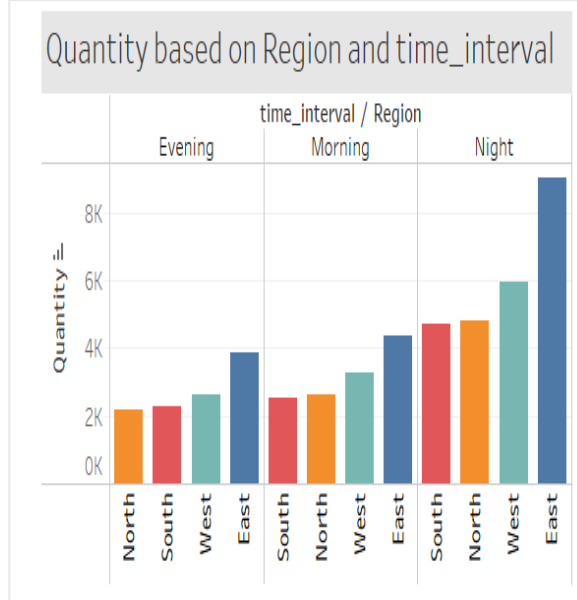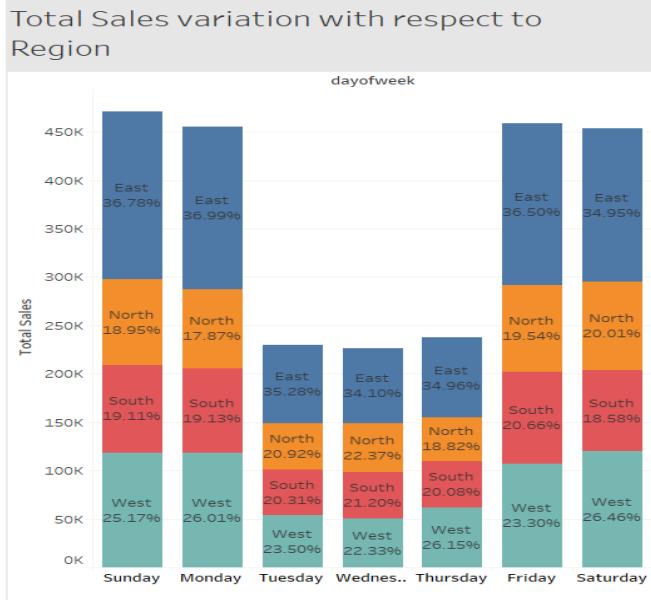
Total Sales variation for each Age Category
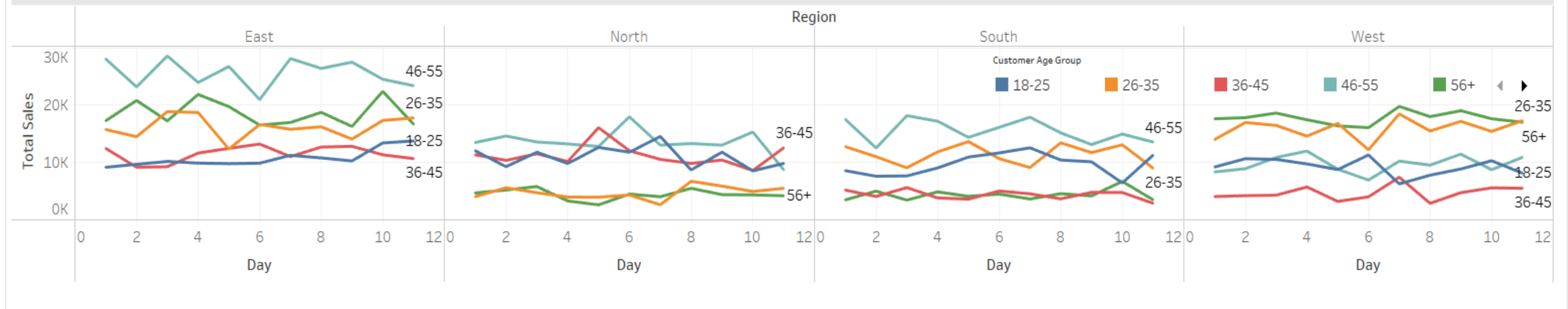
- Analyzing the total sales variation for each category, Its noteworthy in the East and South, sales were highest among the 46-55 age group. In the West, the 56+ age group had the highest sales. Sales for the 56+ group were low in the North and South. The 36-45 age group had higher sales in the East and North but lower in the West and South. Sales for the 26-35 age group was low for the North but relatively higher and similar fluctuations across the East, South, and West. Sales for the 18-25 age group show roughly similar fluctuations.

Regional Analysis

- The daily sales analysis for January shows an upward trend in the Eastern and Western regions, while the Northern and Southern regions exhibit a downward trend. The upward trend could be because of seasonal, product availability or promotional activities. While the downward trend could be because of increased competition, seasonal slowdown or economic downtown.
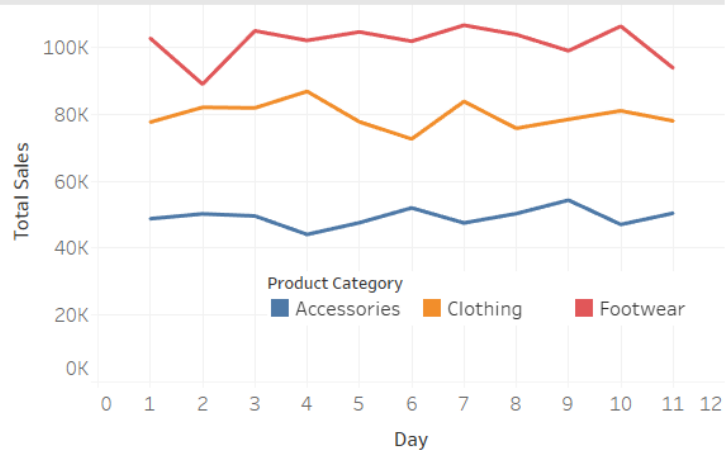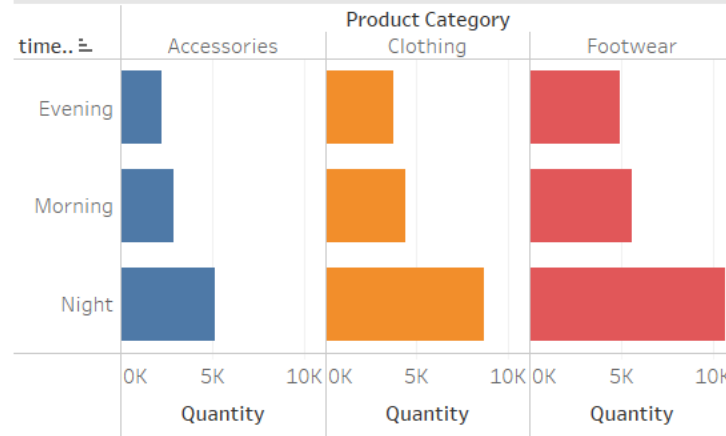
Total Sales variation with respect to Region

Quantity based on Region and time_interval

Return Status based on Region

Return Status	Region			
	East	North	South	West
Not Returned	17,105	9,524	9,465	11,711
Returned	194	98	84	149

Sales Channel with respect to Region

- Analyzing the sales variation with respect to the day of the week and region, its shown that most of the sales occur on Sunday, Monday, Friday and Saturday. Out of which most of the sales on each day is from the East. Except for Tuesday and Wednesday, sales on North is lower than South on each day of the week. Moreover, the sales on the West is higher than North and South.

- The graph showing the quantity based on region and time interval indicates that most of the sales for each region occurred during the night. This could possibly be due to promotional discounts. Sales in the North are slightly lower than in the South in the evening, but slightly higher in the morning and night. Furthermore, evening sales were lower than morning or night across all regions.

- It's shown that most of the products were not returned and the return rate for East is **1.1%**, North is **1.0%**, South is **0.88%** and West is **1.2%**. All regions show a low rate of product returns this could be due to high customer satisfaction, products are accurately described or match consumer expectations. Lower the return rate better is it for the company.

- It's shown that most of the purchases in each region were made online but the difference in the proportion of the quantity of the goods sold online and in-store is slightly higher in the North than in the East, South or West.
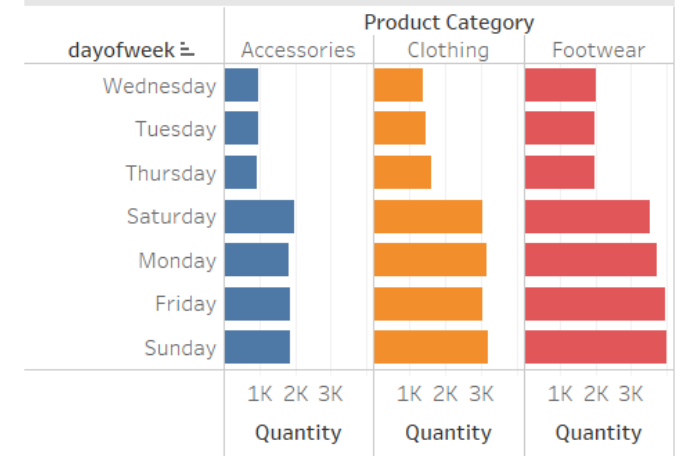
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Product Analysis

- Footwear sales exceed those of clothing and accessories. Footwear accounts for **44.01%** of total sales, clothing for **34.59%**, and accessories for **21.4%**.

- Most sales for all three categories occur at night, followed by morning, then evening.

- Accessories are sold the most on Saturdays, clothing on Mondays and Sundays, and footwear on Fridays and Sundays.

Sales Channel with respect to Category

Return Status with respect to Category
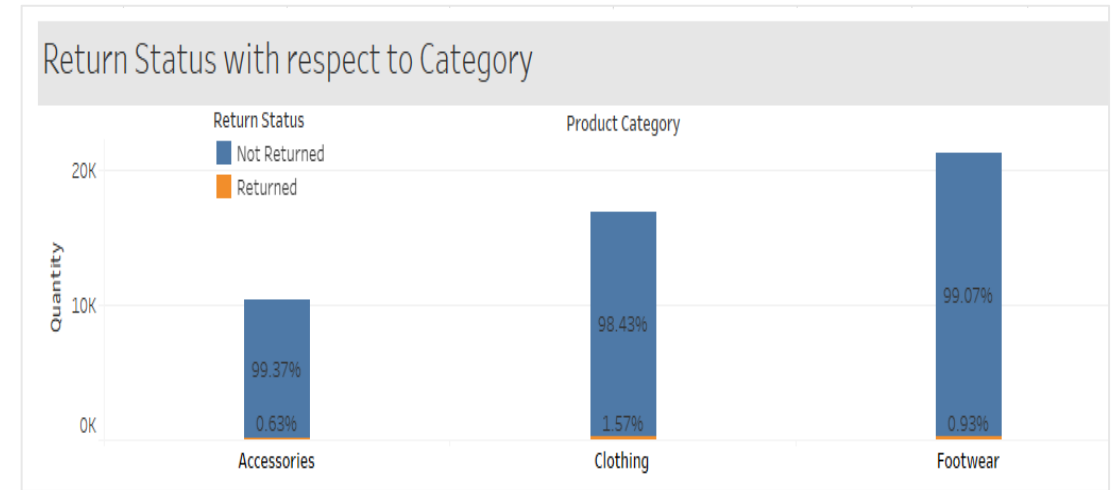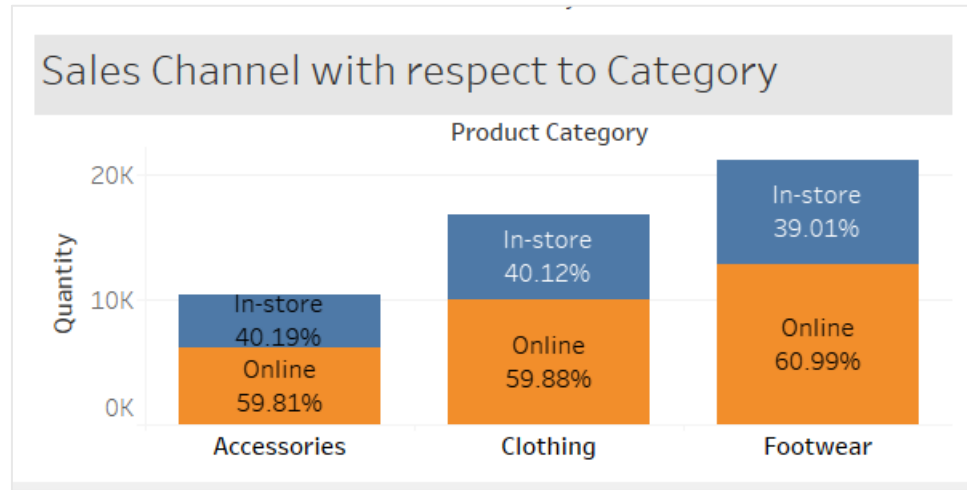
- The online store has the highest sales across all categories, though physical stores also contribute significantly. Footwear is the top-selling category both online and in physical stores. The proportion difference between in-store and online purchases for each product category is greater for footwear than for accessories or clothing.

- Clothing has the most returns, while accessories have the least. The return rates for all categories are minimal and it is a strong positive for the business.

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