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MSC IN DATA SCIENCE: PREDICTION OF GDP GROWTH IN RELATION TO CLIMATE CHANGE INVESTMENT USING MACHINE LEARNING AND NEURAL NETWORKS

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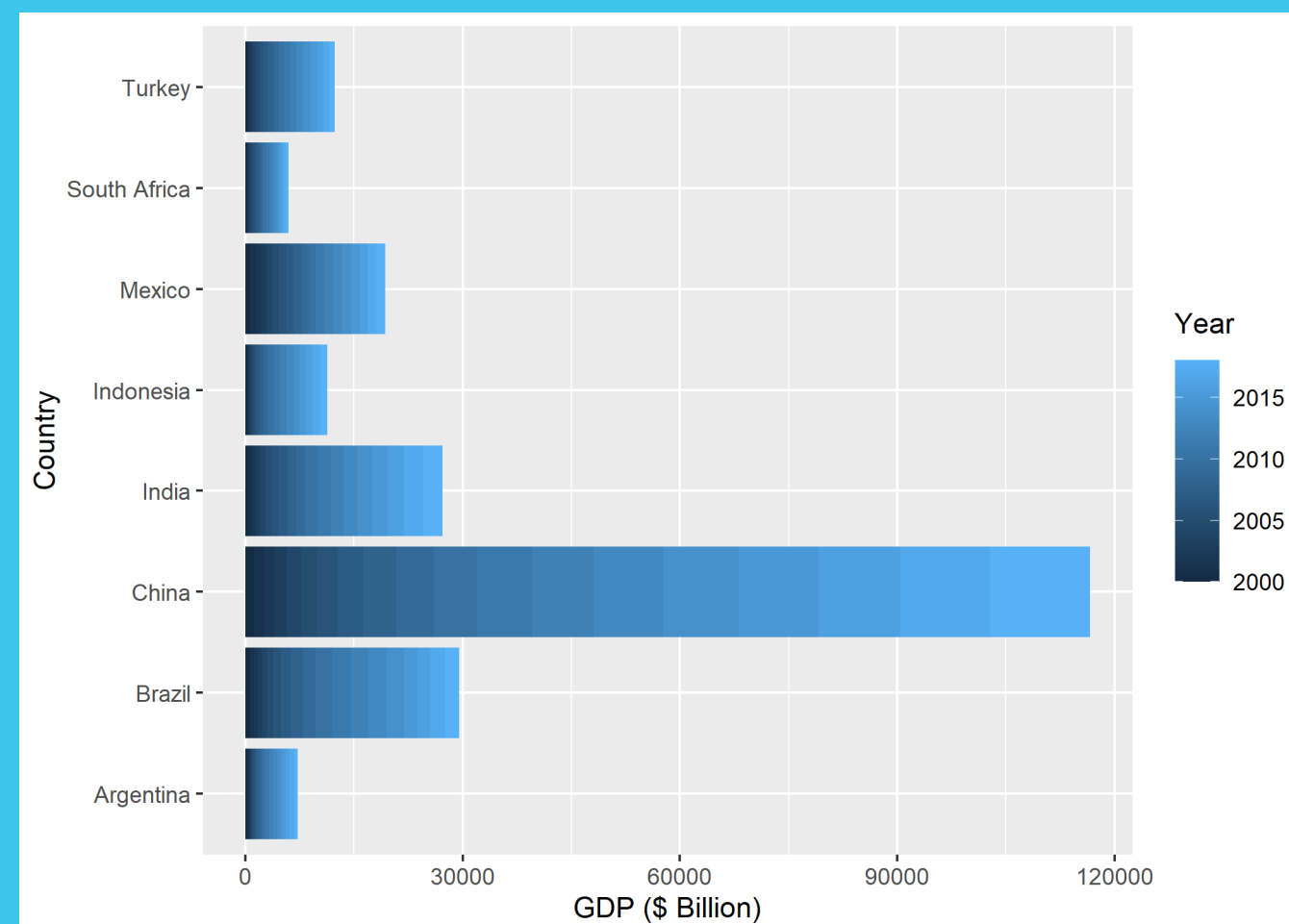
1. INTRODUCTION

The theme of this study is Climate Change Adaptation and will look at Climate Change through this lens and how adaptation affects economic growth.

How we define the countries in the study is by looking at biggest contributors to Climate Change, and the largest economies.

I will identify the trends from each of these datasets and correlate them to gain new insights into whether it's worth pursuing Climate Change Adaptation from strictly an economic point of view.
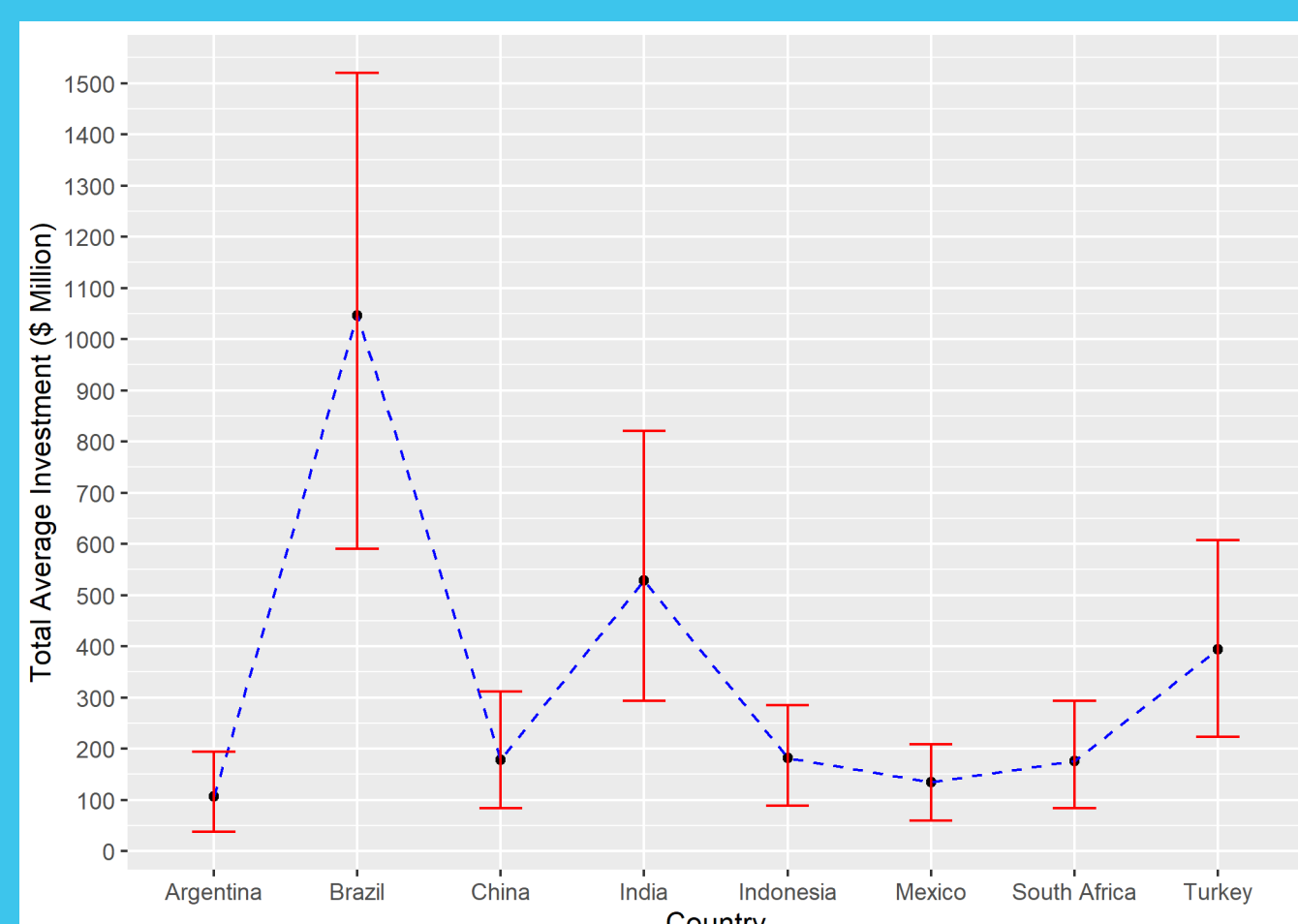
2. LITERATURE REVIEW

- In Richard Black[1]'s research, he cited a NASA[2] study into co-benefits of reduced carbon emissions. "For example, limiting warming to 1.5°C rather than 2°C by 2060 has been estimated to result in co-benefits of 0.5–0.6% of global GDP, owing mostly to reductions in air pollution."

- According to various predictive models, countries such as China have a huge role to play in adaptation. By 2050 there could be a reduction of 10-20% in overall GDP of China due to adaption[3]. This however only takes in the costs of implementation and not future benefits due to decreasing the effect of Climate Change.

3. RESEARCH OBJECTIVE

- Is there a relationship between investing in Climate Change Adaptation and a country's economic prosperity?

- What is the expected growth of a country's economy from investing in Climate Change Adaptation?

4. DATA USED

The datasets I have deemed relevant are as follows:
- GDP per Capita
- Renewable Energy Costs,
- Non-Renewable Energy Prices,
- Non-Renewable Energy Subsidies
- CO2 Emissions
- Carbon Tax

5. METHODOLOGY

- I will be using CRISP-DM for my methodology

- All data will be downloaded from Trading Economics, World Bank and IRENA

- Data will be in csv format, and using Python and R the data will be formatted correctly

- Using Machine Learning and Neural Networks, I will peform preditctive analysis

6. NEXT STEP

- The predictive algorithms will be using a Linear Regression model specfically Multiple Linear Regression

- For Neural Networking, I will be using a Recurrant Neural Network (RNN) such as Long Short-Term Memory (LTSM)

- These predictions will help a country decide whether the rate of investment they are putting into Climate Change Adaptation is worth pursuing

References:
[1] https://eciu.net/analysis/briefings/climate-impacts/climate-economics-costs-and-benefits

[2] https://pubs.giss.nasa.gov/abs/sh09700b.html

[3] Paltsev, S., Morris, J., Cai, Y., Karplus, V. and Jacoby, H. (2012). The role of China in mitigating climate change. Energy Economics, 34,