Coursework Report

ST2187

Business Analytics, Applied Modelling and Prediction

Student Number:

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1. Executive Summary

In this report, five dashboards are produced based on the dataset given to form a story with the use of Tableau. It contains a total word count of 1463, excluding the executive summary, table of content and list of figures.

The concept of my dashboards is developed according to the scale whereby we start by looking into overall profits and sales throughout the four years from 2018 to 2021. Within the dashboards, visual representation in purple indicates profit while green indicates sales. The first dashboard contains three worksheets that compare profits in three approaches. The first approach is where the profit of 2021 is compared to the profit of 2020. The second approach is where profit is layered with sales, giving a clear visual comparison of profit to sales ratio. Lastly, the third approach shows the monthly profits across four years. Some noticeable trends and spikes are observed with trend lines plotted, this will be further discussed in the report under Dashboard 1. In general, profits are deemed to be more important as compared to sales as it provides a much more accurate representation of an organization's financial situation. Hence most of the dashboards analyze profitability instead of sales.

The second and third dashboards will investigate the spread of different categories and segments across global markets over the course of four years to identify patterns and trends. In both dashboards, the global markets are identified into seven markets which are APAC, EU, US, LATAM, Africa, EMEA and Canada. The markets are ordered according to the highest to the lowest profit generated within each market. The Markets in the Doughnut graphs are set as filters, whereby if a certain market is clicked and selected, the graphs would shift the visual results according to the selected market. In the second dashboard, each market's profit trends and a category breakdown containing Technology, Office Suppliers and Furniture profitability are assessed. The same filter function is applied in the third dashboard where we review the profitability of customers in 3 groups namely Consumer, Corporate and Home Office within each Market and as a whole.

Lastly, the fourth and fifth dashboards will narrow down into an analysis of subcategories and an in-depth analysis of discovered least profitable subcategories. Within the fourth dashboard, we first compare the Average Discount and the Average Sales of each Subcategory. Then a bar graph to compare the profitability of each sub-category with its respective profit margin. The findings will be discussed further in the report. In the fifth dashboard, the bottom five profitable sub-categories are filtered out, and one of the least profitable among the five is further examined.

2. Dashboards

2.1 Overview of Profit and Sales

We first look at overall Profits and Sales within four years.	We explore into Markets and Categories within each Market.	We proceed to look into the analysis of Market's Profit within groups of Segment.	We examine the profitability , Average Discount and Average Sales of Sub Categories.	Lastly, We magnify further into the sub category of specifically Tables .

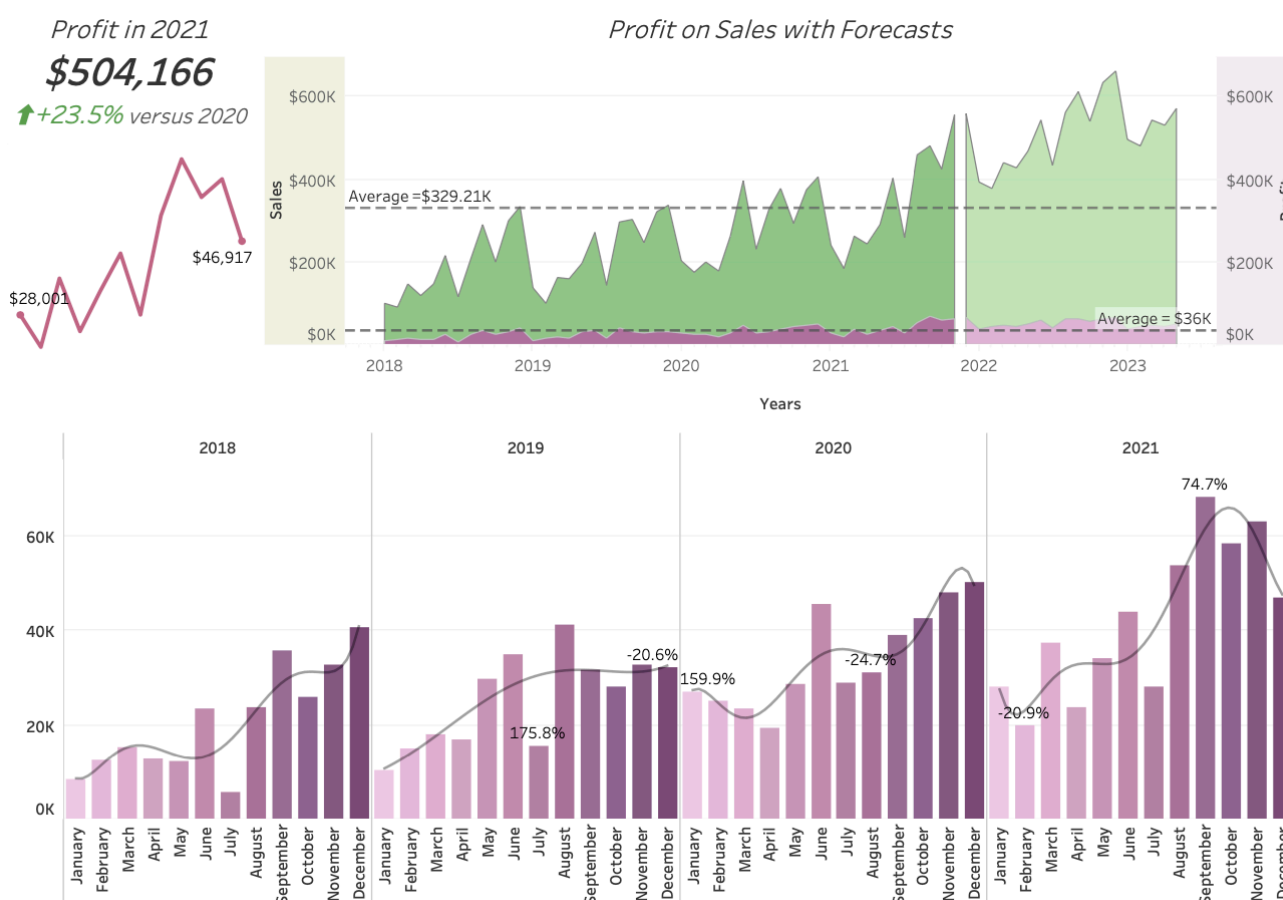## Profit and Sales Overview |Month over Month

Figure 1. Overview of Profit and Sales with Forecasts

Profit generated in 2021 came up to $504,166, an increase of 23.5% compared to the year 2020's profit. Looking into the profit on sales, the Average Sales are roughly $329,210 while the Average Profit is $36,000. The years 2018 and 2019 fell below the average but the years 2020 and 2021 had an overall gain in sales and profit. An 18-month forecast predicts both 2022 and 2023 to be above the Average Sales and Average Profit. Sales are growing at a linear trend based on the sales growth from 2021 and forecasts' graphic representation. However, slow growth in sales and profit can be seen during 2019 and early 2020. This could be explained due to the global pandemic Covid-19 which simultaneously affected different parts of the world.

From the breakdown of profits from each month over the four years, there is a noticeable spike in profit for the month of June during the first half of every year. A seasonality pattern can be observed as sales pick up towards

the end of the year, which generally leads to an upward slope. As noticed from the area graph mentioned above, the second half of the year 2019's profit did not increase compared to other years. The profits experienced a plateau in growth because of weak sales growth.

2.2 Profitability and Sales Distribution of Global Market

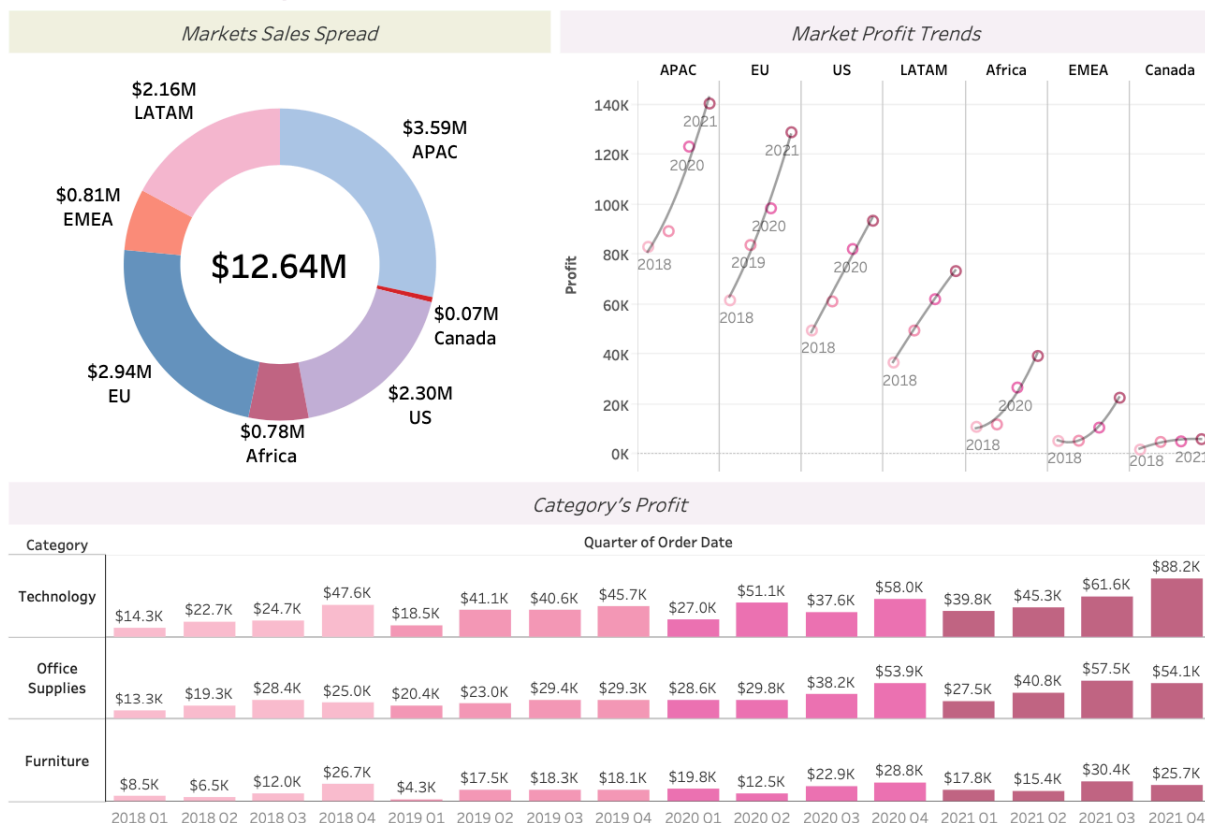| We first look at overall Profits and Sales within four years.	We explore into Markets and Categories within each Market.	We proceed to look into the analysis of Market's Profit within groups of Segment.	We examine the profitability , Average Discount and Average Sales of Sub Categories.	Lastly, We magnify further into the sub category of specifically Tables .

Figure 2. Global Market's Profitability and Sales Distribution

The doughnut graph is utilized as a filter in this dashboard. The two other graphical data displayed will alter in relation to the new parameter chosen by clicking on the name of a market region. By inferring from the doughnut graph, the total sales generated in 2021 are estimated to be $12.64 million. With the profit generated from the preceding dashboard, the gross profit margin comes up to a rough 4%. Given that 5% is considered a low margin and 10% is a healthy margin (CFI,2022), the average net profit margin is 7.71% across various industries (NYU,2023). Discussions and recommendations to address any likely factors that may have contributed to the low-profit margin will be analyzed in the last two dashboards as sub-categories' profitability is reviewed.

APAC has the largest profit among all the markets, followed by the EU, US and LATAM. These four markets have a positive linear slope, with the steepest for APAC, as seen in the Market Profit Trends line graphs. The regional markets in the Market Profit Trends Line graphs are arranged according to descending profits. Africa and EMEA

have an exponential trendline with a rapid increase in profits from 2019 to 2021. Lastly, the Canadian regional market exhibits a logarithmic trendline with a modest increase in profits as seen in Figure 3 below. It is advisable to adopt measures to help enhance profitability for the Canadian market. These measures can be sales strategies such as expanding sales channels and evaluating the effectiveness of existing business strategies.

Figure 3. Canada Profit Trends

We further explore the category which consists of Technology, Office Supplies and Furniture. In general, each year's fourth quarter (Q4) experienced the highest profit made over the whole fiscal year. Most profits came from Technology products, followed by Office Supplies then Furniture, this can be seen on Dashboard 2. However, it is an exception in Canada and the EU as more profits are generated from Office Supplies than Technology as seen in Figures 4 and 5 below. These results were generated from the filter function applied to the doughnut graph which filters the data according to the selected Market.
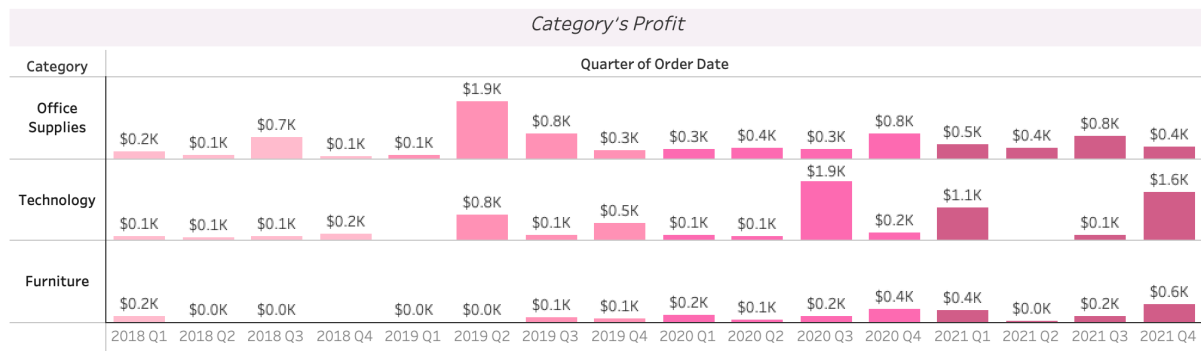

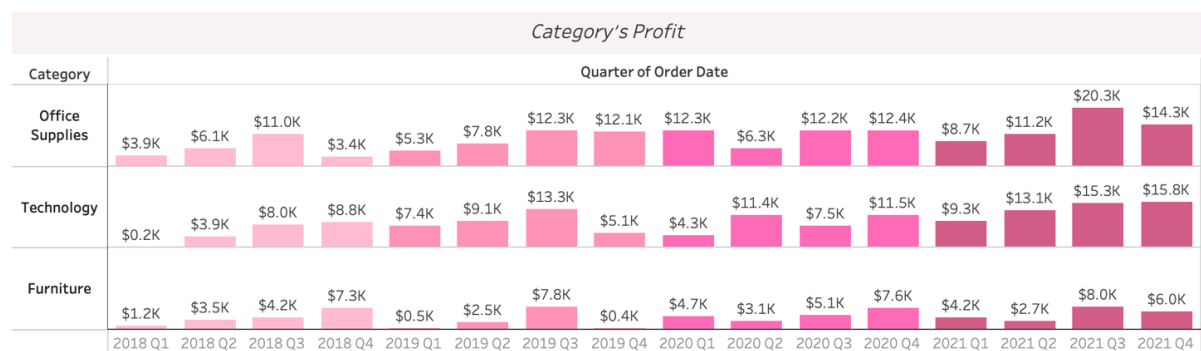*Figure 4. Canada's Profit breakdown within Category*

Figure 5. EU's Profit breakdown within Category

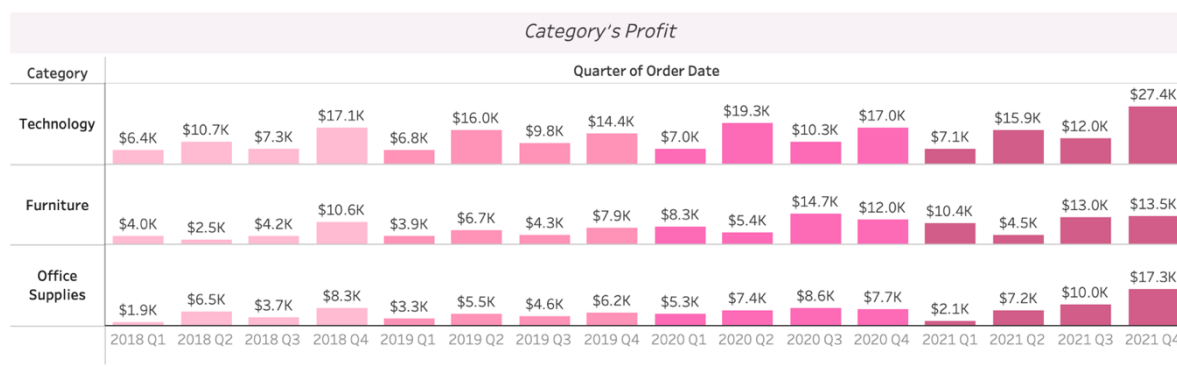In APAC, Furniture is the second largest in profit followed by Office Supplies as shown in Figure 6 below.

Figure 6. APAC's Profit breakdown within Category

2.3 Global Market's Profit in Segments

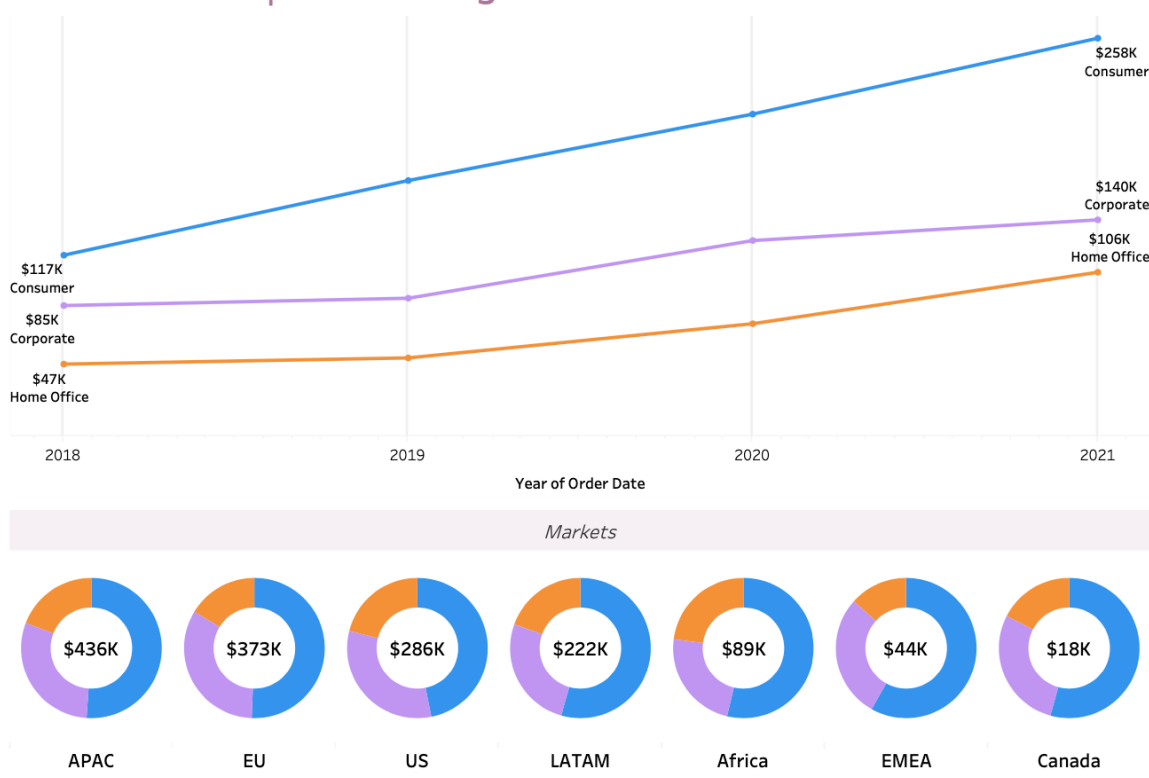| We first look at overall Profits and Sales within four years.	We explore into Markets and Categories within each Market.	We proceed to look into the analysis of Market's Profit within groups of Segment.	We examine the profitability , Average Discount and Average Sales of Sub Categories.	Lastly, We magnify further into the sub category of specifically Tables .

Figure 7. Global Markets' Profit in Segments

There are three types of customers in this dashboard of segments across several market regions. The three types are Consumers, Corporate and Home Offices, represented by Blue, Purple and Orange respectively as seen in

Figure 7. By 2021, the number of Consumers had more than doubled from the year 2018. The market doughnut graph visually shows that Consumers make up at least 50 per cent of the total.

The market doughnut graph performs a filtering function. The selected market's profit in Segments is displayed by clicking on a market's name.

As shown in Figure 8 below, the Corporate and Home office segment's profits for APAC in 2021 are very similar at $35K and $33K, respectively. Growth in self-employment or the number of people working remotely from home could account for this. But in Canada, Home office customers are so few that profits in 2018 and 2019 are below $1K. There was a rise of approximately $2K occurred in 2020, which was followed by a decrease to $1K in 2021.
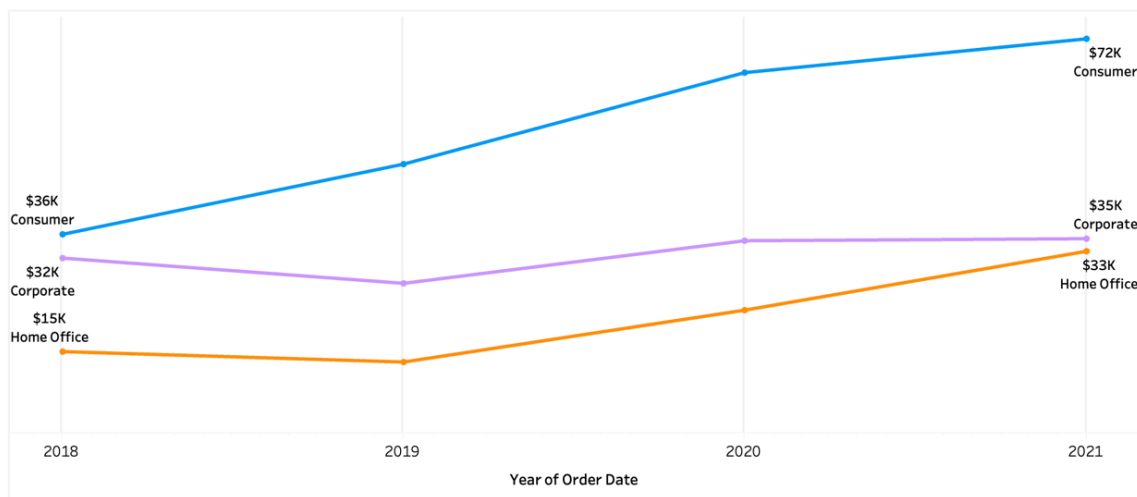

Figure 8. APAC's Segment Profits

Lastly, with reference to Figure 9, we examine in greater detail the African regional market. In 2018, both Consumers and Corporate achieved $3K in profit. Consumers' profit has drastically increased over the past four years by 666%, which could be an indication of rising purchasing power within the African market. Leverage this growth by reaching out to more new customers through marketing content targeted at the Consumers segment.
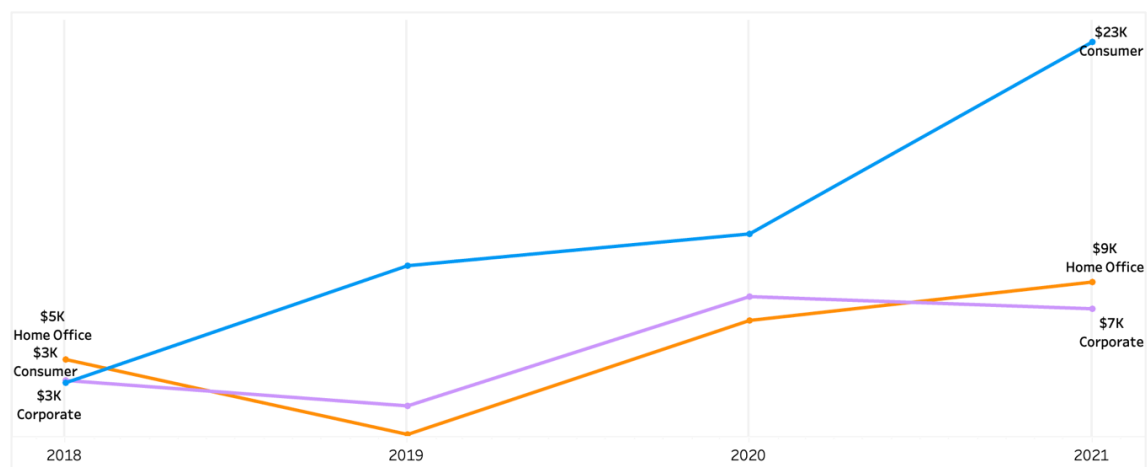

Figure 9. Africa's Segment Profit

2.4 Analysis of Sub Category

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Analysis | Sub Category
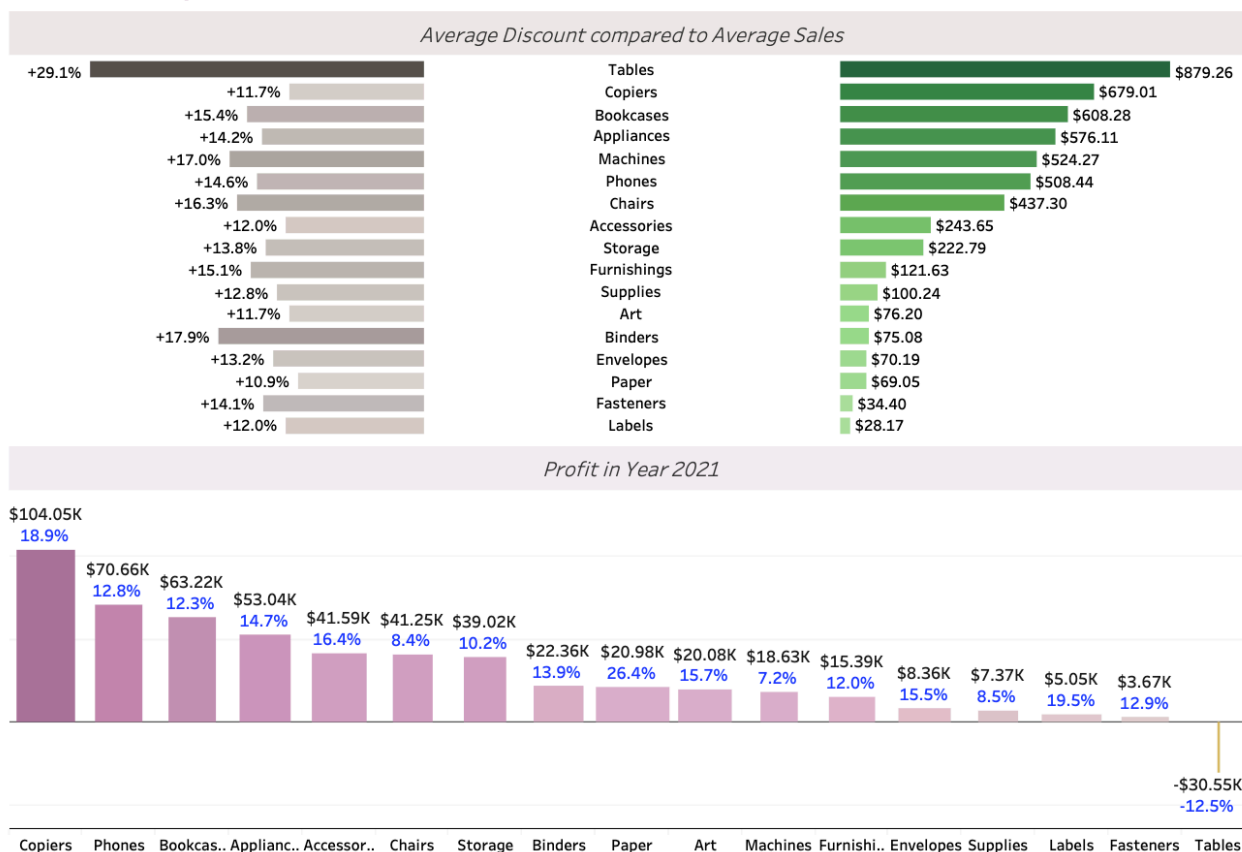
Figure 10. Analysis of Sub Category

The butterfly graph compares the Average Discount to the Average Sales. Tables have the highest Average Sales ($879.26) with the highest Average Discount (29.1%). However, the highest average sales do not necessarily equate to high-profit margins or good profitability. Negative profits of $30.55K were made by Tables, as seen on the bar graph for Profit in the Year 2021 at the bottom of the dashboard. The profit margin for each category is shown by the number in blue. Each bar graph's thickness illustrates the profit margin, the narrower the bar, the lower the profit margin. With that being said, offering a lesser discount of no more than 20% should be considered. The marketing and sales team should revise the discount percentages by the number of products sold, bulk purchases could be given more discounts without comprising profitability.

Copiers have the second-highest average sales ($679.01) with an average discount of 11.7%. Copiers contribute the highest number of profits. More Copiers-related products can be brought into the products line considering the high-profit margin.

Phones are one of the few lucrative product categories in the Year 2021, with earnings of $70.66K and a profit margin of 0.128. It is however ranked sixth position with Average sales ($508.44) and Average discount (14.6%). It is possible to explore additional methods, such as advertising, to enhance sales even further. These would provide significant benefits to the overall future sales performance. Products with discount rates exceeding 16% could explore strategies such as offering a discount during certain seasons or as a bundle with additional accessories to lower the average discount.

From the bar graph in purple, it can be inferred that Office Supplies items such as Paper (26.4%), Art (15.7%), and Labels(19.5%) have better profit margins than other Sub-Categories in Office Supplies. These high-profit margin products have great potential to increase profits if sales can be improved. Given the growing demand for Home Offices, markets such as APAC and Africa are worth tackling. Promotional bundles can be introduced with the purchase of Technological products such as Copiers.

Machines have the lowest profit margin (7.2%) in Technology while Chairs (8.4%) and Tables (-12.5%) have the lowest profit margin in Furniture. This prompts the need to further investigate Tables for the next dashboard.

2.5 In-depth Analysis of Tables

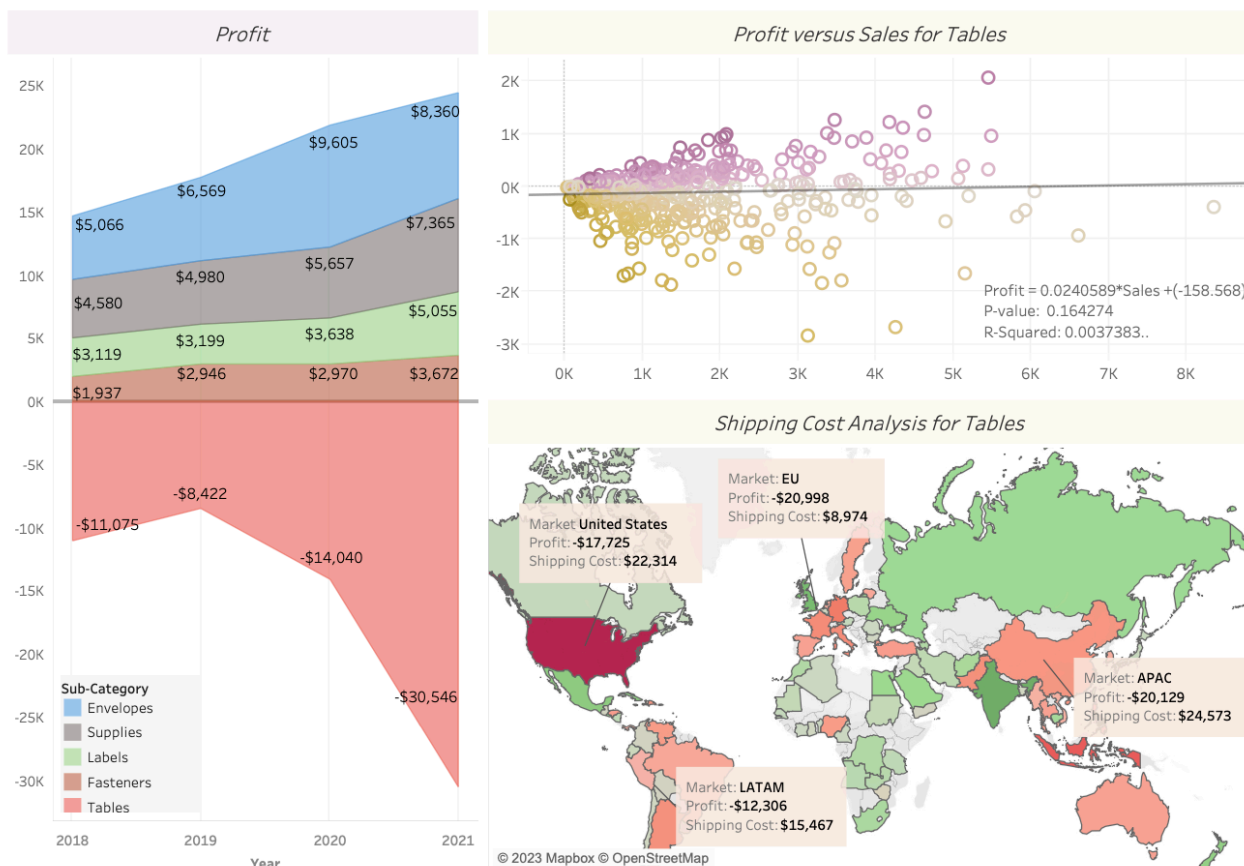| We first look at overall Profits and Sales within four years.	We explore into Markets and Categories within each Market.	We proceed to look into the analysis of Market's Profit within groups of Segment.	We examine the profitability , Average Discount and Average Sales of Sub Categories.	Lastly, We magnify further into the sub category of specifically Tables .

Figure 11. In-depth Analysis of Least Profitable Categories

It is clear from the previous Dashboards that Tables are generating negative profits. In this dashboard, the area line graph displays five of the least profitable sub-categories in descending order of Profits: Envelopes, Supplies, Labels, Fasteners and Tables.

A scatter plot illustrating the relationship between Profit and Sales produced for each order from Tables reveals that a significant volume of sale transactions have a negative profit as evidenced by the greater number of dots plotted in Gold than Purple. The Regression line calculates for Profit = 0.024*Sales+ (-158.6), resulting in a negative profit for most of each sale transaction.

A Geographical map shows that the APAC market has the sum of the highest shipping cost of $24,573 followed by the United States with $22,314. Despite the shipping cost for the EU market ($8,974) being slightly more than one-third of APAC's, the negative profits (-$20,998) are as high as APAC's (-$20,129). Within the EU market,

higher discount rates as much as 70% and 85% are given which has a detrimental impact on profitability. Thus, lower discount rates should be considered for the EU Market for future orders of Tables. It is crucial to examine operating expenditures such as shipping by eliminating unnecessary costs of production and freight prices, so that profits may be improved.

The only markets earning positive profits are Africa, EMEA and Canada with respective figures of $4011, $2764, and $300. This indicates that the demand for tables is driven by a particular market factor. Underperforming products should be considered for elimination and work on business models to further enhance high-margin product categories such as Technology.

3. References

Corporate Finance Institute (2022), What is a profit margin? [Online] Available from:

https://corporatefinanceinstitute.com/resources/accounting/profit-margin/ [Accessed on: 06/02/2023]

Damodaran, A. (2023), Operating and Net Margins [Online] NYU.edu. Available from:

https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/margin.html [Accessed on: 06/02/2023]