

# **RETAIL SALES**

## **ANALYSIS**

**BY**  
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# *project* OVERVIEW

This project showcase data exploration, and analysis of UK Online Retail Sales and Customer Transaction Data from Kaggle using python libraries' such as pandas, seaborn and matplotlib etc. Area of analysis consists of Sales Trend , Geographical, Product and Customer, Analysis and Fraud Risks



Github  
Repository



# **DATASET**

*Online Retail Transaction Data*

This data set provides an in-depth look at transactions, product details, and customer information documented by an online retail company based in the UK. The scope of the data spans vastly, from granular details about each product sold to extensive customer data sets from different countries

**DATA SOURCE :** [kaggle](#)

**AUTHOR :** [UCI](#)

# DATA *Glossary*

- InvoiceNo : A 6-digit number uniquely assigned to each transaction. If the number is prefixed with 'c', it indicates a cancellation. (Nominal)
- StockCode : A unique identifier for each product sold by the retailer. (Nominal)
- Description : The name or a brief description of the product. (Nominal)
- Quantity : The number of units of the product sold in each transaction. (Numeric)
- InvoiceDate : The date and time when the transaction was made. (Datetime)
- UnitPrice : The price per unit of the product in sterling. (Numeric)
- Country : The country where the customer resides. (Nominal)

# PROBLEM

*Statement*

## SALES

- Sales Trend over the year
- Peak sales month(s)
- Overall cancelation rate by order
- Overall cancelation rate by sales

## CUSTOMER

- Highest spending customer by sales and quantity
- Customer with highest cancelation rate (in sales)
- Top 5 countries with highest number of customer

## PRODUCTS

- Top selling products by quantity
- Top selling products by sales
- Products with highest number of cancelation

## GEOGRAPHICAL

- Top 5 countries with highest sales
- Sales trend for these countries
- Top selling products for these countries
- Top 5 highest average spending countries

# DATA Cleaning

FULL PYTHON CODE  
LINK ON GITHUB

\*CLICK HERE

## STEPS :

- Removing unnecessary columns
- Check and remove data with null values
- Changing data types :
  - CustomerID : Int
  - InvoiceDate : Datetime
- Adding new column
  - Sales : unit price \* qty
  - Status : Invoice with 'c' is 'canceled',  
else is 'completed'
- Renaming columns 'Description' to  
'Products'
- Convert cleaned data to csv file



# **EXPLORATION AND** **ANALYSIS**

\*CLICK TITLE ABOVE FOR THE FULL PYTHON CODE ON GITHUB

# DATA OVERVIEW

OF ONE YEAR PERIOD (DEC 2010 - DEC 2011)

**TOTAL  
SALES**

**£ 8,300,065**

**TOTAL ORDER  
COMPLETED**

**18536**

**TOTAL ORDER  
CANCELED**

**3654**

**NUMBER OF  
CUSTOMER**

**4372**

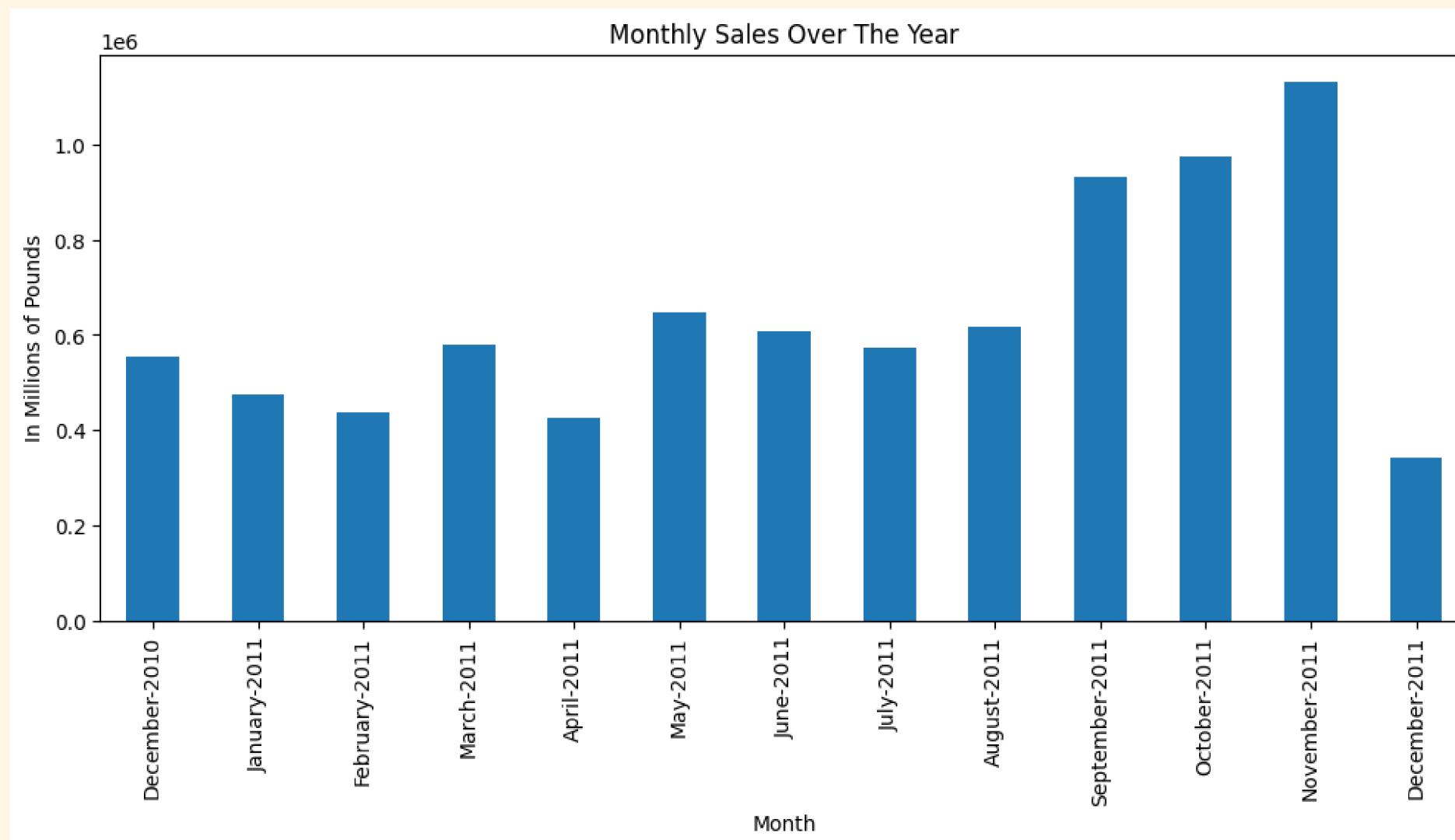
**UNIQUE PRODUCTS  
SOLD**

**3896**

**TOTAL  
COUNTRIES**

**37**

# SALES

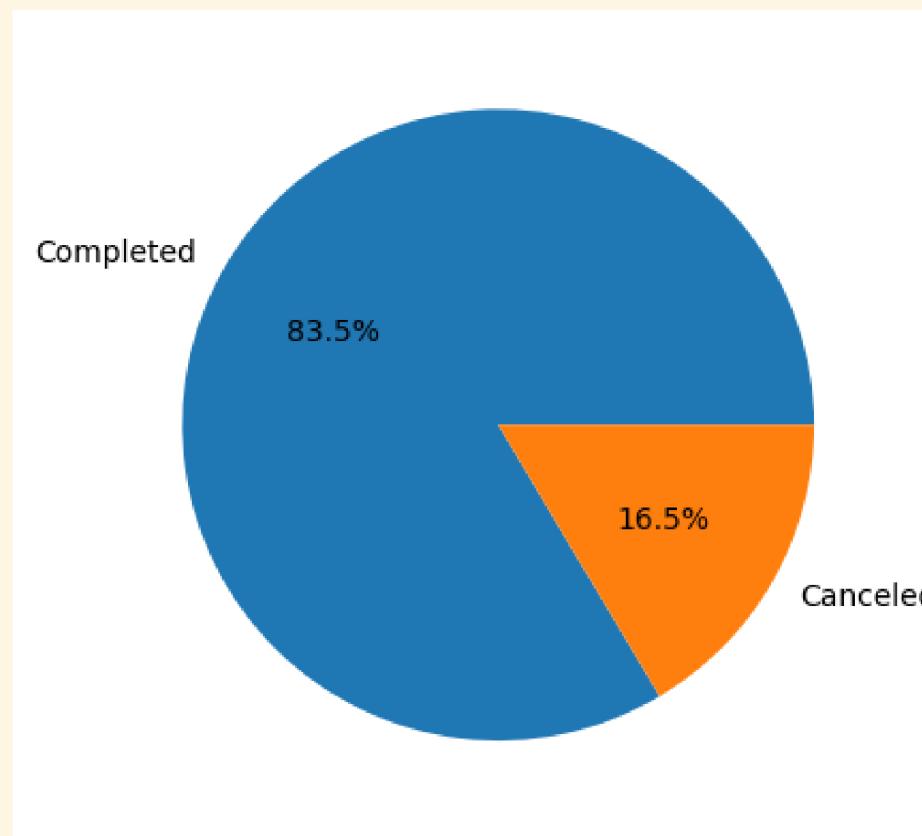


The graph beside shows the monthly sales over the year (Dec 2010 - Dec 2011).

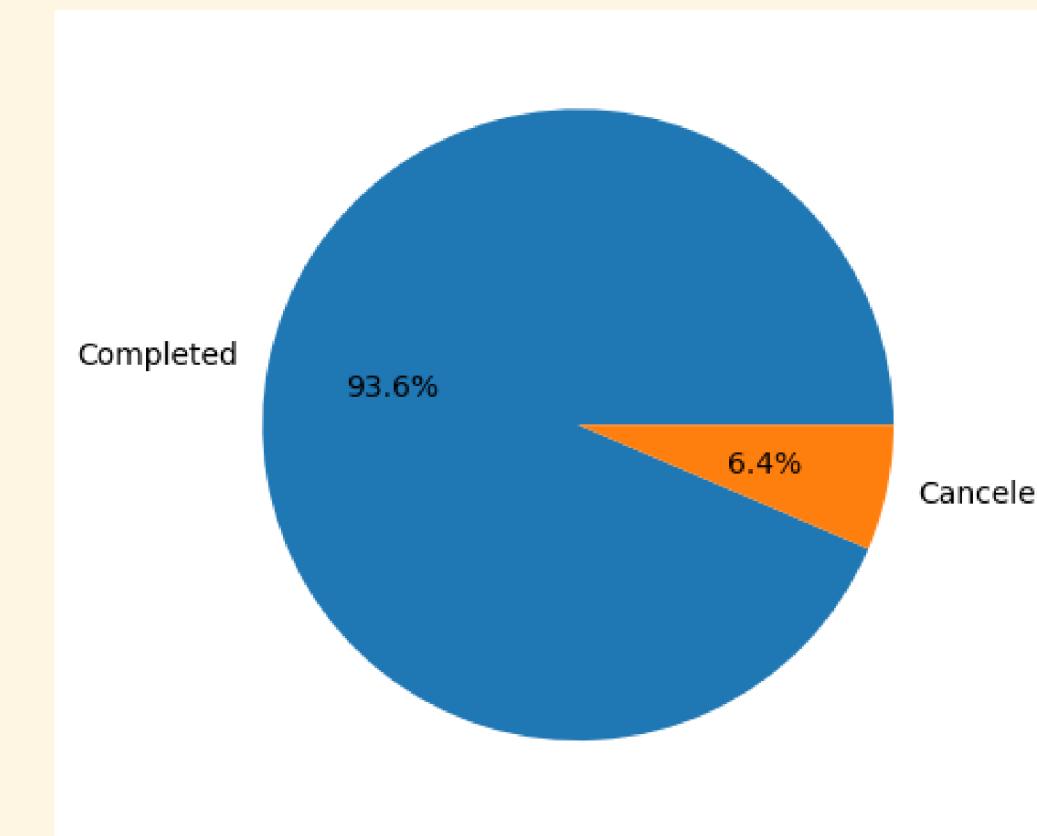
**Highest monthly sales is in November** with over **1M pounds** in sales, and with **lowest sales month is December** 2011 with around **300K pounds**.

Throughout the year, there's an increase in sales through July - Nov, and significant drop in December with **average monthly sales 640K pounds**

## CANCELLATION RATE



**CANCELLATION RATE  
BY ORDER**



**CANCELLATION RATE  
BY SALES**

Over the year, out of 22190 orders (by invoice), there are total **3654 orders canceled**, or around 16.5% out of total orders. Total gross sales of the year is 9,5M pounds, and the canceled order is worth around 6.4% out of the total sales, which makes the **canceled order worth is around 600k pounds**

# CUSTOMER

CustomerID	Sales	Country
14646	279489.02	Netherlands
18102	256438.49	United Kingdom
17450	187482.17	United Kingdom
14911	132572.62	EIRE
12415	123725.45	Australia

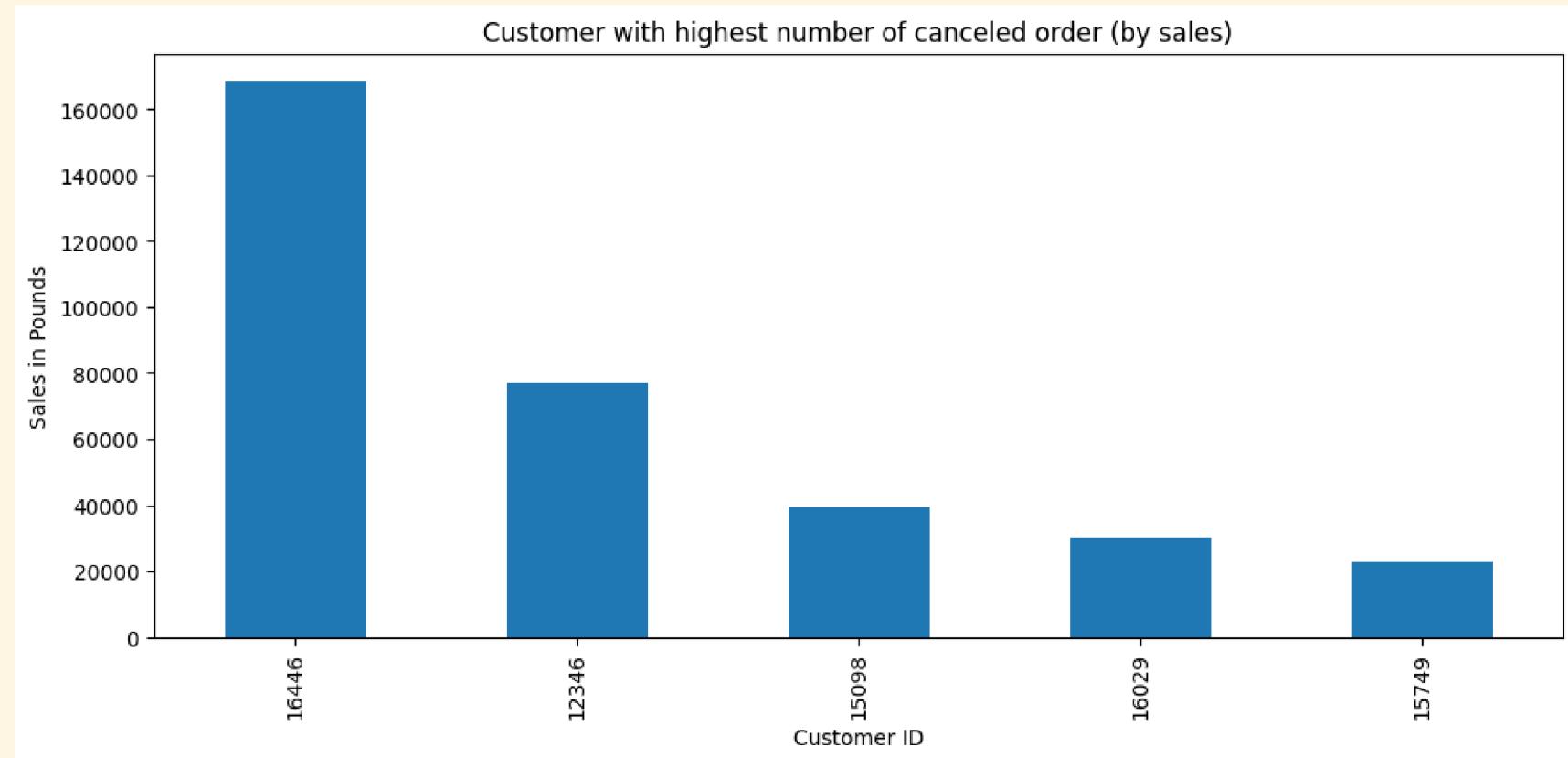
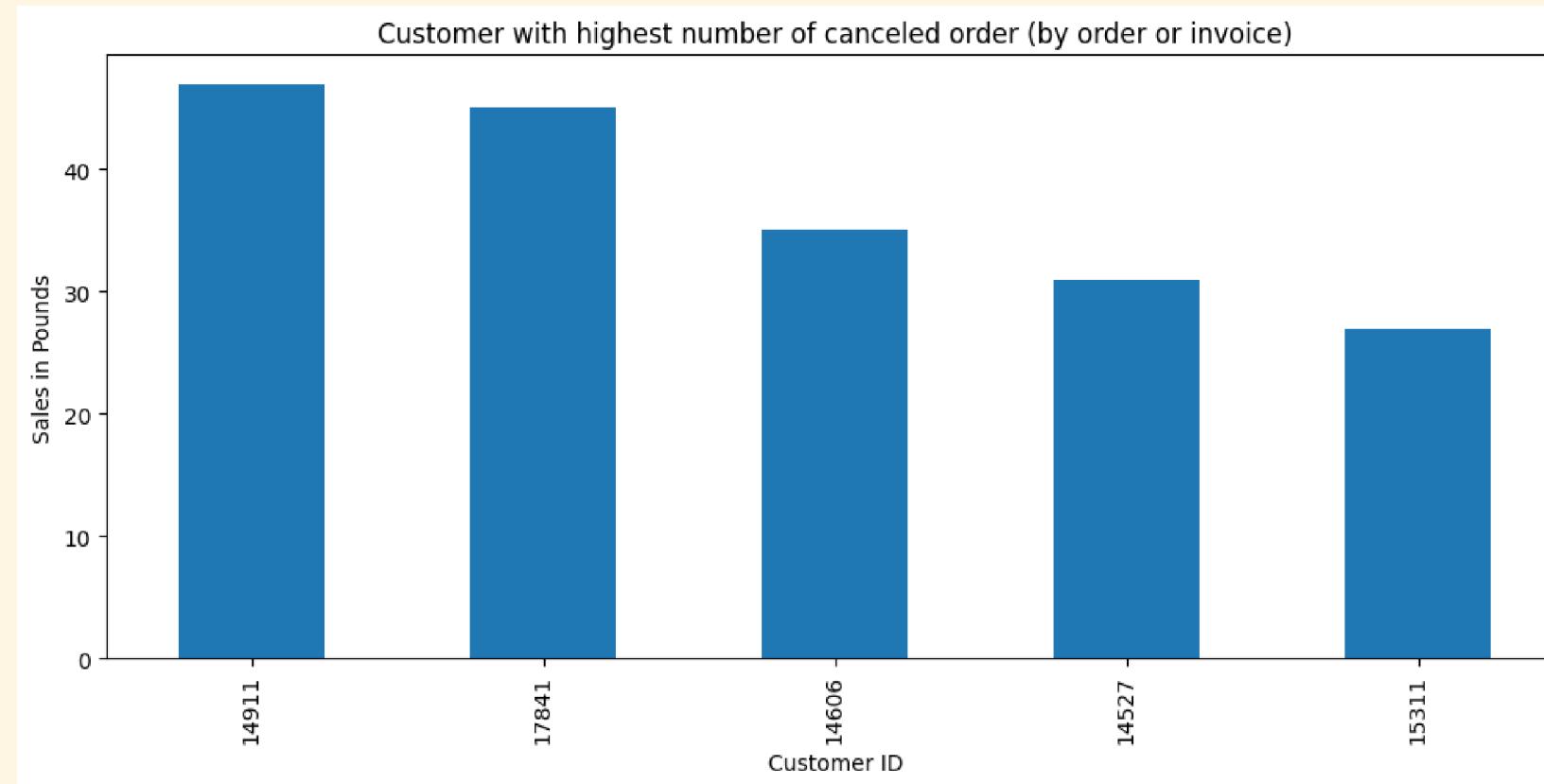
**HIGHEST SPENDING BY SALES**

CustomerID	InvoiceNo	Country
14911	248	EIRE
12748	224	United Kingdom
17841	169	United Kingdom
14606	128	United Kingdom
15311	118	United Kingdom

**HIGHEST SPENDING BY # OF ORDERS**

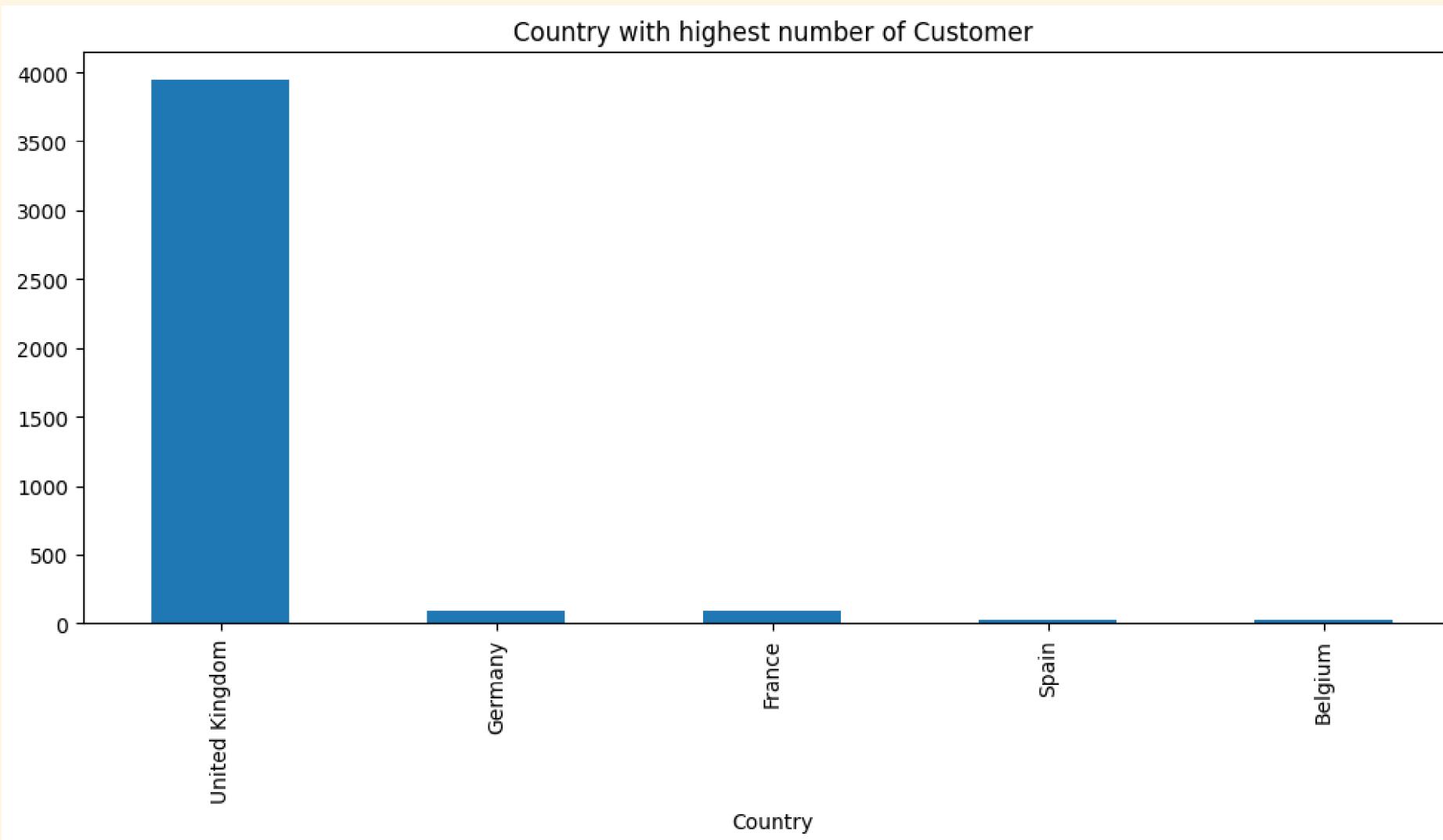
Tables above shows highest spending customers by sales and number of orders. CustomerID 14646 from Netherlands spent almost 280k pounds over the year, while CustomerID 14911 from Ireland made 248 orders throughout the year.

## CUSTOMER WITH HIGHEST CANCELLATION RATE



Graphs above shows CustomerID with highest cancelation rate by number of orders and total sales worth. CustomerID 17841 is the second highest canceled quantity orders by 47 orders, while CustomerID 16446 has the highest canceled orders worth over 168k pounds in sales. **CustomerIDs showed above is an 'at-risks-customers' as these customers shows the potentials of fake orders or scam.**

## COUNTRIES WITH HIGHEST NUMBER OF CUSTOMER

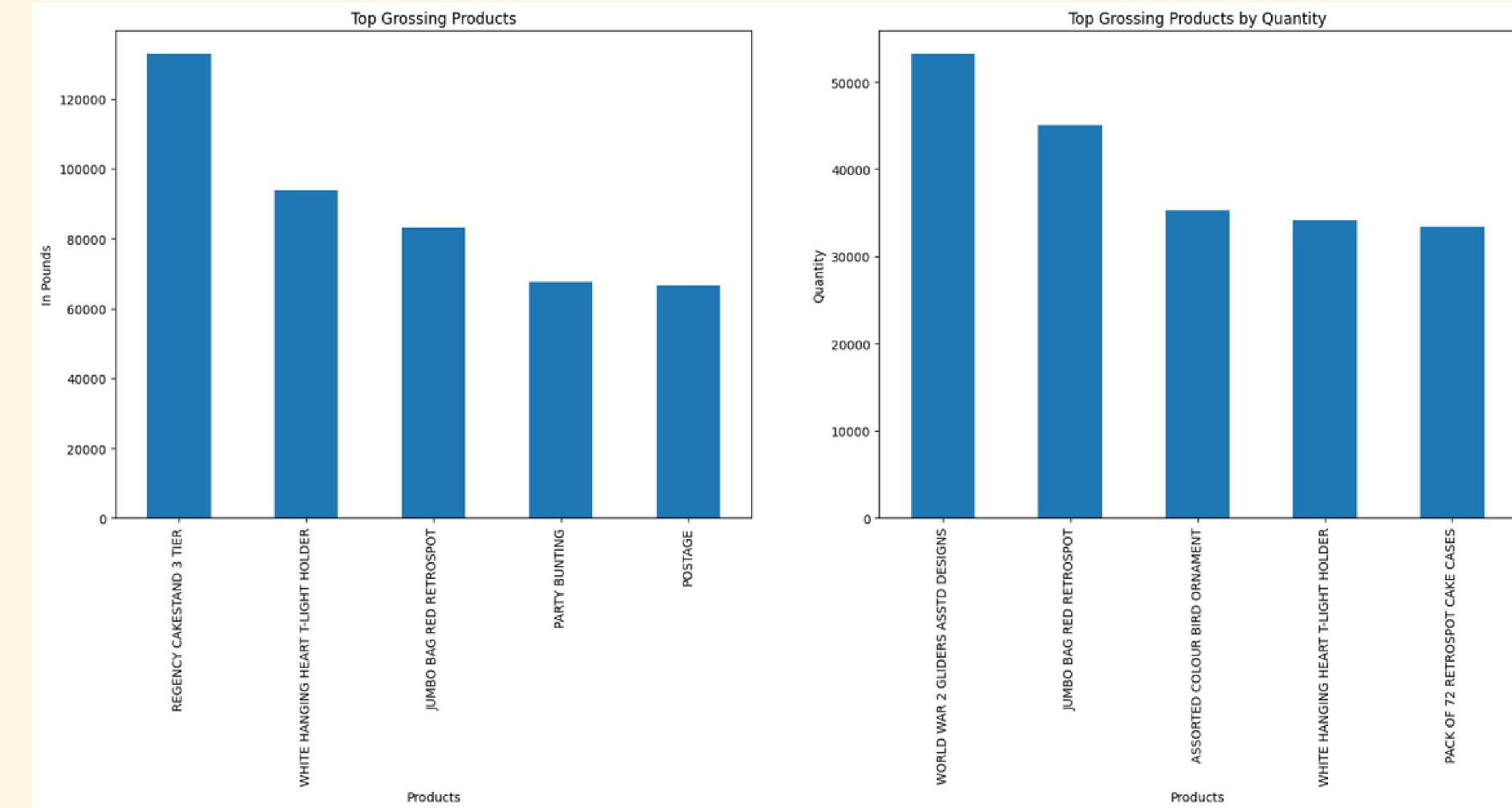


**United Kingdom** has the highest number of customer with almost **4000 customers**. While Germany is seconds, though it's a significantly less with only 95 customers. France, Spain, and Belgium follows with 87, 29, 24 customers respectively

# PRODUCTS

**REGENCY CAKESTAND 3 TIER** is the highest grossing product, which generates over 130k pounds in sales, and **WHITE HANGING HEART T-LIGHT HOLDER** follows with over 93k pounds.

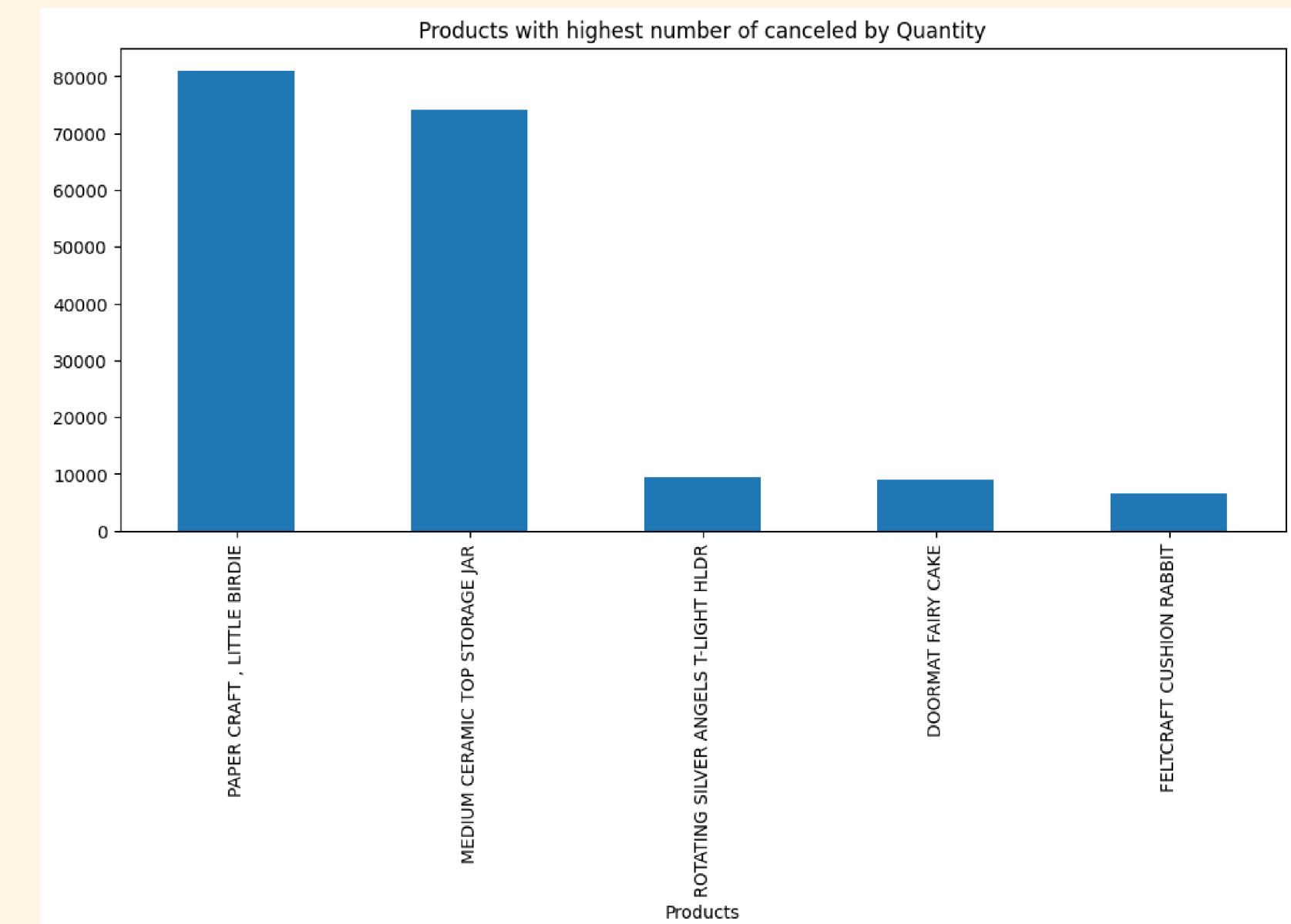
**These products have the potentials to generate increase in revenue.**



While **WORLD WAR 2 GLIDERS ASSTD DESIGNS** is the best selling product by quantity, which sold over 5300 pieces, follows by **JUMBO BAG RED RETROSPOT** with over 4500 quantity sold. **These products have the potentials to increase traffics.**

## PRODUCTS WITH HIGHEST NUMBER OF CANCELLATION

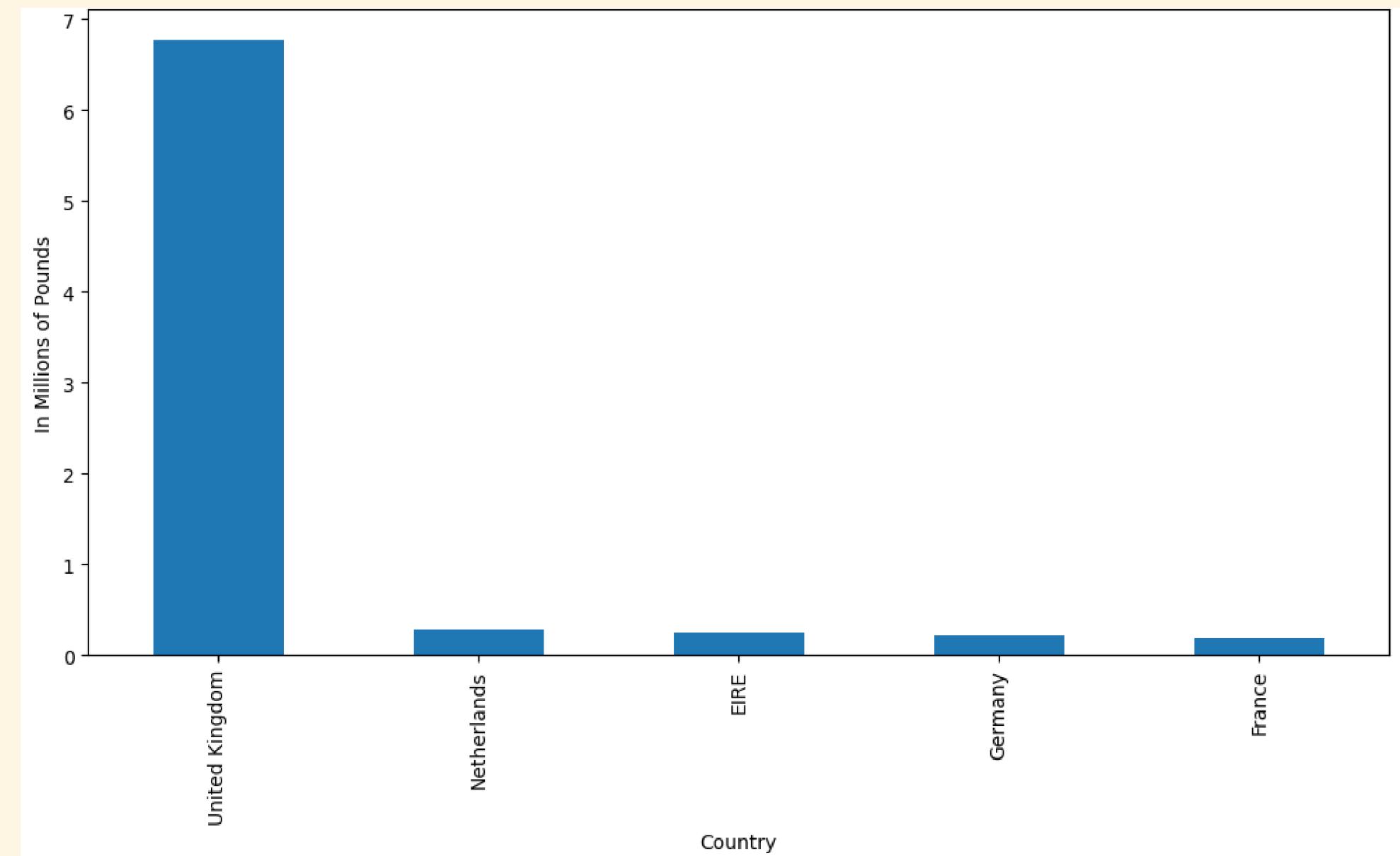
**PAPER CRAFT , LITTLE BIRDIE** has the highest number of cancellation, with over 80k quantity canceled, follows by **MEDIUM CERAMIC TOP STORAGE JAR** with over 74k cancellations. Products mentioned on the graph shows products with issues, **these products shows potential to stop the production or products that need improvements.**



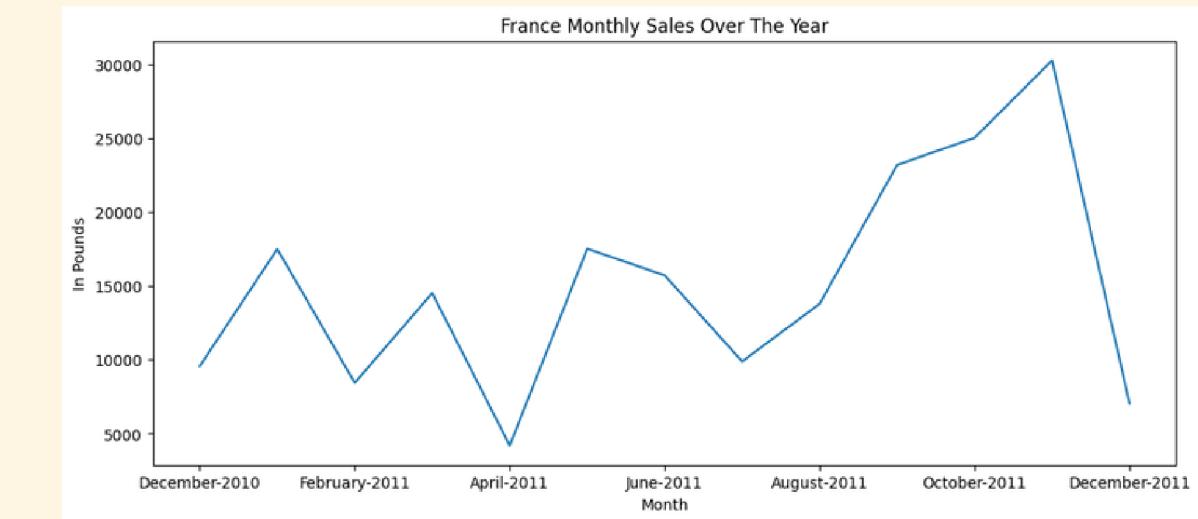
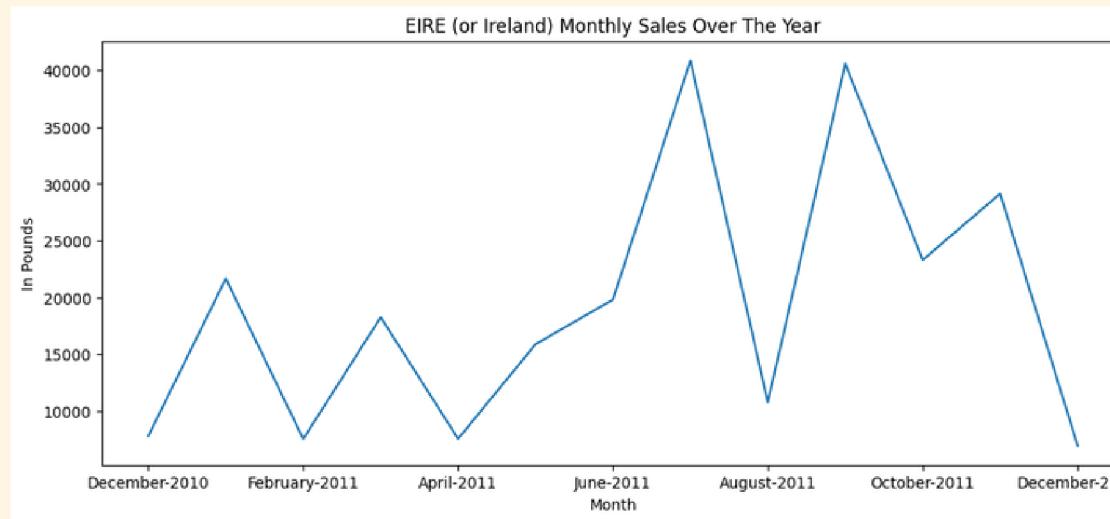
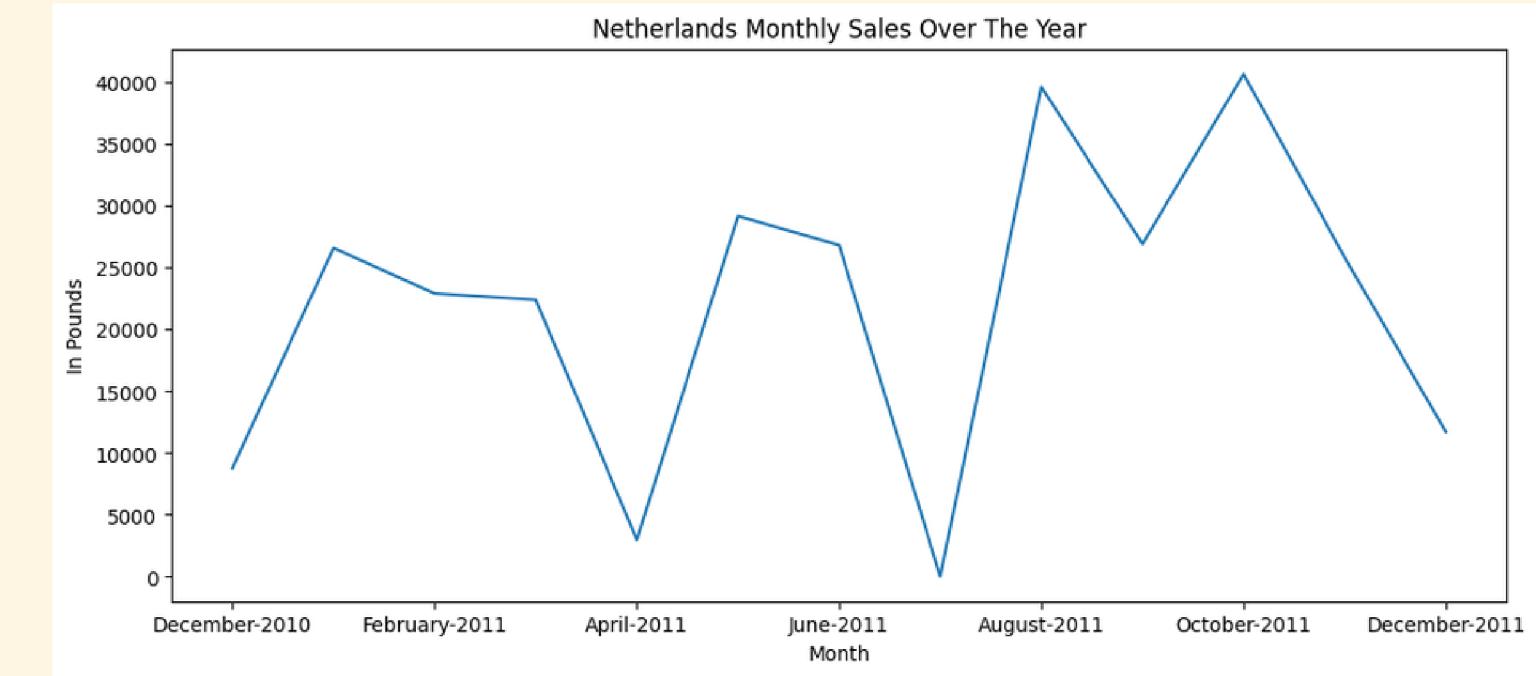
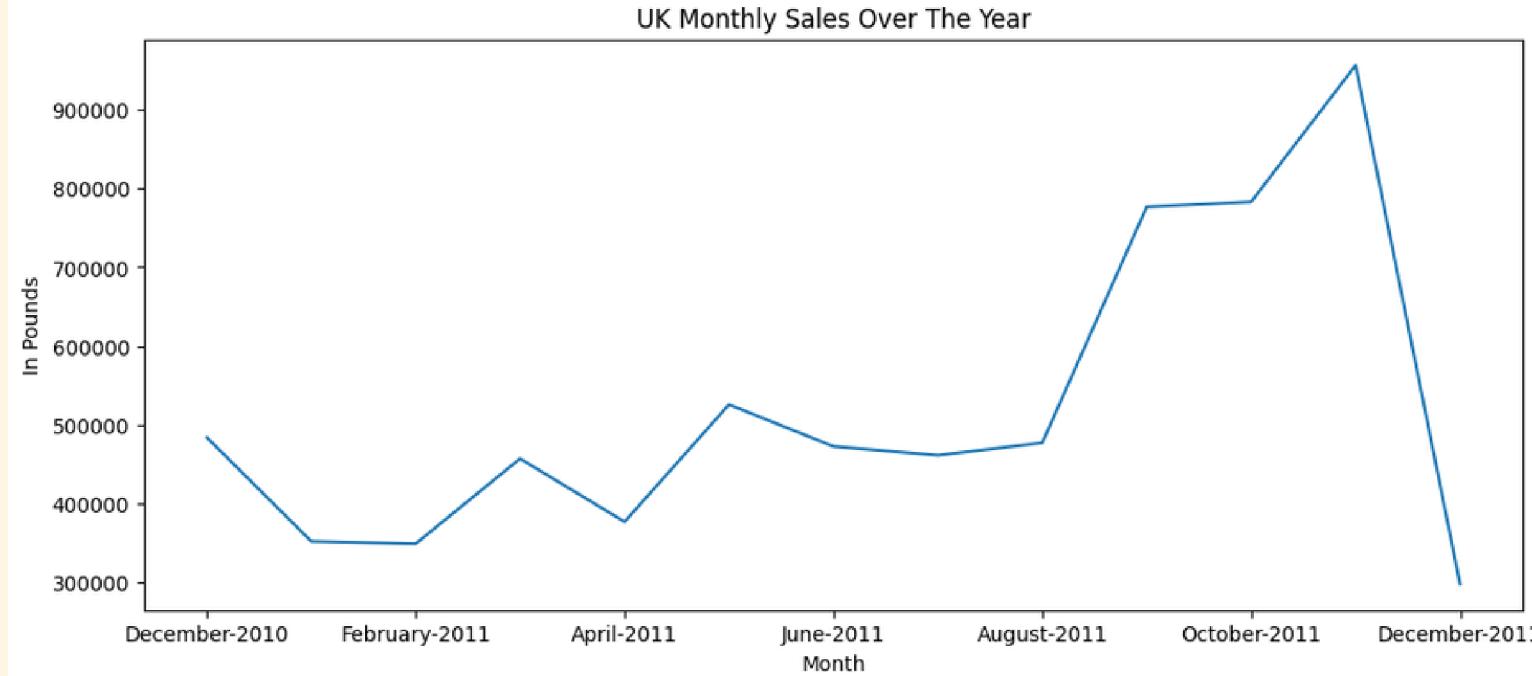
# GEOGRAPHICAL

**United Kingdom (UK)** is the highest spending country, with **total of 6,7M pounds** of the total sales. Followed by **Netherlands**. Although there's a significant gap between UK and the rest of the countries, with total of sales of each countries is less than 300k pounds. **EIRE (Ireland), Germany and France** is the top 3,4 and 5 respectively.

## TOP SPENDING COUNTRIES

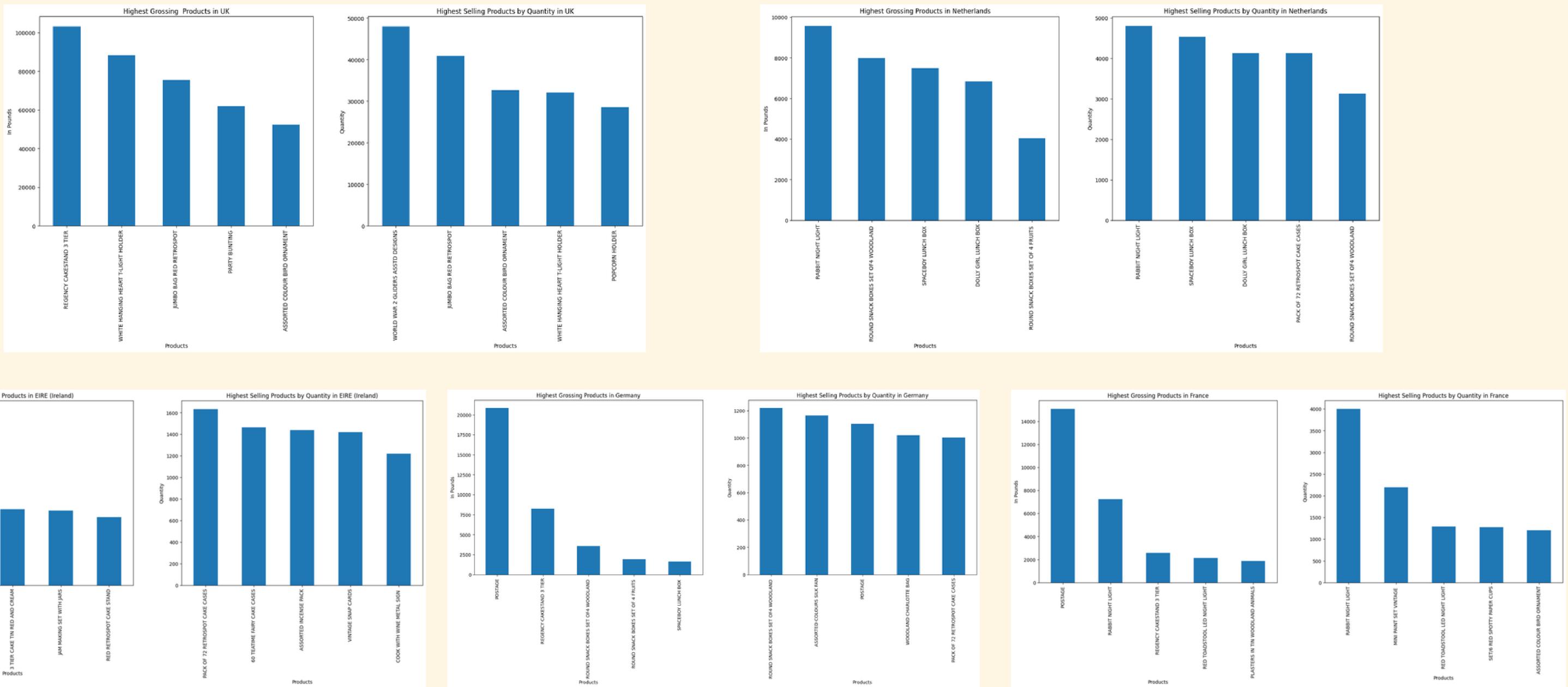


## A CLOSER LOOK OF THE SPENDING OF THESE COUNTRIES OVER THE YEAR



All the countries had their peak sales in the later half of the year. UK, Netherlands and France had peak monthly sales in November, while Ireland had peak sales in July, and Germany in November. In December, all these countries' sales is significantly dropped.

## TOP SELLING PRODUCTS OF EACH COUNTRIES



Regency Cakestand 3 Tier is products with highest potential globally, as it's included in all the countries' highest grossing products aside from Netherlands. While top selling products by quantity diverse for each countries

## HIGHEST AVERAGE SPENDING COUNTRIES

### OVERALL AVERAGE SPENDING

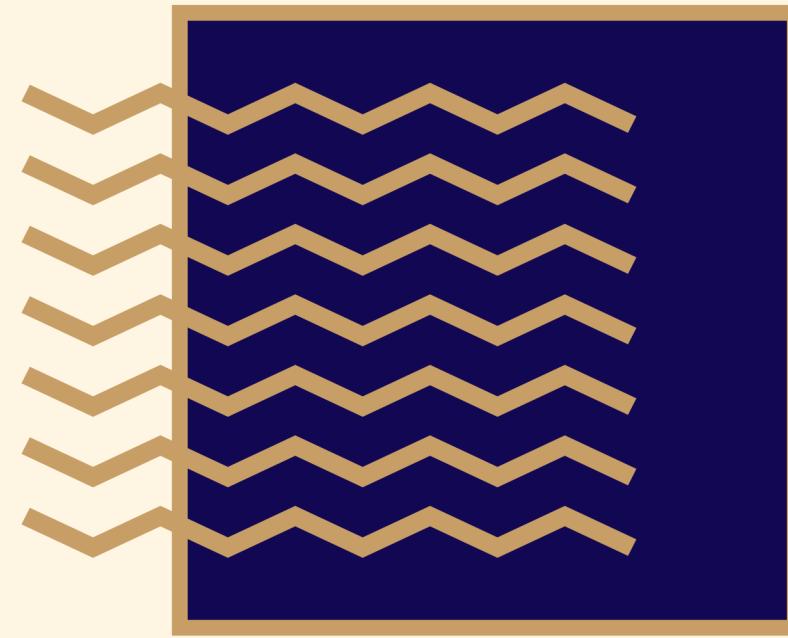
Country	CustomerID	Sales	AvgSpendCust
EIRE	3	250285.22	83428.406667
Netherlands	9	284661.54	31629.060000
Australia	9	138467.41	15385.267778
Singapore	1	9120.39	9120.390000
Sweden	8	36595.91	4574.488750

Ireland is the country that has highest average overall spending around 83k pounds. Meaning, throughout the year, on average customer from Ireland spent 83k pounds. Netherlands, Australia and Singapore follows respectively.

### AVERAGE SPENDING PER ORDER

Country	CustomerID	Sales	InvoiceNo	AvgSpendOrd
Netherlands	9	284661.54	101	2818.431089
Australia	9	138467.41	72	1923.158472
Lebanon	1	1693.88	1	1693.880000
Japan	8	35340.62	28	1262.165000
Israel	4	6994.25	6	1165.708333

Netherlands has the highest average spending per order with 2.8k pounds/order. Meaning, on average, every order made by a customer in Netherlands is worth 2.8k pounds in sales. Australia, Lebanon and Japan follows respectively.



# THANK YOU



## LET'S GET IN TOUCH!

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