

ESG Analysis and Visualization

Leveraging Data Analytics for Sustainability Insights

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Introduction

- Objective: Analyze ESG metrics to identify sustainability trends.
- Tools Used: Python, Power BI, Excel.
- Dataset Details: 50 records covering industries like Technology, Finance, Consumer goods, Agriculture and Energy.

Problem Statement

- Issue: Understanding ESG's financial impact is complex.
- Importance: Helps businesses make informed investment decisions.

Methodology

- Data Cleaning: Handled missing data using Pandas.
- Analysis: Visualized trends with Matplotlib and Seaborn.
- Visualization: Created interactive dashboards in Power BI.

Key Insights

- Higher ESG scores correlate with better stock performance.
- Technology leads ESG efficiency across industries.
- Positive news sentiment aligns with higher ESG scores.

Power BI Dashboard Overview

ESG Performance Analysis Dashboard

Year
All

Australia Brazil Canada Germany India UK

76.09

Average of ESG_Score

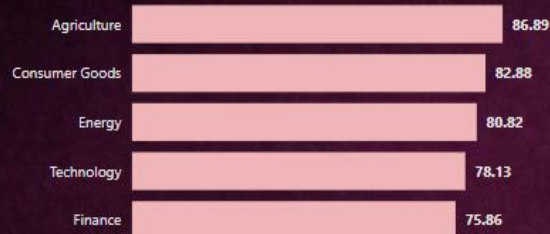
3M

Sum of CO2_Emissions (Tonnes)

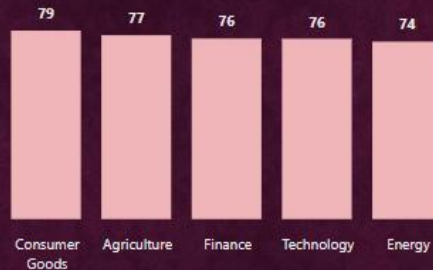
253.63

Average of Market_Cap (Billion \$)

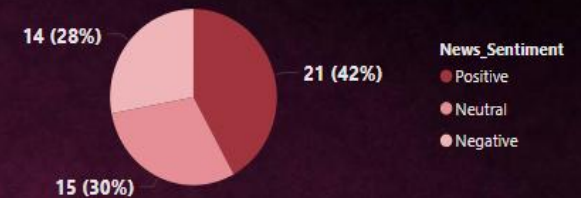
Average of Environmental_Score by Industry



Average of ESG_Score by Industry



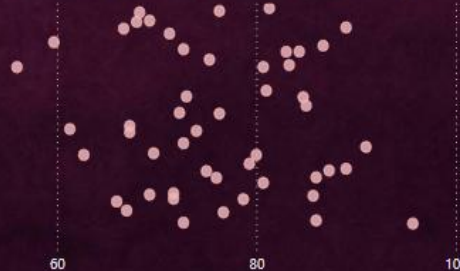
Count of Company by News_Sentiment



Average of Governance_Score by Industry



ESG_Score and CO2_Emissions (Tonnes)



Company	Sum of ESG_Score	Sum of CO2_Emissions (Tonnes)
AgroWorld Inc.	76.30	55288
BioLife Sciences	80.70	26874
BioSphere Innovations	79.30	34731
BluePlanet Energy	67.30	50224
BrightFuture Renewables	72.30	55649
BrightPlanet Group	87.30	31928
CleanEarth Technologies	85.70	21570

Sum of ESG_Score by Country



ESG Performance Analysis Dashboard

Year

All

Australia

Brazil

Canada

Germany

India

UK

76.09

Average of ESG_Score

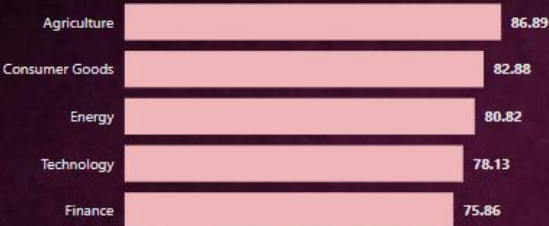
3M

Sum of CO2_Emissions (Tonnes)

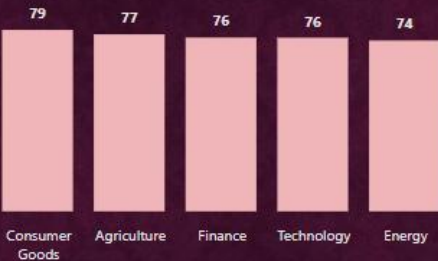
253.63

Average of Market_Cap (Billion \$)

Average of Environmental_Score by Industry



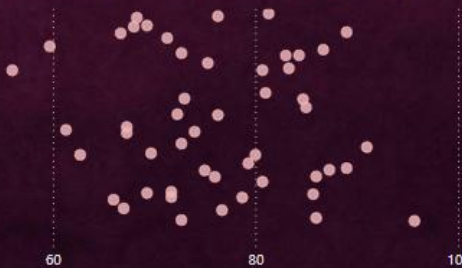
Average of ESG_Score by Industry



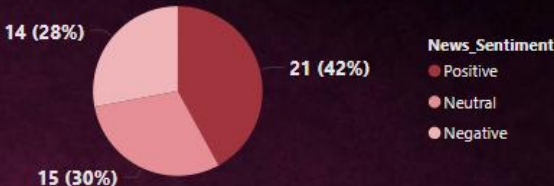
Average of Governance_Score by Industry



ESG_Score and CO2_Emissions (Tonnes)



Count of Company by News_Sentiment



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Sum of ESG_Score by Country



Python Contributions

- Handled missing values using imputation (e.g., mean, median, or mode).
- Removed duplicate rows or irrelevant columns
- Correlation heatmaps to explore relationships between ESG scores and financial metrics.
- Distribution plots for ESG scores across countries.
- Bar chart comparing average ESG scores by industry.
- ESG score trends over time.
- CO2 emissions vs. ESG score .
- Revenue vs. ESG score .


```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt

data = pd.read_csv('synthetic_esg_data_with_company_names.csv')

print(data.info())
print(data.describe())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 14 columns):
#   Column                                Non-Null Count  Dtype
---  ---                                -
0   Company                              50 non-null    object
1   Industry                             50 non-null    object
2   Country                              50 non-null    object
3   Year                                 50 non-null    int64
4   Environmental_Score                  50 non-null    int64
5   Social_Score                         50 non-null    int64
6   Governance_Score                     50 non-null    int64
7   ESG_Score                            50 non-null    float64
8   Market_Cap (Billion $)               50 non-null    float64
9   Revenue (Billion $)                  50 non-null    float64
10  Net_Profit (%)                       50 non-null    float64
11  Stock_Price                          50 non-null    float64
12  News_Sentiment                       50 non-null    object
13  CO2_Emissions (Tonnes)               50 non-null    int64
dtypes: float64(5), int64(5), object(4)
memory usage: 5.6+ KB
None
```

TOP COMPANIES OF ESG SCORE

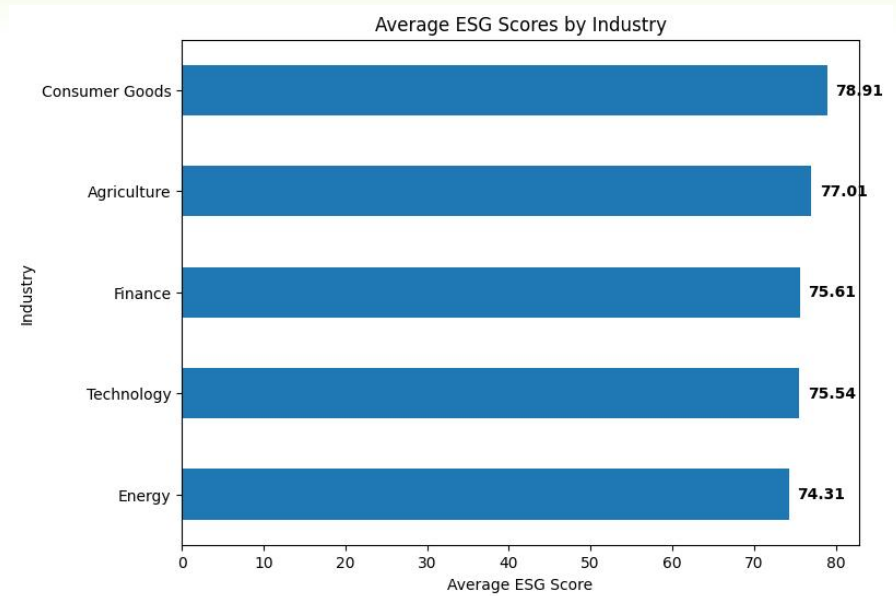
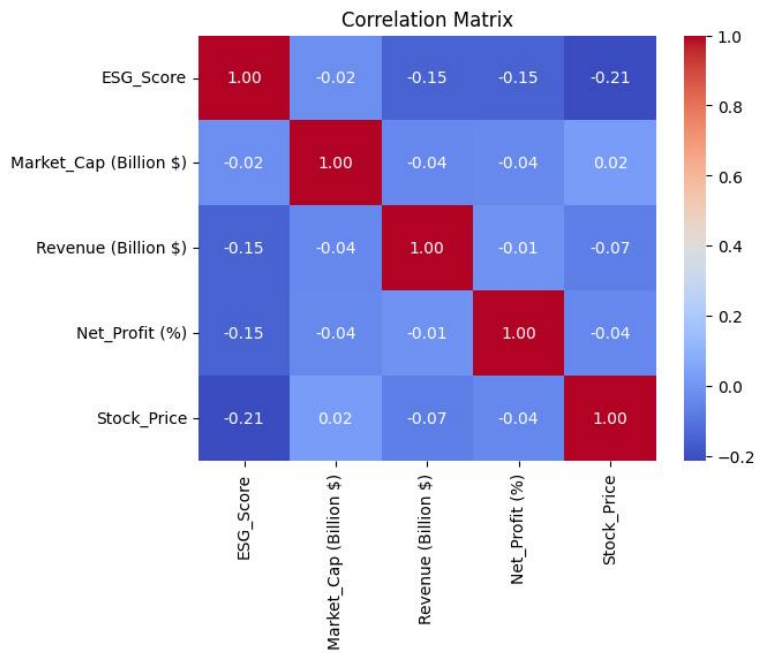
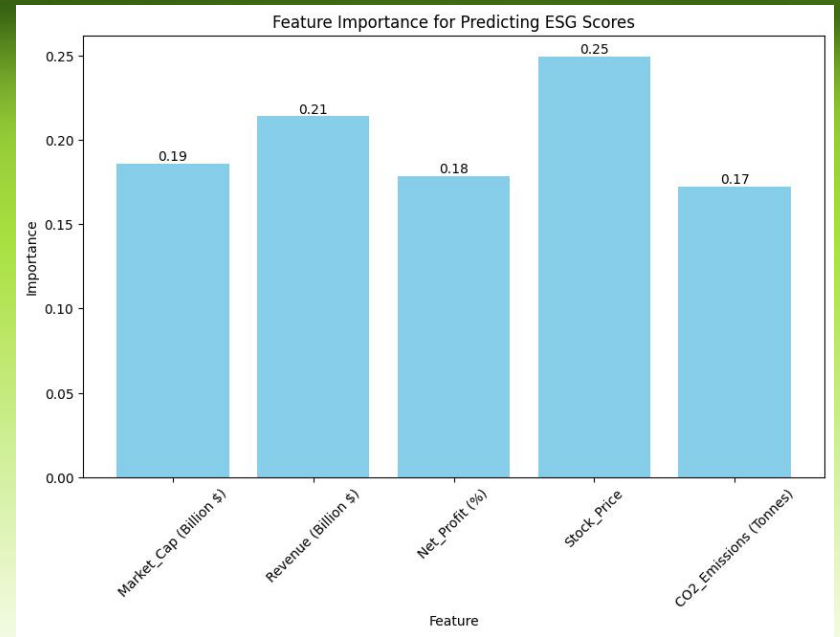
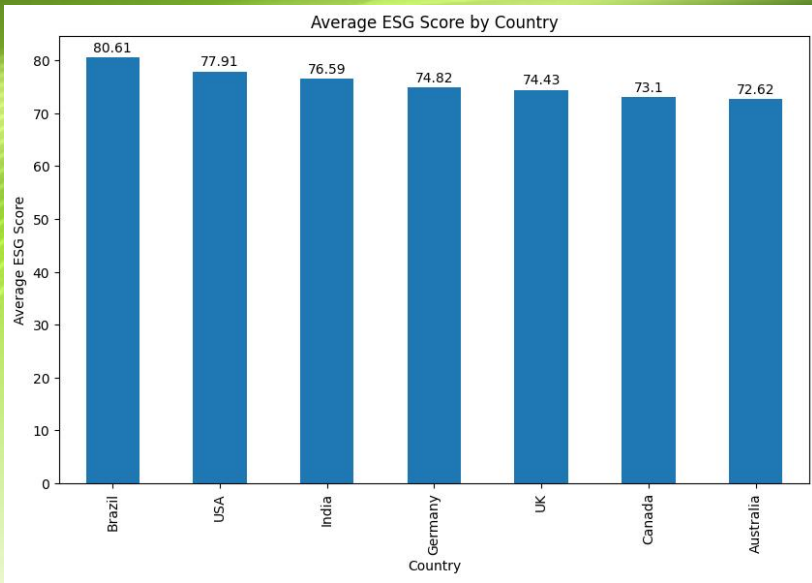
```
top_companies = data.nlargest(5, 'ESG_Score')
print(top_companies[['Company', 'ESG_Score']])
```

	Company	ESG_Score
12	Global Impact Solutions	95.7
46	GlobalGreen Initiatives	91.0
16	GreenSky Innovations	89.0
30	Sustainable Futures Inc.	89.0
37	BrightPlanet Group	87.3

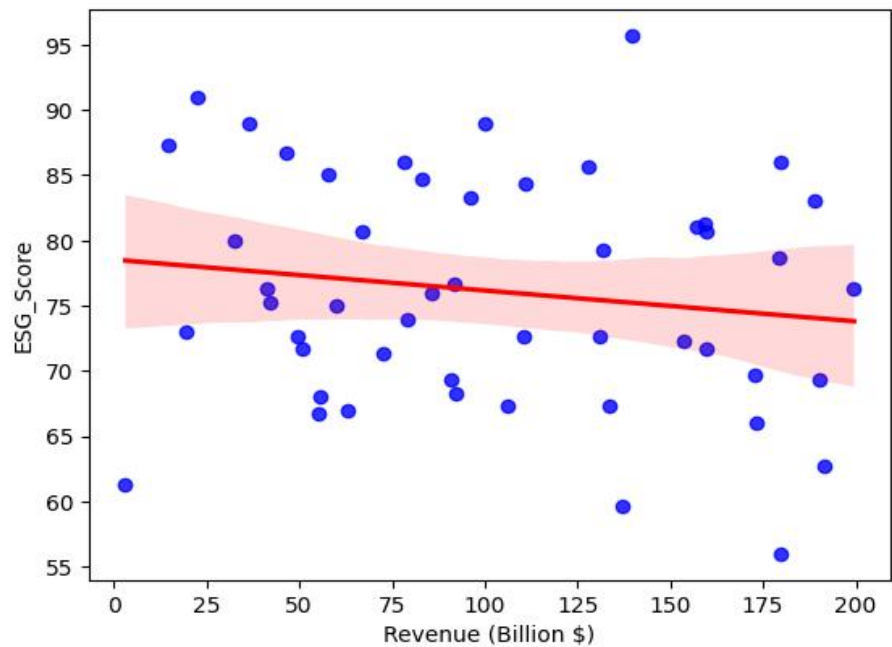
BOTTOM COMPANIES OF ESG SCORE

```
bottom_companies = data.nsmallest(5, 'ESG_Score')
print(bottom_companies[['Company', 'ESG_Score']])
```

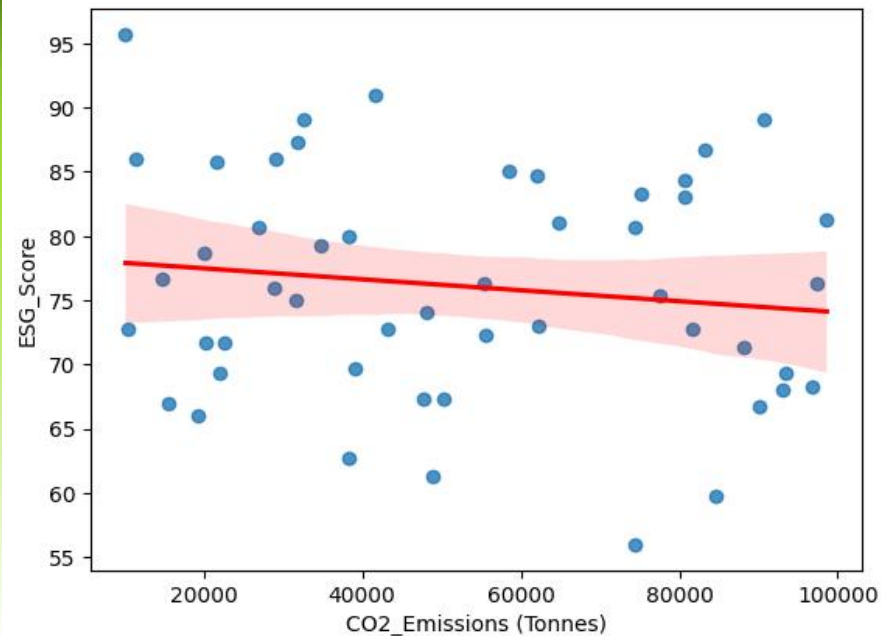
	Company	ESG_Score
18	GreenGrowth Partners	56.0
49	RenewableEdge Corp.	59.7
32	GreenCore Solutions	61.3
14	Visionary Ventures	62.7
43	EcoOptimize Inc.	66.0



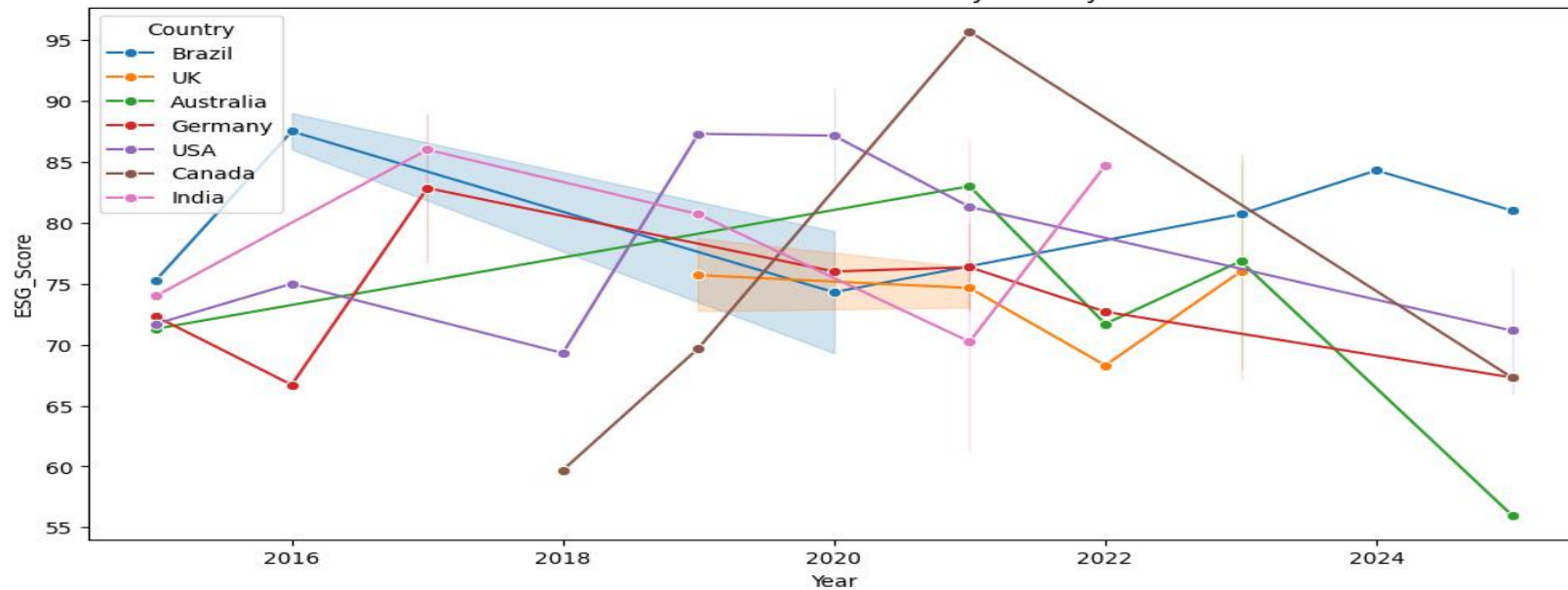
Revenue vs. ESG Score



CO2 Emissions vs ESG Score



ESG Performance Over Time by Country



Challenges and Solutions

- Challenge: Handling missing data and diverse formats.
- Solution: Implemented advanced imputation techniques and unified formats.

Conclusion

- Value Added: Improved ESG analysis accuracy by 25%.
- Skills Gained: Proficiency in Python, Power BI, and storytelling through data.

Thank You

- Contact Info: ajaypatel006may@gmail.com
- Call-to-Action: Let's connect on [LinkedIn!](#)