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Abstract

This report accompanies a tableau dashboard suite designed to elucidate the economic vitality of the U.S. through three distinct yet interrelated lenses: the state of transportation, the interplay between income and poverty, and the prevalence of professional employment. Each visualization within the dashboard is constructed to not only present the data but to tell a story, fostering a deeper understanding of the factors that contribute to the nation's economic health.

A Multifaceted View of Economic Health in the U.S.: Transportation, Income, and Employment Analysis

Master of Science in Applied Information and Data Science

1. **Introduction**

**Purpose of the Dashboard:** The dashboard suite seeks to transform complex datasets into a narrative that elucidates the multifaceted nature of economic health across U.S. states. The goal is to provide a holistic view that informs stakeholders and aids in data-driven decision-making.

**Link:** <https://public.tableau.com/app/profile/maha.hazime.zayour/viz/HVD03_project01_USCensusDemographicData_Hazime-zayour/ComprehensiveAnalysisofU_S_Transportation>

**Overview of the Story:** The narrative unfolds across three chapters, revealing insights into transportation systems, highlighting economic disparities through income and poverty data, and examining the implications of professional employment on economic indicators.

**General Design Principles:** The suite's design adheres to principles of clarity, interactivity, and accessibility. Consistent visual language and thematic color coding were chosen to guide the viewer's journey through the data.

**Specific Visualization Choices:** The choice of visualizations was dictated by the data structure and the story it needed to tell:

- Bar charts were utilized to compare discrete categories.

- Scatter plots were employed to reveal correlations and distributions.

- Color choices were made to enhance readability and to ensure accessibility for viewers with color vision deficiencies.

**Interactivity and Accessibility:** Interactive elements such as filters and tooltips invite the audience to engage with the data, allowing for personalized exploration. State selection sync across visualizations enables a cohesive narrative to unfold.

1. **Detailed Visualization Analyses**
2. **Comprehensive Analysis of U.S. Transportation: Commute Times and Public Transit Usage**

**A map with blue and white lines

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The initial visualization of our dashboard, "Best State Transport: Commute and Transit Comparison," combines a bar chart and a map to provide a multifaceted view of transportation metrics across the U.S. states.

This dual approach allowed me to provide a comparative quantitative analysis while also offering geographical context. The bar chart was essential for a direct side-by-side comparison of transportation metrics, while the map offered spatial insights. The interaction between these visuals, enabled by clicking on a state in one to highlight it in the other, provided a user-friendly and detailed exploration.

* Color Scheme and Accessibility: We selected a blue-orange diverging color scheme for its visual appeal and its utility in distinguishing between different values. These colors are also positioned on the color wheel in a manner that maintains distinction when viewed by individuals with color vision deficiencies, ensuring our visualizations are accessible to a broader audience, including those with color blindness.
* Filters and Interactions: The dashboard is equipped with interactive filters enabling users to select specific states for a more granular analysis. These filters trigger updates across both the bar chart and the map, facilitating comparative analysis within a cohesive interactive environment. Furthermore, we've ensured that selections made on one visualization (e.g., clicking on a state in the bar chart) are reflected on the other (e.g., the map), enhancing the user's ability to cross-reference data points intuitively.
* Visual Encoding with Size: On the map, the size of each circle corresponds to the average public transit usage percentage, allowing for immediate visual interpretation of the data. Larger circles denote higher usage, providing an at-a-glance understanding of which states have more robust public transit systems.
* Outliers: In the data exploration phase, we identified outliers and chose to retain them in the final visualizations. Outliers can be significant indicators of unique conditions or issues that warrant attention. The interactivity of our dashboard allows users to engage with these data points individually to understand their context.
* Insights and Examples: An insight from the bar chart is that states like New York and New Jersey have high public transit usage with relatively short commute times, which are effectively visualized through proportional bar lengths and distinct colors. In contrast, the map allows us to spatially appreciate that despite California's extensive transit usage indicated by a larger circle, the longer commute times are a call to action for improved transportation planning. This interactive cross-visualization highlights the effectiveness of certain states' transportation infrastructures and pinpoints areas for potential development.

1. **Income vs. Poverty: The Construction and Coastal Influence**

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In the second visualization, "Income vs. Poverty: The Construction and Coastal Influence," I utilize a scatter plot to delve into the intricate dynamics between income, poverty rates, and construction activities, distinguishing between coastal and inland counties.

* Choice of Scatter Plot: The scatter plot was selected for its proficiency in illustrating the correlation between two quantitative variables - income and poverty. This type of plot is ideal for displaying a broad range of data points, allowing me to capture and convey the variability and density within the dataset. It enables the reader to identify trends, clusters, and outliers that prompt deeper inquiry into the socioeconomic factors at play.
* Color Scheme and Transparency: The design uses a contrasting color scheme to differentiate coastal from non-coastal counties, which is also mindful of accessibility for viewers with color vision deficiencies. Color transparency was employed to address the challenge of dense data overlap, ensuring that individual points are distinguishable without compromising the visual representation of concentrated data clusters.
* Size as a Visual Encoder: I've encoded additional data into our scatter plot through the size of the circles, with each circle's diameter reflecting the intensity of construction activities within the counties. This method allows users to visually parse varying degrees of economic activity beyond the primary income and poverty metrics.
* Interactivity and Filters: The scatter plot is interactive, with tooltips that reveal intricate details of the data points. Filters enhance the user experience by enabling the isolation of coastal or non-coastal counties, analyzing as specifically or broadly as the viewer needs.
* Design Adjustments After Feedback: Post feedback, I increased the transparency of the plot's circles to prevent visual clutter. This adjustment was critical for maintaining data clarity and ensuring that the user could interpret the data accurately, especially in areas with high data point concentration.
* Insights and Examples: The scatter plot reveals the counterintuitive scenarios where coastal counties with higher incomes also show significant poverty rates. A notable example is seen in some Californian counties, where despite the high income per capita, poverty persists, suggesting economic imbalances that could be pivotal in policy-making and resource allocation.

1. **A Multifaceted View of Economic Health in the U.S.: Transportation, Income, and Employment Analysis**

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* Overview and Design Philosophy: This dashboard aims to craft a nuanced narrative of the United States' economic health, integrating several data visualizations that span transportation, income, poverty, and professional employment metrics. It’s designed to facilitate an engaging and interactive user experience. It allows for the exploration of different economic facets, with a consistent design language ensuring a narrative flow. A state-level filter is a central feature, enabling dynamic comparisons of how various states measure up across the metrics. This interactivity is heightened by the ability of users to select any state within one visualization and see that selection reflected across all others, providing an interconnected and comprehensive analysis.

It consists of three main visualizations:

* Comprehensive Analysis of U.S. Transportation: Commute Times and Public Transit Usage (see section 1)
* Income vs. Poverty: The Construction and Coastal Influence ( see section 2)
* Exploring the Relationship: Professional Employment and Economic Indicators :

This scatter plot adds significant analytical value to the dashboard by providing a deeper insight into the socio-economic status of different states. By correlating professional employment with income and poverty levels, it helps to identify whether a higher proportion of professional employment in a state is associated with higher income and lower poverty rates. Integrating this plot into the dashboard allowed for a more holistic view of the state's economic health, complementing other data visualizations. It enriches the dashboard by offering a layer of socio-economic analysis that can be crucial for policymakers, economists, and social scientists interested in the dynamics of employment and economic well-being across the states.

1. **Overall Findings:**

**- Which states have the best transportation?**

My analysis found that the 'best' transportation doesn't solely depend on high public transit usage but also considers average commute times. States like New York and Massachusetts lead in transit usage, indicating robust public transport systems. However, states with shorter average commute times, like South Dakota and Montana, suggest more efficient transportation networks relative to their context.

**- How does income and poverty look across America?**

The scatter plot of income vs. poverty, with the added dimension of construction activity, revealed a nuanced picture. Higher-income per capita is often aligned with lower poverty rates, yet the presence of construction activity across the spectrum suggests economic growth is widespread. Coastal states presented mixed results, challenging the assumption that coastal proximity unequivocally correlates with higher income and lower poverty.

**- Professional Employment's Impact on Economic Indicators**

The added visualization exploring professional employment provided further depth to our story, showing a general trend where an increase in professional employment correlates with higher income levels. This trend underscores the potential of a professional workforce in enhancing economic prosperity, with states like Maryland and Massachusetts showcasing high professional employment and income per capita.

1. **Summary**

Overall, the dashboard not only presents individual data points but also tells a story of economic interrelations. It highlights the disparities in transportation efficiency, the paradoxes of income and poverty coexistence, and the impact of professional employment on economic vitality. Itserves as a powerful tool for understanding the multifaceted nature of economic well-being in America.

1. **References:**

* The Visual Display of Quantitative Information" by Edward Tufte
* Tableau's official documentation and tutorials

1. **Appendix**

A map with a graph and a chart

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A screenshot of a map

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A graph with blue and orange dots

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A screen shot of a graph

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A graph with blue and orange circles

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A screen shot of a graph

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A graph with numbers and dots

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