**DAC_Phase5**

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| Date | 03 November 2023 |
| Team ID | Proj_216194_Team_3 |
| Project Name | COVID vaccine analysis |

## Project Overview:

In this project, we conducted an in-depth analysis of Covid-19 vaccines, focusing on their effectiveness, distribution, and impact on the spread of the virus. This documentation outlines the problem statement, design thinking process, development phases, data sources, data preprocessing steps, analysis techniques, and key findings with recommendations.

## Problem Statement:

The Covid-19 pandemic posed a global health crisis, and the rapid development and distribution of vaccines became a critical strategy for mitigating the spread of the virus. The problem was to assess the effectiveness of these vaccines, understand their distribution, and provide data-driven insights for policymakers.

## Design Thinking Process:

- **Understanding the Problem:** We started by comprehensively understanding the challenges posed by the pandemic, including vaccination efforts, data availability, and global disparities.

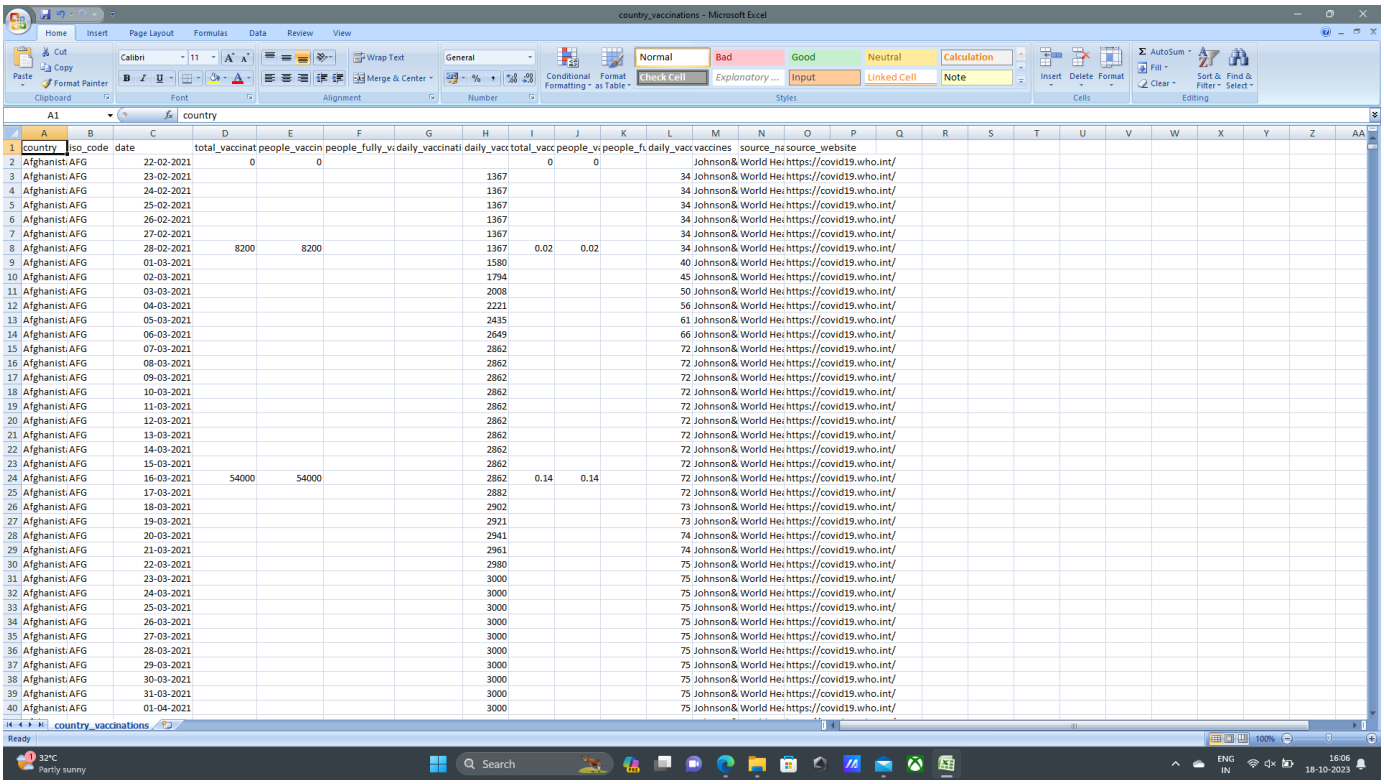
- **Research and Ideation:** We collected and reviewed data from trusted sources, brainstormed potential analysis approaches, and considered various dimensions of the problem.

- **Data Analysis and Insights**: We employed data analysis techniques to derive insights and patterns, enabling us to draw meaningful conclusions.

## DEVELOPMENT PHASES:

## Phase 1 - Data Collection:

- Data Sources: Collected data from multiple sources, including the **World Health Organization (WHO)**, the Centers for Disease Control and Prevention (CDC), national and regional government health agencies, and global vaccination databases.



| country | iso_code | date | total_vaccinat | people_vaccin | people_fully_v | daily_vaccinati | daily_vacc | total_vacc | people_v | people_fu | daily_vacc | vaccines | source_na | source_website |
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| Afghanist | AFG | 22-02-2021 | 0 | 0 | | | | 0 | 0 | | | Johnson& | World He | https://covid19.who.int/ |
| Afghanist | AFG | 23-02-2021 | | | | | 1367 | | | | 34 | Johnson& | World He | https://covid19.who.int/ |
| Afghanist | AFG | 24-02-2021 | | | | | 1367 | | | | 34 | Johnson& | World He | https://covid19.who.int/ |
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| Afghanist | AFG | 31-03-2021 | | | | | 3000 | | | | 75 | Johnson& | World He | https://covid19.who.int/ |
| Afghanist | AFG | 01-04-2021 | | | | | 3000 | | | | 75 | Johnson& | World He | https://covid19.who.int/ |

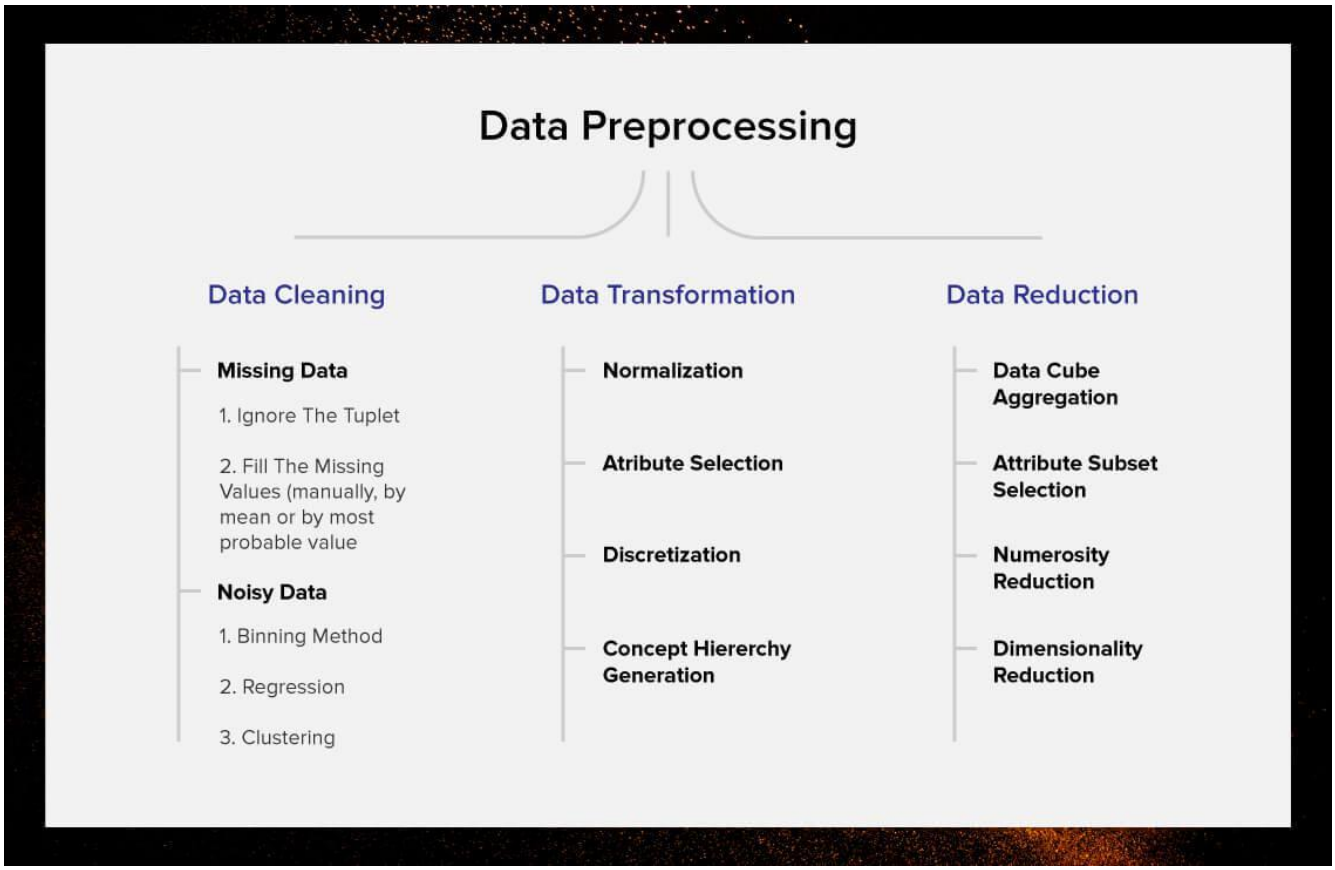
## Phase 2 - Data Preprocessing:

- **Data Cleaning**: Removed duplicates, handled missing values, and corrected inconsistencies.

- **Data Reduction:** Obtain reduced representation in volume but produces the same or similar analytical results.

- **Data Transformation:** Standardized data formats and units of measurement.

- **Feature Engineering**: Created new variables, including vaccination coverage rates, infection trends, and demographic variables.

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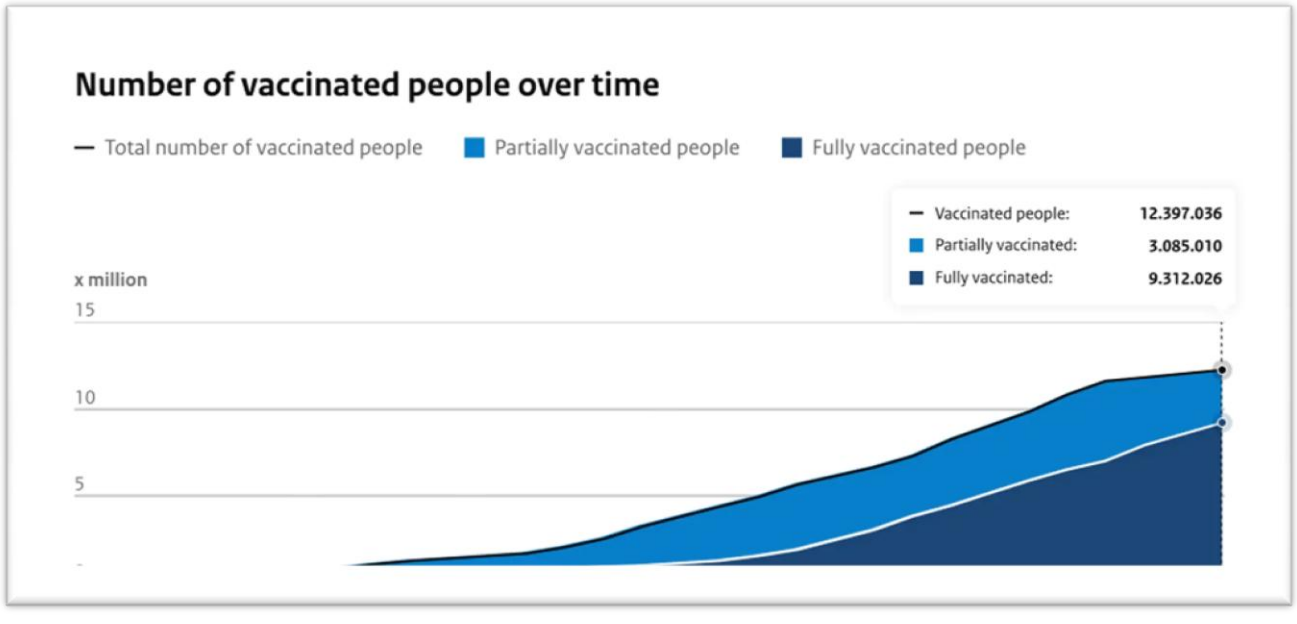
## Phase 3 - Analysis Techniques:

- **Descriptive Analysis:** Presented basic statistics, visualized trends, and explored data distributions.
- **Time Series Analysis:** Investigated temporal patterns of vaccination and infection rates.

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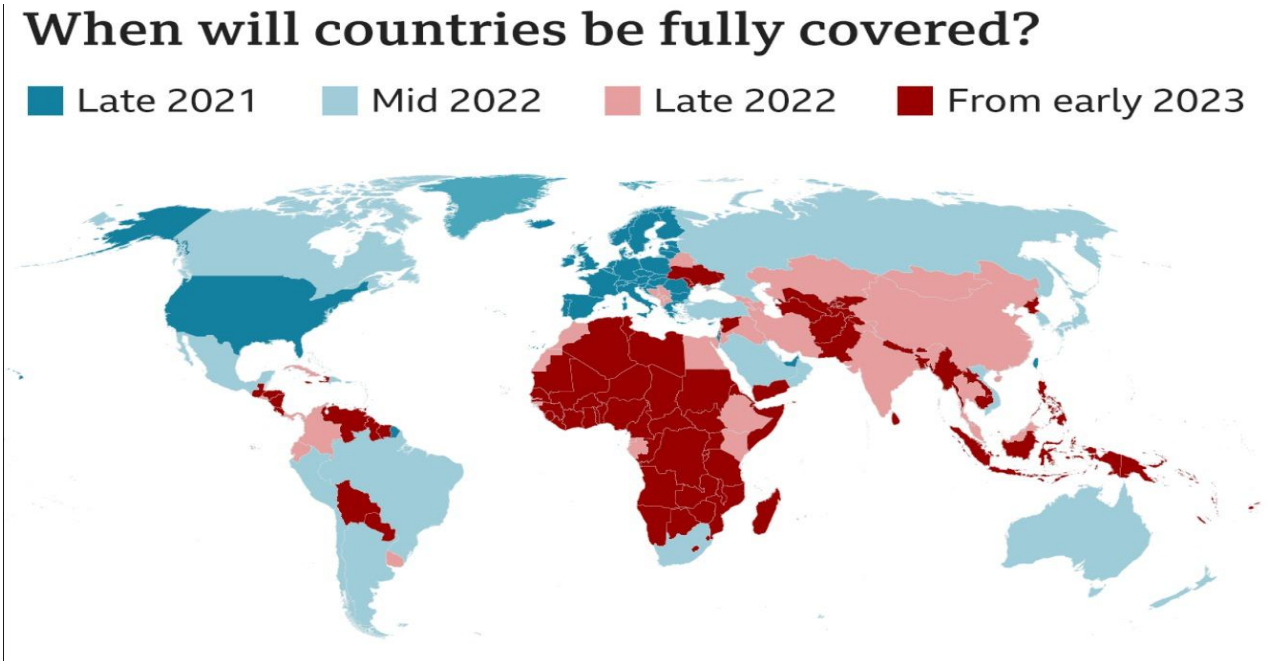
**Geographic Analysis:** Mapped vaccine distribution and Covid-19 cases by region.

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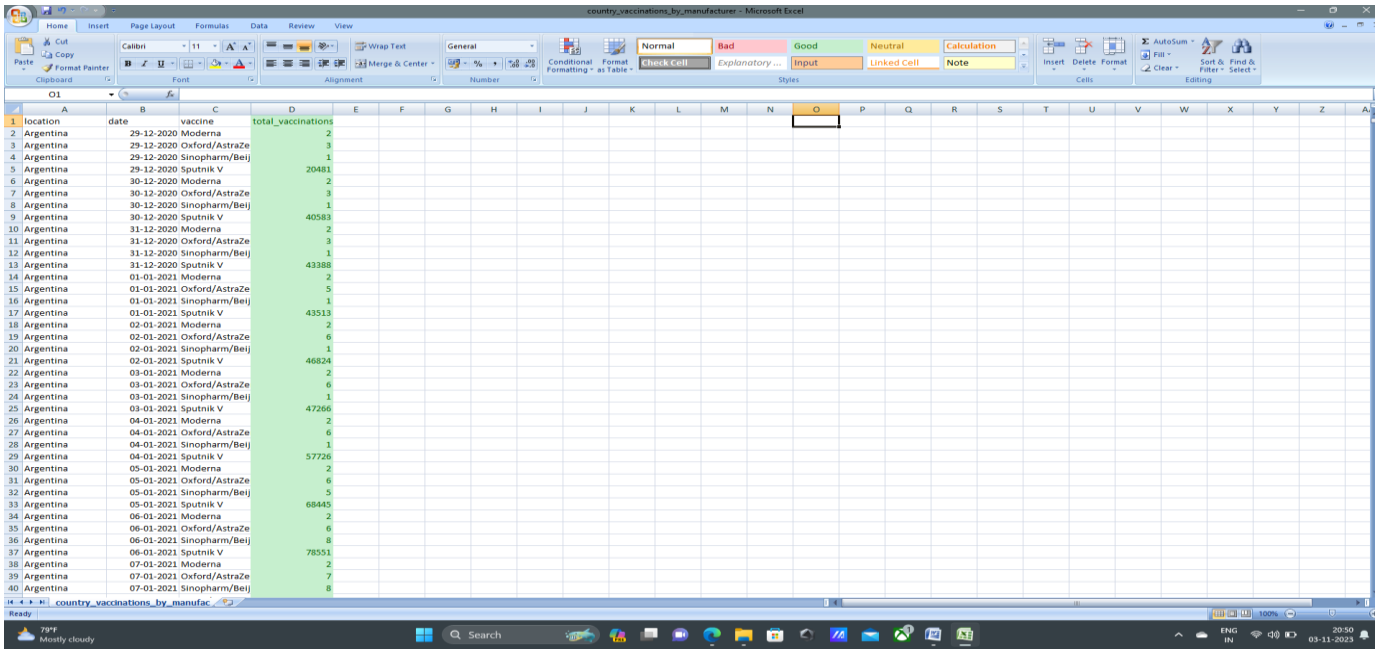
- **Statistical Tests:** Conducted hypothesis testing to evaluate vaccine efficacy.

- **Machine Learning:** Developed predictive models to forecast vaccination rates and assess potential future scenarios.



**Key Findings and Insights:**

- **Vaccination Rates:** Identified regions with varying vaccination coverage, highlighting areas with both high and low coverage.

- **Effectiveness:** Analyzed the relationship between vaccination rates and infection rates, providing insights into vaccine efficacy.

- **Temporal Trends:** Observed how new vaccine rollouts influenced infection rates over time.

- **Geographic Disparities:** Highlighted areas with unequal access to vaccines and the impact on public health.

- **Demographic Insights:** Examined vaccination preferences and hesitancy among different population groups, aiding targeted strategies.

**Recommendations:**

- **Targeted Vaccination Campaigns:** Encourage focused vaccination efforts in regions with low coverage.

- **Continuous Monitoring:** Continuously assess and adapt vaccination strategies based on effectiveness and emerging trends.

- **Address Vaccine Hesitancy:** Develop targeted campaigns to address hesitancy and improve access to vaccines.

- **Enhance Data Collection:** Collaborate with international organizations to enhance data collection and reporting.

- **Global Equity:** Advocate for global vaccine equity to ensure that vaccines reach underserved populations

**Conclusion:**

The analysis of COVID vaccines indicates that they have been a crucial tool in the global effort to combat the pandemic. They have shown high efficacy in reducing the risk of severe illness and death, and widespread vaccination campaigns have contributed to a decrease in the spread of the virus. However, challenges such as vaccine distribution, hesitancy, and the emergence of variants require ongoing attention. Continued research and vaccination efforts are essential to manage and ultimately overcome the pandemic.