KULLIYYAH OF INFORMATION AND COMMUNICATION TECHNOLOGY

INFO 4312 Information Visualization SECTION 1

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Project Report

Title: "What Are The Trends In Malaysia's States In Income During 2022"

Group 6:

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1. Executive Summary

The initial objective of our study was to examine the issue of gender pay disparity in Malaysia. However, due to technical limitations, we had to redirect our efforts towards analyzing income patterns among different states in Malaysia for the year 2022. We applied Tableau to create visual representations of income distribution, expenditure, and inequality using a complete dataset obtained from the Department of Statistics Malaysia. The design choices guaranteed a distinct and coherent story progression. Our investigation found differences in income, with certain states experiencing elevated poverty rates. To promote inclusive growth, we suggest implementing focused economic development initiatives, income redistribution programs, efficient allocation of resources, and ongoing monitoring. Considering the difficulties encountered, our analysis offers useful insights for policymakers to address economic inequities in Malaysia.

2. Introduction

In an era dominated by data, understanding and visualizing socioeconomic trends are crucial for more informed decision-making and policy formulation. Our Tableau-based information visualization project delves into the complicated tapestry of Malaysia's economic landscape, focusing on four critical aspects which are Income Trends, State-Level Income and Expenditure Analysis, Gini Coefficient Analysis, and Poverty Rate Analysis.

Relating to our project objectives, the primary purpose of this project is to provide stakeholders, policymakers, and the general public with an intuitive and accessible platform to comprehend the multi-sided dimensions of income distribution, expenditure patterns, wealth inequality, and poverty rates across Malaysia's diverse regions. Through compelling visualizations, we aim to assist decision-makers such as the government to identify areas of improvement, allocate resources efficiently, and formulate targeted policies that address the unique economic challenges faced by each state. In a broader context, this project holds significance as it contributes to the ongoing discussion on inclusive growth and sustainable development. By fostering transparency and promoting data-driven insights, our visualizations

aim to encourage constructive dialogue and collaboration among stakeholders to build a more equitable and resilient Malaysian society.

The dataset underpinning this project encompasses a comprehensive collection of socioeconomic indicators, meticulously curated to reflect the economic realities of each state in Malaysia for the year 2022. These indicators range from income distribution statistics and expenditure patterns to Gini coefficients and poverty rates. The relevance of this dataset lies in its ability to serve as a rich source of information, offering a detailed portrait of the economic landscape. As we go through all the worksheets and dashboards, we will unravel the unique stories and challenges faced by each state.

In this project, we utilize Microsoft Excel and Tableau for data cleaning, and analysis as well as to provide relevant visualization for a comprehensive narrative. By using the power of this software, we aim to unravel complex patterns, facilitate insightful comparisons, and foster a comprehensive understanding of the economic disparities and trends across the states of Malaysia.

3. Dataset Description

The dataset utilized in this information visualization project is a comprehensive compilation of socioeconomic indicators, offering insights into the economic dynamics of Malaysia in the year 2022. The dataset encompasses dimensions such as the 1st day of the year 2022 as all dates, states of Malaysia, districts of Malaysia, income mean, income median, expenditure mean, Gini coefficient, and poverty rate. This structured dataset allows for granular analysis of 160 districts, reflecting the diversity and intricacies of Malaysia's economic landscape.

The dataset is obtained from a data repository maintained by the Department of Statistics Malaysia (DOSM). This ensures that the data used represent official sources for government-collected data, ensuring credibility and reliability. The dataset comprises 160 rows, each representing a distinct district in Malaysia, and 8 columns, encapsulating the key dimensions of income, expenditure, Gini coefficient, and poverty rate. This streamlined structure ensures manageability while retaining the necessary level of detail for district-level analysis. The dataset is organized in a tabular format, facilitating easy integration into analytical tools such as

Tableau. Each row corresponds to a district, while columns represent the different dimensions. To provide a structured foundation for in-depth exploration in Tableau, all the districts will be grouped into their corresponding states.

The selection of this dataset is driven by the alignment of its dimensions with the project's objectives by including income mean and income median which facilitates a detailed analysis of income trends across different states in Malaysia. By examining the mean and median values, the project aims to uncover variations, disparities, and patterns in income distribution. Next, the dataset's incorporation of poverty rates allows for a comprehensive exploration of poverty trends across states in Malaysia. Through visualization and analysis, the project seeks to identify regions grappling with higher poverty rates, guiding targeted interventions and policy measures. Lastly, the dataset incorporates the Gini coefficient, a widely recognized metric for measuring income inequality, which is a crucial dimension in the dataset. By correlating Gini coefficients with states in Malaysia, the project aims to uncover the relationship between income inequality and regional disparities, contributing to informed discussions on equitable economic development.

4. Data Analysis

To understand income disparities better, we analyzed the trends in average income across different states in Malaysia to identify underlying factors contributing to disparities. For instance, states with a stronger industrial base or diversified economic activities may exhibit higher income levels. To analyze future trends in income, we utilize predictive models to forecast potential changes in income trends. This foresight can help policymakers anticipate and address emerging disparities. Henceforth, we should implement targeted policies and initiatives based on the analysis. If certain states show consistent improvement, share best practices with underperforming regions. Encourage investments in sectors with growth potential, foster skill development programs, and support industries that contribute to overall economic growth.

Next, the exploration of income inequality entails investigating the relationship between Gini coefficients and states. Factors contributing to income inequality, such as unequal access to education and job opportunities, should be identified. Predictive modeling can assess potential changes in income inequality, and advocacy for policies promoting equitable economic

development is crucial. Investments in education, skill-building initiatives, and progressive taxation measures are recommended.

Additionally, the analysis includes an examination of district-level income and expenditure patterns to understand localized factors contributing to economic disparities. Recommendations involve implementing targeted development projects in districts with lower economic indicators and improving infrastructure, healthcare, and educational facilities to create a more balanced regional development landscape. Continuous monitoring and reassessment of these strategies will be essential for fostering sustainable and inclusive growth in the future.

5. Storyboarding And Design Choices

The dashboard provides a thorough socioeconomic analysis that specifically examines income trends, inequality, and poverty rates in Malaysia. The visualization uses a treemap to effectively represent the amount of state income, bar charts for an easy comparison of income and expenditure by state, and bubble charts to visually depict the Gini coefficients, which measure inequality. The deliberate selection of chart types, colors, and layout serves the objective of directing viewers through a coherent storyline - starting with a comprehension of overall income patterns nationwide and progressing towards more complex analyses of inequality and poverty, which hold significant consequences for policy-making. The dashboard achieves a harmonious combination of comprehensive data presentation and simple understanding, ensuring that complex data can be understood in a user-friendly manner.

- **Chart Types Used**

A treemap is used to highlight the proportional scale of incomes across different states. Income and expenditure are shown in bar charts: They facilitate direct comparison among states. Gini coefficient represented in a bubble chart: The visualization depicts varying levels of inequality, where larger bubbles correspond to higher levels of inequality.

- **Hues**

The treemap has different colors that serve as indicators between various states.

The use of green colors in bar charts serves as a visual indicator for comparing values about the average. The diverse range of colors in the bubble chart serves to highlight the Gini coefficient data.

- **Arrangement**

The logical progression is from left to right and from top to bottom. It provides a clear and structured path for the audience to follow the storyline.
Metrics that are closely connected and organized together: This enables the process of comparing and contrasting various data points.

- **Justification**

The design choices guarantee clarity and improve the process of narrating a story. The treemap provides a rapid visual display of states with greater incomes, while bar charts effectively compare incomes and expenditures. Additionally, the bubble chart offers an intuitive depiction of inequality. The color palette is precisely selected to highlight disparities without covering the audience. The design of the layout is meticulously constructed to guide the audience through the data in a coherent and systematic order, conforming to the customary reading and comprehension patterns of viewers.

6. Tableau Visualization

The Tableau visualization presents a comprehensive and diverse perspective of Malaysia's economic environment. The visualization tool incorporates a treemap to represent income distribution across states, bar charts to provide an in-depth study of income and spending, and a bubble chart to display the Gini coefficient. The structure of the dashboard begins with overarching revenue patterns and gradually focuses on individual elements such as expenses and poverty. This configuration presents a narrative of economic variety and inequality, leading viewers from a broad perspective to intricate particulars.

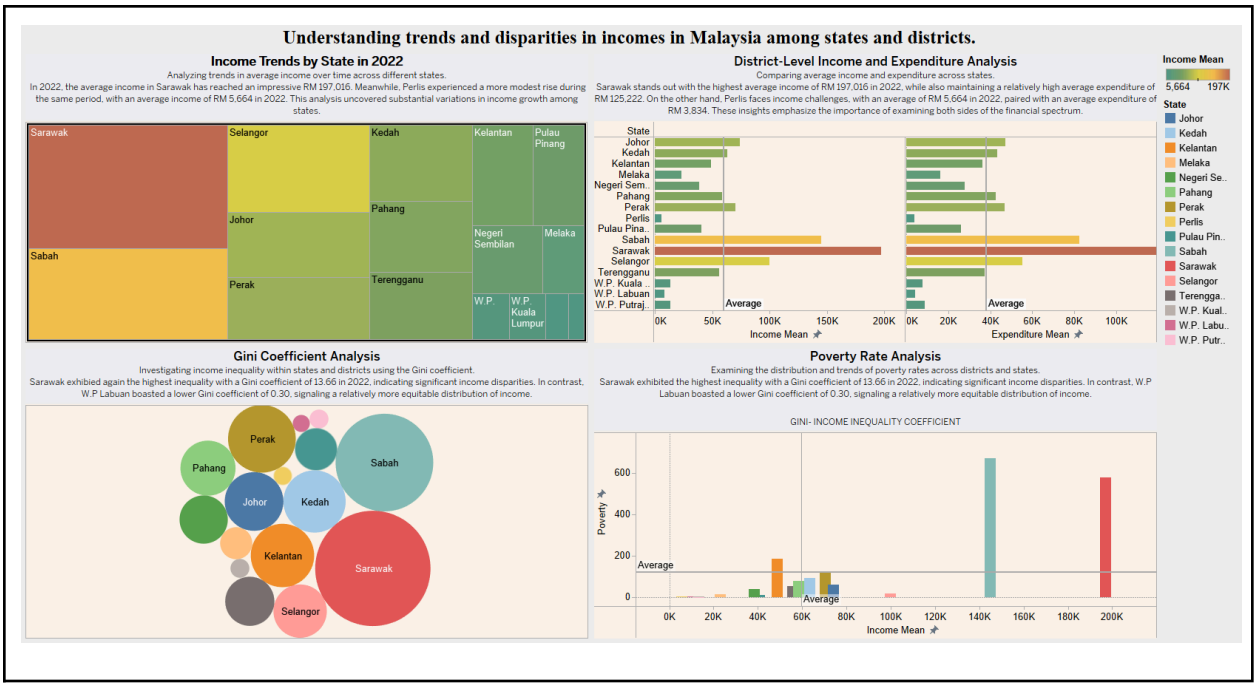

Figure 1. Dashboard

7. Data Storytelling

The purpose of the dashboard is to provide information and educate the audience about the economic inequalities present in Malaysia. The method employs visual hierarchies to direct focus, first with broad income patterns and descending to intricate examinations of inequality and poverty rates. The narrative presented shows an obvious and notable disparity, with certain nations thriving while others face considerable challenges. The treemap and bar charts provide a comprehensive overview of income and spending, while the bubble chart's study of the Gini coefficient emphasizes inequality, forcing the audience to reflect on the root causes and potential remedies for these economic difficulties. The visualization has been designed to enhance the accessibility of complex data, hence facilitating well-informed discussions and future policy actions.

8. Results And Discussion

Our research into the income trends in Malaysia in 2022 has provided important new information about the differences in wealth between the various states. Notably, some areas—like Selangor—have higher average incomes while others, like Kelantan and Sabah, have greater rates of poverty and financial hardship. This emphasizes the need for focused economic strategies that are adapted to the particular difficulties faced by each area, similar to realizing that different areas of a garden require different maintenance,

Our analysis highlights how constantly changing economic conditions are, underscoring the significance of continuous evaluations. Like caring for a garden, government interventions and policies require ongoing observation. By doing this, it is ensured that things are getting better and that resources are going to where they are most needed. In addition, Our findings illustrate the role of policymakers in fostering a more equitable society and add to the larger conversation on inclusive growth. Decision-makers can use Tableau visualizations as a potent tool to pinpoint problem areas, distribute funds wisely, and create focused policies for inclusive growth. To put it briefly, our analysis is a useful tool for making well-informed decisions and promotes continuous communication and cooperation between stakeholders to improve Malaysia's economic environment.

9. Challenges And Limitations

The project faced multiple obstacles and constraints that impacted its results. An outstanding obstacle was the technical limitation related to the dataset. Following the first proposal we aimed to look into gender pay inequality, complications emerged with data detection and cleaning in Tableau. And as a result, the dataset was ultimately replaced with the one used for evaluating income patterns in Malaysian states in 2022. The adjustment slightly impacted the project's outcomes by redirecting the attention from gender pay inequality to more comprehensive income patterns, thus enhancing the project's inclusivity while modifying the original research goals.

Moreover, the division of effort towards addressing technical limitations may have limited the depth of the study and investigation of the chosen dataset, which reduced the project's capacity to provide subtle insights. In general, the modification in the dataset resolved technical

problems, but it also required a change in project goals and might have impacted the thoroughness of the research.

10. Conclusion

The data show that income differences reside among Malaysians in different regions. While certain parts of Malaysia, like Kelantan and Sabah, have greater rates of poverty and financial difficulty, other regions, like Selangor, have higher average incomes. After closer review, various regions require distinct plans to support their improved economic growth. In general, urban areas are more successful than rural ones. To ensure that everyone has an equal opportunity to earn a good living, the government must develop plans for each region. The figures also show that to lessen economic distress and poverty, some areas require greater focus. It is imperative that the government periodically assesses whether conditions are improving.

11. Recommendations

The Tableau dashboard analysis suggests improving education, infrastructure, and healthcare in underperforming Malaysian states to reduce economic inequality. Progressive taxes and social assistance should be used to reduce income inequality, especially in high-Gini regions. A careful distribution of government resources to ensure fair development and a solid monitoring system to evaluate the effects of these policies and inform future sustainable development changes are essential to this plan.

12. References link for dataset:

https://open.dosm.gov.my/data-catalogue/hies_state