



ST2187 Business Analytics, Applied Modelling and Prediction

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Executive Summary

A business is successful when it is profitable and sustainable in the long run. This report aims to discuss the important insights from Tableau's data analysis as well as to provide useful recommendations to further increase the company's profits. In this way, the company can continue to grow and generate more profits.

We found that the Canadian market was the main contributor to the profit earned by the company while EMEA reflected the opposite. This infers that the company can examine the opportunities to attract more profits from these 2 markets as it shows high demand in the Canadian market and a huge potential to increase EMEA profit, given that the European, Middle East and Africa (EMEA) is not a small market.

To increase the shipping costs and quantity sold, the company can have campaigns to offer promotions, discounts, and shipping deals for customers in Canada who purchase copiers as it is proven that there is a strong, positive, and linear correlation between profits and shipping costs as well as discounts and quantity sold. As British Columbia was the state that generated the most profit in the market, the company can extend the campaigns to British Columbia's customers who buy bookcases.

Additionally, similar campaigns can also be used for the EMEA market but specifically target customers who buy copiers. Since both markets have produced high profits from copiers, the company can develop or sell more attractive and unique copiers to increase the quantity sold. Also, the company can consider selling more bookcases for customers in British Columbia as the bookcases account for the high profit generated in the furniture category.

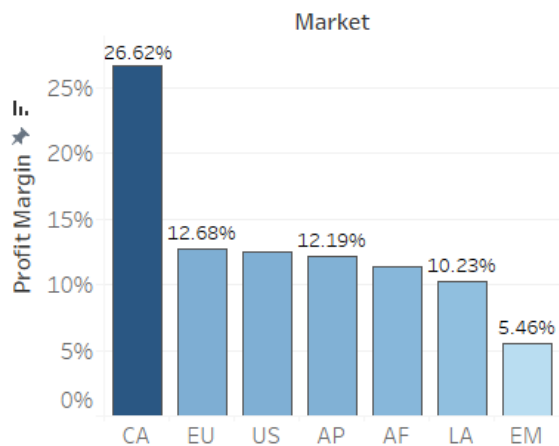
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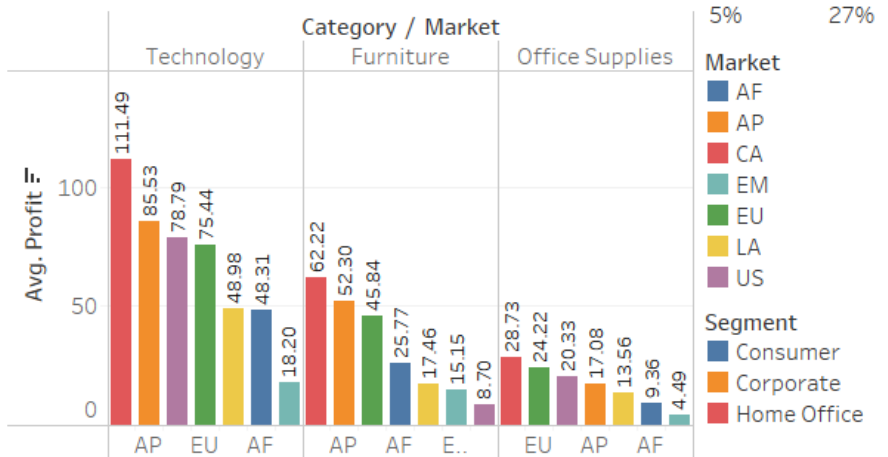
Findings

Profits in Markets	Additional Insights in Markets	Insights in Canada Market	Insights in British Columbia	Insights in EMEA Market
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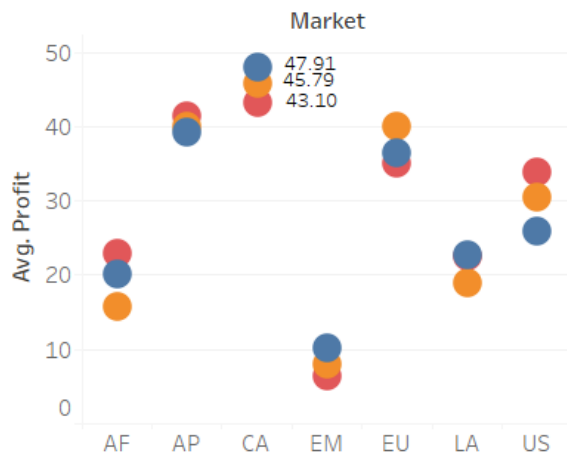
Net Profit Margin



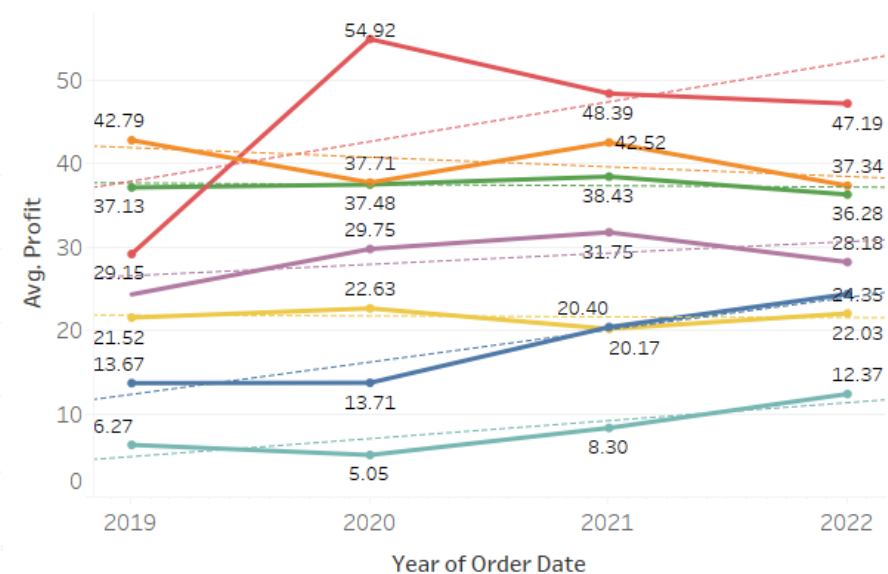
Average Profit in Category



Average Profit in Customer Segments



Average Profit across Years



The Canadian market had the highest net profit margin of 26.62% among other markets. For every unit in sales, the profit earned is 0.26. This shows that the Canadian Market is profitable and could be a potential market to expand the business. In contrast, the EMEA market has the lowest profit margin of 5.46% which raised concern about generating profit from this market.

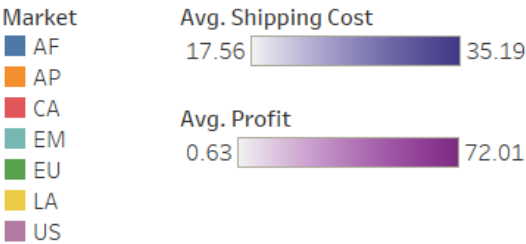
In all 3 product categories, the Canadian market generated the most significant amount of profit with 111.49 in technology, 62.22 in furniture and 28.73 in office supplies.

In the customer segments graph, each segment is represented by blue, orange and red colours respectively. Canadian Market had the highest profit in all 3 segments as compared to other markets. Moreover, its consumer segment produced the most amount of profit at 47.91 per order.

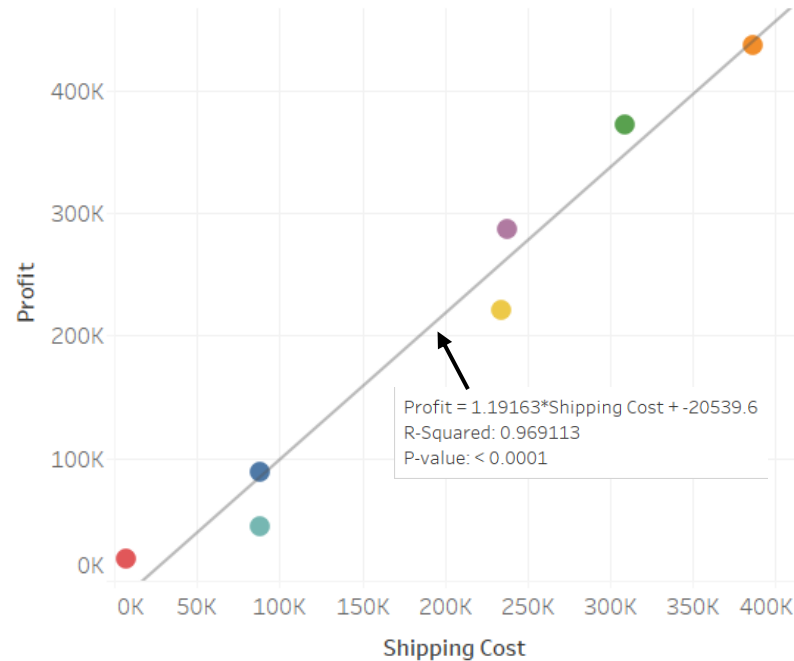
Apart from 2019, the Canadian market has had the highest profit for 3 consecutive years. In 2020, we can see that there was a steep increase in profit for the Canadian market from 29.15 to 54.92 per order. In contrast, it decreased from 54.92 to 48.39 in 2021 and further to 47.19 in 2022. This could be a sign that the Canadian market has stopped growing. However, this data contained only 4 years of records, it would be inaccurate to infer that there is no potential to expand in the Canadian market. On top of that, the trend line is upward-sloping and steeper than other trend lines. This suggests that the profit has increased over the years.

Average Profit in Ship Mode

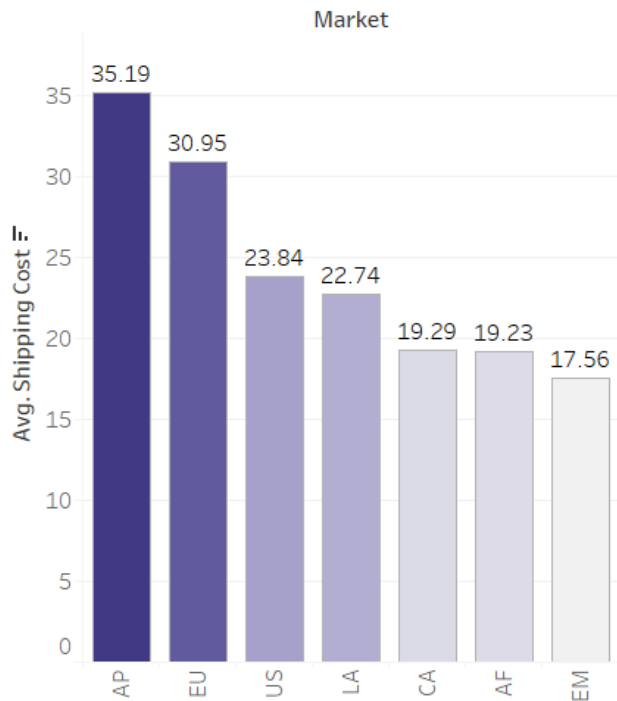
Ship Mode	Market						
	AF	AP	CA	EM	EU	LA	US
First Class	13.58	37.97	39.60	0.63	32.08	27.77	31.84
Same Day	20.93	34.99	28.37	6.24	46.55	18.15	29.27
Second Class	27.55	34.97	72.01	12.58	36.49	18.49	29.54
Standard Class	17.61	42.13	39.53	9.61	37.93	21.33	27.51



Correlation Between Shipping Cost and Profit



Average Shipping Cost

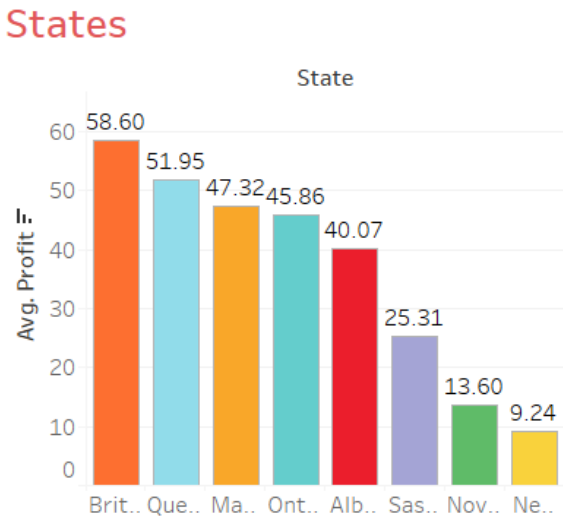


We observed that in the correlation graph, the data points are not widely spread out and the regression line has a very high R square value of 0.969. This indicated that a 96.90% change in profit can be explained by shipping costs for this model. By taking the square root of R square, we calculated that the correlation coefficient is 0.984. This can be interpreted as that there is a strong, positive linear correlation between shipping cost and profit. Furthermore, the P-value is less than 0.01% which means that for any significance level, we reject the null hypothesis that shipping costs have no significant impact on profit. Hence, on average, a dollar increase in shipping costs would increase the profit by 1.19 units, ceteris paribus. We deduced that the correlation between shipping cost and profit is strongly positively correlated.

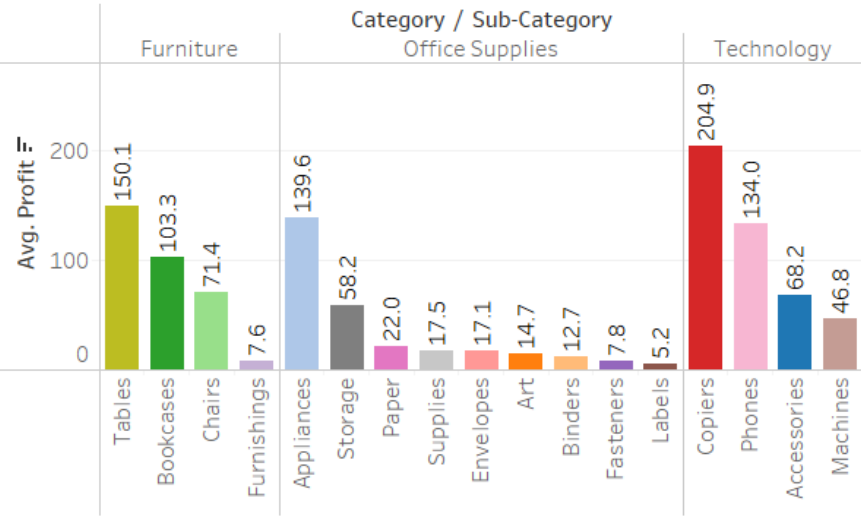
Among all the classes in shipping mode, the Canadian market had the most outstanding profit with an average of 72.01 profit per order in the second class. This evidences that the Canadian market favours second-class shipping mode. Simultaneously, EMEA was ranked the lowest in all 4 shipping modes.

In shipping cost, the Canadian market was ranked third last with 19.29 shipping cost per order as compared to other markets. As known previously, the higher the shipping cost, the more profit we can earn. Hence, the company should explore ways to increase the shipping costs in Canada. Similarly, the EMEA market had the lowest shipping cost of 17.56 per order, which proves the reason why it had the lowest profit in all shipping modes, which led to the lowest profit margin among all markets.

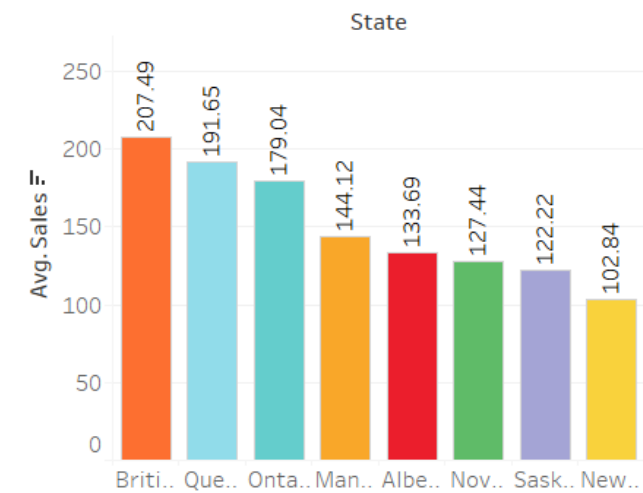
Average Profit in Canada's States



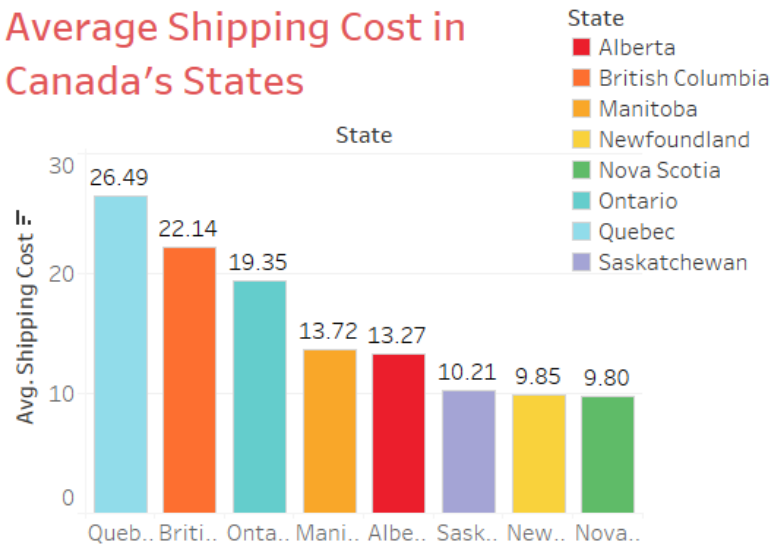
Average Profit in Sub-Category in Canada



Average Sales in Canada's States



Average Shipping Cost in Canada's States



Comparing all the states in the Canadian market, British Columbia had the highest profit at 58.60 per order while Newfoundland had the lowest profit at 9.24 per order.

Quebec generated the highest shipping cost with 26.49 per shipping order while British Columbia was the runner-up with 22.14 per shipping order. This signified that shipping cost was not the reason why British Columbia had the highest profit per order across all states.

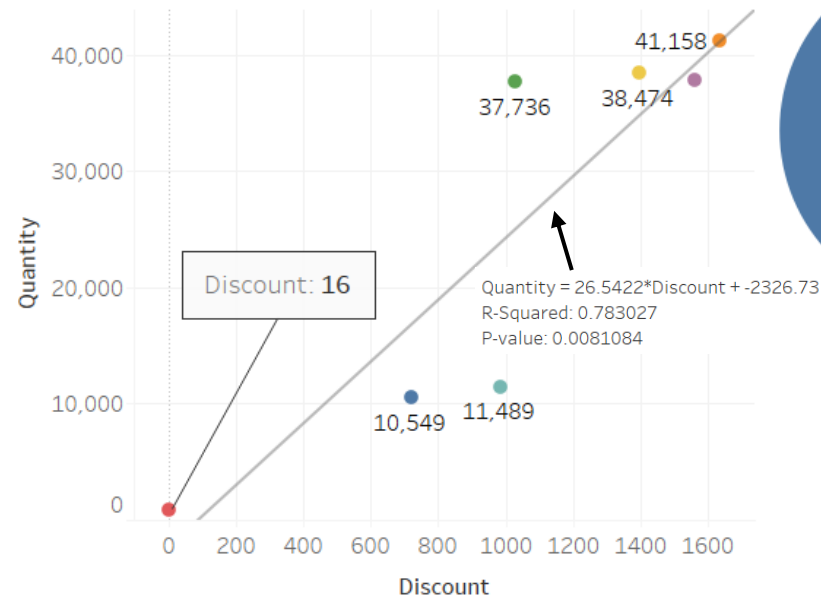
In sales, British Columbia had 207.49 per order while Quebec ranked second with 191.65. This further elaborated that sales were the reason why British Columbia had the highest profit per order.

In addition, copiers made the highest profit per order as compared to other categories. This requires further investigation to see if there could be a potential for copiers to generate more profit per order as quantity increases.

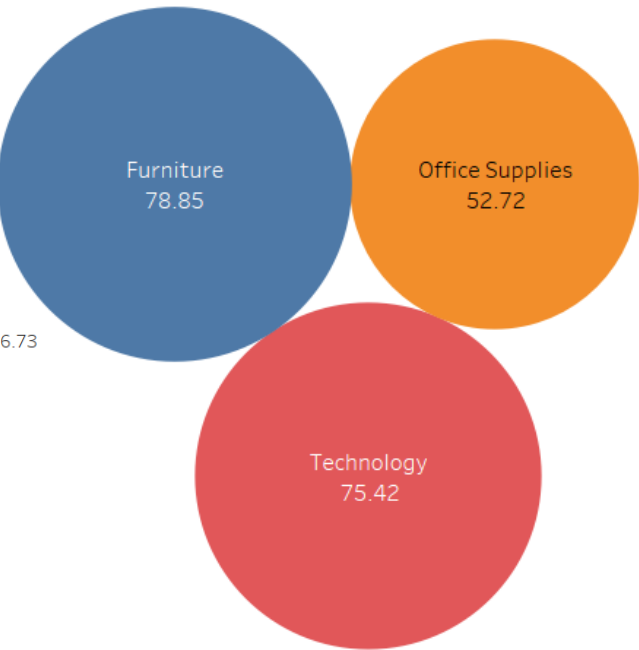
Profit Percentage in Furniture’s Sub-Category



Correlation Between Purchased Quantity and Discount



Average Profit in Category

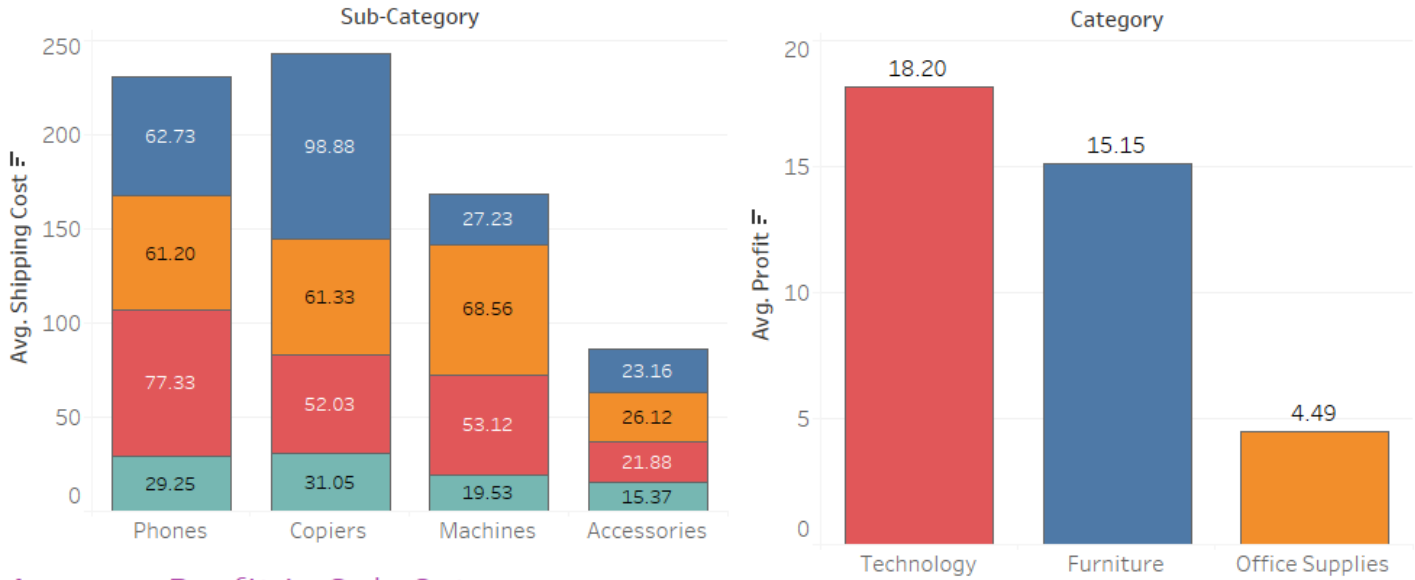


In British Columbia, the most profit-earning category was furniture with 78.85 per order. Also, we found that bookcases accounted for 39.97% of the profit earned in the furniture category.

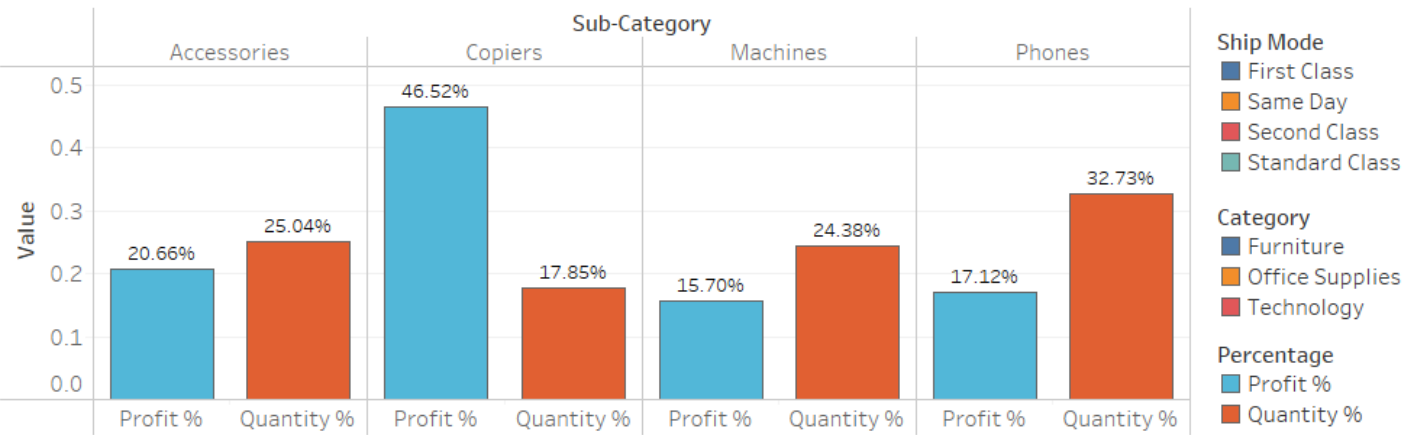
The scatterplot has an R square value of 0.783 which gives a correlation coefficient of 0.884. This infers that there is also a strong, positive linear correlation between quantity purchased and discount. The more discounts the company gives, the more products are bought. An R Square of 78.3% is considered high and conveys that 78.3% of the change in purchased quantity is due to a discount in this model. In addition, the p-value is 0.8% is smaller than the 1% significance level. This suggests that, for any significance level, the null hypothesis that states discounts have no significant impact on profit is being

rejected. Hence, the coefficient of discount is significant. On average, a dollar increase in discount would increase the quantity purchased by customers by 26 units, *ceteris paribus*. We derived that the correlation between discounts and quantity is strongly positively correlated.

Average Shipping Cost in Sub-Category Average Profit in Category



Average Profit in Sub-Category



In EMEA, the best profit-earning category was Technology which had 18.20 profit per order, followed by furniture with 15.15 and office supplies with 4.49.

Copiers accounted for nearly half of the profit earned in the Technology category at 46.52% and only 17.85% of the total quantity sold. There is a potential to increase the profit by increasing the sold quantity of copiers.

Similarly, copiers had the highest shipping cost among other sub-categories in Technology. In copiers, first-class shipping mode generated higher shipping costs. This infers that EMEA customers prefer to use first-class shipping for copiers.

Recommendations

Statistically, we found that Canada has ranked the highest average profit among markets, across all 3 customer segments, categories and year-over-year basis. Hence, the company should explore ways to attract more customers in the Canadian market to achieve more profits.

In one of the findings, we noticed a strong, positive linear correlation between shipping costs and profits. Canada ranked third last in shipping costs among other markets which indicates room for improvement to increase the Canadian market's shipping costs. Therefore, we can boost their shipping costs by introducing attractive shipping deals for second-class shipping mode as the chart suggested that the Canadian market used it more often and the attractive deals can lure customers into buying more products without having concerns about the shipping costs.

In addition, there is a strong, positive linear correlation between discount and quantity which means that giving discounts can help to increase the quantity sold to customers. In the same chart, we noticed that Canada was given only 16 dollars of discounts compared to other markets. This indicates that more discounts should be given to Canada to boost the quantity sold in the technology category, especially for copiers which generated 204.90 of profit per order compared to sub-categories in other categories.

In the Canadian market, British Columbia earned the highest profit across all states due to sales. Since furniture accounted for the high profit generated in the state, we found that 39.97% of the total profit belongs to bookcases. This could be another way for the company to produce more unique bookcases at attractive prices, with discounts, to increase sales and drive profits further.

Alternatively, EMEA is not a small market, and the company can dive into attracting more customers in EMEA by selling more technology products. As copiers had the highest profit with the lowest quantity sold, the company can explore into increasing the number of copiers sold by giving sufficient discounts to increase the quantity sold. Besides that, the company can offer first-class shipping deals for customers who purchase copiers to increase profits.

Ergo, I recommend the senior manager to increase the profit of the company by offering a decent amount of discounts and promotions through campaigns to encourage customers to buy more copiers in the Canadian market. Moreover, the company can offer attractive deals for second-class shipping mode and sell more unique bookcases at attractive prices with discounts, to raise more profits. In

addition, the company can expand the discounts and shipping deals to EMEA for copier products in first-class shipping mode.

Although discounts, attractive shipping deals and introducing new and unique products are essentials to increase profits, the company needs to keep in mind the sustainability of the campaigns by allocating a feasible amount of money and ensuring the long-term profitability of the company.

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