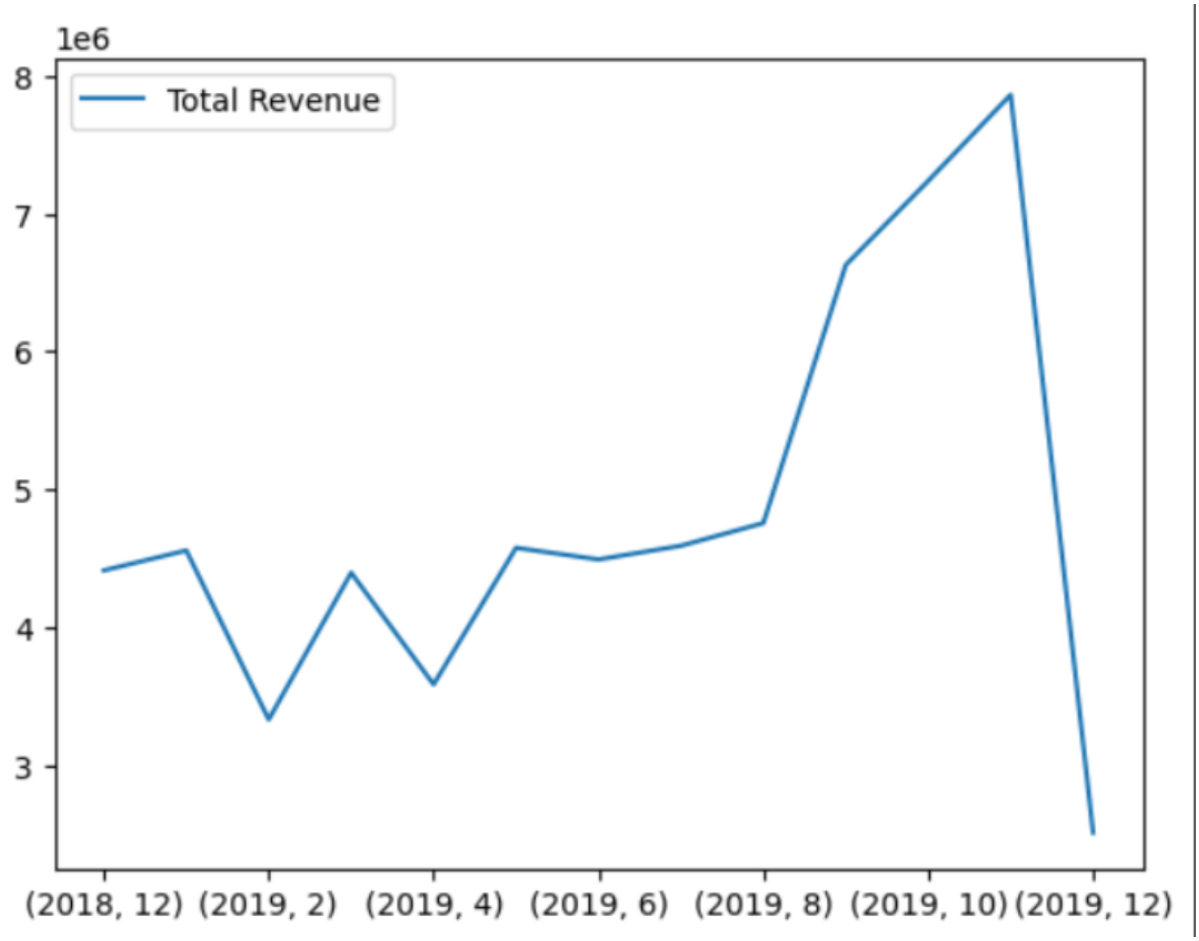
E-Commerce Sales Trend Analysis Final Report

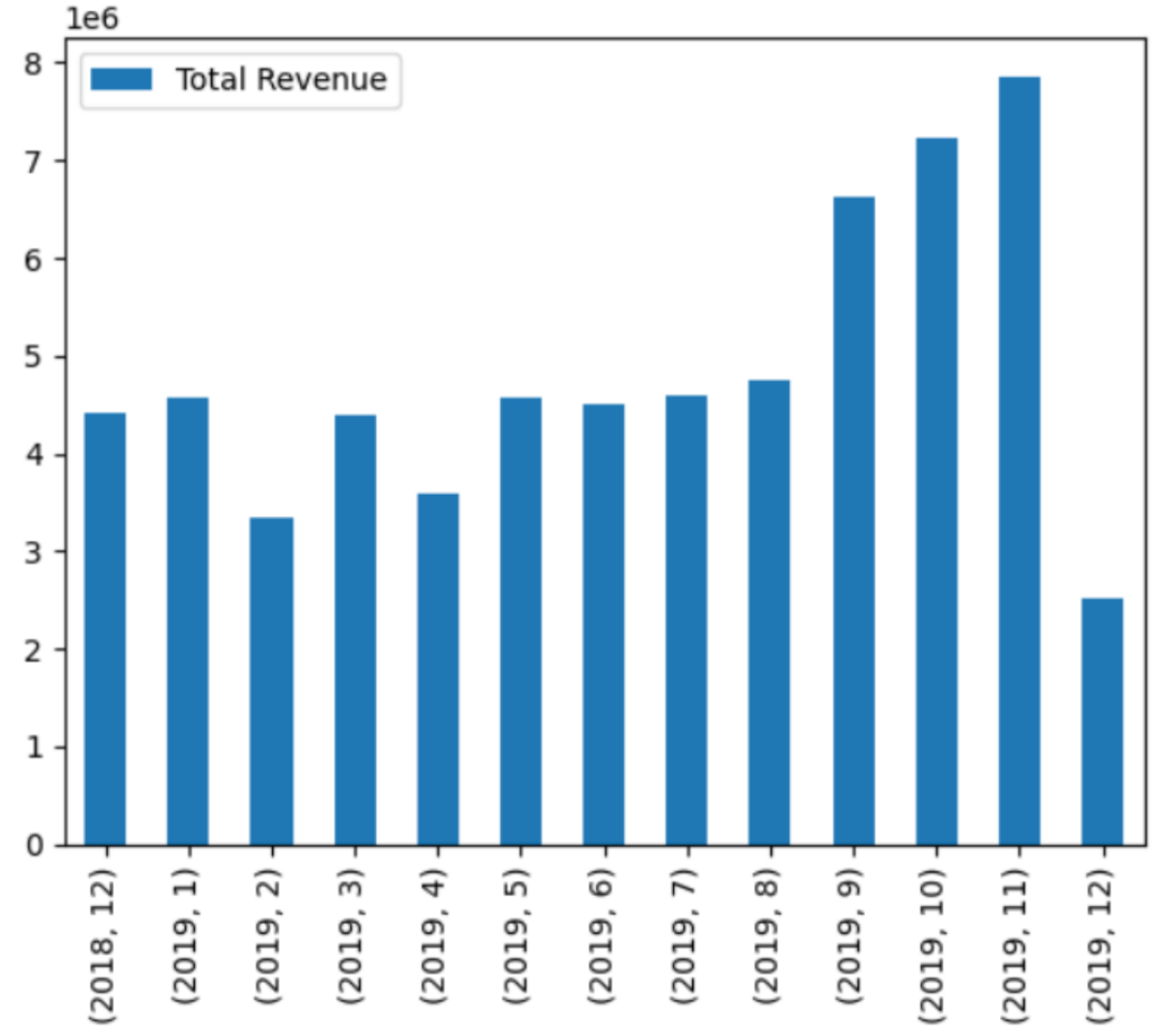
This is the final report for the E-Commerce Website Sales Trend Analysis and Business Recommendations Project

Sales Trends

Monthly/Yearly Sales Trends

When grouping the data by month and year, we see that there are some overall trends in total revenue made by sales. Upon visualizing the data using a line graph and bar graph, the trend becomes clear.



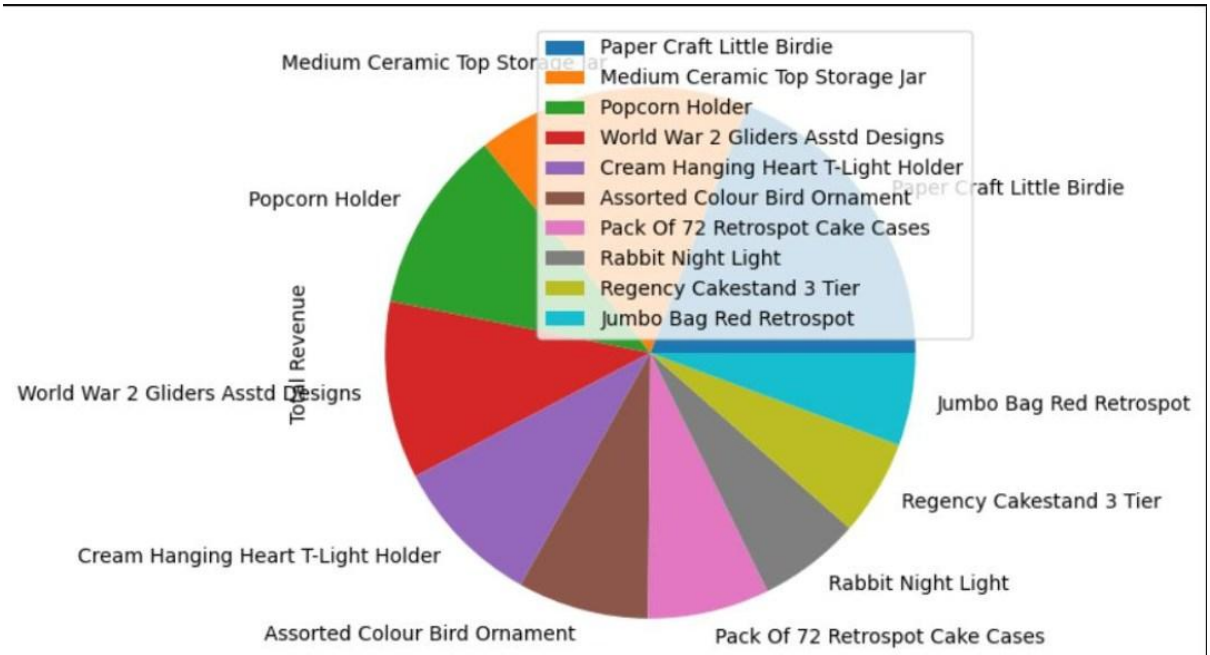


In the latter months of the year i.e. September, October and November, sales from the E-Commerce website peaked. In addition, there was a lull in sales during December and January, with the lowest points being in February and April.

When sorting by year, we notice that there are only records for December 2018 sales, so a year-by-year comparison would not yield workable results.

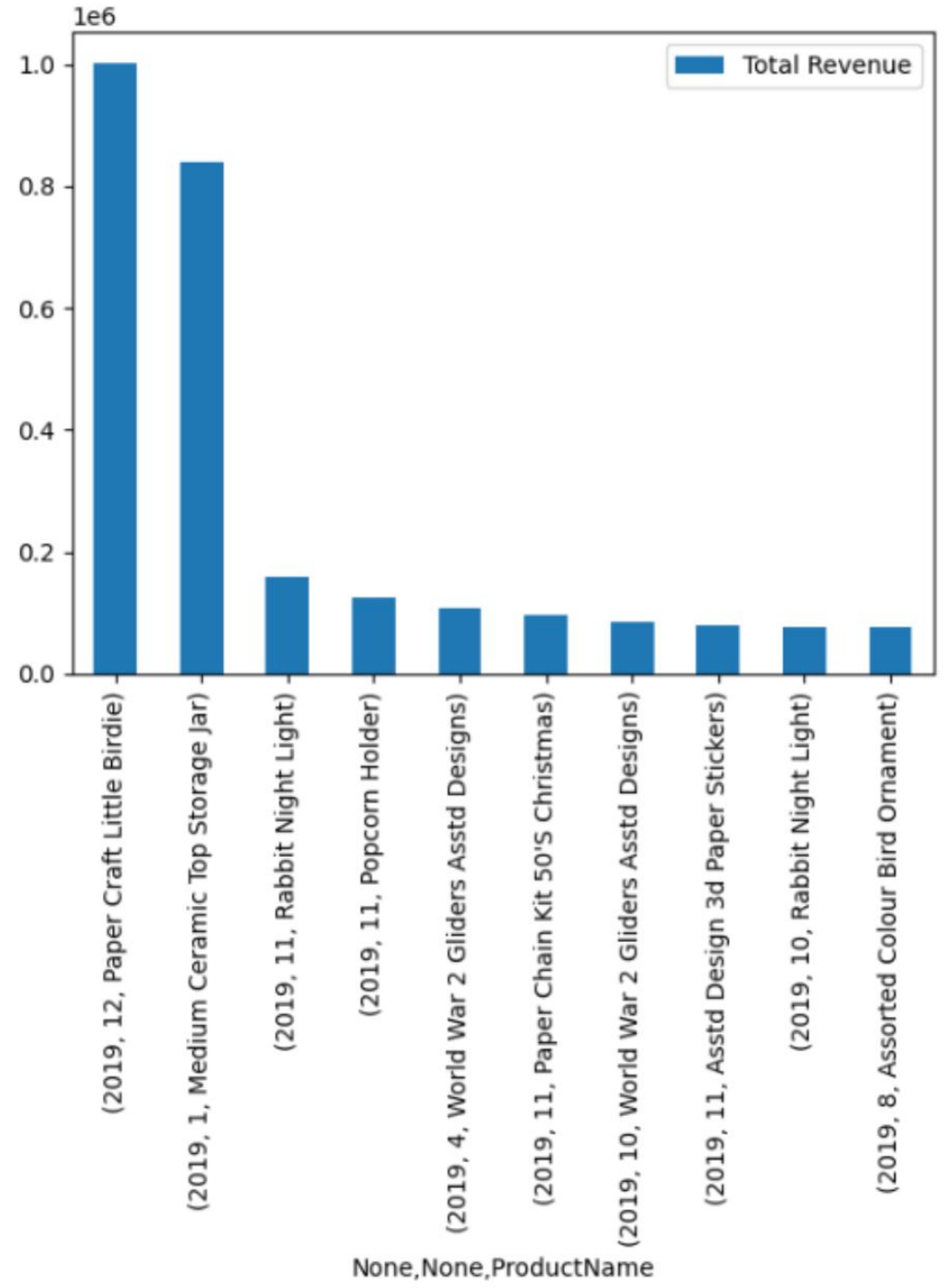
Best-Selling Products

Upon sorting the dataset according to total revenue and product sales, we identi the 10 products that performed the best out of all the products.



We see that the best performing product is “Paper Craft Little Birdie”, followed by “Medium Ceramic Top Storage Jar” and “Popcorn Holder”.

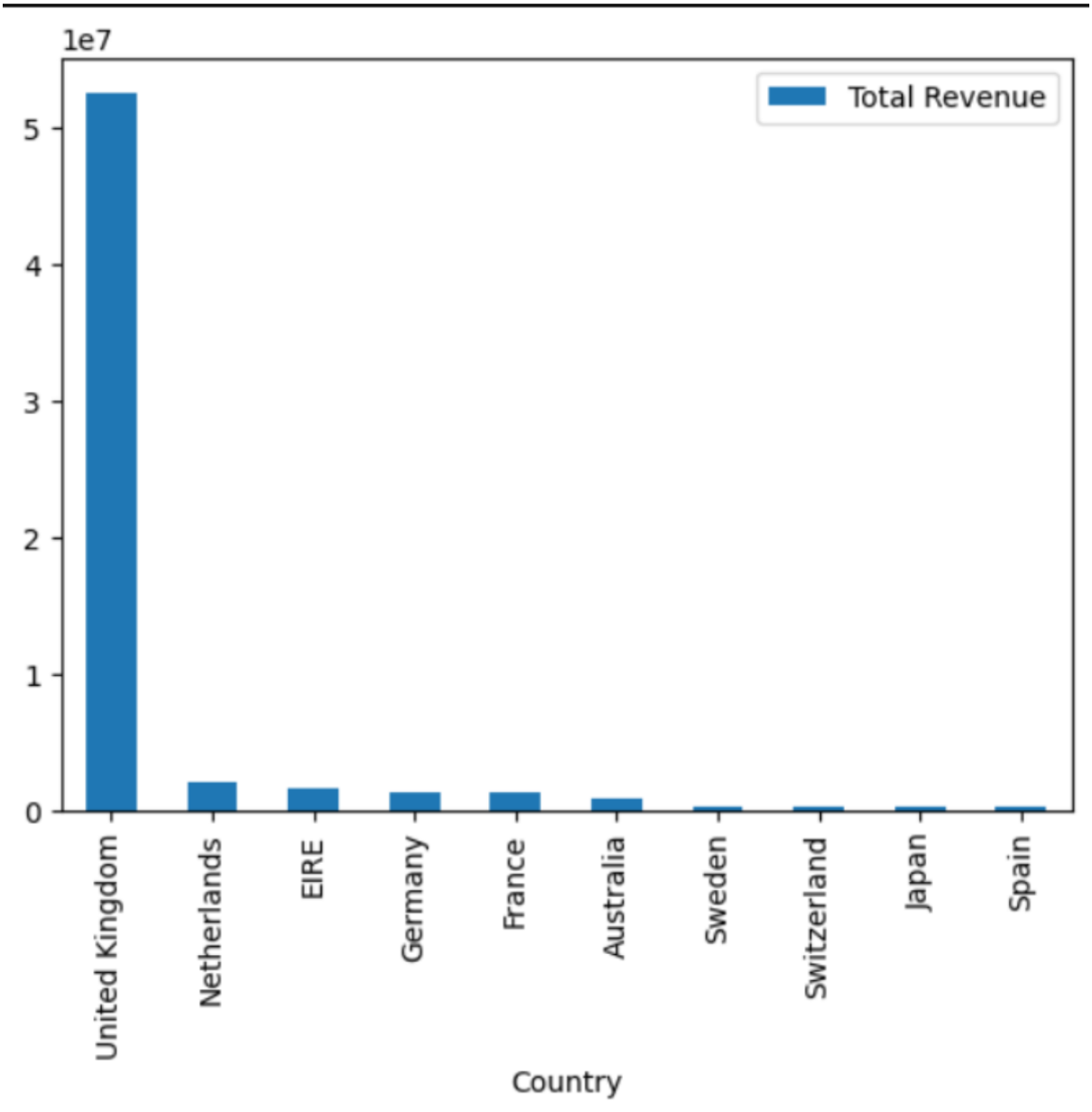
Upon sorting by both product and Month/Year, we get the following visualization



We can see that the best selling product performed the best in December 2019, followed by the second best selling product in January 2019.

Geographical Sales Data

When sorting the data by country and region, we found out the top 10 best performing countries, and the most profitable among them was the United Kingdom.



Key takeaways

Key takeaways from this report are

- That products sell more during the end of the year than at the start of it
- That certain products perform much better than other during those months
- That the United Kingdom and European Region is more profitable than other regions of the world, but Australia is a budding market

Recommendations

Employ strategies to increase sales during the end of the year through end-of-year sales. Invest in the Australian market. Invest in Paper Craft Little Birdies and Medium Ceramic Top Storage Jars

Time Series Analysis and Forecast

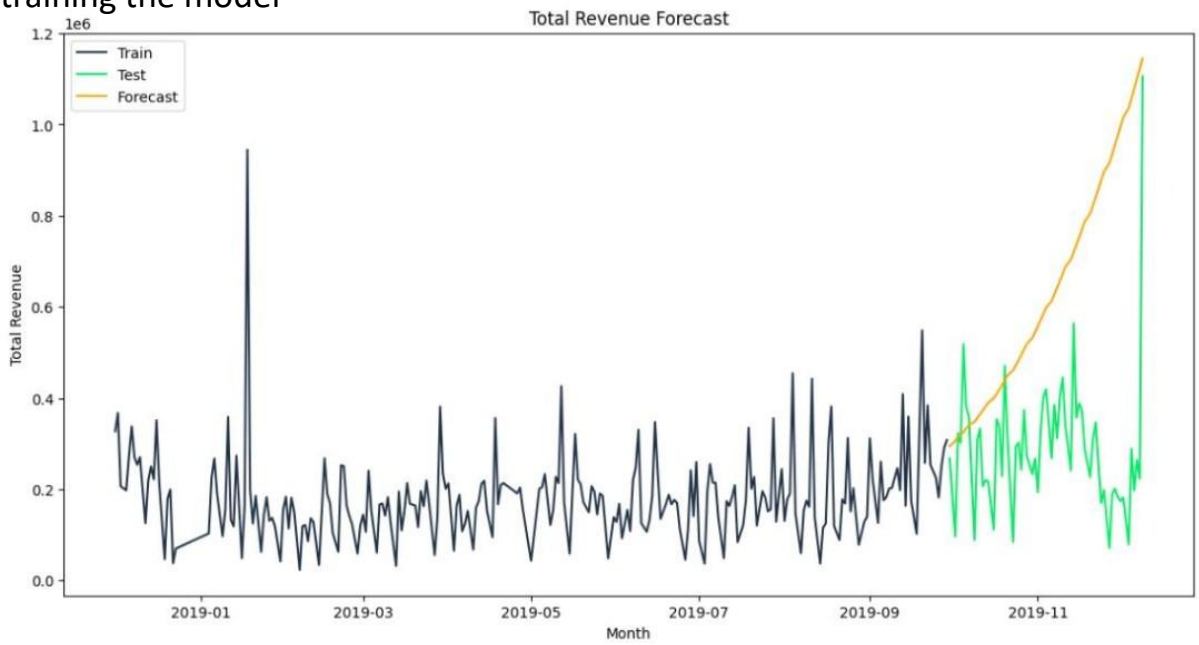
Time Series Model

The model chosen for analysis of the given dataset was the Auto Regressive Incremental Moving Average model, or ARIMA Model. This model was chosen as the data does not have clear trends or seasonality because of the limited data we have.

The ARIMA model uses three values (p, d, q) as an order of lags that can be

used to modify and fit the model as we require. To determine p, d and q, we graph the Auto Correlation Function and Partial Auto Correlation Functions

Using these graphs we can determine the values of p, d and q, by training the model



The most optimal value of the order is (2, 3, 2). The evaluation metrics used were Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC) and Root Mean Square Error (RMSE)

AIC:
6540.191279992015
BIC:
6578.432379063262
RMSE:
29936919.3844

This model and forecast tells us hat there is potential seasonality every year in the winter months where sales increases.

Business Recommendations

It is recommended that the website attempt to capitalise on the seasonality by puting end-of-year sales and winter sales on the website to drive sales higher.