Analysis of supermarket sales data in the Country of Myanmar across 3 major cities

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Important Links:

Tableau Dashboards	https://public.tableau.com/app/profile/jayanth.s.s/viz/Project_16913218801360/Dashboard1
	https://public.tableau.com/app/profile/jayanth.s.s/viz/dashboard2_16916170398990/Dashboard1
Python Jupyter notebook	https://colab.research.google.com/drive/1i3YxYEZGOcwVlrilnUkxaTHIWfpxpbMH#scrollTo=Xia7tTPal57G

Abstract:

In a global economy characterised by evolving consumer preferences and competitive markets, understanding the dynamics of retail sales is paramount for informed business decisions. This study embarks on an in-depth analysis of supermarket sales within the unique setting of the Country of Myanmar, focusing on three key cities: Mandalay, Naypyidaw, and Yangon.

The primary objective of this research is to dissect and elucidate the sales patterns within these cities across distinct customer segments, namely member and normal customers. Furthermore, the analysis extends to a demographic lens, separating

sales data by gender, encompassing both male and female consumers. By adopting Python programming in conjunction with advanced data visualisation tools, a comprehensive examination of these multi-dimensional datasets is facilitated.

Through rigorous analysis, this study seeks to uncover critical insights into consumer behaviour, preferences, and purchasing trends. This includes discerning variations in shopping patterns between member and normal customers, as well as disparities attributed to gender and city-specific factors. The data-driven approach not only provides an empirical basis for understanding shopping behaviours but also facilitates the identification of potential growth areas and areas warranting targeted interventions.

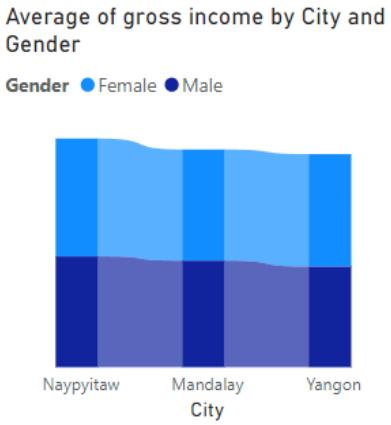
Ultimately, the findings of this study hold pragmatic implications for supermarket chains operating in Myanmar. By shedding light on the intricacies of sales dynamics, businesses can tailor their strategies to cater to the specific needs and preferences of diverse customer segments. This research contributes to the body of knowledge surrounding retail management, offering a nuanced perspective on the complex interplay of demographic factors, customer type, and urban location in shaping supermarket sales trends.

Problem Statement:

1. What is the gross income distribution gender wise?

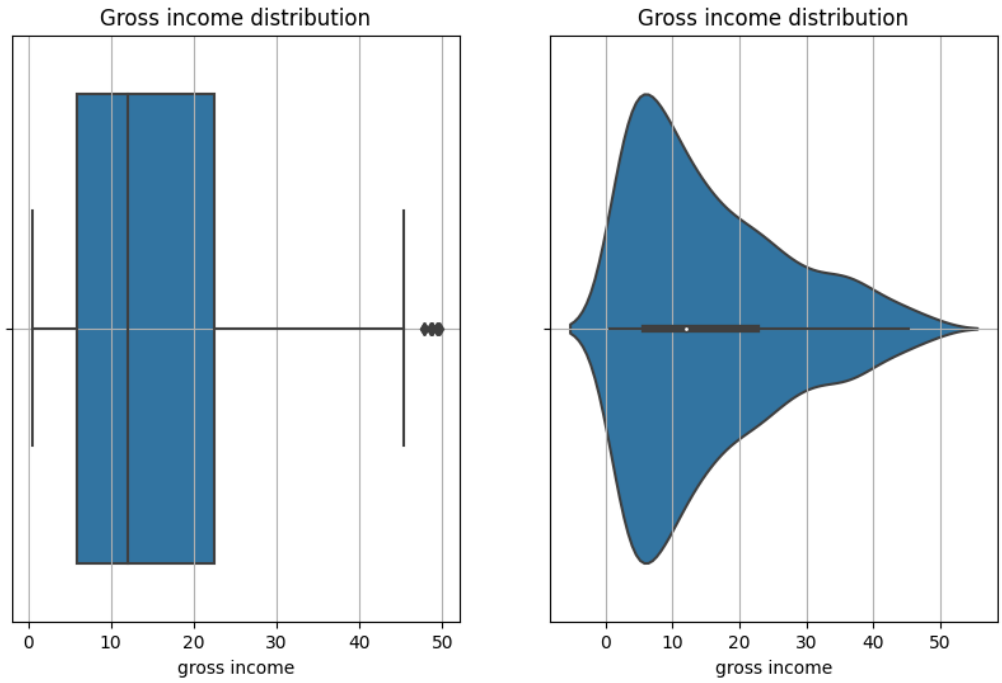
The gross income distribution across all the 3 Cities have been plotted using python and power BI. In python, the plot is only gender against gross income, while in power BI, we can see the plot including per city as well. The plots indicate that the gender Female

have a slightly higher gross income compared to men.

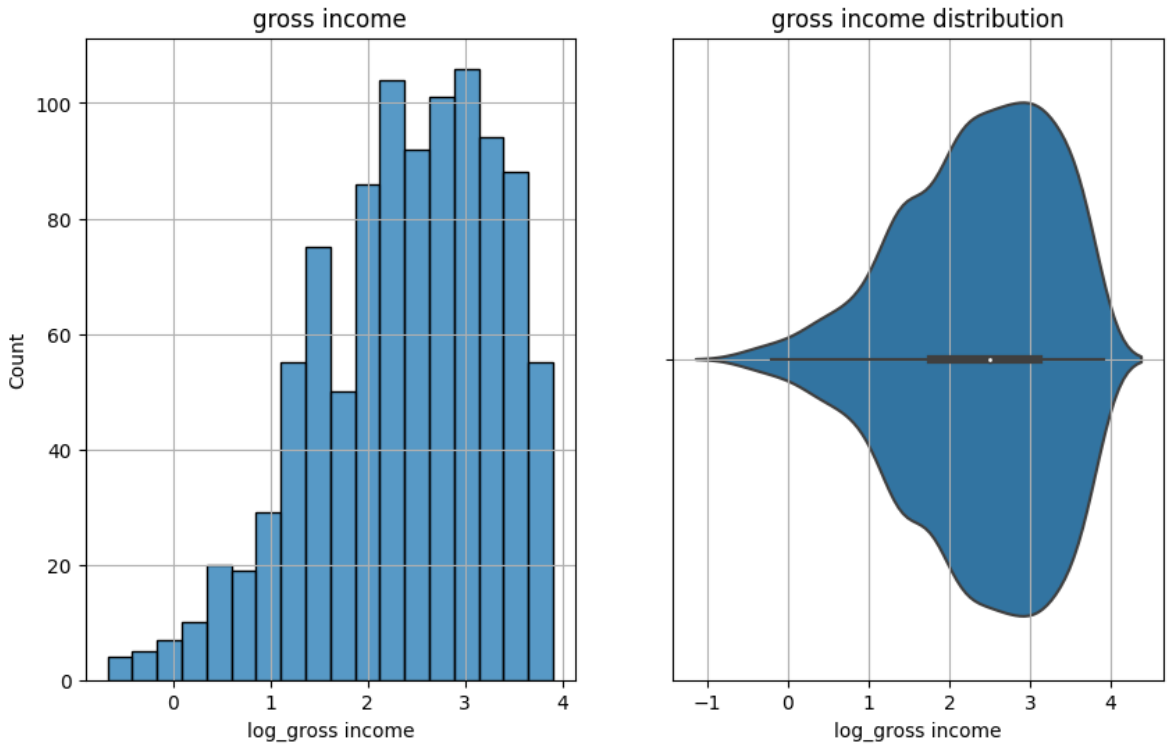


2. What is the total gross income distribution?

The total gross income distribution across all 3 cities has been plotted using Python, which indicates that the data is actually right skewed, i.e.; outliers in the right side of the data. When logarithmic transformation was applied, we can observe that the skewness moved to the left side of the data, however, the data is closer to stability than the normally distributed data.



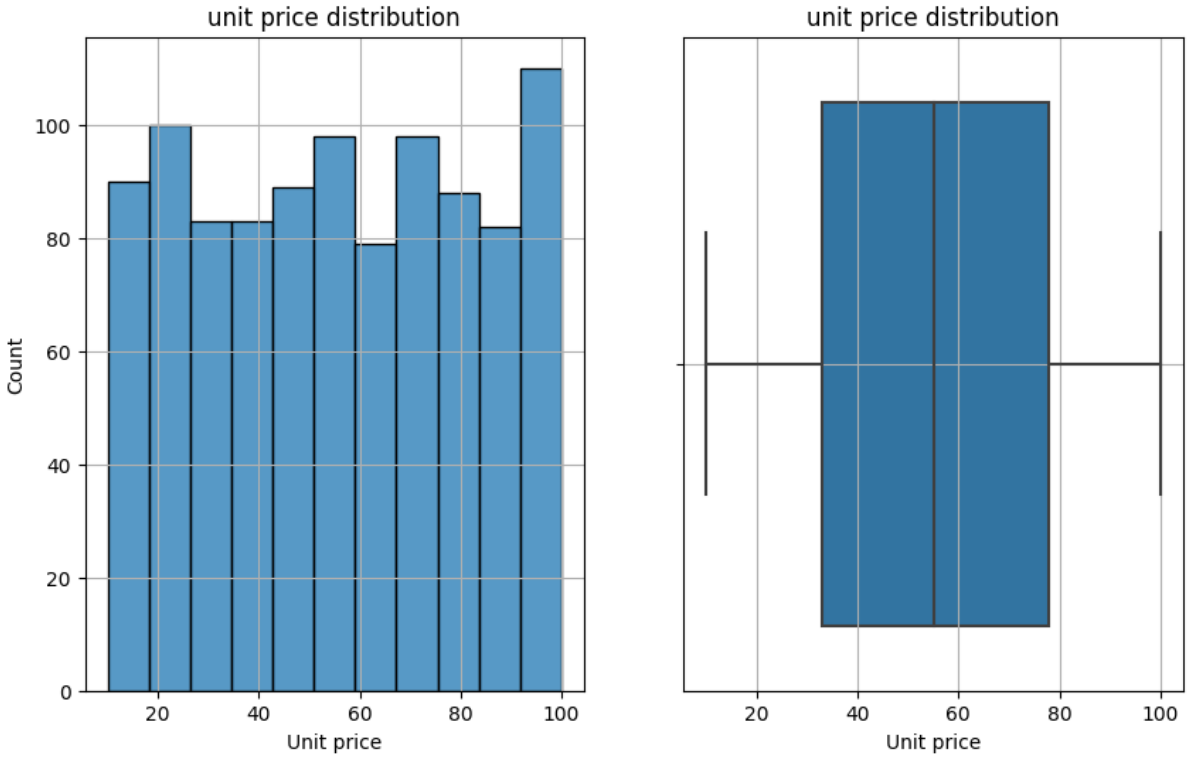
Normally distributed gross income plot



Logarithmic representation of the gross income data

3. What is the total Unit price distribution?

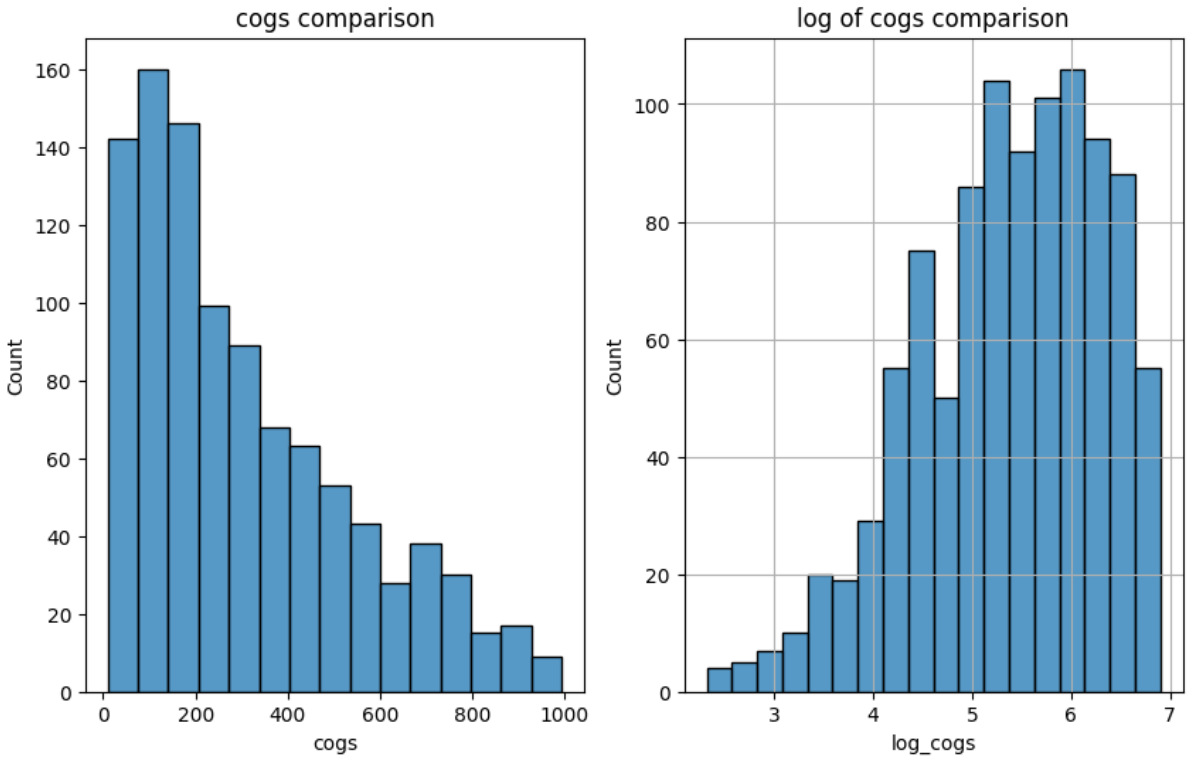
The unit price distribution was plotted using python, which states that the data is normally distributed and there are no outliers in the data, which implies that the data stabilised.



Normal distribution of unit price

4. What is the cost of goods sold distribution?

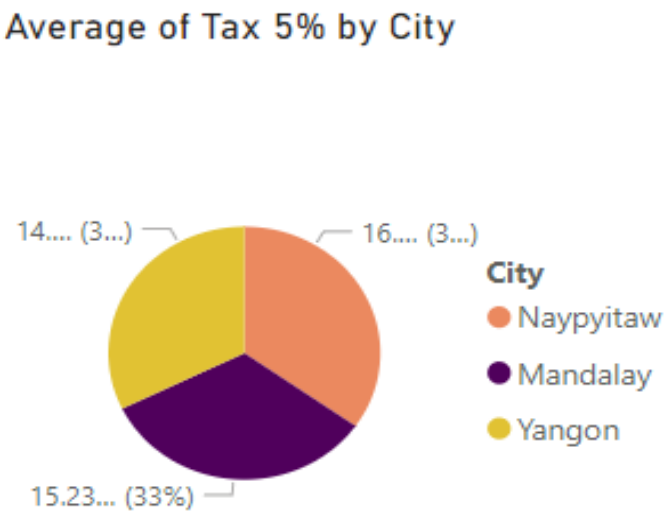
The cost of goods sold is quite similar to the gross income distribution plot wise, however, the count if the plot varies, i.e.; the parameters are significantly greater.



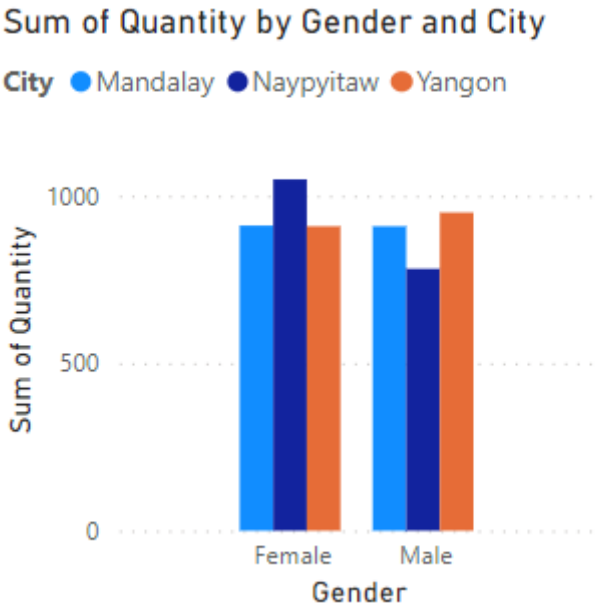
Normal vs Logarithmic representation of the cogs

5. What are the other plots made for this dataset?

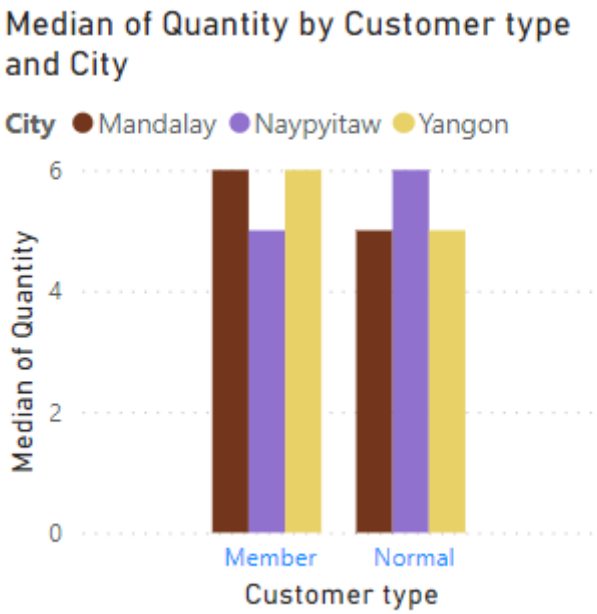
The other plots of the dataset are as below:



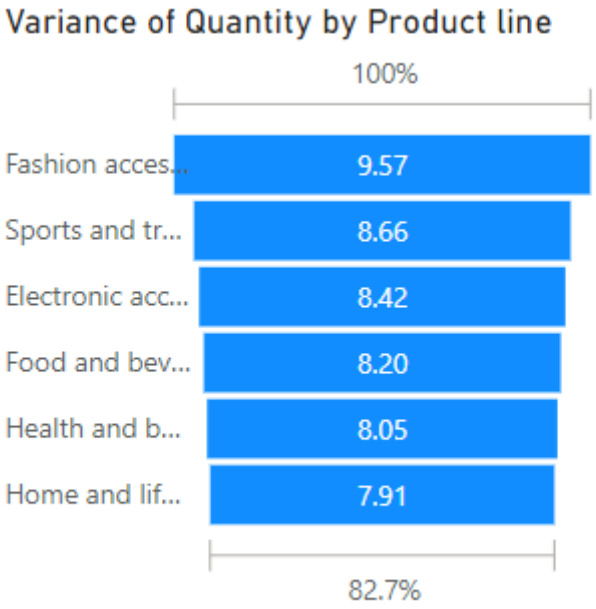
Tax Average city wise



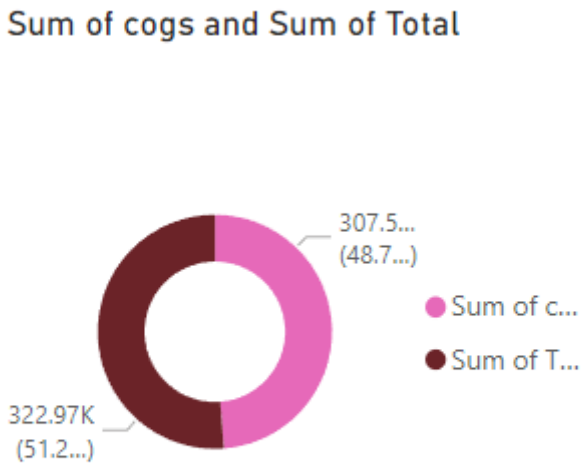
Sum of quantity purchased per gender per city



Median of Quantity by Customer type and City

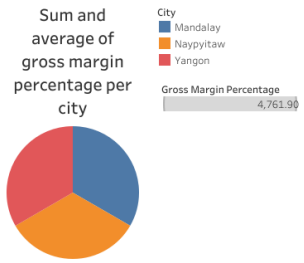


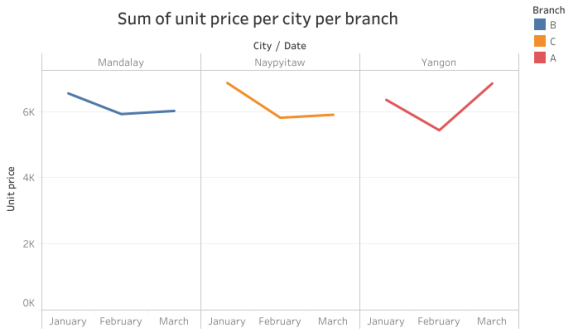
Variance of Quantity sold by product line

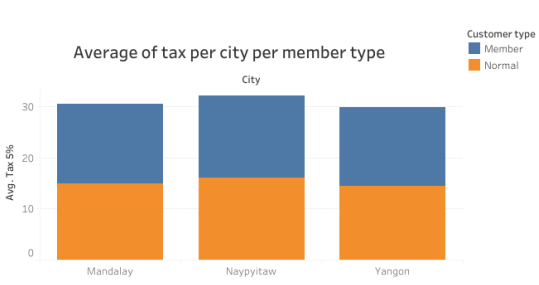


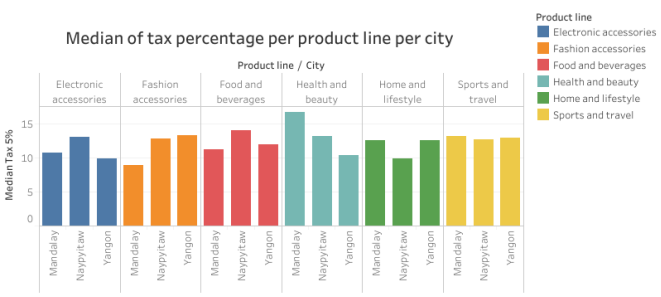
Sum of cogs vs sum of total

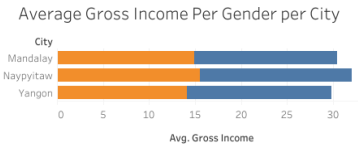
Tableau Dashboards (Below)

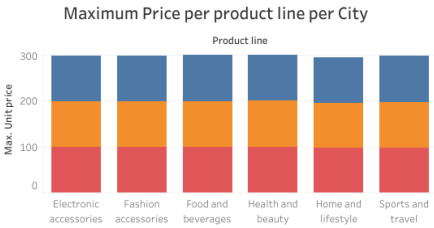


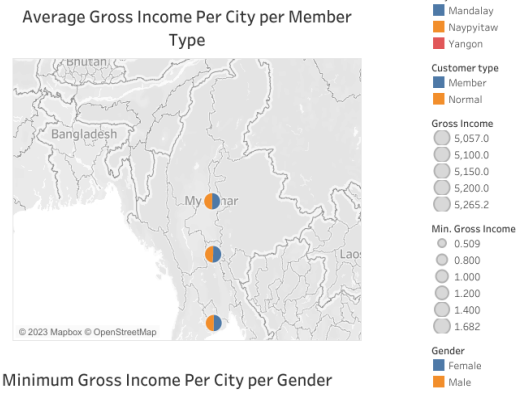


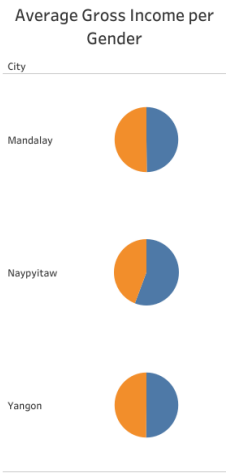


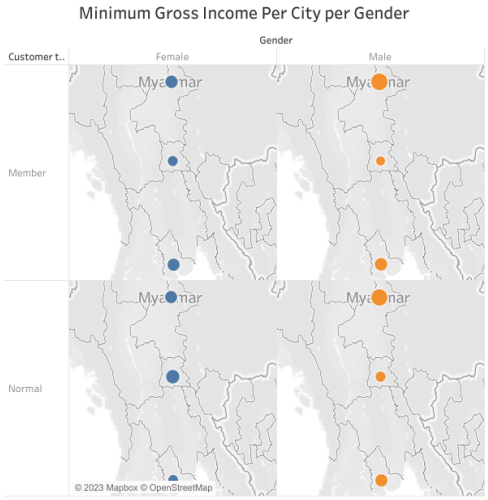












Process undertaken to achieve this:

1. **Dataset Selection and Preparation:**

First, you would have selected a dataset containing information about supermarket sales. This dataset might include details such as product names, prices, quantities sold, dates, and customer information. Before analysis, the dataset needs to be cleaned and preprocessed to ensure its quality and usability. This could involve handling missing values, removing duplicates, and converting data types if needed.

2. **Data Cleaning and Plotting in Python:**

Python is a popular programming language for data analysis. You likely used libraries like Pandas for data manipulation and Matplotlib or Seaborn for data visualization. During this step, you would have performed exploratory data analysis (EDA) to gain initial insights into the dataset. This could include generating summary statistics, creating histograms, scatter plots, and other visualizations to understand the distribution of sales, trends over time, and relationships between variables.

3. **Data Transformation and Enrichment:**

Depending on the dataset, you might have performed additional data transformations or enrichment to create new features. For example, calculating total revenue by multiplying quantities sold with prices, or extracting time-related features like day of the week or month from the date column. These additional features can provide deeper insights into sales patterns.

4. **Visualization with Power BI:**

Power BI is a powerful business intelligence tool that allows you to create interactive and visually appealing dashboards. You might have imported the cleaned and enriched data into Power BI and designed a dashboard that includes various visual elements such as line charts, bar charts, pie charts, and tables. The dashboard can help you present the sales data in a user-friendly and intuitive manner, enabling stakeholders to explore the data and make informed decisions.

5. **Visualization with Tableau:**

Similar to Power BI, Tableau is another widely used data visualization tool. You may have replicated the dashboard you created in Power BI within Tableau. Tableau provides a range of visualization options and allows for interactive features, filters, and drill-down capabilities,

making it easier to uncover trends, outliers, and correlations within the data.

6. **Insights and Decision Making:**

By analyzing the visualizations created in both Power BI and Tableau, you can extract valuable insights from the data. These insights might include identifying peak sales periods, popular products, customer preferences, and correlations between different variables. These findings can guide strategic business decisions, such as optimizing inventory levels, planning promotions, and improving customer experiences.

In summary, the process involves a comprehensive journey from data selection and cleaning in Python to creating interactive and informative visualizations using Power BI and Tableau. This holistic approach enables better understanding of the supermarket sales dataset and empowers data-driven decision-making within the organization.

Conclusion:

- This analysis concludes that in the representation of gross income of female vs male, the males earn slightly less than the females.
- This analysis also proves that the normal customers spend more on food and beverages while the member customers spend more on Beauty and health.
- This also proves that the tax% is highest in the city of Naypyitaw, since it is the capital of Myanmar.

Actionable insights:

1. **Gender-based Income Disparity:**

Insight: Males earn slightly less than females based on the gross income representation.

Actionable Insights:

Equal Pay Consideration: Evaluate the pay structure and policies within the organization to ensure that gender-based income disparities are addressed. If there are any unjust discrepancies, take steps to rectify them and promote gender pay equity.

Performance Review: Conduct a comprehensive performance review to determine if there are any gender biases affecting promotions and

bonuses. Implement measures to ensure fairness in career advancement opportunities.

2. **Customer Spending Patterns:**

Insight: Normal customers spend more on food and beverages, while member customers spend more on Beauty and health.

Actionable Insights:

Targeted Marketing: Tailor marketing campaigns and offers based on customer segments. For normal customers, focus on promoting food and beverage products. For member customers, emphasize beauty and health-related products.

Loyalty Program Enhancement: Enhance the loyalty program to offer incentives for both food and beverage products and beauty and health products. This can encourage cross-category spending and increase customer engagement.

3. **Tax Disparity in Different Locations:**

Insight: The tax% is highest in the city of Naypyitaw, the capital of Myanmar.

Actionable Insights:

Pricing Strategy: Adjust pricing strategies for products in Naypyitaw to account for the higher tax rate. Ensure that prices remain competitive while also covering the increased tax burden.

Localized Offerings: Explore the possibility of introducing location-specific promotions or products in Naypyitaw to mitigate the impact of higher taxes. This can attract and retain local customers.

4. **Holistic Business Strategy:**

Data-driven Decision-making: Promote a culture of data-driven decision-making throughout the organization. Encourage teams to rely on insights from analyses like these to guide strategies and operations.

Continuous Monitoring: Regularly update and monitor the income and spending patterns of different customer segments, as well as the tax rates in various locations. This helps ensure that strategies remain aligned with evolving trends.

Diversity and Inclusion: Use insights from gender-based income disparities to initiate diversity and inclusion programs that foster equality and empowerment in the workplace.

5. **Personalized Customer Experience:**

Segmentation and Customization: Leverage customer spending patterns to create personalized shopping experiences. Send tailored recommendations and offers to different customer segments to enhance customer satisfaction and loyalty.

6. **Government Relations and Pricing Strategies:**

Tax Advocacy: Consider engaging with local authorities to understand the reasons behind the higher tax rate in Naypyitaw. This can lead to productive discussions and potential advocacy for tax reforms.

Price Transparency: Ensure that customers in Naypyitaw are aware of the reasons for slightly higher prices due to the tax rate. Transparency can help maintain customer trust.

Incorporating these actionable insights into the supermarket's strategies and operations can lead to more effective decision-making, improved customer experiences, and enhanced business

performance. Remember to continuously monitor the effectiveness of these actions and be prepared to adjust strategies based on ongoing analysis and feedback.