

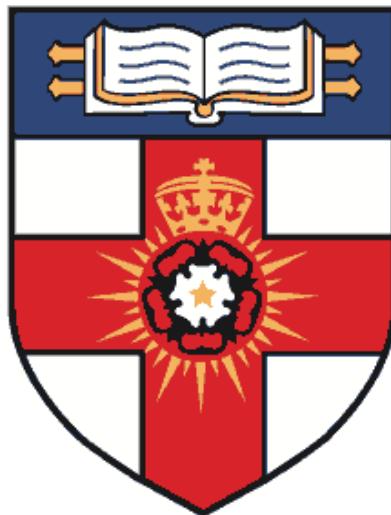


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# ST2187 COURSEWORK REPORT

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Business Analytics, Applied Modelling, and Prediction



LORENCIA LO

STUDENT NUMBER : 220458845

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## EXECUTIVE SUMMARY

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The realm of business is vast and diverse, spanning across various industries such as furniture, apparel, real estate, and more. Amidst this complexity, data analysis plays a pivotal role in understanding what is going on and predicting what might happen next in the business dynamics. Companies strive to extract valuable insights from data to optimize their strategies and enhance profitability. In today's competitive landscape, leveraging data analytics has become essential for achieving sustainable growth and maximizing revenue.

In this report, we will present a story consisting of five dashboards showcasing insightful and engaging visualizations, such as maps, packed bubbles, line chart, bar chart, area chart, and pie chart. These visualizations aim to deepen our understanding of exact and estimated values, current trends, and future predictions. The five dashboards cover a comprehensive overview of sales analysis, profit analysis, category analysis, shipping cost analysis, and forecast analysis.

Our analysis aims to empower senior management with actionable insights to optimize decision-making and drive success in the company's future success. We conclude by offering strategic recommendations to guide senior management towards achieving greater prosperity.

## **INTRODUCTION**

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The data set given was from 1 January 2019 to 31 December 2022. It comprises the company's performance, along with information on countries, states, markets, categories, shipping records, as well as values associated with sales, profit, discounts, shipping costs, and more. We will analyze the dataset to identify relationships and trends, simplifying the data to facilitate easier analysis and provide recommendations for important insights. To prevent any confusion, sales represent the total value generated from product sales before deducting the cost of primary goods, while profit reflects the total value after deducting these costs.

# STORY OVERVIEW

## DASHBOARD 1. SALES ANALYSIS

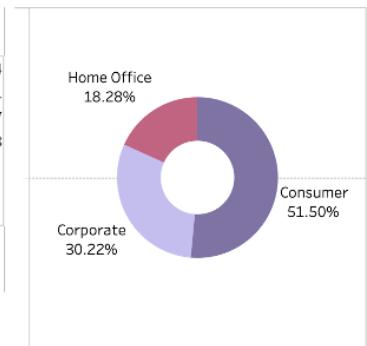
### Story 1



Sales Each Market by Order Date



% Sales by Segment



Sales Each Country



In terms of market, APAC leads as the largest sales market, demonstrating consistent growth over the four-year period, resulting in a sales record of \$1,207,384 in 2022. In contrast, Canada has the smallest sales across four years with an average value of \$16,732. Furthermore, Africa, EMEA, EU, and LATAM demonstrate good increases, but Africa and EMEA do not show substantial growth. While the US and LATAM show similar sales values, the US maintains a higher position.

Despite the temporary decline in the US in 2020, it encountered a significant increase in 2022 to \$734,007.

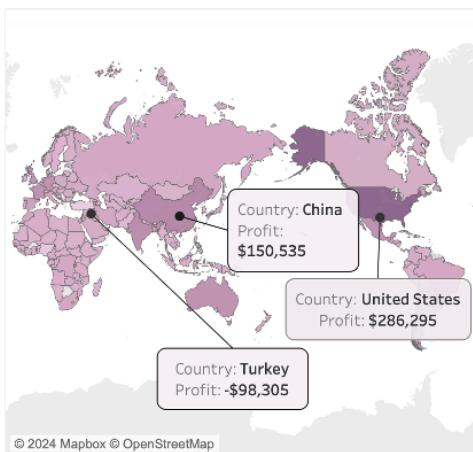
In sales by country, the United States dominates as the largest sales with a total of \$2,296,487, followed by Australia with total sales of \$925,236. Conversely, Equatorial Guinea has the smallest total sales, amounting to \$151. This difference in sales proportions may be due to the large population of each country, resulting in comparable total sales. Among sales segments, consumers contribute 51.5% of the total sales, followed by corporate and home office, which account for 30.22% and 18.28% respectively. One possible reason for this is that consumers may have a wider range of product preferences compared to corporate and home office buyers.

## DASHBOARD 2. PROFIT ANALYSIS

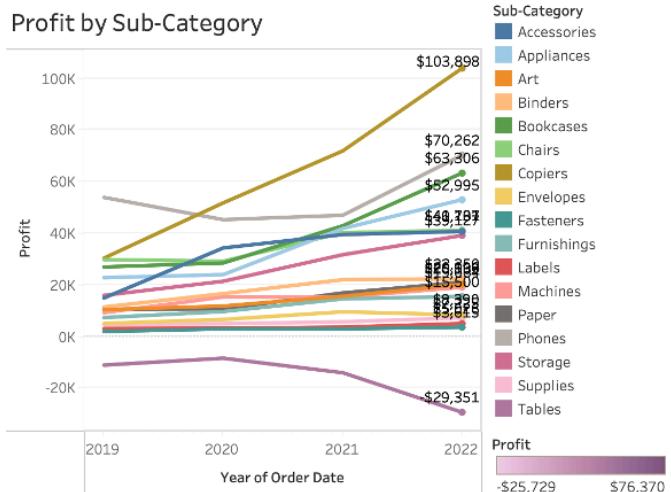
### Story 1



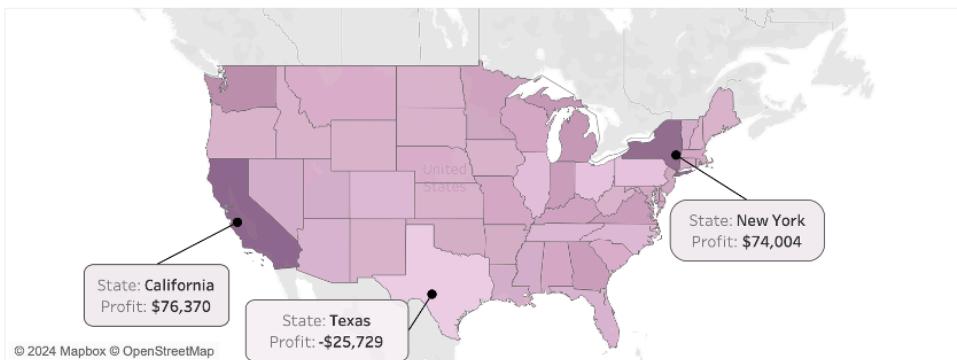
Total Profit by Country



Profit by Sub-Category



U.S Profit by States



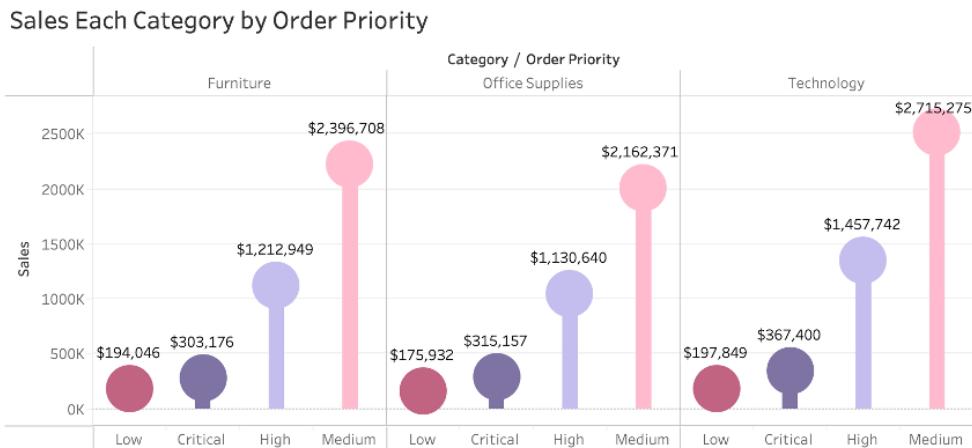
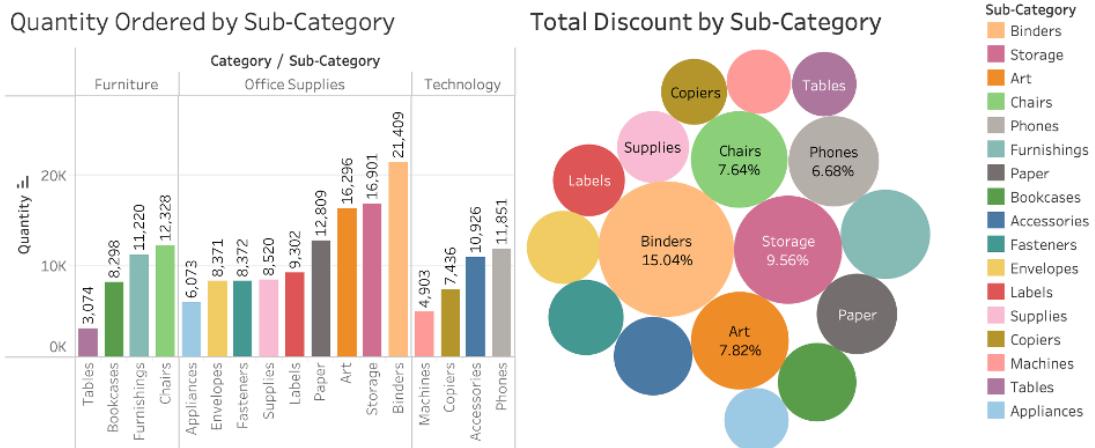
The U.S not only has the highest sales but also the highest profit of \$286,295, followed by China with \$150,535. Meanwhile, Turkey experiences the largest loss, with a negative amount of \$98,305. This may occur due to differences in business scale and market circumstances. Upon examining the U.S. profit by states, California stands out with the highest profit of \$76,730, followed by New York that demonstrates a substantial profit of \$74,004. On the contrary, Texas incurs the highest loss of -\$25,729, which indicates that the expenses in Texas surpass the total

sales. Nonetheless, the remaining states show a good profit return, with fewer than 10 states experiencing losses.

In early 2019, phones contributed the highest profit of \$53,879, followed by copiers with a profit of \$30,375. However, there was a downturn in phone sales from late 2019 until 2022. During this period, copiers experienced a substantial rise in profitability, reaching \$103,898 in 2022. On the other hand, tables consistently incurred losses throughout the four-year period. While there was a slight increase between 2019 and 2020, it fell significantly to -\$29,351 on 2022. The other sub-categories experienced moderate growth on average, with some showing significant increases over the years.

## DASHBOARD 3. CATEGORY ANALYSIS

## Story 1



Similarly to the percentage profit observed in sub-categories previously, the quantity ordered displays a similar pattern. Tables, which consistently experience a loss of profit, only generate sales of 3,074, making it the lowest quantity ordered among all categories. Although copiers lead in terms of profit, binders rank first in the quantity ordered with a total of 21,409, followed by storage with a quantity of 16,901. Furthermore, appliances and machines have relatively low appeal to customers, with total quantities of less than 7,000. This may be because of a weak marketing strategy.

There is a correlation between the quantity ordered and the total discount. This can be proven by binders and storage, which not only have the highest quantity ordered but also boast the highest discounts at 15.04% and 9.56%, respectively. In contrast, tables and appliances offer comparatively lower total discounts, at around 3.41% and 3.40%, respectively. The remaining products generally display normal discount percentages, with no negative values, indicating average to good results.

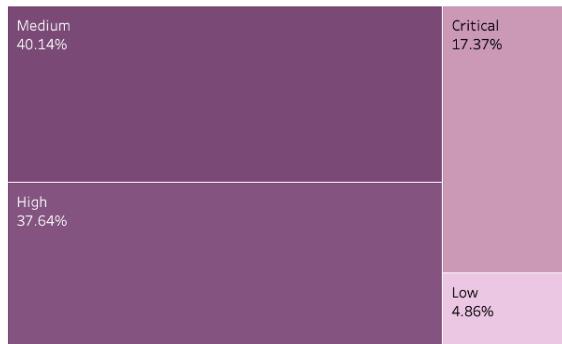
In terms of category sales, medium order priority consistently outperforms other priorities across all categories. Specifically, in the technology category, sales peak across all order priorities, with medium order priority achieving the highest sales of \$2,715,275. In Furniture and Office Supplies categories, sales values across different order priorities are relatively consistent. However, the lowest sales are consistently attributed to low order priority, particularly within the Office Supplies category.

## DASHBOARD 4. SHIPPING COST ANALYSIS

### Story 1



% of Sum of Shipping Cost By Order Priority



Total of Shipping Cost by Ship Mode



Average Shipping Cost by Ship Date



Medium order priority not only dominates sales across categories but also retains the highest shipping cost, accounting for 40.14%, followed by high order priority at 37.64%. However, low order priority ranks last with only 4.86%.

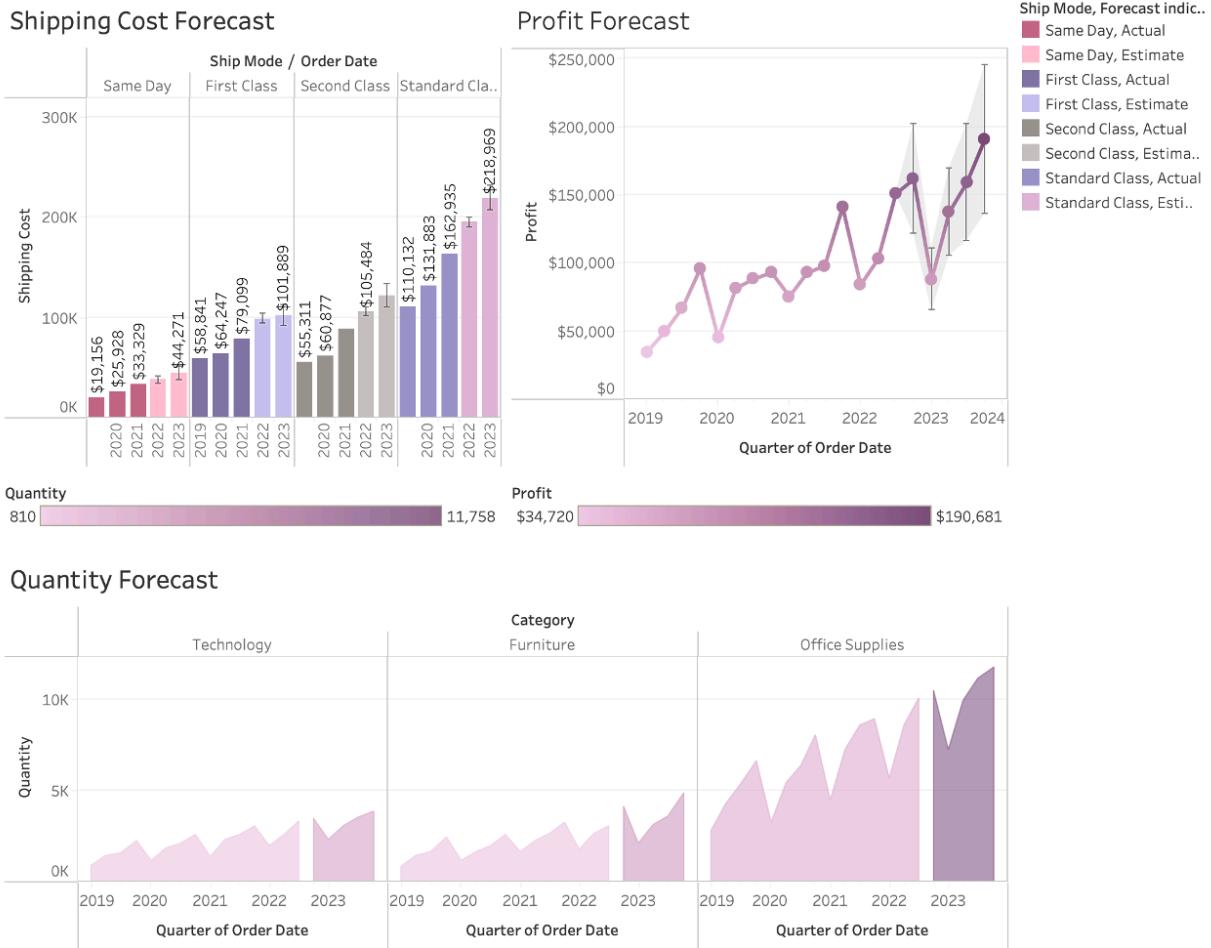
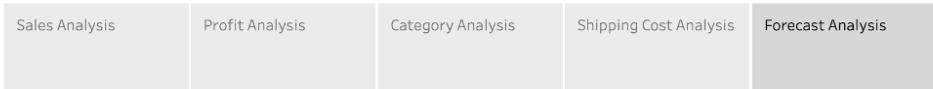
Standard class is the most commonly chosen option by customers because it provides a cost-effective shipping option. Therefore, it has the highest total shipping cost at \$614,320. Some customers may think that first class shipping is less economical compared to standard or second-

class options as it offers similar services at a higher price. Consequently, first-class shipping ranks third at \$307,651, with same-day shipping trailing behind at \$115,903.

In 2019, the average shipping cost stood at \$27.26, which was the highest average cost among the observed years. Subsequently, from 2020 to 2022, the costs remained relatively stable, ranging from \$25 to \$27. However, a significant decrease was seen in 2023, with the average shipping cost dropping to \$21.28.

## DASHBOARD 5. FORECAST ANALYSIS

### Story 1



All shipping modes are anticipated to experience increases in total shipping cost in 2022 and 2023. Standard class still remains the highest predicted shipping costs, with forecasts indicating a significant rise to \$218,969 in 2023. Second class is forecasted to experience slightly higher cost increases compared to first class, with anticipated costs of \$121,714 by 2023. Furthermore, the shipping cost for same day are projected to consistently increase annually, although the increases are not substantial.

The profit forecast foresees fluctuations in profits extending until 2023. There is an estimated significant decrease in profitability from the fourth quarter of 2022 to the first quarter of 2023, with profits dropping to \$88,064. However, profits are expected to rebound significantly afterward, with an anticipated climb to \$190,681 by the fourth quarter of 2023. Category forecast follows the similar pattern as profit forecast. There will be a downturn in the quantity ordered across all categories in the first quarter of 2023, followed by a significant rise leading up to the fourth quarter. Office Supplies are expected to be the category with the highest quantity, reaching a peak of 11,758.

## **CONCLUSION**

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Based on the analysis and visualizations provided, the United States demonstrates remarkable success in both sales and profit, with California being a major contributor to its profitability. This could be because of its strong economic growth and vast market opportunities. Conversely, Equatorial Guinea and Turkey, which are countries with the lowest sales and profit figures respectively, require strategic interventions to stimulate their economic growth.

For category and sub-category, higher discounts incentivize customers to make purchases at lower prices, resulting in increased quantities sold for each sub-category. As observed, binders and storage items are in high demand and also offer the highest discounts among sub-categories. In contrast, tables have the lowest profitability, quantity ordered, and discount rates. Their poor performance over the four-year period may be attributed to inadequate marketing strategies or a lack of consumer interest.

The shipping cost analysis across different dimensions offers valuable insights for optimizing shipping strategies and managing costs effectively. One notable observation is that most consumers opt for standard class shipping due to its affordability, unless the order priority is urgent. In terms of forecast analysis, there is an overall upward trend in shipping cost, profit, and quantity ordered. Although profits and quantity are projected to see significant increases in the fourth quarter, they are expected to decline steeply in the subsequent quarter. However, these trends are subject to change depending on various factors, helping companies in making informed decisions concerning their financial planning and operational strategies.

## **RECOMMENDATIONS**

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Some recommendations include adjusting pricing strategies and offering targeted discounts or promotions to increase sales and profits in regions where losses are incurred. Furthermore, exploring opportunities to boost sales of products with low quantities and sales, such as promoting them during special occasions like inventory clearance sales. Innovating new products based on consumer demand complements this strategy. However, it is also essential to consider discontinuing tables from the sub-category due to the lack of profitability and quantity ordered. It is advisable to redirect focus towards more lucrative options that have shown sustained performance over the years.

In addition, companies could explore strategies to improve the attractiveness and competitiveness of first class and same day shipping, such as offering premium services, discounts, or incentives for customers to upgrade. Finally, extend the promotional period from the fourth quarter through the first quarter to mitigate the significant decline in the future.

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