



DATA ANALYST
OPTIMIZING PRODUCT PERFORMANCE
**RETAIL SALES E-COMMERCE
(UNITED KINGDOM)**



AUGUST 30, 2025

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Hello, i'm

DEVI AULIA OKTAVIONA



Introduction

Public Relations graduate with strong interest in Marketing Communication & Data Analytics. Experienced in both international and national projects for leading campaigns, branding, and community initiatives, with measurable results in donations, engagement, and retention. Skilled in combining creative storytelling and data-driven insights to optimize business growth.



Trello



Office



zoom



Meta
metaverse

TOOLS

Skills



PERSONAL Skill



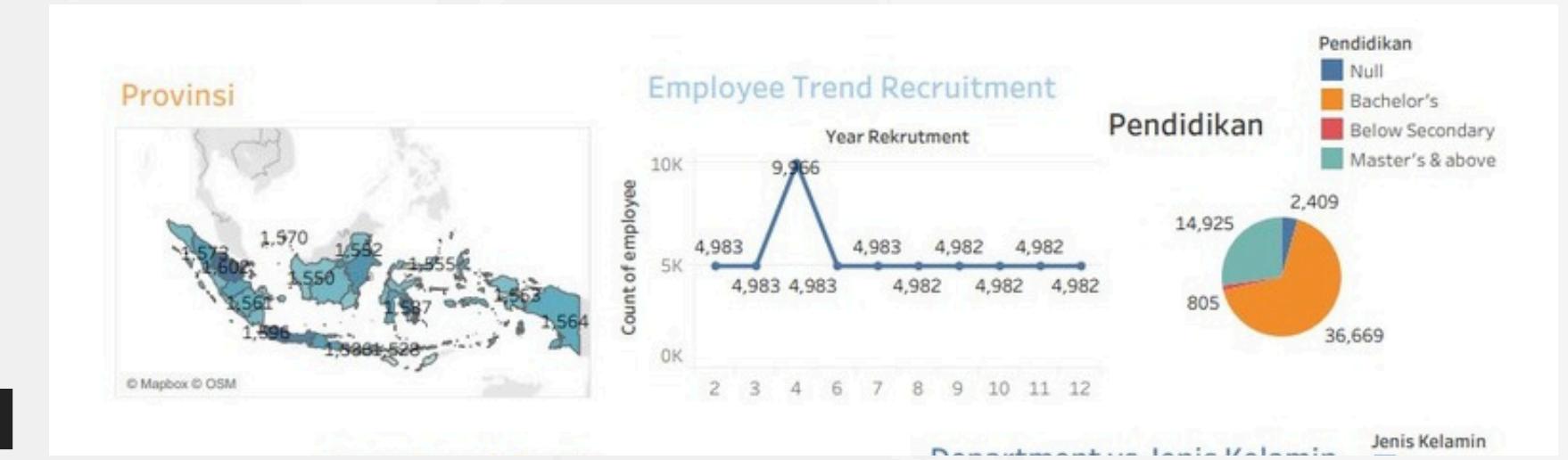
Skills

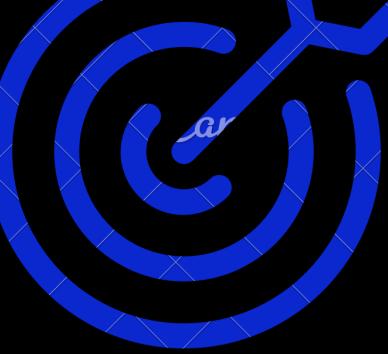
★ KOL & BRAND COMMUNITY

★ VISUAL DESIGN & CONTENT MARKETING

★ DIGITAL CAMPAIGN PLANNING & EXECUTION

★ DATA ANALYST





Executive Summary

PROJECT DESCRIPTION

This project analyzes retail e-commerce sales data to identify key trends, customer behavior, and product performance. The analysis covers sales patterns, top products, basket size, delivery performance, and customer reviews. Insights are translated into business recommendations to optimize marketing, inventory planning, and customer retention.

OBJECTIVE

To analyze sales trends, product performance, and customer segments in order to provide strategic recommendations for increasing profitability.

TOOLS & METHODS

- **Data Processing:** Python (Jupyter Notebook)
- **Visualization:** Matplotlib & Seaborn
- **EDA:** Sales Transaction.csv

INSIGHT

- Sales show seasonal **peaks in November** (holiday campaigns) with weaker off-peak months.
- Revenue is dominated by the **UK domestic market**, with smaller contributions from Netherlands, Australia, and Singapore.
- Product sales are led by **low-medium priced item** household & seasonal items.
- Most customers purchase only **1-5 transaction**, with limited retention outside January cohort.

RECOMMENDATION

- **Strengthen holiday campaigns** and replicate promotions in off-peak months.
- **Improve customer retention** via loyalty programs and re-engagement strategies.
- **Optimize product mix:** focus on low-medium price volume, upsell premium items.
- **Enhance logistics & inventory** readiness to handle seasonal demand efficiently.

Business Background



"Retail Sales E-Commerce (United Kingdom)"

The dataset covers one year of e-commerce retail transactions from a London-based store that sold gifts and household items for both adults and children during the period of 2018–2019. Customers came from across the globe, typically purchasing directly for personal use, while some small businesses bought in bulk for resale through retail outlets.

In the e-commerce industry, segmentation analysis plays a vital role in understanding purchasing patterns and optimizing profitable marketing strategies. This project transforms the dataset into actionable insights by analyzing customer segmentation, sales performance, and product trends, ultimately providing strategic recommendations to support sustainable business growth.

Business Problem

This project analyzes retail e-commerce sales data to identify key trends, customer behavior, and product performance. The analysis covers sales patterns, top products, basket size, delivery performance, and customer reviews. Insights are translated into business recommendations to optimize marketing, inventory planning, and customer retention.

Objective

The objective of this analysis is to identify monthly sales trends, discover the most frequently purchased products, measure customer purchase behavior per transaction, and determine the most profitable customer segments. Based on these findings, the project aims to provide actionable, data-driven recommendations to optimize sales performance, improve customer retention, and support sustainable business growth.

Data Explanation

The dataset comes from a UK-based online retail store covering transactions from 2018–2019. The store sells gifts and household products for both adults and children through its e-commerce platform. Customers are spread worldwide, ranging from individual buyers to small businesses purchasing in bulk for resale.

METHODOLOGY

1. Data Collection & Preparation

- Imported dataset from the UK online retail store (2018–2019).
 - Performed data cleaning: handling missing values, removing duplicates, and standardizing data types.
- Created additional time-based features and transaction metrics

2. Exploratory Data Analysis (EDA)

- Analyzed sales trends across months and seasons.
 - Identified top-selling products and revenue contribution
 - Examined customer behavior & geographic distribution
- Assessed seasonality patterns

3. Insight Generation

Synthesized findings to highlight patterns in sales, products, customers, and regions.

4. Recommendation Development

- Translated insights into actionable strategies for sales optimization, customer retention, product, logistics, and market expansion.



DATA ANALYST

EXPLORATORY DATA ANALYSIS,
VISUALIZATION, INSIGHT



1. How are the sales trends over the past months?



Insight:

- Sales remained relatively stable from January to August.
- A significant increase began in September, **reaching the peak in November 2019.**
- In December, sales show a sharp decline. However, this drop is due to incomplete data, as records are only up to December 9.

```
# Find the last transaction date
last_transaction_date = df_sales['Date'].max()

last_transaction_date

Timestamp('2019-12-09 00:00:00')
```

Data Support:



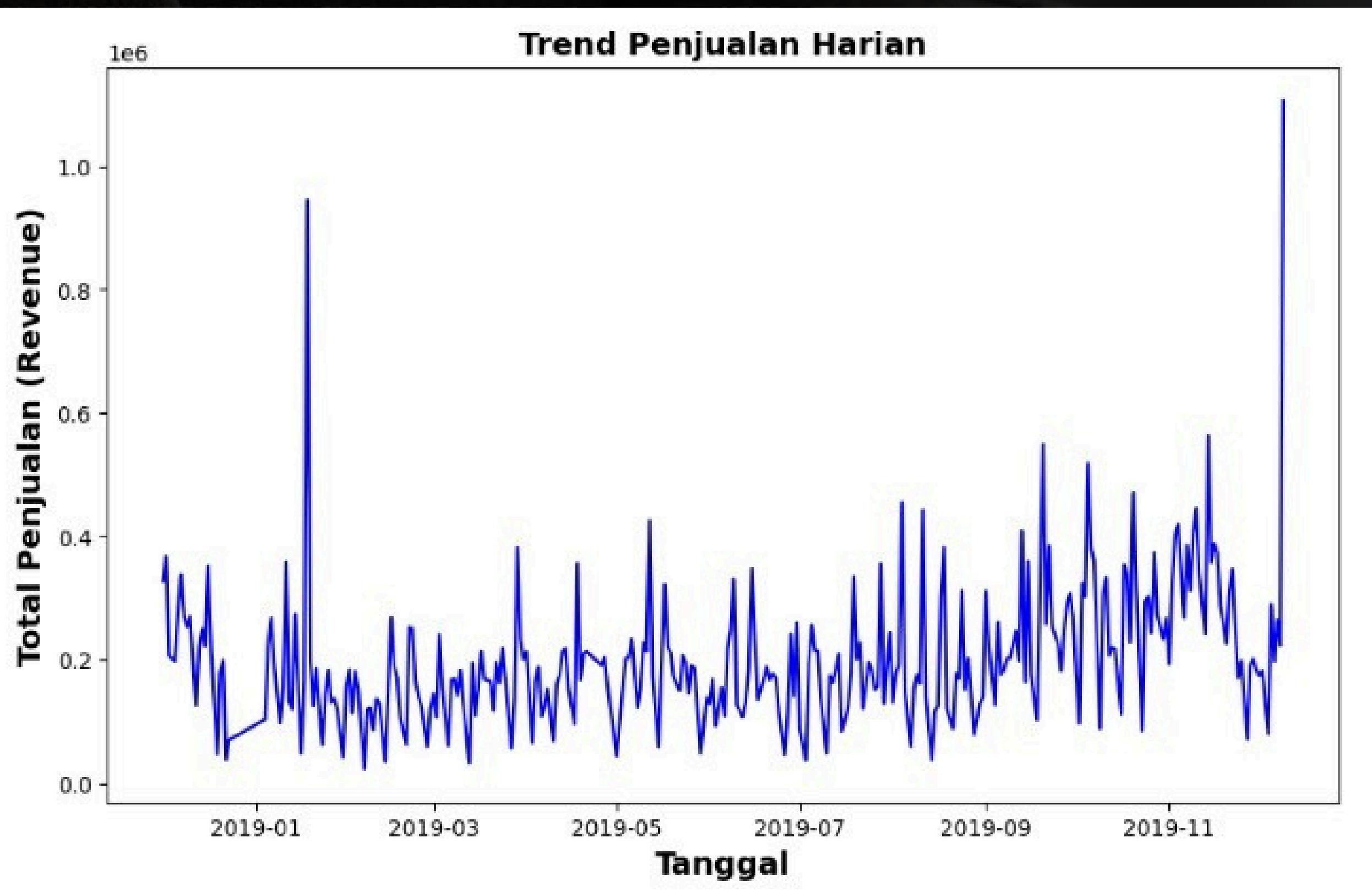
Insight:

- The highest sales trend occurred in November 2019, with a total revenue of £7,861,197.

Rekomendasi:

- Increase sales during low-demand months by maintaining stable performance from January to October.
- Implement effective stock management strategies, ensuring better inventory preparation ahead of the sales surge in November and December.
- Strengthen customer loyalty programs to sustain and grow sales outside of peak periods.

Data Support:



Insight:

- Sales trends show fluctuations with several peak periods at specific times.
- Daily sales data indicate notable spikes at the beginning of the year (January 2019) and toward the end of the year (Nov –Dec 2019).
- These significant increases are likely influenced by promotions or specific marketing campaigns.

Factors Influencing Sales Trends:

2. Why did sales spike in November 2019?

- Indication of a **seasonal effect**, with demand surging ahead of Christmas and New Year celebrations.
- The spike was driven by several factors:
 - **Consumer behavior** – customers tend to shop earlier for the holiday season.
 - **Global promotional events** – such as **Black Friday**.
 - **Retailer strategy** – pushing seasonal stock before December.

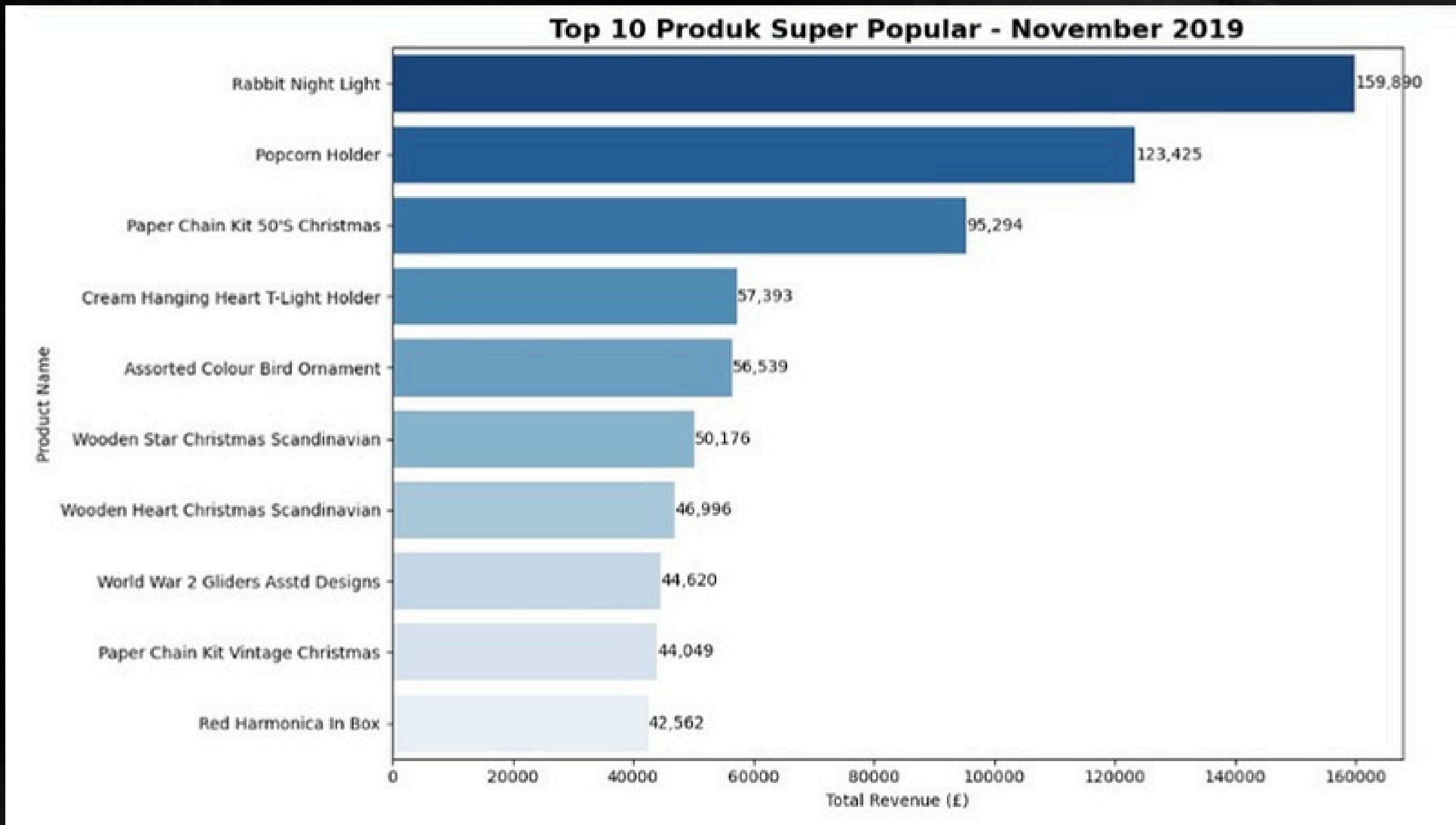
2. Why did basket size increase at the beginning (Jan) and end of the year (Nov-Dec) 2019?

- Influenced by **seasonal campaigns and major promotions**, such as **11.11 (Singles' Day)**, **(December Sale)**, and **New Year promotions**, encouraged purchases which bulk

3. Why did sales drop sharply in December 2019?

- The drastic decline in December was most likely due to a **post-peak season effect**, as many customers had already shopped earlier.
- Sales activity still existed, but **online purchases tended to decrease** because of **limited shipping timeframes** before the holidays.

Data Support:



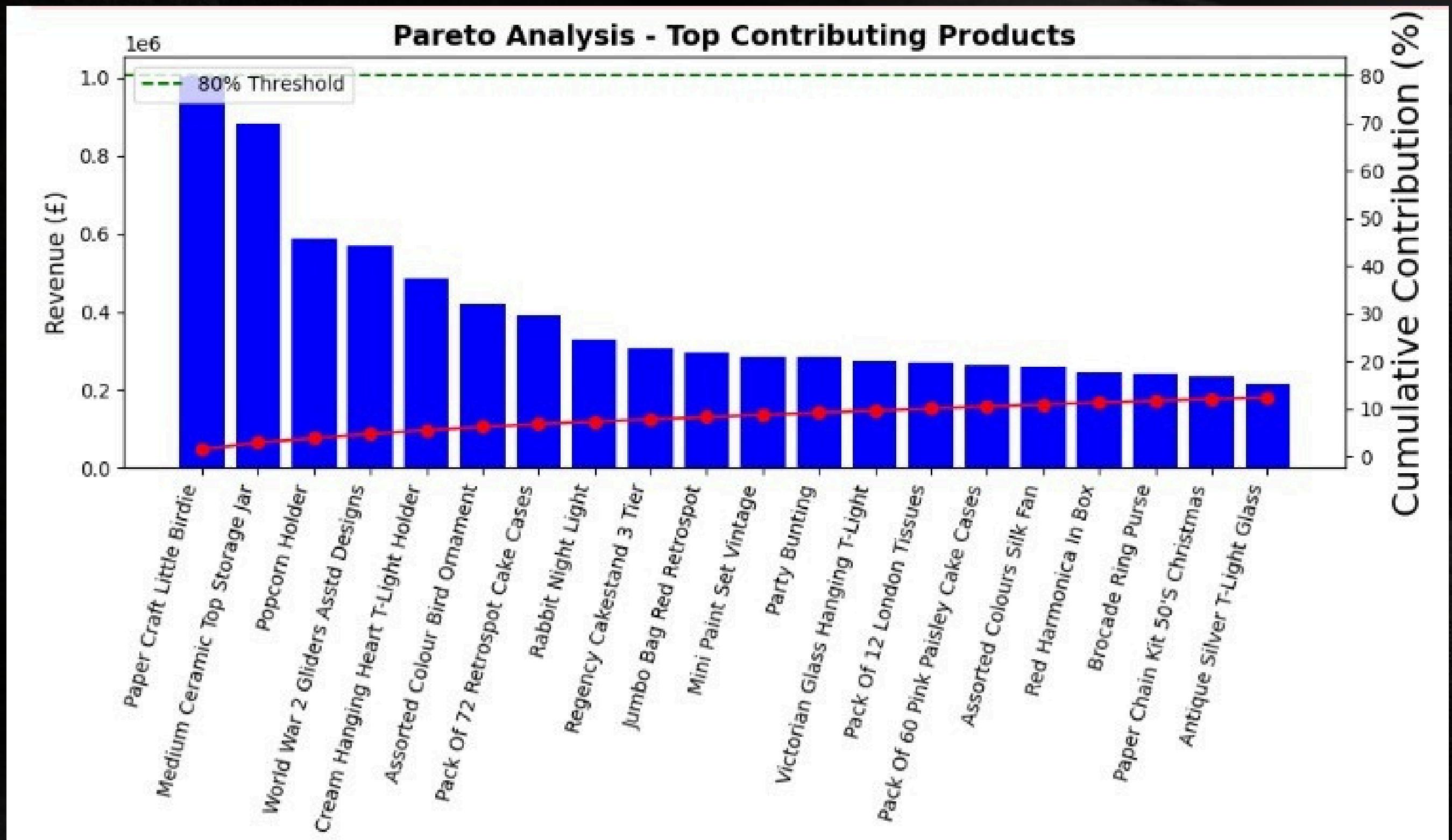
Insight:

- The best-selling product in **November 2019** was the **Rabbit Night Light**.
- The **Top 10 Super Popular Products** were mainly **seasonal Christmas** items, typically purchased to meet consumer needs leading up to the holiday season.

Recommendation:

- Strengthen seasonal product campaigns** to maximize holiday sales.
- Ensure early stock preparation** for **best-selling seasonal items** to avoid shortages.

2. What are the most frequently purchased products?



Insight:

- The best-selling products are dominated by small decorative and household items, such as Paper Craft Little Birdie (80,995 units sold).
- Out of the entire product range, only **931 products contribute to 80% of total revenue**, as shown in the Pareto analysis.

Recommendation

- Focus inventory and marketing efforts on **high-contribution products** to maximize profitability.

Factors Influencing Product Popularity:

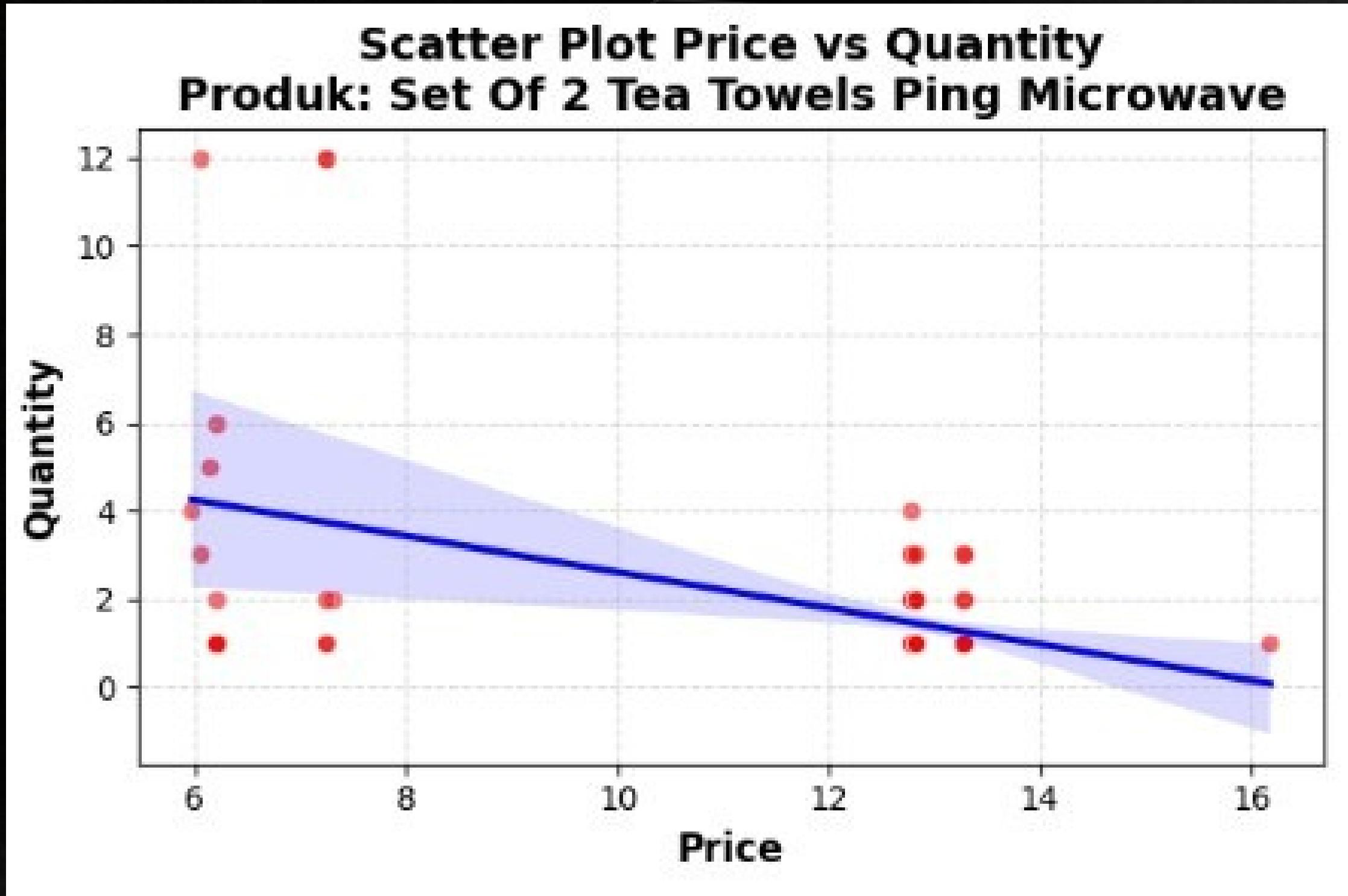
1. Why was the “Super Popular” product category the highest in Nov 2019?

- **Combination of Price & Volume** – products sold in high quantities with relatively higher prices, boosting overall revenue.
- **Holiday Season Effect (Nov 2019)** – many products were gifts or decorations purchased ahead of year-end holidays and Christmas.
- **Best-Seller Effect** – already popular products continued to be repurchased by customers, reinforcing their sales performance.

2. Why did these products become best-sellers?

- **Relatively Low Price** – small, decorative, and household items that are affordable and easy to purchase.
- **Gift/Seasonal Products** – such as Rabbit Night Light or Assorted Colour Bird Ornament, which are popular as gifts and Christmas decorations during the holiday season.
- **High Utility & Repeat Purchases** – items like Storage Jars and Cake Cases are often bought multiple times due to recurring needs.

Data Support: Price Elasticity



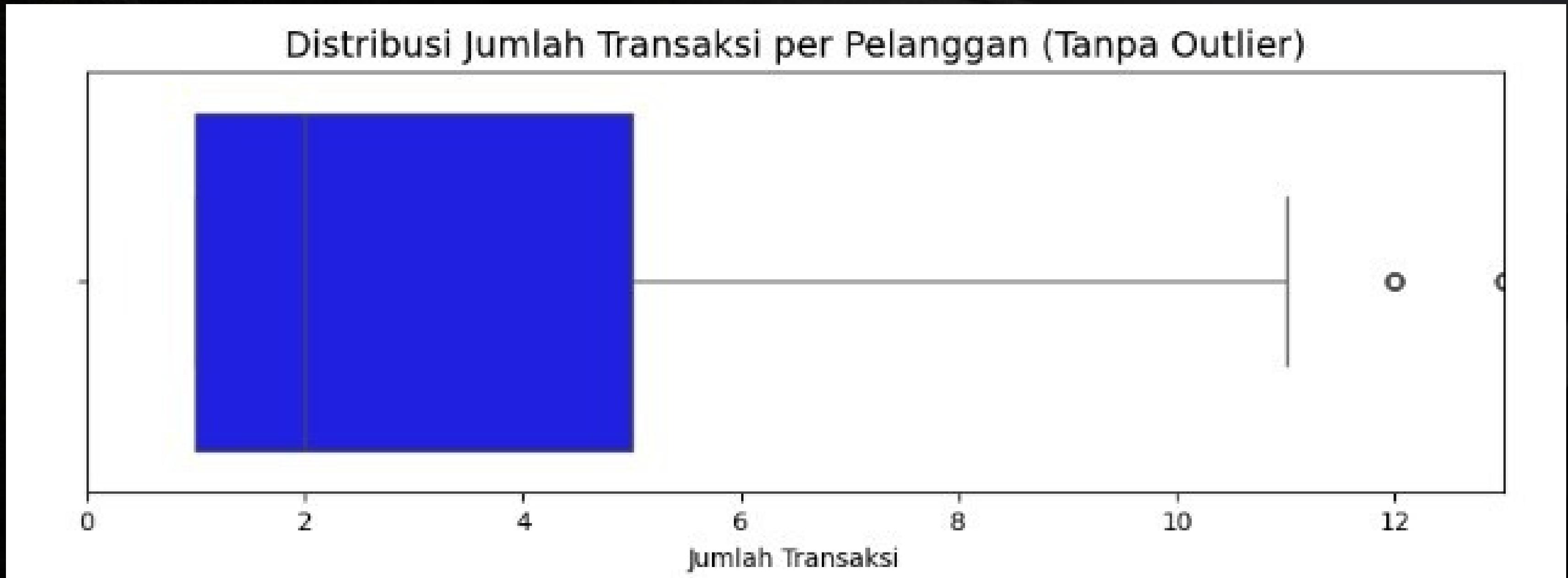
Insight

- Consumers are **price-sensitive**, meaning that as prices increase, sales volume decreases.
- The **optimal price** range is around **£6-£7**, where sales volume reaches its peak.

Recommendation:

- Set product prices **below £8** to maintain strong demand.
- For higher-priced items, apply **discounts or promotional strategies** to attract buyers and sustain sales volume.

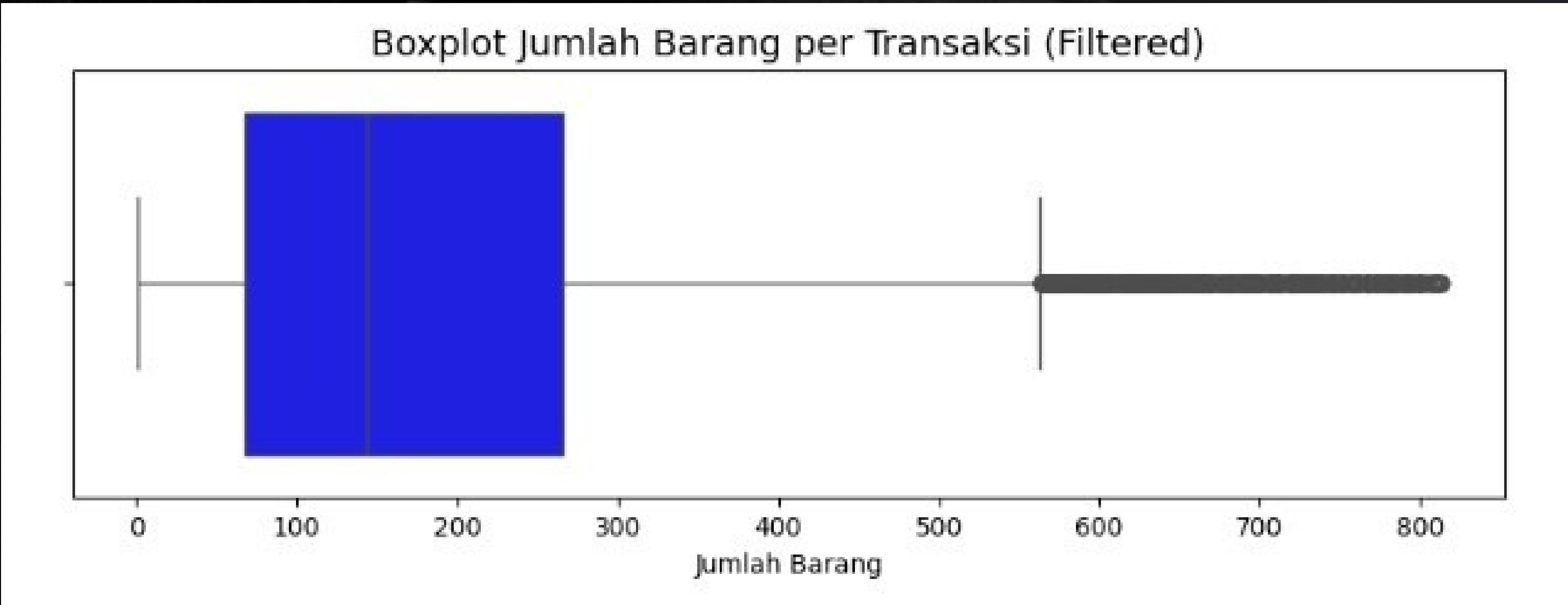
3. How many products do customers purchase in each transaction?



Insight

- The majority of customers purchase only 1–5 products per transaction

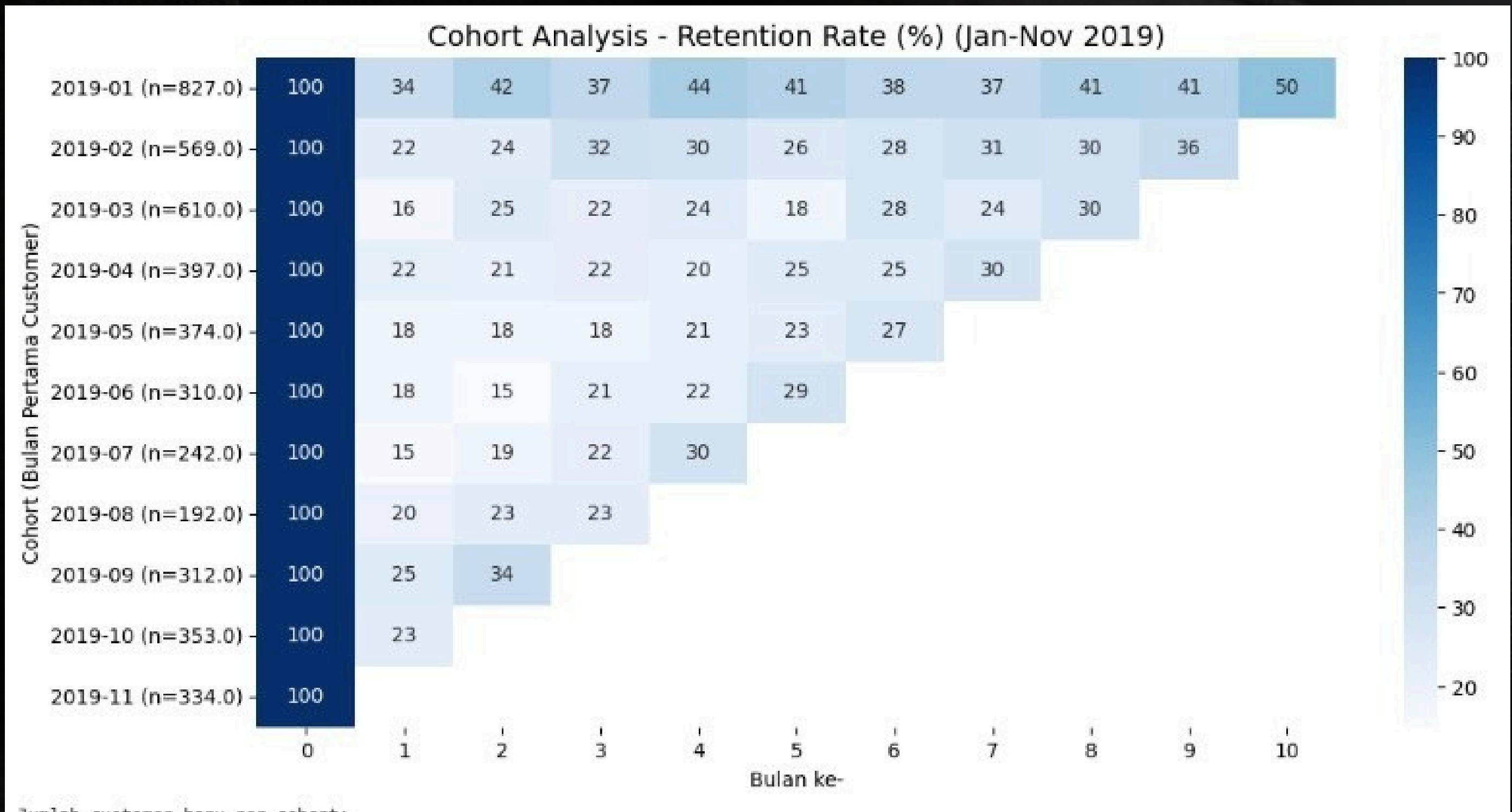
Data Support:



Insight

- The number of items per transaction is relatively stable, typically ranging between **80–200 items**.

Data Support:



Insight:

- The 2019-01 cohort achieved the highest **month-one retention rate, at 34%** in January 2019.
- Overall, the **growth trend of new customers is slowing down.**

Recommendation:

- Replicate early-year acquisition strategies** to boost retention in other cohorts.
- Strengthen engagement programs** (loyalty program)
- Analyze behavior of the Jan cohort** to identify key drivers of loyalty

Factors Influencing Customer Transactions & Retention:

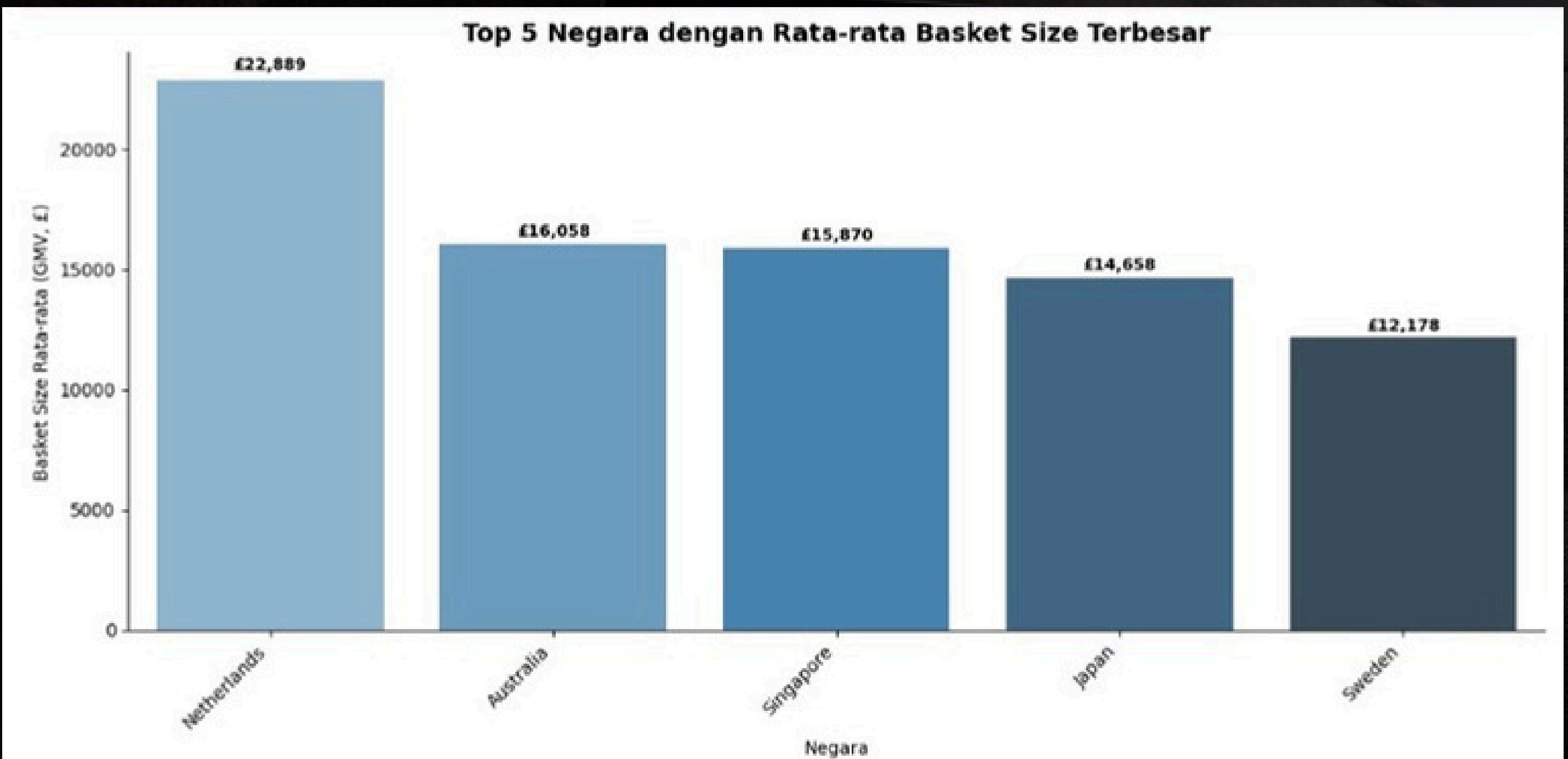
1. Why do the majority of customers only have 1–5 transactions?

- **Customer acquisition without strong retention** → many new customers try once but do not return.
- **One-time purchase product nature** → if items are non-consumable (e.g., electronics, furniture), repeat purchases are naturally limited.
- **General e-commerce behavior** → many customers typically purchase only 1–2 times.

2. Why was cohort retention highest in January 2019?

- Likely due to the **New Year period**, when many **big promotions, giveaways, and attractive campaigns** encouraged customers to stay engaged and make repeat purchases

4. Who are the most profitable customer segments?

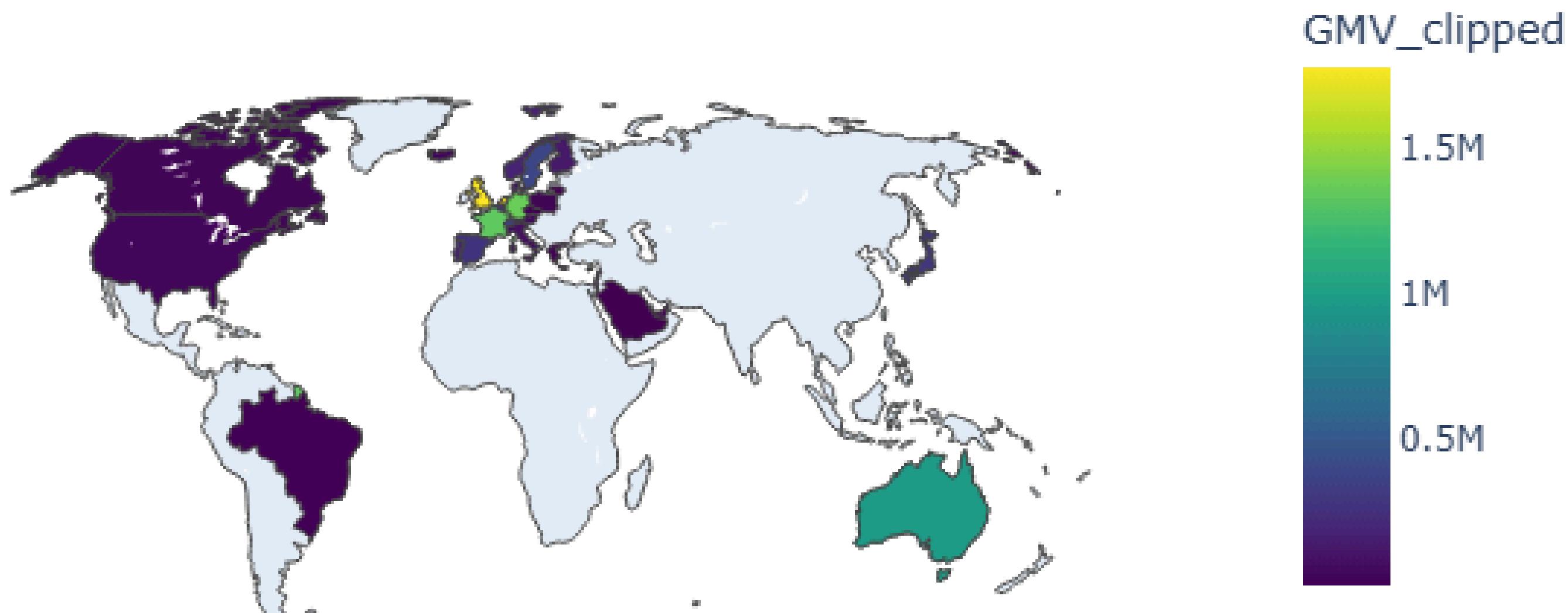


Insight

- **Netherlands dominates with the highest basket size** and total revenue (€22,889), indicating strong purchasing power and a premium-focused market.
- **Australia and Singapore rank 2nd and 3rd**, reflecting mature markets with high transaction values.
- **Japan and Sweden are at the lower end of the Top 5, with smaller basket sizes**; still important markets but with more conservative buying behavior.

Data Support:

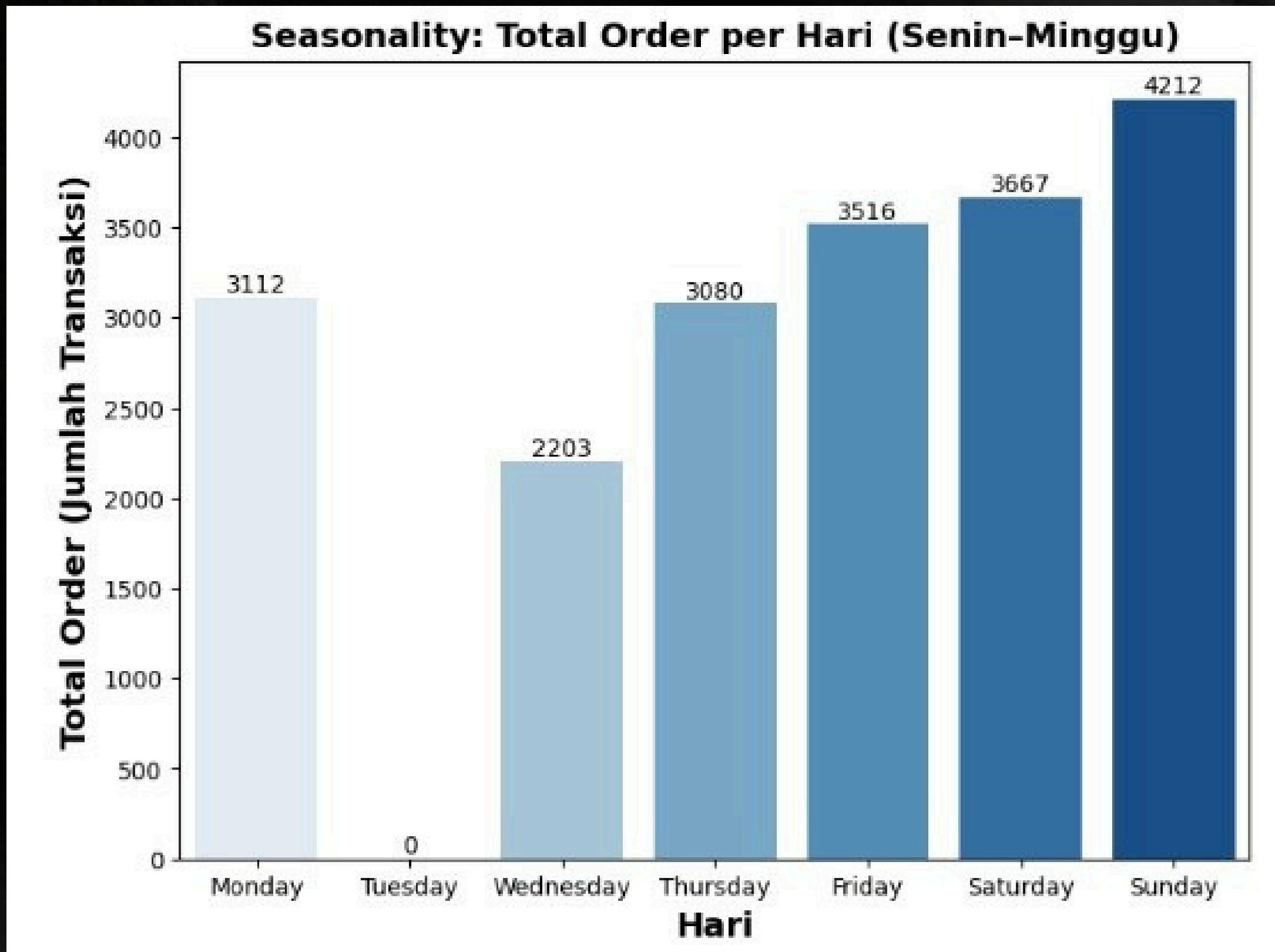
Total Revenue (GMV) per Negara
(Outlier dirampingkan ke 95th percentile)



Insight

- **The United Kingdom dominates** with the highest total revenue of approximately **£52.5M**.
- **Netherlands** contributes around **£2.1M**.
- **Ireland** generates about **£1.7M**.
- **Germany** records total revenue of roughly **£1.3M**.
- **France** contributes approximately **£1.3M**.

Data Support:



Insight:

- Total orders show an **upward trend from Thursday to Saturday**.
- **Sunday records the peak with 4,212 orders.**
- **Wednesday has the lowest order volume with only 2,203 orders.**
- This indicates that **customers are more active in shopping during weekends**, while engagement is weaker mid-week.

Factors Influencing Sales Performance:

1. Why are product sales the highest in the United Kingdom?

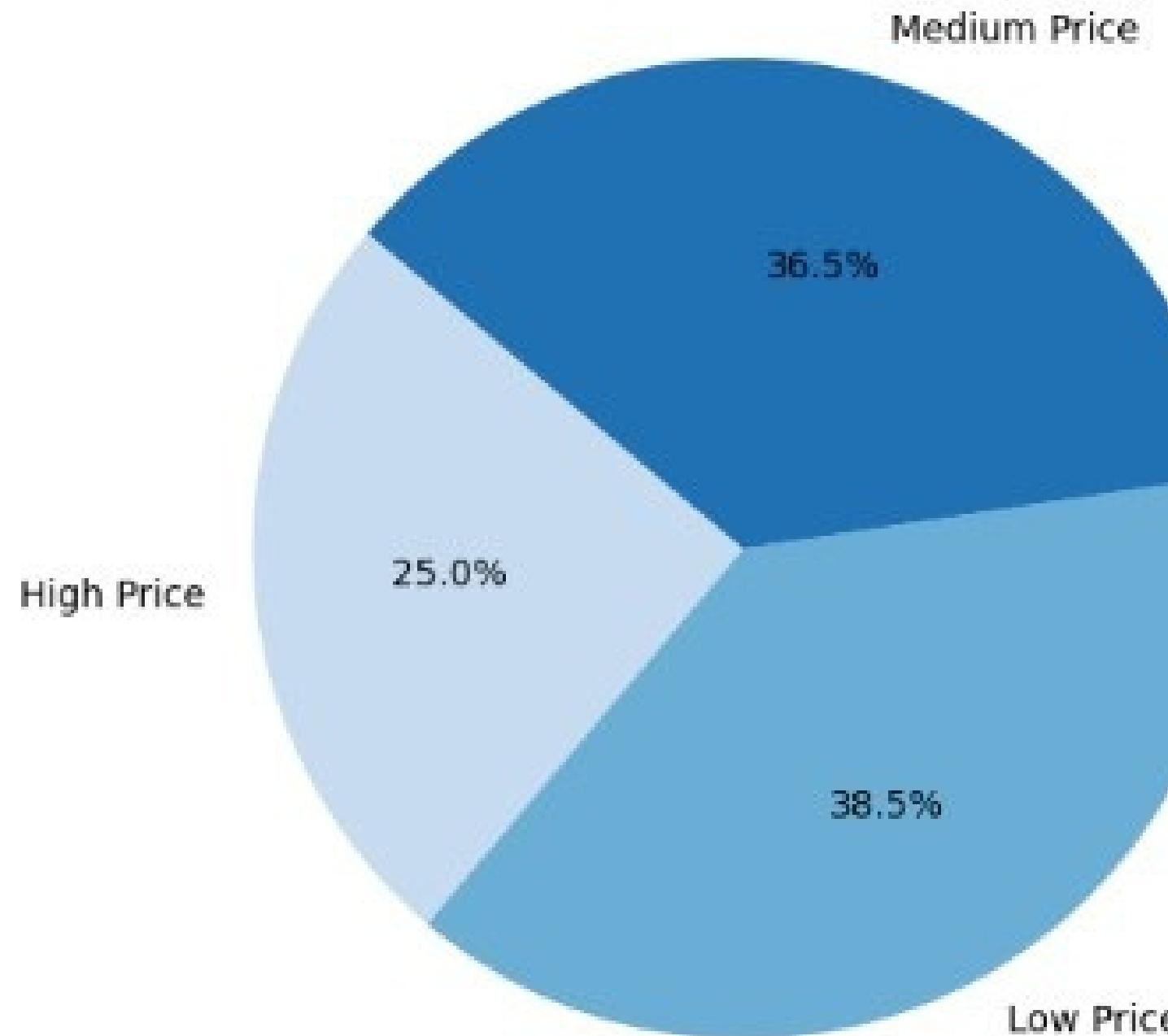
- It is **the company's domestic market (UK-based)**, which naturally provides a larger customer base.
- **Easier accessibility** due to lower and faster logistics.
- **Higher potential for repeat purchases** from UK customers.

2. Why are product sales the highest on Sundays?

- As it is a **day off**, customers have more free time to shop.
- **Weekend promotions** are often offered by retailers.
- Consumer shopping behavior typically increases on weekends to **prepare for the upcoming week**.

Data Support:

Distribusi Produk Berdasarkan Segmentasi Harga



Insight:

- The distribution of products based on price segmentation is dominated by the **low-price segment (38.5%)**, followed by the **medium-price segment (36.5%)**.

Rekomendasi:

- Implement **price bundling strategies and offer attractive promotions** to boost sales across different price segments. This approach can encourage customers to purchase more items at once, increase perceived value, and drive higher revenue from both low-medium and high-price products.

CONCLUSION:

- Sales performance shows **seasonal peaks (November, holiday campaigns)** and weaker months with lower customer activity.
- Revenue is heavily dominated by the **UK domestic market**, with other countries contributing smaller but important shares.
- Product sales are led by **low- to medium-price segments and seasonal/household items**, with bulk purchases driving transaction averages.
- Customer behavior indicates most buyers make **only 1-5 transactions**, with strong retention observed in the **January cohort**.

RECOMMENDATION STRATEGY TO INCREASE PROFIT

- 1. Maximize Seasonal Peaks:** Strengthen campaigns around November–December (holiday shopping) and replicate success in off-peak months.
- 2. Enhance Retention Programs:** Introduce loyalty rewards, personalized offers, and re-engagement campaigns to reduce one-time buyers.
- 3. Leverage Market Segmentation:**
 - Focus on low–medium price products for volume.
 - Upsell high-price products through premium campaigns.
 - Apply bundling and attractive promotions across segments.
- 4. Optimize Geographic Focus:** Prioritize the UK with tailored promotions while expanding in high-potential markets (Netherlands, Australia, Singapore).
- 5. Inventory & Logistics Readiness:** Prepare stock and shipping capacity ahead of peak demand to capture sales without shortages.

I WANT TO SAY

THANK YOU



dauliaoktaviona@gmail.com



LinkedIn.com/in/dauliaoktaviona

GROUND

THE INDUSTRY'S HISTORY