

# E-Commerce Analysis

## ***RFM*** ————— ***Clustering***

Atthoriq Putra Pangestu

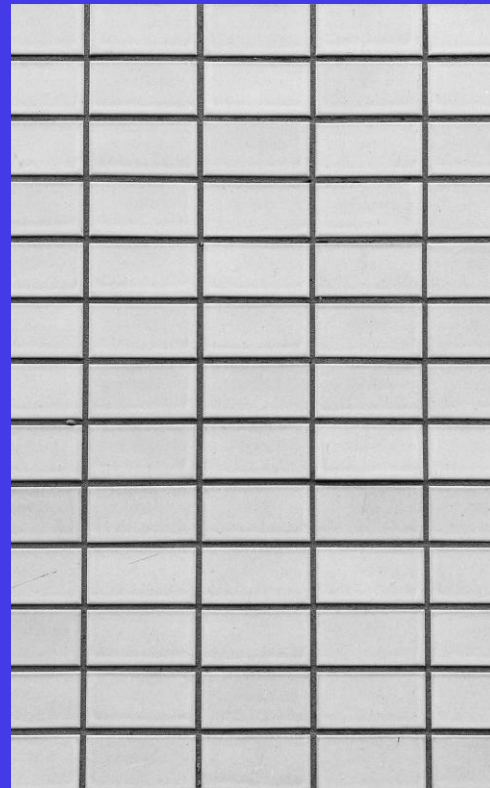


Photo by [DLKR](#)

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Photo by [Ann H](#)

# ★ 01 \_\_\_\_\_

## Background

Why do we started working on this project?

# What, Why, and How?

This project analyzes [sales data](#) (Nov 2018-Nov 2019) from a [UK online gift & homeware store](#) (est. 2007) to identify high-potential customer segments for targeted marketing

We'll leverage [EDA \(Exploratory Data Analysis\)](#), [k-means clustering](#), and [RFM analysis](#) to segment and profile the most promising group, then tailor recommendations to their unique characteristics



Photo by [Soulful Pizza](#)

# ★ 02

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## Initial Analysis

Some relevant findings from exploratory analysis

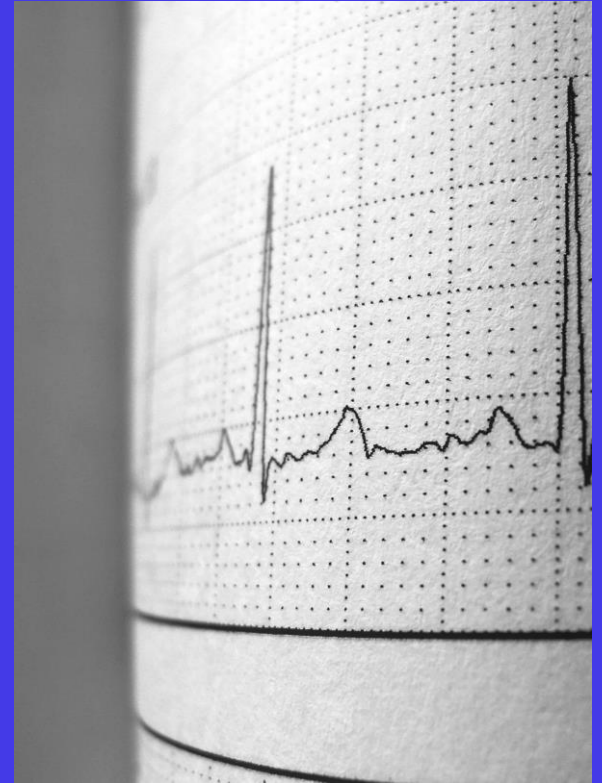
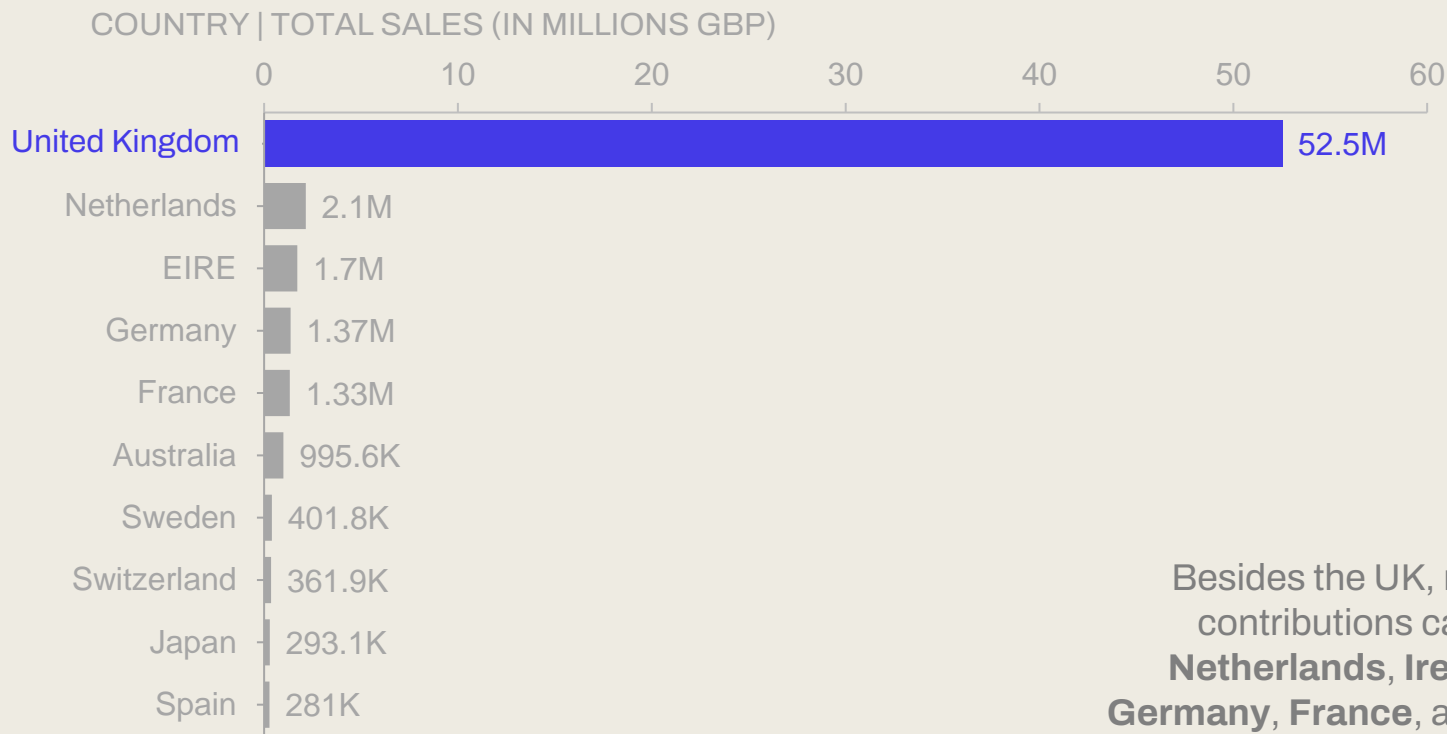


Photo by [Luan Rezende](#)

# UK Dominates Total Sales

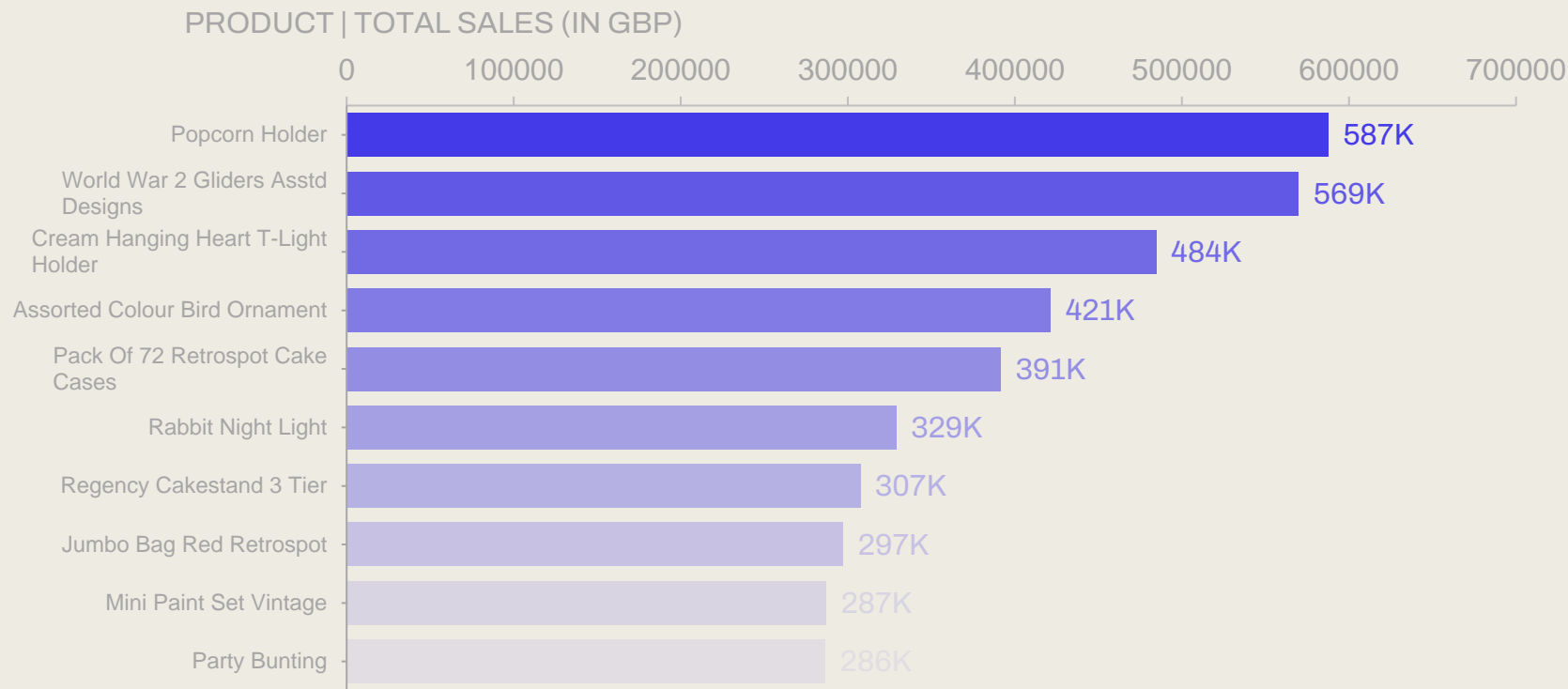
This domination is obvious because the e-commerce is based in the UK



Besides the UK, notable sales contributions came from **the Netherlands, Ireland (EIRE), Germany, France, and Australia**

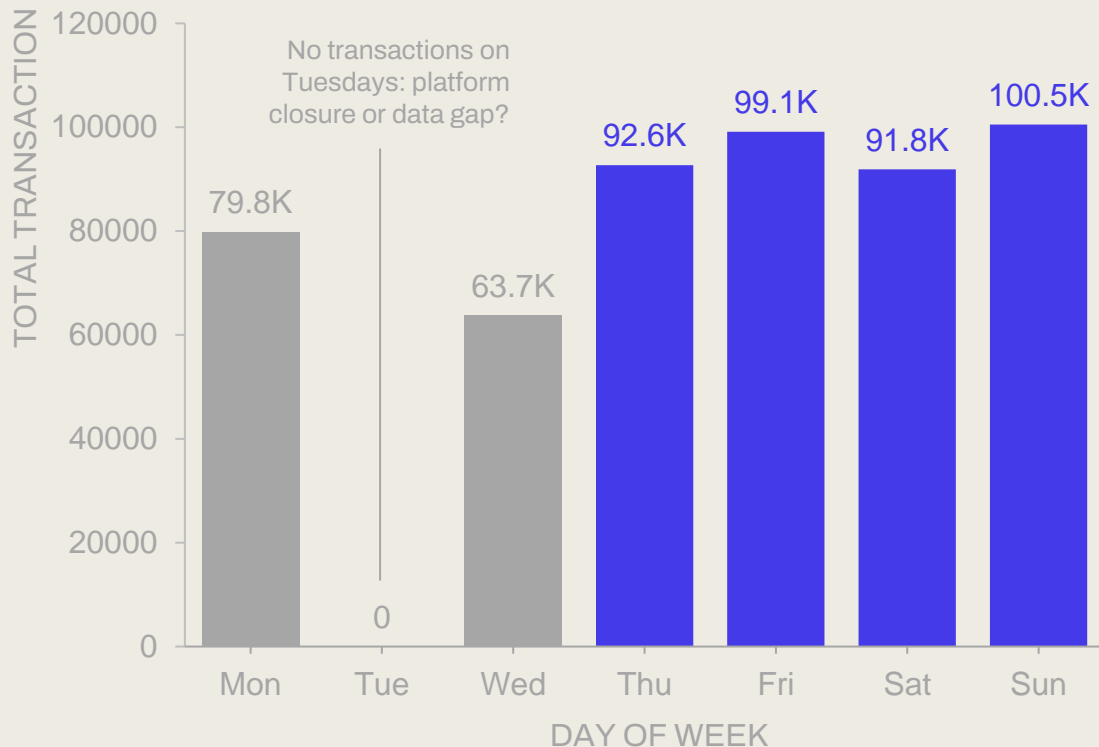
# Top 10 Products Driving Most Sales

Top-selling categories: party supplies, kid's toys, and home décor. [Popcorn Holder](#): 2018-2019 bestseller



# Prime Days: Thursday-Sunday

Transactions on these days are higher than the average (mean = 87.9K)

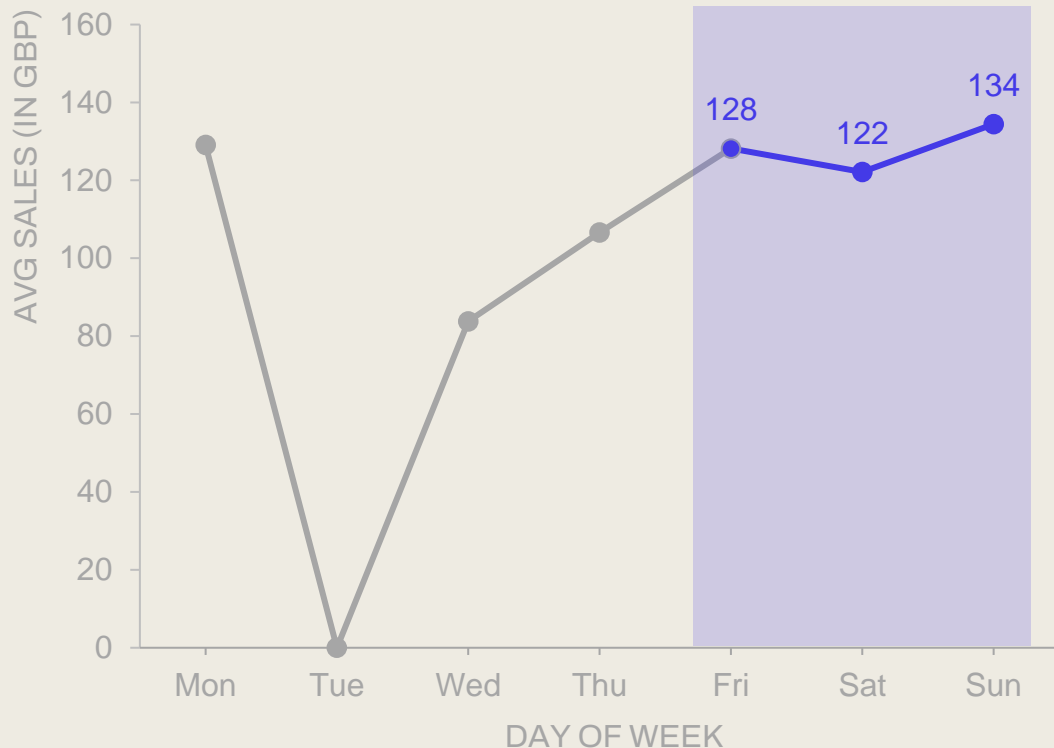


Customers are more active towards the **weekend**, possibly anticipating weekend activities



# Higher Average Sales on Weekends

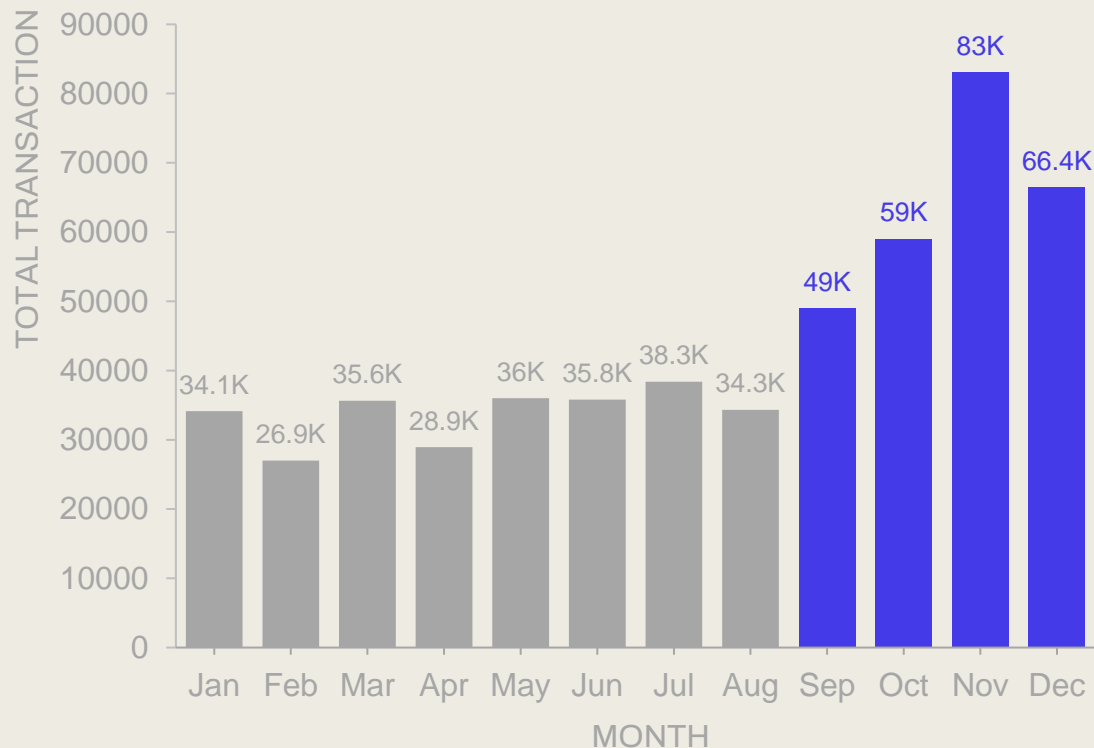
Average sales are higher than other days on weekends (mean = £117)



On weekends, customers not only shop more frequently, but they also spend more, buying **higher-priced items** or **larger quantities**

# Prime Months: September-December

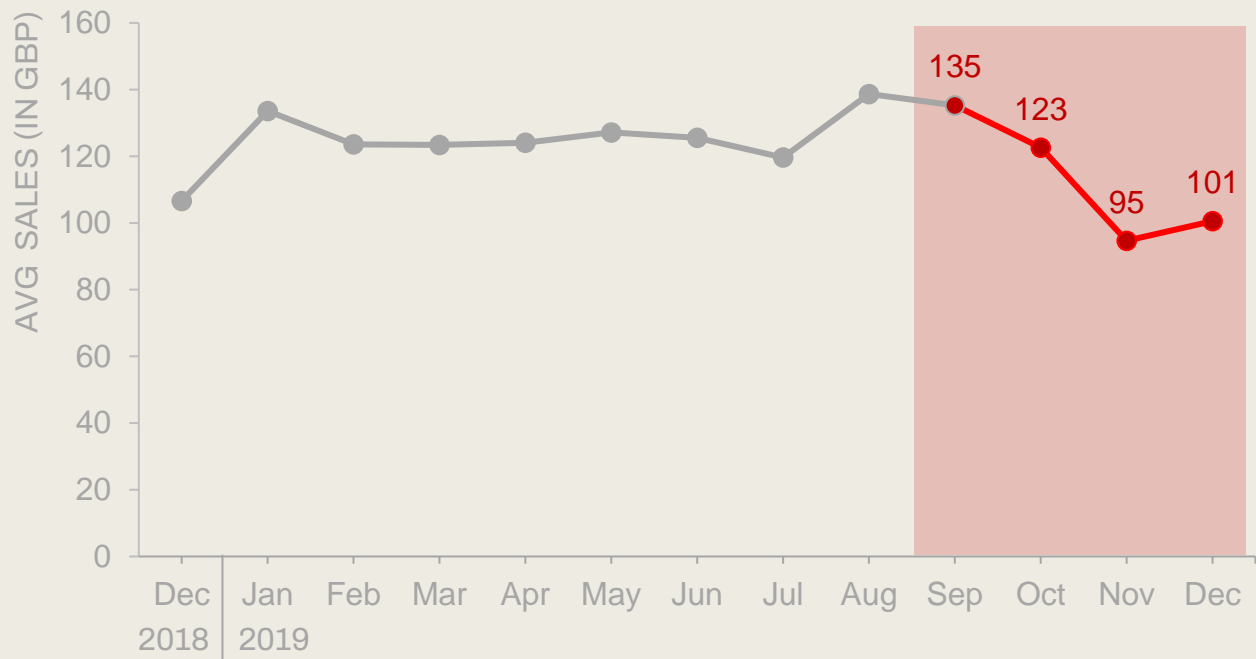
Transactions on these months are higher than the average (mean = 43.9K)



Customers are more active towards the **year's end**, suggesting anticipation for end of the year holidays

# Average Sales: Dropping for the Past 4 Months.

Even though the total transactions are higher than other months



Customers may transact more during these times, but opt for products with **lower prices** or make **smaller purchases**



Photo by [Meruyert Gonullu](#)



# 03

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## Cluster Analysis

Finding clusters and identifying the best one

# What is RFM, Anyway?



## Recency

The freshness of customer's activity, be it purchases or visits

Days since customer's last purchase



## Frequency

Frequency of customer's transactions or visits

Total transactions from each customer



## Monetary

Purchasing power of customer

Total money spent from each customer

# In Essence,

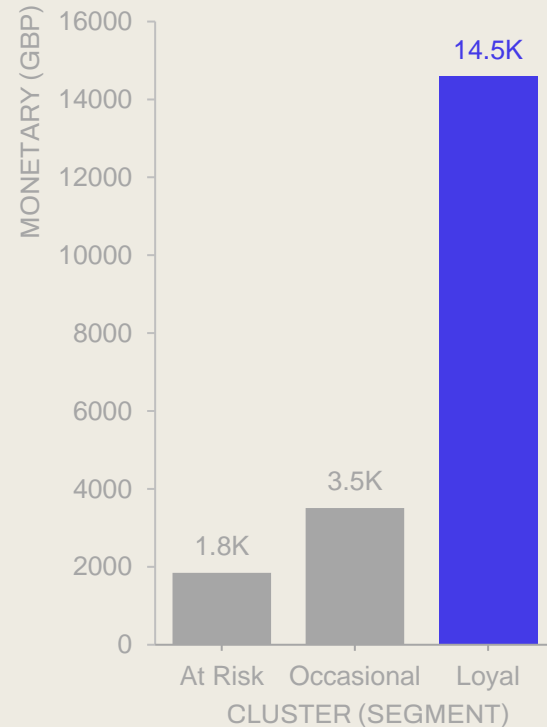
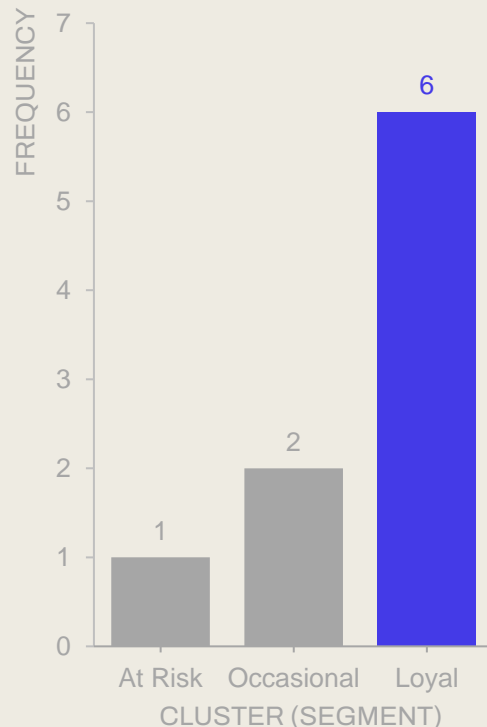
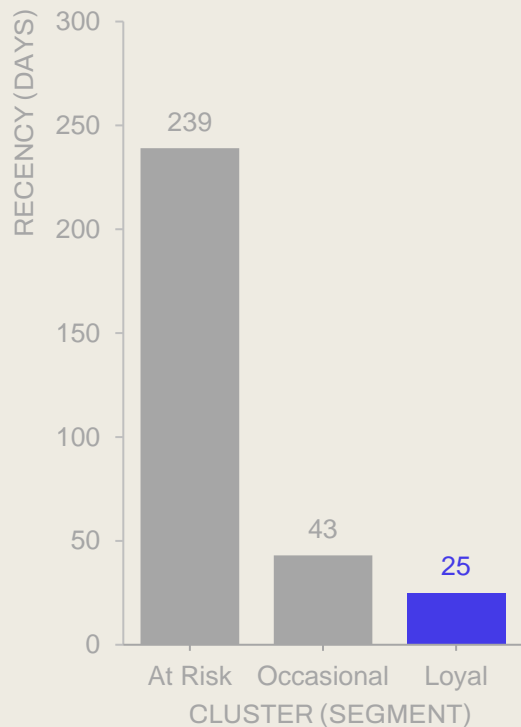
The clustering algorithm (k-means) will produce customer clusters (segments) based on RFM measures, and we are looking for a cluster that:

1. Have low recency (days since the last transaction)
2. Have high frequency (total transaction)
3. Have high monetary (total spend)

After the processes, we found three customer clusters (segments) in the data

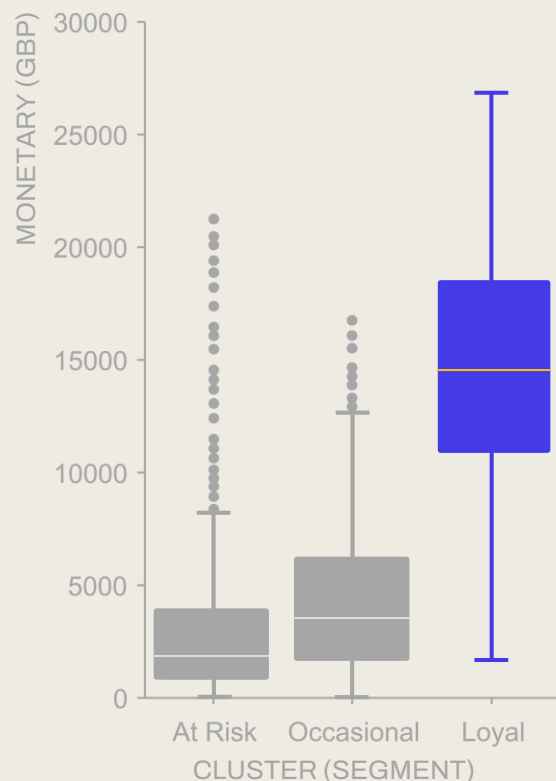
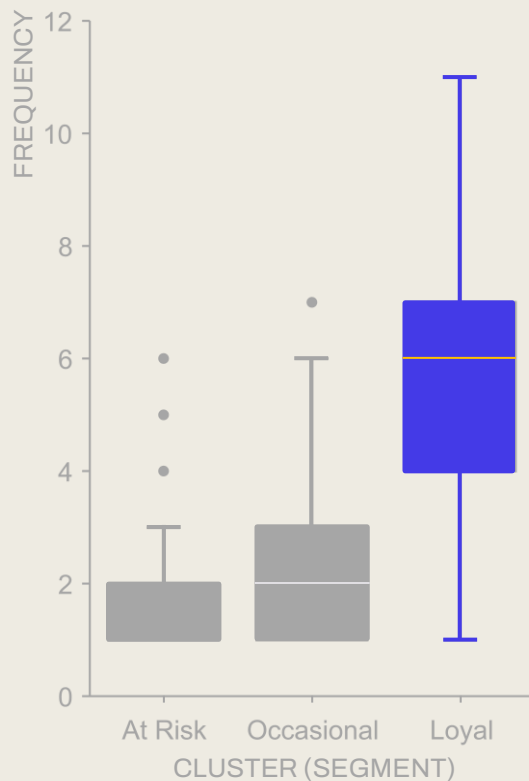
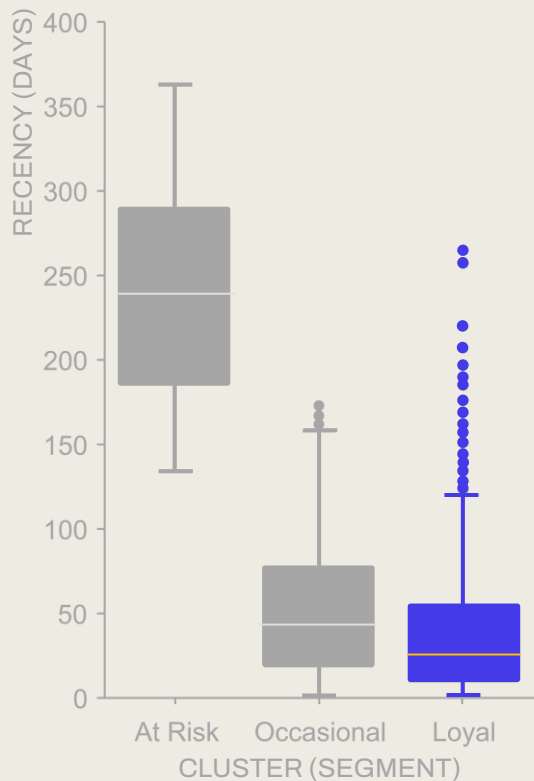
# Prime Cluster: Loyal Segment

Having low median recency, high median frequency, and high median monetary



# Prime Cluster: Loyal Segment

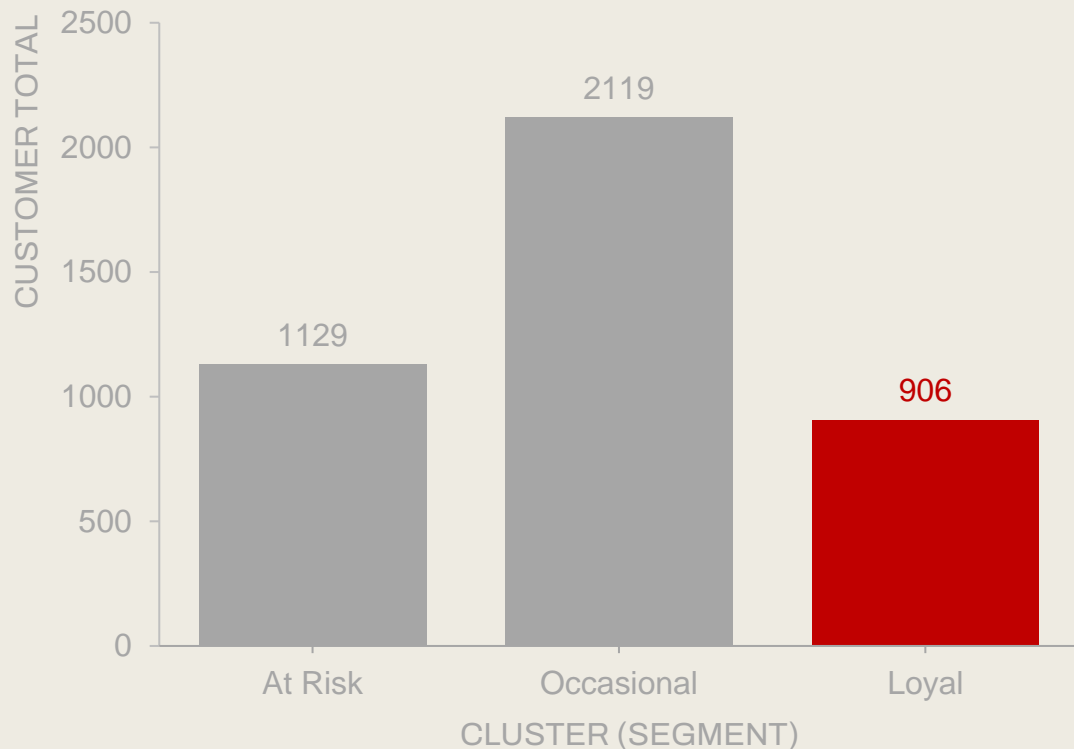
Having low recency range, high frequency range, and high monetary range





# Low Percentage of Loyal Customers

They have the lowest proportions of 22% among other clusters



This insight raises concerns  
as **engaged customers** are  
**outnumbered** by occasional  
and at-risk customers

# For now,

Let's prioritize [Loyal Customers](#), our most promising segment, despite being smaller in numbers than other segments. Let's delve deeper into their traits, including:



**Preferred  
Products**



**Typical Product  
Price Purchased**



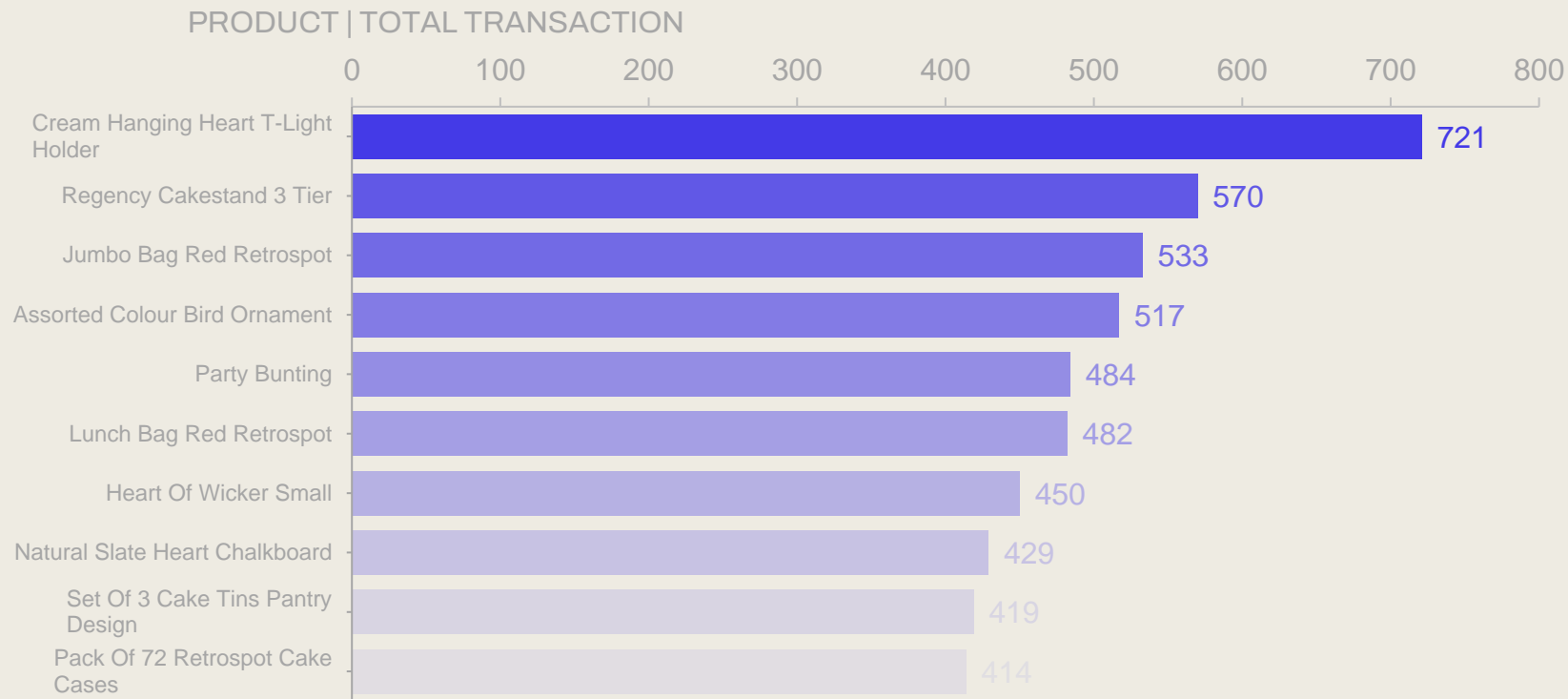
**Typical Purchase  
Quantity**



**Usual Purchase  
Timing**

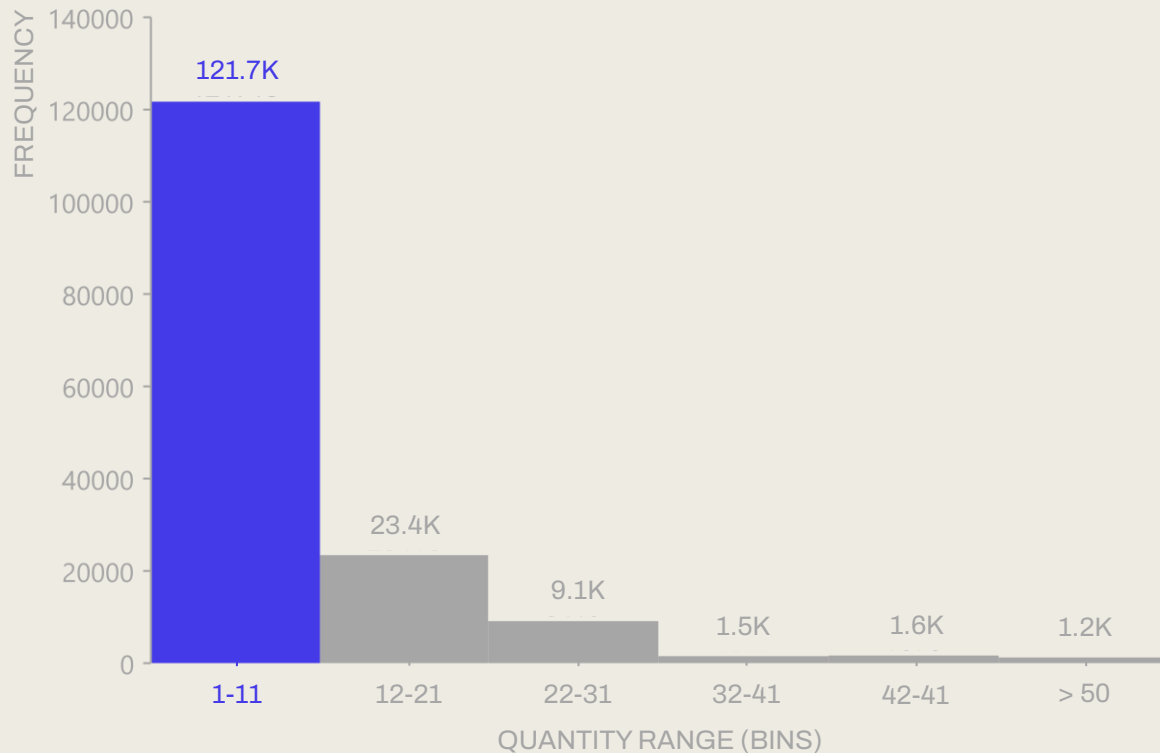
# Top 10 Most Purchased Products

Most of these products are categorized as Home Décor, Party Supplies, and Kitchenware



# Loyal Customers: Purchase Quantities

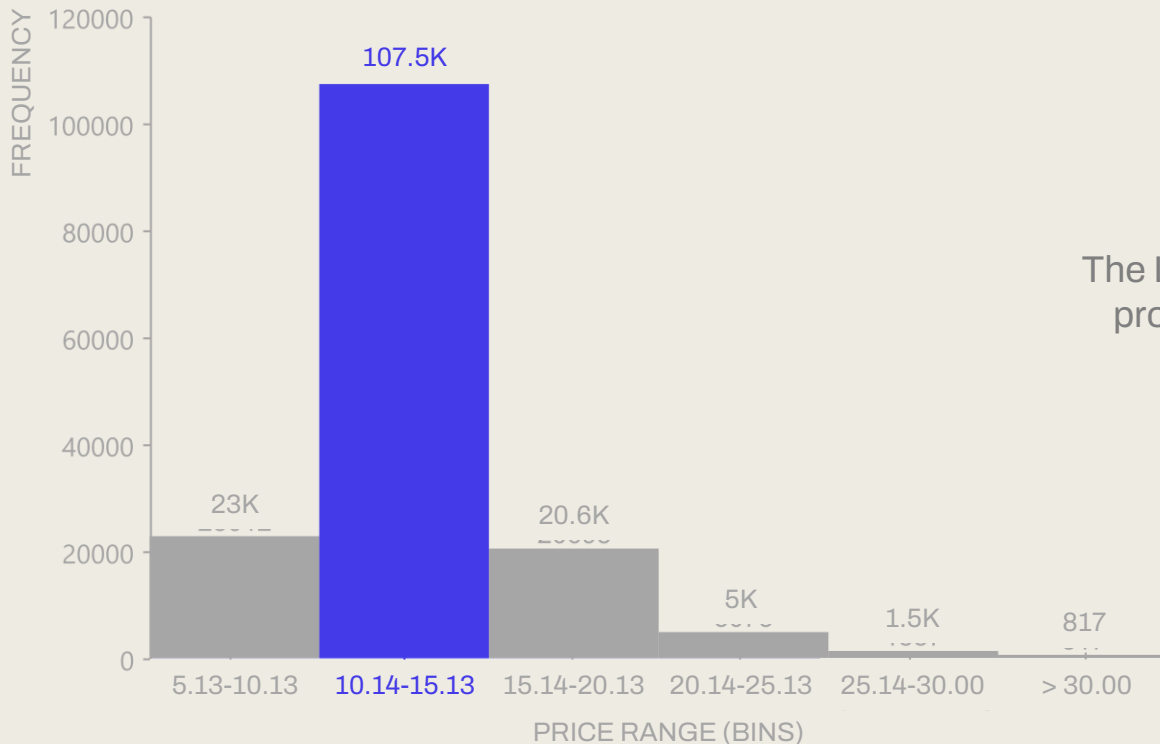
The typical order quantity for 77% of this segment falls within the 1-11 range



The Loyal Customer cluster generally makes **small to moderate**-sized purchases

# Loyal Customers: Product Price

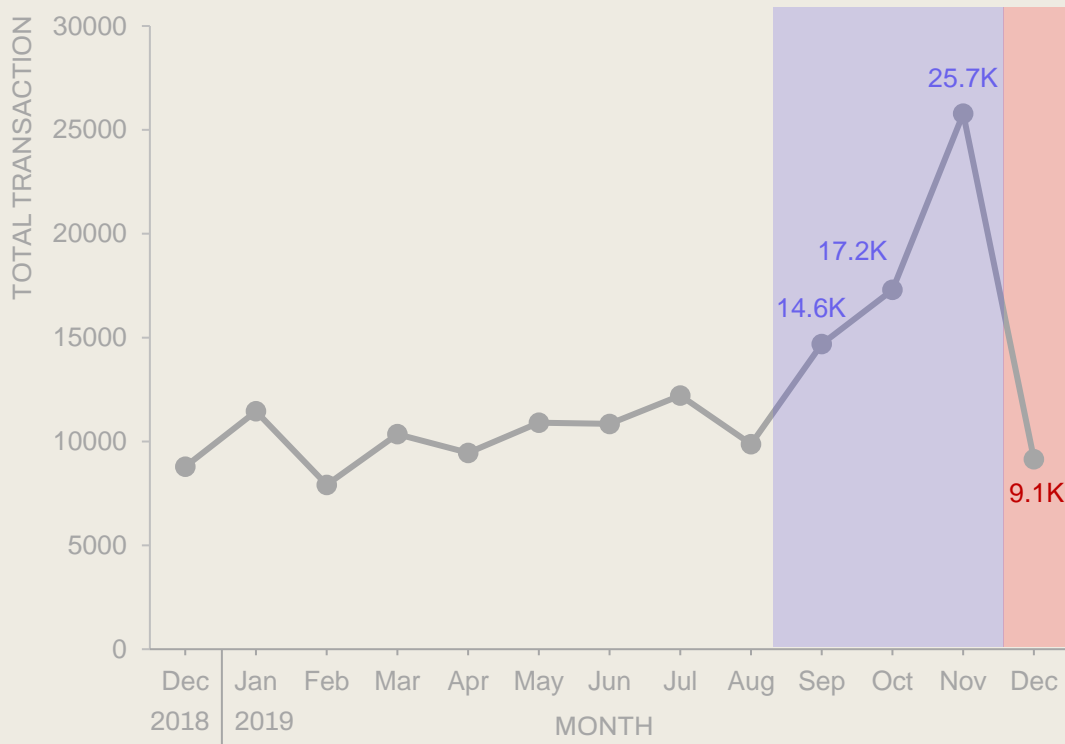
68% customers of this segment typically buys products priced between £10.14 and £15.13



The Loyal Customers cluster finds products priced between £10.14 and £15.13 most appealing

# Prime Months: September-November

Transactions surged from September to November but **sharply dropped** in **December**

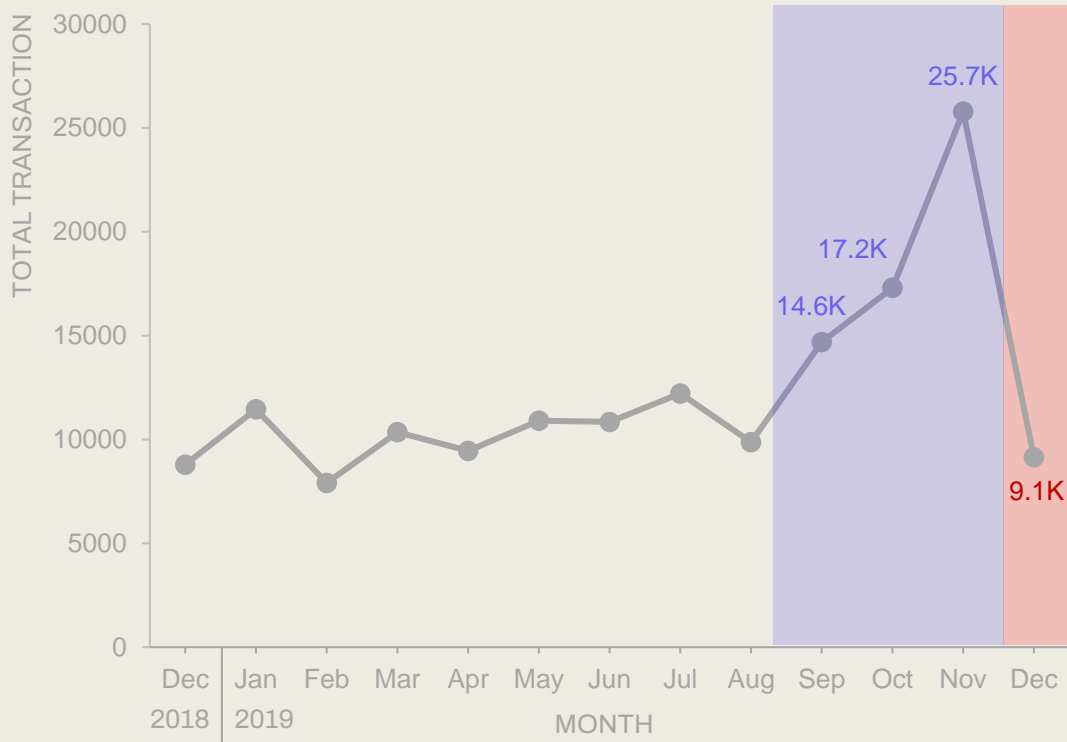


Why did the transaction surge on these months?

- Pre-holiday events start in September, leading shoppers to grab gifts early and dodge the December crush

# Prime Months: September-November

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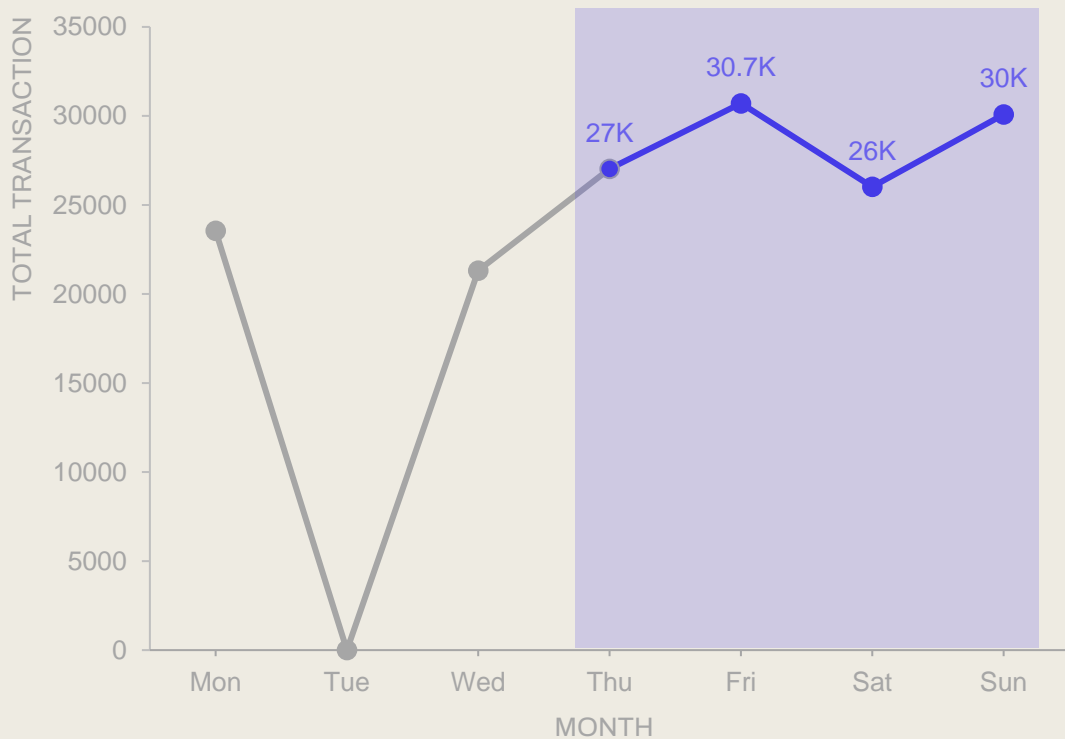


Why the **December drop**?

- Customers might anticipate **holiday chaos** and **finish shopping early** (in November)
- December's **busy logistics** (Christmas & New Year's) could worry them about **delays**

# Prime Days: Thursday-Sunday

Transactions volumes are higher around these days for the Loyal Customers segment



This suggests customers in the Loyal Customers segment buy items in anticipation of [weekend activities](#), ensuring they have what they need by the week's end



# ★ 04

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## Recommendations

What actions can the business take?



Photo by [HARUN BENLİ](#)

# Six proposed actions:

With the **Loyal Customers** identified, their **buying habits** analyzed, and **revenue potential** established, we formulated business recommendations to capitalize on this valuable segment



**Bulk Pricing & Tiered Point System**



**Front Page Personalization**



**Separate Section for Products Under \$15**



**Increase Push Email Campaigns at Year's End**



**Curated Product Bundles**



**Weekend Campaigns**



# Bulk Pricing & Tiered Point System

## Benefits: Increased Revenue and Customer Satisfaction

- Introduce **discounts** for purchasing specific quantities of **top-selling products**
- Threshold quantities should be strategically chosen to encourage bulk purchases **without sacrificing profit margins** too much

## Actions Needed:

- ☐ **Cost of Goods Sold (COGS) analysis** by product to determine profitable bulk pricing
- ☐ **Discount sensitivity analysis** to ensure attractive discounts level and find the “sweet spot”
- ☐ Potential collaboration with **Pricing & Merchandising** department





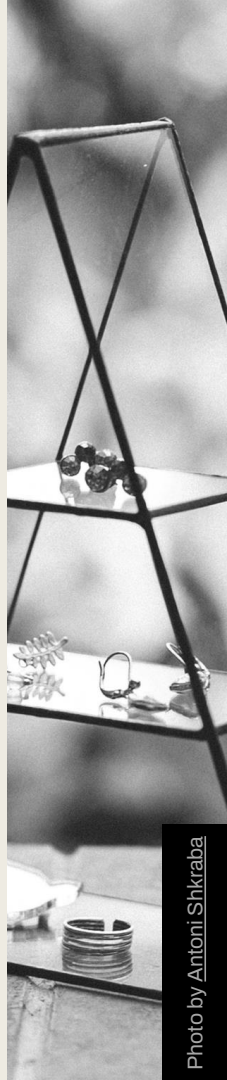
# Bulk Pricing & Tiered Point System

## Benefits: Increased Revenue and Customer Satisfaction

- Implement a **Bronze**, **Silver**, and **Gold** customer tier system based on **purchase frequency**
- Higher tiers unlock greater benefits, incentivizing **increased purchases**

## Actions Needed:

- ☐ Define **purchase frequency requirements** for each tier
- ☐ Determine **attractive** and **differentiated benefits** for each tier
- ☐ Potential collaboration with **Loyalty/Retention** or **Marketing** department





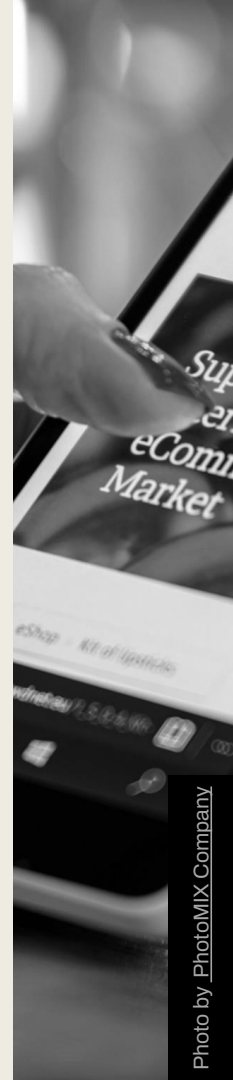
# Front Page Personalization

## Benefits: Increased Sales, Conversion, and Customer Experience/Engagement

- Highlight **top-selling products** for the **Loyal Customers cluster** within the **first section** of their dedicated landing page
- Feature **similar products** related to each top seller alongside it, encouraging **further exploration** and **purchases**

## Actions Needed:

- ☐ **Develop and design sections** dedicated to customers in the Loyal Customers cluster, featuring their **top products** and **category filters**
- ☐ Work with **Merchandising** and **Product Management** teams to optimize product selection and cross-selling suggestions
- ☐ **A/B test** different placement strategies for optimal performance





# Separate Section for Products Under \$15

**Benefits:** Increased Sales, Conversion, and Customer Experience/Engagement

- Create an independent "Under £15!" section on the e-commerce home page
- Feature top-selling and similar items under £15 from their preferred categories within this section
- Host monthly events within the "Under £15!" section

## Actions Needed:

- ☐ Develop algorithms for dynamic product selection and presentation within the "Under £15!" section
- ☐ Collaborate with Marketing, Merchandising and Product Management teams to optimize product selection & category presentation and event planning





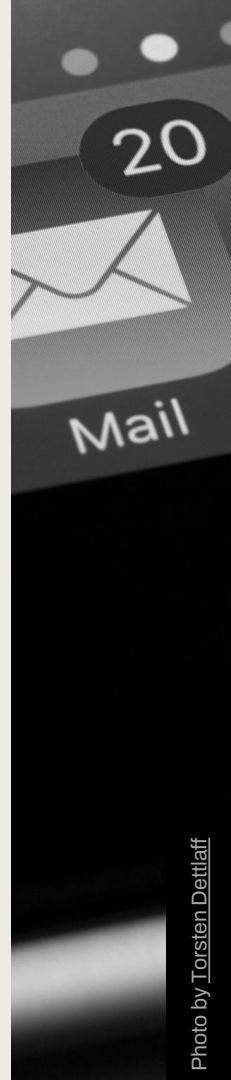
# Increase Push Email Campaigns at Year's End

## Benefits: Increased Sales and Conversion

- Send targeted push emails from **September to November**, focusing on **Thursdays to Sundays** when engagement is typically higher
- Leverage these periods to deliver personalized messaging that "**nurtures**" **customers** towards **purchasing** their **top-selling products**

## Actions Needed:

- ☐ Define the optimal **email frequency** and **timing (hour)** for sending push notifications during peak season (through surveys and next analysis)
- ☐ **Design personalized push emails** featuring top-selling products and interesting offers
- ☐ Potential collaboration with **Marketing** or **Digital Marketing** departments





# Curated Product Bundles

## Benefits: Increased Sales, Revenue, and Customer Experience and Loyalty

- Create pre-packaged bundles like "Party Poppers for New Year's Eve" featuring a mix of relevant products within different categories (potential: Home Décor, Party Supplies, and Kitchenware) accompanied by **exclusive New Year cards**
- Offer **customized bundles** based on customer data such as **family size** and **marital status** (need more data and analysis)

## Actions Needed:

- ☐ **Design attractive visuals** and **compelling messaging** to promote the bundles across marketing channels
- ☐ Potential collaboration with **Product/Merchandising** and **Marketing/Branding** departments







# Weekend Campaigns

## Benefits: Increased Customer Engagement and Loyalty

- Introduce a limited-time "Weekend Bargains" campaign offering exclusive perks to our most valuable customers - the Loyal Customers segment
- Campaign Options: Double Loyalty Points, Best-Selling Product Discounts, Reduced Delivery Costs

## Actions Needed:

- ☐ Identify the campaign option with the highest acceptance/use rate through A/B tests and surveys after the event trial
- ☐ Collaborate with Marketing and Finance departments to assess campaign costs and potential impact on profitability



# Thank you!

If you have any questions, please feel free to reach me out on any of these contacts:

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