Business Analytics, Applied Modelling and Predictions ST2187

UOL ID: 220460044

Report

Word Count: 1500

Executive Summary

The dataset gives us details of customers who has completed and received their order(s) from the business from 2019 to 2022.

The business grouped their products into 3 main categories: Furniture, Office Supplies and Technology which is then further categorised into its more specific sub-categories.

The demographic of the business consists of 3 segments: Consumer, Corporate and Home Office. It ships to 149 countries and 1094 states in 7 markets, namely Africa, APAC, Canada, EMEA, EU, LATAM and US. In 2019 they had 1309 unique customers who ordered, this number increased to 1373 in 2020, 1454 in 2021 and 1511 in 2022. With close to 1600 customers ordering from this business based on the calculation of the unique customer ID numbers from the data set provided.

The customer is able to choose its ship mode and order priority which will affect the lead time[1] of the delivery once payment is made. The cost of this is assumed to be borne by both the customer and the business for a more equal business to consumer relationship. We will be looking at the order data of these customers in order to identify trends in sales and profit and take actions to improve these numbers.

Table of Contents:

[1] The time between the order payment date and ship date.

1. Introduction and Purpose

With this report we aim to gain insights of the business to understand the opportunity costs and areas of improvements that can be achieved. We hope that with better understanding of the current situation, we aim to be able to increase profits and decrease costs to optimise the business performance. We observed the relationships between variables and its usefulness through tableau and categorised the information into 5 categories that aims to bring about better sales and profit margin.

2. Sales History and Forecasting

When looking at the sales history, we see a general increase in sales from 2019 to 2022. With annual trends being year start having lowest sales and peaking near end. The only anomaly in this observed trend is in mid 2021, there is a spike in number of orders from all 3 segments, where the peak in sum of sales exceeded the year end. With every business, the year-on-year gives insightful information on how the business performance. As the given data starts from 2019, no information of its previous year was provided to do the comparison with. Each quarter, we see an increase in sales comparing to the same quarter of the previous year. With the lowest increase being 9% in Q4 2020 and highest being 42% in Q1 2021. The yearly sales data can be used to forecast the 2023 sales as the annual trends in peaks and troughs are similar. It is predicted that February would have the lowest total sales at around 300,000 and it would gradually increase to around 600,000 by year end.

3. Discount and Profit against Sales

While it is understandable that a business would want to give discounts to incentivise customers to purchase more and increase sales, discounts and sales does not necessarily have a direct relationship where having a higher discount would result in having increased sales. Shown in the scatterplot graph of discount given against sales, most of the higher sales came from lower discounted rates except for the exceptionally large sale with a 50% discount. Discounts should be strategically distributed and spaced to maximise profit and the business should minimise the frequency and amount of high percentage discounts are distributed and stick to discounts under 50%.

The company had its lowest profit margins in 2019 where it fell below 10% and had even hit 5% at its lowest, it has since stabilised and maintained a healthy margin of 10-15%. This indicates that the company was operating at a loss initially but has thereafter recovered. To establish an appropriate pricing strategy that would increase cost efficiency and increase profit margins without sacrificing on product quality and consumer retention, it would be insightful do the cost breakdown of each sale to determine which areas we are able to do R&D and increase investment revenues by. Covered later in the report, we should also be considering reducing the amount of low-performing goods sold in order to maximise our productivity and efficiency.

4. Geographical Profit and Sales

The business has a global market with United States, France and Australia having the highest number of customers at 793, 679, 660 respectively. On the other end, countries like Chad, Taiwan, and UAE have a lower customer base of 1, 5 and 6. This could be due to factors including population, number of business competitors, costs of goods. With the dataset provided, we looked at the average shipping costs to determine if it affects a customer's decision in purchasing an item. In the named countries, Chad had the highest shipping cost is at about $150 as compared to UAE at less than $10. Furthermore, United States shipping fee is double that of Australia while having the 1st and 3rd highest number of customers. Both of this indicates that while there may be some correlation between shipping costs and number of customers, it is not a significant factor that affects the elasticity of customers. What this means for a business is that having lower shipping costs will not necessarily attract more customers to the business in the country. Looking at the profit per country, we can see that the countries with more customers make more profit. This relationship is sensible as sales is higher when there are more customers and, in the data provided, profit is affected by sales and shipping costs. As a result, United States, France and Australia have a relatively higher net profit as compared to other countries. It is also observed that China, India and United Kingdom have a sizable net profit, comparable to that of countries with the highest number of customers and that is because they have a customer base of around 500 at each said countries. This reinforces that having more customers will increase profits.

Thus, businesses should increase their consumer reach by boosting advertising efforts in countries, focusing on those with higher populations.

In general, the profit ratio per region is 0.1 - 0.2 (10-20%) with some countries being in the negatives. It is observed that most of these countries with negative profit ratios have a much larger absolute ratio at about 1.5 (-150%). The company should negate this through reducing product costs, and overall cost of production through efforts like reducing labour costs by moving productions to a country with lower wages and outsourcing 3rd party vendors for production. Advertising will increase the overall sales by increasing reach and brand awareness, paired with an improved profit ratio brings about higher net profit.

5. Relationship between Variables

In a glance, we can see that the frequency of discounts given as well as its percentage over the years have remained consistent and this gives good benchmark to show the profit over discount given assuming the same results annually. At a 30% discount the company would receive more losses then profit in the sale and like what the sales over discount given indicates, 50% should be the discount ceiling as the highest profit at 50% discount is $0. Therefore, to achieve a sustainable business model, the company should not be giving discounts that are more than 50% and should be limiting the number of 50% discounts given as it is historically seen to be of loss to the company. We looked into relationship between the quantity sold and the number of orders over time. They have a direct relationship with customers buying a similar average number of goods per order. This indicates that while there might be customers who buy 1 or 2 goods from the business, there are other customers who buy more and brings up the quantity and the average quantity sold per order ID.

6. Business Profitability

Profit has been repeatedly mentioned throughout this report as it is an indicator of the business financial performance. We look at the profit per category and profit against ship mode to determine whether to keep a product subcategory and determine the best ship mode for the business. The ranking of sales per category is technology, furniture followed by office supply. With more dissection, the highest subcategory is phones (technology) and lowest is labels (office supply). We further look into each category and its subcategories and find out that copiers (technology) have the best profit to shipping cost ratio while tables (furniture) the worst. This ratio is further worsened by the fact that the tables profitability is negative. To increase profitability and compete with market competitors, the company should source for suppliers with similar quality with lower costs in order to decrease production costs as well as boost R&D in subcategories that sells better. However, if the company is unable to lower the costs, it is advisable to stop selling tables due to the opportunity costs where labour resources can be allocated elsewhere to increase productivity.

The company provides 4 types of shipping options to the customers: same day, first class, second class, standard class with 0 days, 2 days, 3 days and 5 days lead time respectively. Critical order priorities can only be found in the first 3 classes and low priority in the last. The overall profit per class corresponds to same day having the lowest and increasing to standard class having the highest. In cases like this, while it makes sense in terms of profit to remove same day shipping, it is important to remind ourselves of our customers' needs. Instead of removing same day shipping altogether, the better alternative shipping option is to merge first class and second class shipping as they have similar lead times with only a 1-day difference and have similar profits.

7. Conclusion

These analyses deepen the business understanding of consumer habits, allowing the business to implement backend changes that would benefit both the customers and business, simultaneously optimising costs and improving the profit margins. This would allow for the business to have a greater edge and market position in the industry while having greater efficiency and less opportunity costs. More fine-tuning can be done by looking at consumer-facing changes that can be made to improve the business.