**Individual Writing Assignment #3**

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**INTRODUCTION:**

The purpose of this paper is to analyze a dataset from a grocery chain company and to use that data to help with a local grocery store in Rye, East Sussex, in the UK, which is a small town. This paper will focus on the problems that are being faced with the data, a description of the data given, the analytical techniques that are being used in this report, the results of the analytical techniques and some recommendations based on the analytical techniques as to what the startup grocery store should do to be a successful business.

**PROBLEMS:**

Some of the problems that are most likely being identified within the data is to figure out which products are selling well and how many of each product is being sold. Understanding customer behavior in the data is important such as the dates in which the products are being sold, how much they are spending, and the quantity of each product being purchased. Another issue to focus on could be inventory management to ensure that stock levels are kept on track and to identify any items that may have a high number of quantities sold.

**DATA DESCRIPTION:**

The spreadsheet shows data across 8 different columns. The first column consists of the invoice number which is a number associated with each transaction and this information could be useful to track individual sales, returns, or customer inquiries. The next column consists of a stock code which is a number associated for each product. The next column is a description of a product which lists the name of the product and should have a connection with the stock code. The next column displays the quantity of each product being purchased for each transaction which could be useful for managing inventory and indicating how popular a product might be. The next column is the invoice date, which is the date the transaction was made which could be beneficial for analyzing any trends and could help with time management regarding inventory. The next column is the unit price which is the price of which the product is sold for. The next column is the customer ID which is an identifier for the customer who made the purchase which can be used to help understand customer behavior. The final column is the country in which the transaction was made, which can be used to identify any geographical demographics regarding the purchases.

The dataset was cleaned by clearing out any sections of the data that had blanks or poorly entered information because it wouldn’t be relevant to the data. All purchases made in countries that were not the UK were deleted because the goal of this report is to start a local grocery store in Rye, East Sussex which is in the UK, so only purchases made in the UK would be relevant for this project.

Some questions to consider would be which products have the highest quantity sold, which products are making the most sales, and if there are any trends with the date in which a transaction was made.

**ANALYTICAL TECHNIQUES:**

The first analytical technique that was used for this report is an Excel pivot table. This can be used to help summarize data especially in large quantities such as with the Grocery Retail excel file that has been given. This is the main reason why this technique is being used because when first opening the dataset in Excel, there was over 500,000 rows to work with, making it very hard to work with, and even with some data mart cleaning, there was still about 350,000 rows remaining meaning that trying to find some of the trends in the data would be very difficult. Using a pivot table has its advantages because you can sort everything by certain categories which would be a lot harder to do in just a normal Excel spreadsheet, and it also groups certain data that repeats itself in the spreadsheet into groups making the data more organized. Creating calculated fields is also easier when using a pivot table as it helps saves time instead of just doing it in the regular Excel spreadsheet and dragging the equation down into a few hundred thousand rows. The other analytical techniques also wouldn’t have been able to be created had it not been for the pivot table.

The second analytical technique that was used for this report is a line graph. There were two uses of the line graph, the first line graph was used to identify some of the products with the highest amount of quantity and analyzing the trend over time whereas the other chart does the same thing, except it focuses on the amount of sales from the products that earn the highest amount. The benefits of this is that it makes it easier to understand the data and can help identify any trends or patterns within the products. This technique can also be used to help identify any future forecasting in the following months or years regarding things such as sales, or quantity which can be beneficial for inventory.

The third analytical technique used was a bar chart which takes the total number of sales per month and the quantity of each product sold per month. The benefits of this are that it can help better understand seasonality across the different months and if any trends occur within the data, it can help understand when sales and quantity trend to drive up and what makes it decrease. This can also help make predictions on what to expect for a future month especially with the more data that gets presented.

**ANALYSIS RESULTS:**

1. **PIVOT TABLE:**

**A screenshot of a computer

Description automatically generated**

For the pivot table, the information that was displayed was the description of each product, the sum of the quantity of each product sold, the sum of the unit price for each product sold, and a calculated field titled ‘Sales’ which took the quantity times the unit price. Based on the table, the top 3 selling products include the ‘White Hanging Heart T-Light Holder’ with almost $200 million in sales, the ‘Regency Cakestand 3 Tier’ with over $170 million in sales , and the ‘Jumbo Bag Red Retrospot’ with over $120 million in sales. Another thing to notice was that out of the top 20 products with the highest amount of sales earned, 12 of these products earned the most sales during quarter 4, 6 of these products earned the most sales during quarter 3, 1 of these products earned the most sales during quarter 2, and 1 of these products earned the most sales during quarter 1. Based on this information, it seems that during quarters 3 and 4, there was most likely an increase in sales based on this information. In addition to this, all of the top 3 products had the highest number of sales during quarter 4. The sum of quantity column was also very important for determining how much of each product was sold for each transaction. The top 3 products with the highest number of quantities sold includes the ‘Paper Craft, Little Birdie’, the ‘Medium Ceramic Top Storage Jar’, and the ‘World War 2 Gliders Assisted Designs’. Based on the data, once again it seems like the later quarters also had the highest quantities sold as out of the top 20 products with the highest quantities sold, 10 of those products had the highest number of quantities sold in quarter 4, 3 of those products had the highest number of quantities sold in quarter 3, 4 of those products had the highest number of quantities sold in quarter 2, and 3 of those products had the highest number of quantities sold in quarter 1.

Some recommendations that should be taken into consideration include focusing on products that tend to be high performers in terms of high sales and quantity sold. The start-up grocery store should focus on making sure inventory rates for the higher selling products are increased especially during seasons with high demand to make sure that sales are maximized and to make sure that there isn’t any stockouts. Another recommendation would be to test out different pricing strategies such as trying out different price points for products with lower sales volumes which could be used to help find a good balance between demand and revenue. They should also focus on selling some of the more popular products such as the ‘White Hanging Heart T-Light Holder” which will help capitalize on its popularity and explore potential cross-sell opportunities.

1. **LINE CHART:**

For the line chart, there were two different types of line charts used which was a chart identifying the top 10 products with the highest overall quantity sold across four different quarters for the amount of quantity for each product sold while the other chart was identifying the top 10 products with the highest overall sales sold across four different quarters. Based on the quantity line chart, the ‘Paper Craft, Little Birdie’ had nothing sold for the first three quarters possibly because maybe it wasn’t in stock at the time, but easily had the highest number for quarter 4, while for the ‘Medium Ceramic Top Storage Jar’, it had the highest quantity sold for quarter 1, but didn’t sell much for the next 3 quarters. The reason why some products such as the ‘Paper Craft, Little Birdie’ sold so much in the later quarters was mostly due to seasonal changes as certain holidays coming up can result in some seasonal products receiving a high number of sales. There were other products that had a higher amount of quantities in later quarters such as the ‘Jumbo Bag Red Retrospot’ and ‘Assorted Colour Bird Ornament’ which had it’s highest number of quantities sold in quarters 3 & 4. Based on the sales line chart, some products such as the ‘Paper Chain Kit 50’s Christmas’ didn’t sell much in the first two quarters but sold a lot afterwards, especially in quarter 4 being the highest seller out of the other products. The main reason for this is most likely due to seasonal changes as quarter 4 would represent the months around October through December and Christmas is in December which would most likely be the reason why the sales for quarter 4 were so high. Some products such as the ‘White Hanging Heart T-Light Holder’ and the ‘Regency Cakestand 3 Tier’ have shown an consistent increase in sales across each of the quarters.

Across both of these charts, some recommendations that could be implemented would be to focus on seasonal marketing and to anticipate any sales during the holidays especially in regards to products such as the ‘Paper Craft, Little Birdie’ and the ‘Paper Chain Kit 50’s Christmas’ as this was most likely the reason why these products were booming in the fourth quarter due to holidays such as Christmas being within that timeframe. Another thing that the startup grocery store should do would be to stock up on products that are consistently being sold as such as with the data showing that some products in the grocery chain company include the ‘White Hanging Heart T-Light Holder’ and the ‘Regency Cakestand 3 Tier’. Also, implementing promotions can be beneficial as well as some products like the ‘Medium Ceramic Top Storage Jar’ which had a high amount of quantity sold in quarter 1 but had a significant decrease in the next 3 quarters and implementing promotions can improve both the number of products sold and increase the overall sales.

1. **BAR CHART**

For the bar chart, there were two different kinds of bar charts. One of the bar charts has the quantity of products sold from the store for each month of the year. From the chart it seemed to be gradually increasing and decreasing from the months of January to August, but significantly increased from September to November, and decreased in December. The second bar chart has the total number of sales for each month of the year, and it follows a pretty similar trend to the quantity chart. The main differences between them both is that the spike from August to September, October to November, and November to December were more drastic in the sales chart as opposed to the quantity chart. The increase of sales towards the last third of the year would have an impact on business decisions. Some of these decisions would include focusing on stock and inventory management and ensure sufficient stock levels to ensure that there’s enough products for the customer and to avoid missing out on any revenue. Another business decision that could be influenced is the staffing behind a company’s team because if a business starts growing especially with more products being sold and more sales being made, then it can potentially result in an increase in staffing.

Some recommendations for the start-up grocery store would be to focus on making sure that inventory is well prepared for any months that may be busy, in particular during the months of September to December seeing as these were the busiest months in terms of inventory and sales. During the months where there were no peaks, one thing that would be important would be to try and find ways to engage any potential customers during the off-peak period due to the lower number of sales. Some ways to combat this could be through certain promotions or a loyalty program which may potentially result in a more well-rounded distribution of sales throughout the year and could make the operational processes of the business easier.

**CONCLUSIONS:**

Based on the dataset given and based on the analytical techniques that were used for this report, it’s clear that why it may be tough to figure out what to consider for this grocery store, however, it does give some information on what things to consider when starting out. Some things that this grocery store should come up with based on the analytical techniques used include focusing on inventory management which is something that all three analytical techniques focused upon. It’s important to make sure that stock levels are tracked in real time while also implementing prediction techniques such as forecasting based on the data given. It’s important to also focus on high-performing products, especially for those products that experience a peak in quantity and sales as shown from the months of September through December. Another potential recommendation mentioned would be to focus on using appropriate pricing methods and promotions which would in return, help during the months where it’s down season such as during the months of January through August as shown in the data as it can help increase these sales during those years. Another thing that could be focused on for this company would be to focus on seasonal marketing and having seasonal products. As the data shows, some products such as the ‘Paper Craft, Little Birdie’ had the highest quantity sold during the fourth quarter and one product which was the ‘Paper Chain Kit 50’s Christmas’ made the most sales in the fourth quarter due to it being a seasonal item. This approach could greatly benefit this startup grocery store if they can take the time to understand the market behind seasonal products which can easily drive-up sales for the company. The last main thing to consider would be to focus carefully on the operation of the business within the peak seasons which would be considered according to the data set from September to December. It’s important to consider factors during these important times of the year such as within the staffing or with the stock and inventory management to make sure that it’s enough for the company to handle. While it can be difficult to begin a startup grocery store company, if they can take this information into account, then it can lead them to success.