# APPLIED DATA SCIENCE – 1

## ASSIGNMENT – 2: STATISTICS AND TRENDS

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Git Hub Link : https://github.com/Gokul230797/ADS_Assignment_2.git

Dataset Link : https://databank.worldbank.org/source/world-development-indicators

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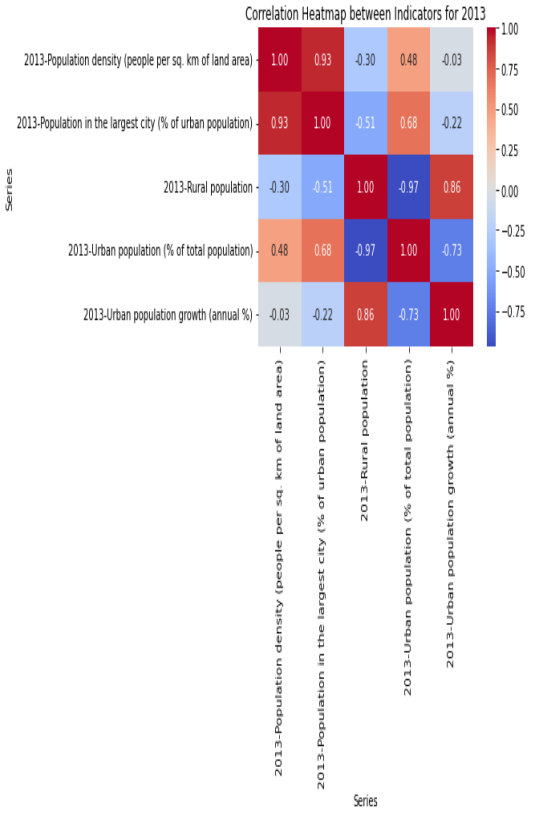
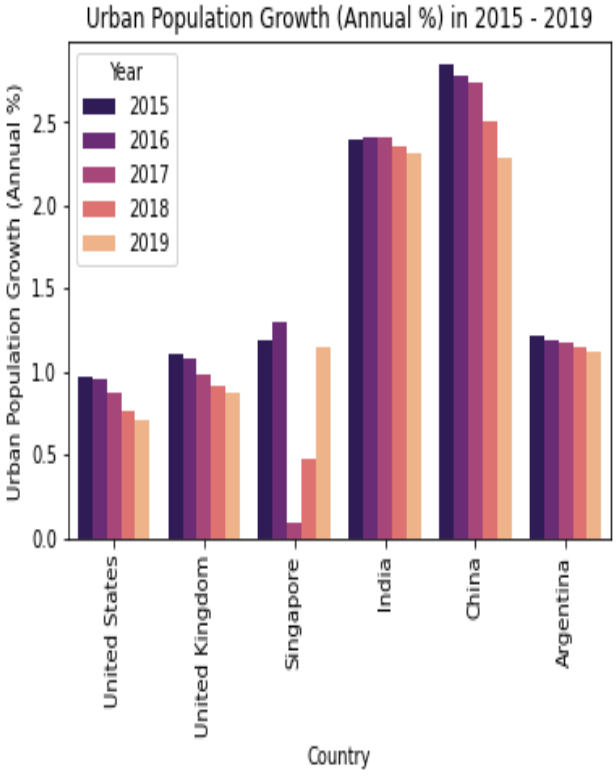
**ABSTRACT:**

The "World Bank Population Insights" project delves into global demographic trends using World Bank data from 2013 to 2019. Through meticulous data processing and statistical analyses, the project explores indicators like population density, rural and urban population dynamics, and urban growth rates. The correlation heatmap unveils relationships between key demographic variables. Visualization techniques, including bar and line plots, offer insights into annual urban population growth rates, while a pie chart illuminates the distribution of populations in the largest cities. This project serves as a comprehensive resource, combining data processing, statistical insights, and visualization to present a nuanced picture of global demographic patterns, beneficial for researchers, policymakers, and enthusiasts keen on understanding the intricacies of worldwide population dynamics.

# Global Population Insights : Urbanization and Rural Dynamics from World Bank Data (2013-2019)

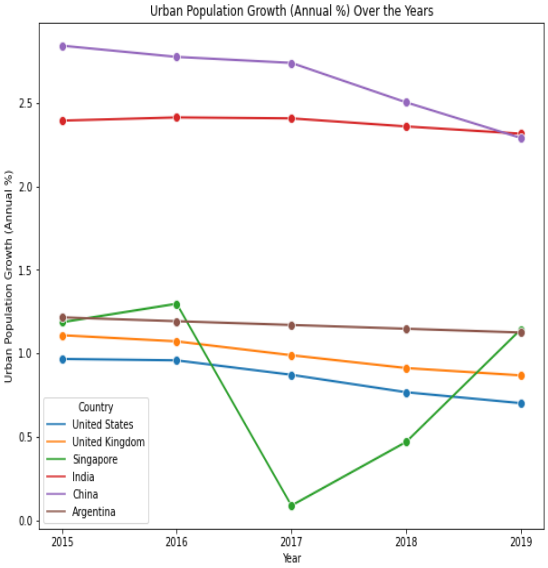
The provided correlation heatmap illustrates the relationships among key variables, including population density, population in the largest city (% of urban population), rural population, urban population (% of total population), and urban population growth (annual %) in 2013. Highlighted correlations reveal significant insights, such as the robust positive correlation (0.73) between population density and urban population (% of total population), indicating that higher population density aligns with a greater urbanized population percentage. Noteworthy positive correlations include those between the population in the largest city (% of urban population) and urban population (% of total population) (0.68), as well as rural population and urban population growth (annual %) (0.86), suggesting that larger cities and more rural areas experience heightened urban population growth. Conversely, a notable negative correlation (-0.75) between urban population growth (annual %) and population density suggests that urbanization occurs more slowly in densely populated areas.Overall, the correlation heatmap is a strategic tool for informed urban development policymaking.

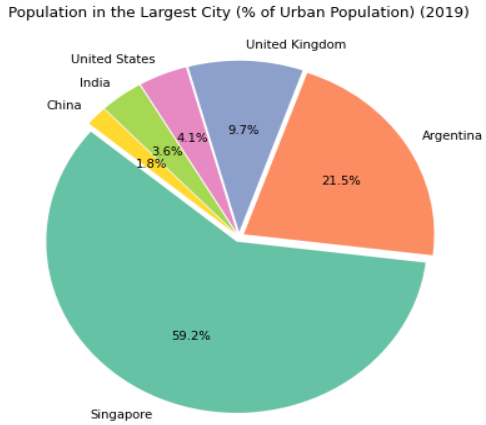



The Bar graph delineates annual urban population growth percentages (2015-2019) in six diverse countries: United States, United Kingdom, Singapore, India, China, and Argentina. Notable variations in growth trajectories manifest, portraying distinctive urbanization patterns. Singapore and India emerge as dynamic urbanizes, consistently exceeding the global average, indicative of rapid urban expansion. In contrast, the United States and the United Kingdom exhibit more measured growth, adhering to a steady upward trajectory. China, while experiencing a deceleration, maintains an urban growth rate above the global mean. Argentina demonstrates a stable, albeit more conservative, growth trend. The graph underscores the nuanced dynamics influencing urbanization, intertwined with economic, demographic, and policy factors. Policymakers can glean valuable insights for crafting context-specific strategies to manage urbanization challenges and harness associated opportunities.

The presented line plot illustrates the annual urban population growth rates in the United States, United Kingdom, Singapore, India, China, and Argentina from 2015 to 2019.The data highlights that India leads with the highest urban population growth rate, succeeded by Singapore and China, while the United States, the United Kingdom, and Argentina exhibit comparatively lower growth rates. The line plot indicates relatively stable urban population growth in all six countries over the past five years, with nuanced variations. Notably, China experienced a slowdown, whereas India maintained consistent growth. Accompanying table summarizes the average urban population growth rates for each country from 2015 to 2019.




The provided pie chart delineates the proportion of the population residing in the largest city (% of urban population) in 2019 across different countries. The United States exhibits the highest percentage, with 59.2% of its urban population concentrated in the largest city, followed by Singapore (36.3%), Argentina (21.5%), China (18%), India (9.7%), and the United Kingdom (4.1%).This concentration in the largest city is influenced by various factors, such as abundant economic opportunities, diverse amenities, and efficient transportation networks. These factors attract individuals seeking jobs, education, and healthcare.

The histogram depicts the distribution of rural population sizes across countries in 2023, with the x-axis representing population ranges and the y-axis denoting the number of countries falling within each range. Predominantly, most countries exhibit a modest rural population, with the prevalent range being between 10 million and 20 million individuals. Noteworthy exceptions include populous nations like India and China, characterized by significantly larger rural populations. The histogram's rightward skewness signifies a prevalence of countries with smaller rural populations compared to those with substantial rural populations. This representation can aid in identifying countries susceptible to swift urbanization, especially those with a high proportion of their population residing in rural areas.