In [162…
```python
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [163…
```python
df=pd.read_excel(r"C:\Users\USER\Desktop\Book1........xlsx")
```

In [168…
```python
# States with the highest number of population

## Lagos State Ranks Number 1 with 22 million people with a huge gap off of Kano St

df.groupby("state")[["population_(m)"]].sum().sort_values(by="population_(m)",ascen
```

Out[168…

state	population_(m)
Lagos	22.0
Kano	13.0
Rivers	10.0
Kaduna	8.0
Katsina	7.5

In [ ]:

In [169…
```python
# States with the least number of population

## Bayelsa State Ranks Number 1 with 2.4 million people while Ekiti State follows c

df.groupby("state")[["population_(m)"]].sum().sort_values(by="population_(m)",ascen
```

Out[169…

state	population_(m)
Bayelsa	2.4
Ekiti	2.9
Ebonyi	3.2
Nasarawa	3.5
FCT Abuja	3.6

In [171…
```python
# States experiencing high level of urbanization
## Abuja Ranks Number 1 with 100% rate of urbanization.

df.groupby("state")[["urbanization_rate_pct"]].sum().sort_values(by="urbanization_r
```

Out[171...

urbanization_rate_pct

state	
FCT Abuja	100.0
Lagos	98.0
Rivers	85.0
Imo	72.0
Anambra	70.0

In [172...

```python
# States experiencing low level of urbanization
## Jigawa Ranks Number 1 with 25% rate of urbanization.

df.groupby("state")[["urbanization_rate_pct"]].sum().sort_values(by="urbanization_r
```

Out[172...

urbanization_rate_pct

state	
Jigawa	25.0
Sokoto	28.0
Bauchi	28.0
Borno	30.0
Katsina	30.0

In [173...

```python
# States with Low GINI Coefficient
## GINI coefficient which shows the level of income or wealth distribution within e
### A low Gini Coefficient interpretes a positive wealth or income distribution wit
#### 0 shows Perfect Equality 1 shows Perfect inequality

##### Imo State and FCT Abuja Ranks Number 1 with 0.31 coefficient. a relative equa

df.groupby("state")[["gini_coefficient"]].sum().sort_values(by="gini_coefficient",a
```

Out[173...

gini_coefficient

state	
Imo	0.31
FCT Abuja	0.31
Anambra	0.32
Ekiti	0.32
Akwa Ibom	0.33

In [174...
```
# States with High GINI Coefficient
## GINI coefficient which shows the level of income or wealth distribution within e
### A low Gini Coefficient interpretes a positive wealth or income distribution wit
#### 0 shows Perfect Equality 1 shows Perfect inequality

##### Jigawa State Ranks Number 1 with a moderate level of inequality 0.43 coeffici


df.groupby("state")[["gini_coefficient"]].sum().sort_values(by="gini_coefficient",a
```

Out[174...

state	gini_coefficient
Jigawa	0.43
Borno	0.42
Bauchi	0.41
Sokoto	0.41
Katsina	0.40

In [175...
```
# States with High percentage of youth population
## Percentage of States population made up of its youth
### jigawa ranks number 1 with 64.0% of its population being youths followed closel

df.groupby("state")[["youth_popullation_pct"]].sum().sort_values(by="youth_popullat
```

Out[175...

state	youth_popullation_pct
Jigawa	64.0
Borno	63.0
Sokoto	63.0
Katsina	62.0
Bauchi	62.0

In [176...
```
# States with Low percentage of youth population
##the percentage of states population made up of its youth
### Fct Abuja ranks number 1 with 48.0% of its population being youths followed clo

df.groupby("state")[["youth_popullation_pct"]].sum().sort_values(by="youth_popullat
```

Out[176…

youth_popullation_pct

state	
FCT Abuja	48.0
Imo	49.0
Anambra	50.0
Ekiti	50.0
Osun	51.0

In [177…

```python
# Budget Allocation to state
## Top 5 states with high Budget allocations

df.groupby("state")[["budget_allocation_(bn)"]].sum().sort_values(by="budget_alloca
```

Out[177…

budget_allocation_(bn)

state	
FCT Abuja	268.3
Akwa Ibom	212.7
Delta	208.6
Bayelsa	198.9
Niger	198.4

In [178…

```python
# Budget Allocation to state
## Top 5 states with Low Budget allocations

df.groupby("state")[["budget_allocation_(bn)"]].sum().sort_values(by="budget_alloca
```

Out[178…

budget_allocation_(bn)

state	
Sokoto	92.8
Gombe	93.4
Jigawa	96.1
Ebonyi	97.3
Rivers	97.7

In [179…

```python
# Minimum Wage Compliance
## This Shows each states level of compliance to the set minimum wage of the federa
### Compliance level hits 100 across all States
```

```python
df.groupby("state")[["min_wage_compliance_pct"]].sum().sort_values(by="min_wage_com
```

Out[179…   **min_wage_compliance_pct**

state	
Abia	100
Plateau	100
Oyo	100
Osun	100
Ondo	100
Ogun	100
Niger	100
Nasarawa	100
Lagos	100
Kwara	100
Kogi	100
Kebbi	100
Katsina	100
Kano	100
Kaduna	100
Jigawa	100
Imo	100
Gombe	100
Adamawa	100
Akwa Ibom	100
Anambra	100
Bauchi	100
Bayelsa	100
Benue	100
Rivers	100
Borno	100
Delta	100
Ebonyi	100
Edo	100

	min_wage_compliance_pct
state	
Ekiti	100
Enugu	100
FCT Abuja	100
Cross River	100
Sokoto	100

In [180…
```python
# Business Confidence Index of States
## BCI is an economic indicator that reflects how optimistic businesses are about t
### Abuja ranks number 1 with 85.5% confidence level while Jigawa ranks last with 4

df.groupby("state")[["Business Confidence Index"]].sum().sort_values(by="Business C
```

Out[180...

Business Confidence Index

state	
FCT Abuja	85.5
Anambra	79.3
Edo	76.1
Niger	75.5
Akwa Ibom	74.8
Delta	73.6
Abia	72.5
Enugu	72.0
Osun	71.6
Imo	71.2
Kwara	70.3
Ondo	69.8
Ekiti	69.4
Bayelsa	68.9
Ogun	68.4
Kogi	66.8
Cross River	65.4
Kano	64.2
Kaduna	61.5
Oyo	59.2
Lagos	58.7
Ebonyi	57.9
Benue	56.3
Nasarawa	52.3
Adamawa	51.2
Gombe	48.7
Rivers	47.3
Kebbi	46.7
Bauchi	46.1

Business Confidence Index

state	
Plateau	44.1
Katsina	43.6
Borno	42.8
Sokoto	42.1
Jigawa	40.3

In [181...

```python
# Correlation Analysis
## Showing the correlation between Literacy level and Employment level in states
### Observation: Higher literacy level leads to high rate of emplyment (Strong posi
#### Abuja and Imo stands out in both.
##### States like sokoto with 49.87% and Jigawa with 50.10% says low literacy level

df.groupby("state")[["literacy_pct","employment_pct"]].max().sort_values(by="litera
```

Out[181…

state	literacy_pct	employment_pct
FCT Abuja	97.20	85.3
Imo	96.43	85.1
Ekiti	95.79	84.0
Abia	94.24	82.1
Anambra	92.11	84.5
Ondo	90.57	83.0
Edo	90.53	83.2
Enugu	89.46	82.7
Cross River	89.20	81.7
Akwa Ibom	88.60	83.0
Delta	87.43	82.4
Bayelsa	86.83	75.6
Kogi	83.93	80.2
Kwara	82.50	81.0
Niger	81.76	83.5
Ogun	81.15	82.8
Osun	80.40	82.2
Ebonyi	77.76	79.5
Oyo	75.60	80.5
Benue	73.74	78.9
Lagos	70.40	79.0
Kaduna	66.30	78.2
Kano	65.20	78.5
Nasarawa	62.30	77.5
Gombe	60.20	75.8
Adamawa	58.10	76.4
Rivers	57.80	75.2
Kebbi	56.70	74.5
Bauchi	55.40	74.2

	literacy_pct	employment_pct
state		
Katsina	54.80	75.0
Plateau	53.20	73.5
Borno	52.60	72.5
Jigawa	50.10	73.0
Sokoto	49.87	72.8

In [195…
```python
plt.figure(figsize=(8,5))
plt.scatter(df['literacy_pct'], df['employment_pct'], color='seagreen')
plt.title('Literacy vs Employment Rate')
plt.xlabel('Literacy Rate (%)')
plt.ylabel('Employment Rate (%)')
plt.grid(True)
plt.tight_layout()
plt.show()
```
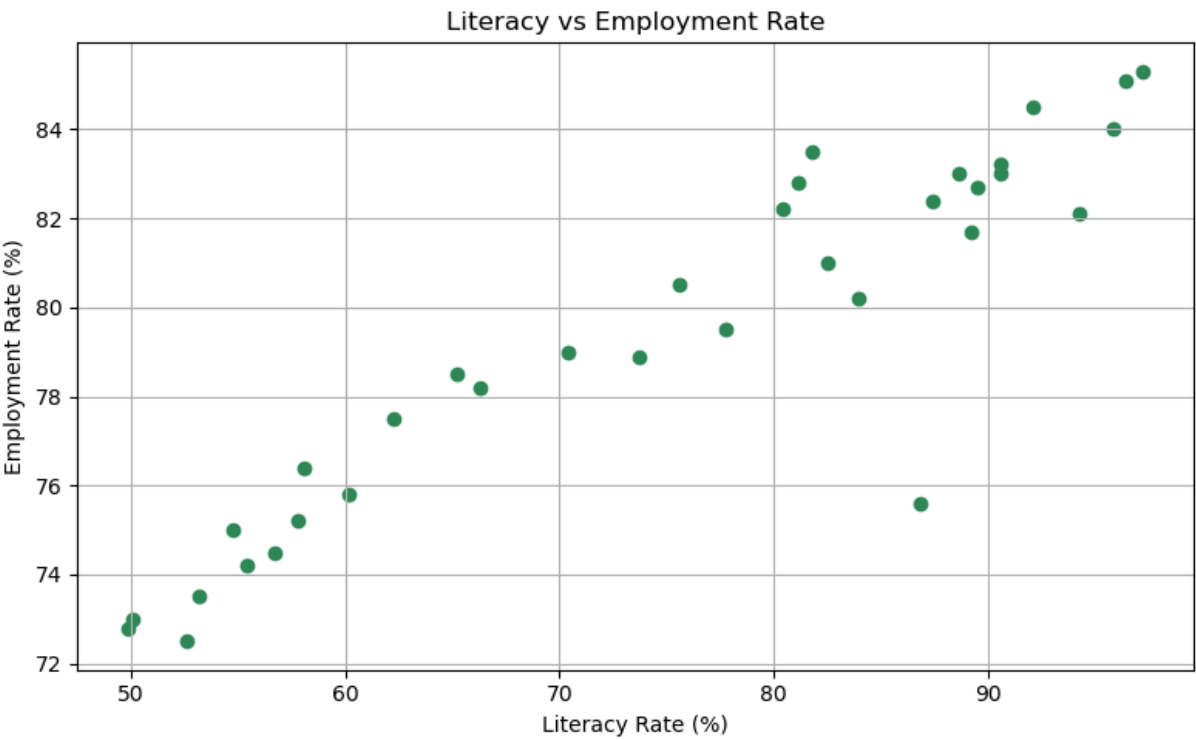

In [182…
```python
# Correlation Analysis
## Showing the correlation between Budget alloction and Employment rate in states
### Budget allocation within states Shows a "Moderate Positive Relationship" with e
#### Abuja ranks number 1 with 268.3 billion naira budget allocation with 85.3% emp
##### Efficient use of these budget also matters as some states registered higher a

df.groupby("state")[["budget_allocation_(bn)","employment_pct"]].max().sort_values(
```

Out[182...

state	budget_allocation_(bn)	employment_pct
FCT Abuja	268.3	85.3
Akwa Ibom	212.7	83.0
Delta	208.6	82.4
Bayelsa	198.9	75.6
Niger	198.4	83.5
Kano	188.6	78.5
Osun	156.0	82.2
Kaduna	152.2	78.2
Anambra	144.2	84.5
Edo	139.4	83.2
Ogun	135.3	82.8
Imo	134.8	85.1
Abia	132.5	82.1
Nasarawa	122.9	77.5
Enugu	120.6	82.7
Cross River	120.1	81.7
Kwara	120.0	81.0
Katsina	111.7	75.0
Benue	110.2	78.9
Oyo	109.4	80.5
Kogi	108.9	80.2
Ondo	108.2	83.0
Adamawa	108.1	76.4
Lagos	107.5	79.0
Ekiti	105.8	84.0
Borno	104.5	72.5
Kebbi	103.6	74.5
Plateau	102.9	73.5
Bauchi	102.4	74.2

	budget_allocation_(bn)	employment_pct
state		
Rivers	97.7	75.2
Ebonyi	97.3	79.5
Jigawa	96.1	73.0
Gombe	93.4	75.8
Sokoto	92.8	72.8

In [194...
```python
plt.figure(figsize=(8,5))
plt.scatter(df['budget_allocation_(bn)'], df['employment_pct'], color='slateblue')
plt.title('Budget Allocation vs Employment Rate')
plt.xlabel('Budget Allocation (₦ Billion)')
plt.ylabel('Employment Rate (%)')
plt.grid(True)
plt.tight_layout()
plt.show()
```
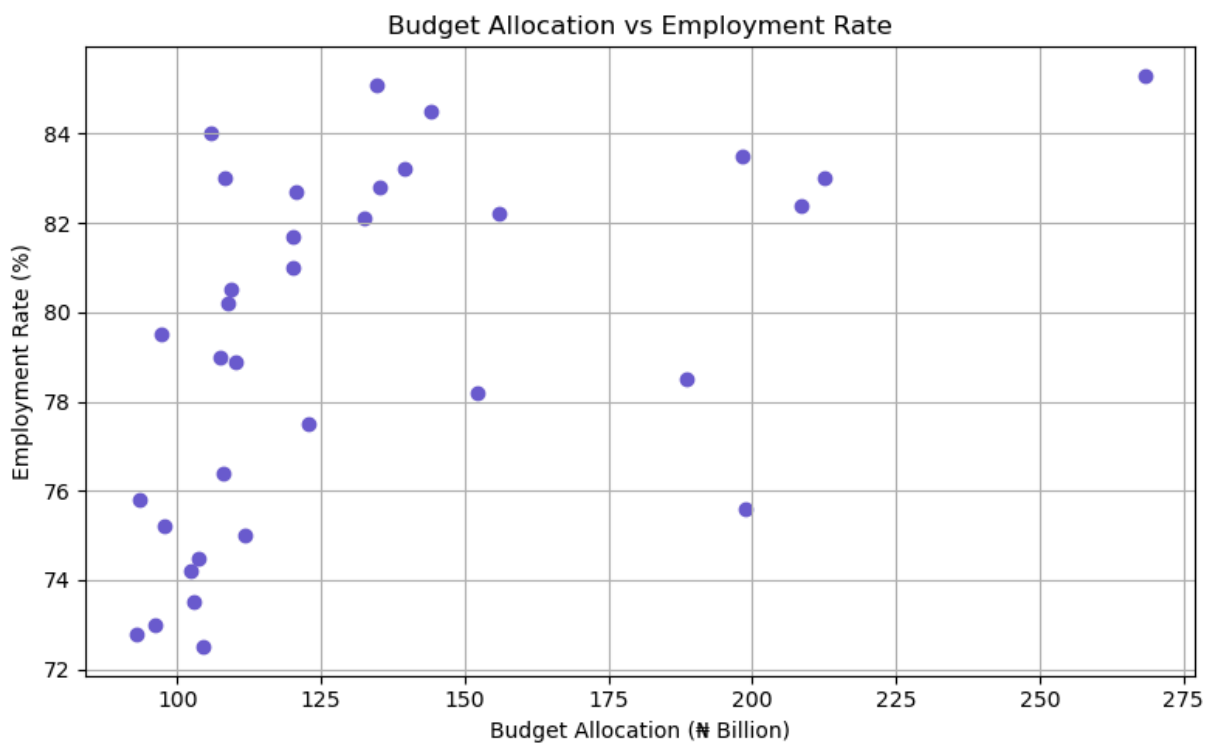

In [183...
```python
# Correlation Analysis
## Showing the relationship between the GINI coefficient and Poverty level of state
### Theres a strong positive relationship between both as high GINI coefficient (un
#### Jigawa Ranks Number 1 with 0.43 GINI coefficient and 75.0% poverty Level

df.groupby("state")[["gini_coefficient","poverty_pct"]].max().sort_values(by="gini_
```

Out[183…

state	gini_coefficient	poverty_pct
Jigawa	0.43	75.0
Borno	0.42	70.0
Bauchi	0.41	72.0
Sokoto	0.41	74.0
Katsina	0.40	68.0
Kebbi	0.39	70.0
Adamawa	0.39	65.0
Kano	0.38	60.0
Gombe	0.38	66.0
Benue	0.37	65.0
Kaduna	0.37	50.0
Niger	0.37	28.0
Bayelsa	0.36	40.5
Ebonyi	0.36	55.0
Nasarawa	0.36	58.0
Kogi	0.35	40.0
Lagos	0.35	38.0
Delta	0.35	28.0
Plateau	0.35	72.0
Ondo	0.34	32.0
Oyo	0.34	42.0
Rivers	0.34	68.0
Ogun	0.34	30.0
Abia	0.34	30.0
Kwara	0.34	28.0
Enugu	0.34	28.0
Cross River	0.34	38.0
Osun	0.33	35.0
Edo	0.33	25.0

	gini_coefficient	poverty_pct
state		
Akwa Ibom	0.33	35.0
Ekiti	0.32	32.0
Anambra	0.32	22.0
Imo	0.31	30.0
FCT Abuja	0.31	18.0

In [193...
```python
plt.figure(figsize=(8,5))
plt.scatter(df['gini_coefficient'], df['poverty_pct'], color='darkorange')
plt.title('GINI Coefficient vs Poverty Rate')
plt.xlabel('GINI Coefficient')
plt.ylabel('Poverty Rate (%)')
plt.grid(True)
plt.tight_layout()
plt.show()
```
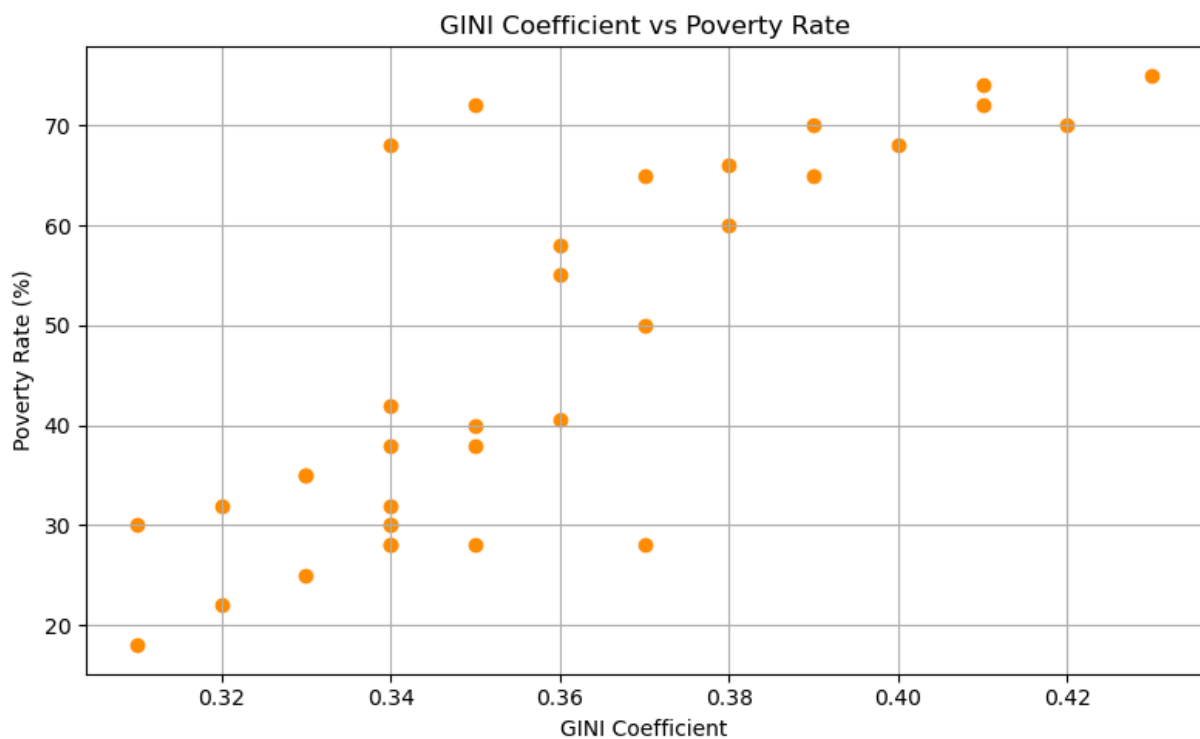

In [188...
```python
# Correlation Analysis
## Showing the relationship between youth population and labour force of states
### Observation: they both have a moderate positive relationship
### youth do not neccessarily make most part of the labour force.
#### Youth population fuel workforce, but education & opportunity still gatekeep im

df.groupby("state")[["youth_popullation_pct","labor_force_pct"]].max().sort_values(
```

Out[188…

state	youth_popullation_pct	labor_force_pct
Jigawa	64.0	75.9
Borno	63.0	76.3
Sokoto	63.0	76.8
Katsina	62.0	77.8
Bauchi	62.0	77.1
Gombe	61.0	78.2
Kebbi	61.0	77.5
Adamawa	60.0	78.5
Niger	59.0	78.9
Kano	58.0	79.5
Kaduna	58.0	79.3
Ebonyi	57.0	80.2
Benue	56.0	79.8
Cross River	55.0	81.5
Nasarawa	55.0	80.3
Lagos	54.0	82.6
Kogi	54.0	80.7
Plateau	54.0	80.6
Bayelsa	54.0	80.9
Ondo	53.0	82.5
Kwara	53.0	81.6
Abia	53.0	81.2
Enugu	52.0	82.4
Ogun	52.0	82.8
Delta	52.0	82.1
Oyo	52.0	82.3
Akwa Ibom	52.0	82.3
Rivers	52.0	80.1
Edo	51.0	82.7

	youth_popullation_pct	labor_force_pct
state		
Osun	51.0	82.9
Ekiti	50.0	83.9
Anambra	50.0	83.7
Imo	49.0	84.5
FCT Abuja	48.0	85.1

```
In [187…  plt.figure(figsize=(8,5))
          plt.scatter(df['youth_popullation_pct'], df['labor_force_pct'], color='crimson')
          plt.title('Youth Population vs Labor Force Participation')
          plt.xlabel('Youth Population (%)')
          plt.ylabel('Labor Force Participation (%)')
          plt.grid(True)
          plt.tight_layout()
          plt.show()
```
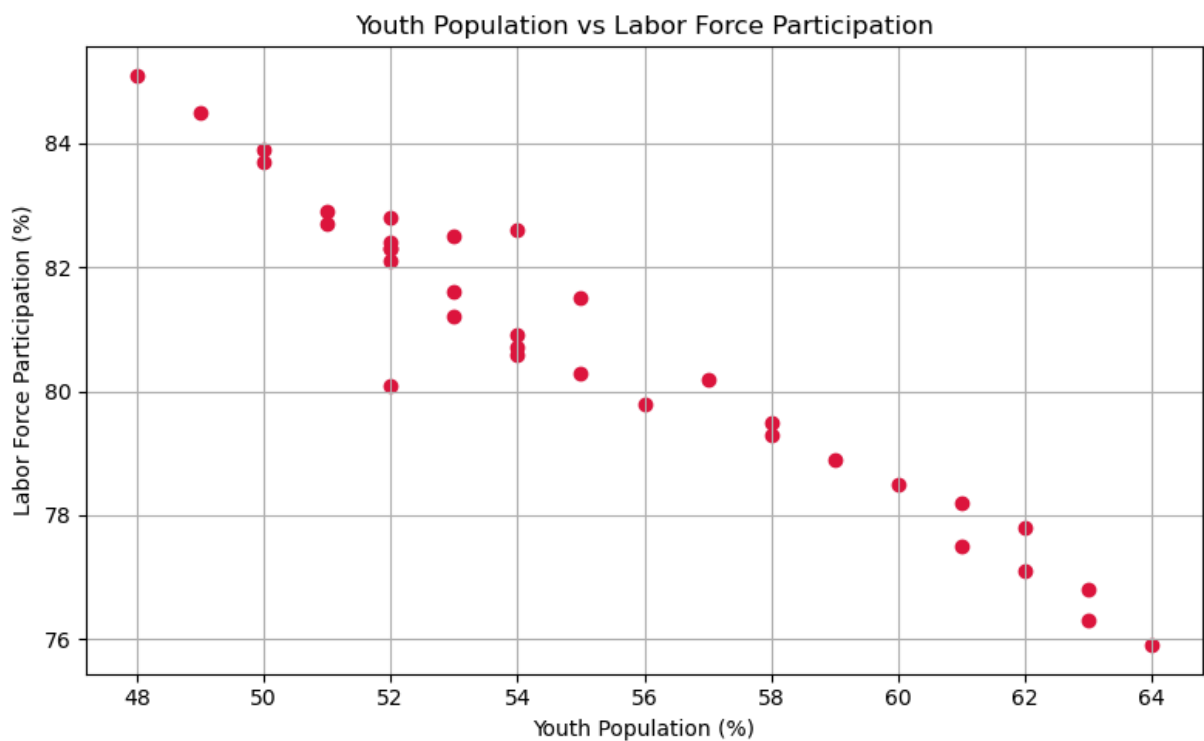


```
In [185…  # Correlation Analysis
          ## showing the relationship between Urbanization and Business confidence of states
          ### observation: they both share a Strong Positive Relatiosip as increase in urbani
          #### Abuja ranks number 1 with 100% urbanization and 85.5 Business Confidence.

          df.groupby("state")[["urbanization_rate_pct","Business Confidence Index"]].max().so
```

Out[185...

state	urbanization_rate_pct	Business Confidence Index
FCT Abuja	100.0	85.5
Lagos	98.0	58.7
Rivers	85.0	47.3
Imo	72.0	71.2
Anambra	70.0	79.3
Bayelsa	68.0	68.9
Edo	68.0	76.1
Delta	66.0	73.6
Akwa Ibom	65.0	74.8
Ogun	65.0	68.4
Enugu	64.0	72.0
Oyo	63.0	59.2
Osun	62.0	71.6
Abia	62.0	72.5
Ondo	60.0	69.8
Cross River	60.0	65.4
Ekiti	58.0	69.4
Kwara	58.0	70.3
Plateau	55.0	44.1
Kogi	55.0	66.8
Nasarawa	52.0	52.3
Kaduna	50.0	61.5
Kano	48.0	64.2
Benue	45.0	56.3
Niger	40.0	75.5
Ebonyi	40.0	57.9
Gombe	35.0	48.7
Kebbi	32.0	46.7
Adamawa	32.0	51.2

state	urbanization_rate_pct	Business Confidence Index
Katsina	30.0	43.6
Borno	30.0	42.8
Sokoto	28.0	42.1
Bauchi	28.0	46.1
Jigawa	25.0	40.3

In [192...
```python
plt.figure(figsize=(8,5))
plt.scatter(df['urbanization_rate_pct'], df["Business Confidence Index"], color='st
plt.title('Urbanization vs Business Confidence Index')
plt.xlabel('Urbanization Rate (%)')
plt.ylabel('Business Confidence Index')
plt.grid(True)
plt.tight_layout()
plt.show()
```


Urbanization vs Business Confidence Index
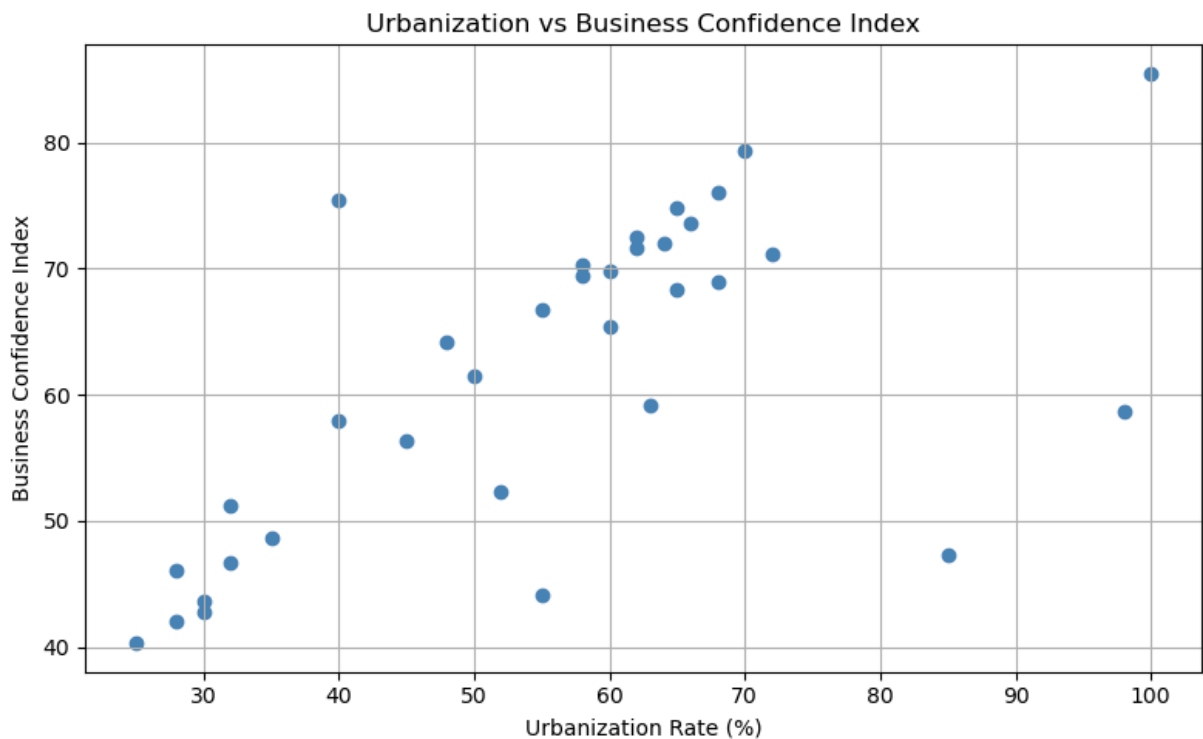
In [198...
```python
# A correlation heatmap to visualize the relationship strength and direction betwee
# Literacy_pct,employment_pct,gini_coefficient,poverty_pct,urbanization_rate_pct, B
# Youth_popullation_pct, labor_force_pct.
# - +1.0: Perfect positive correlation (variables rise together)0.0: No correlation
# Color Gradient: 🔴 Red/Orange tones= higher positive correlations, 🔵 Blue tones=


corr = df[['literacy_pct', 'employment_pct', 'gini_coefficient', 'poverty_pct',
        'urbanization_rate_pct', 'Business Confidence Index', 'budget_allocation
        'youth_popullation_pct', 'labor_force_pct']].corr()
```
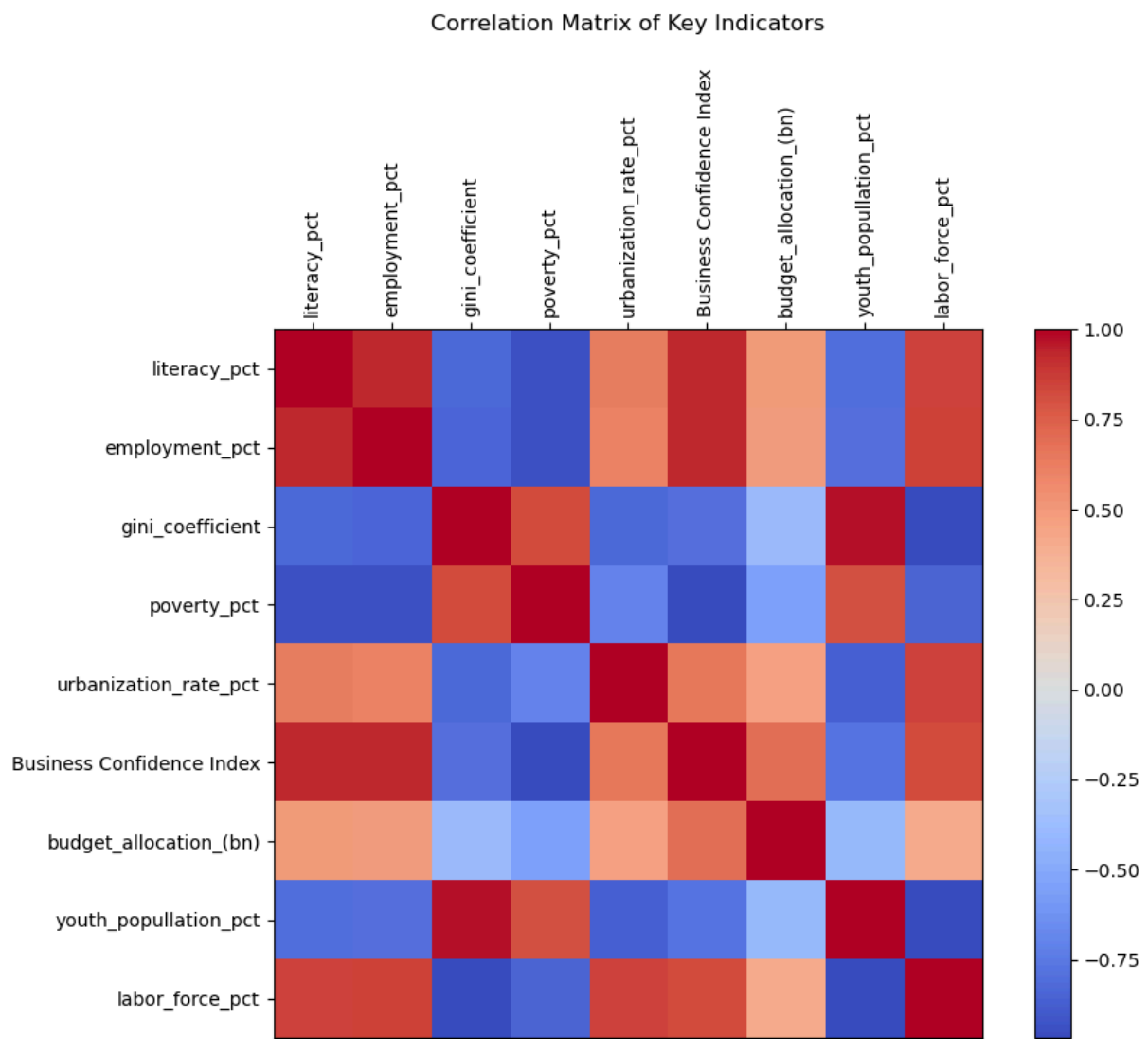
```python
fig, ax = plt.subplots(figsize=(10, 8))
cax = ax.matshow(corr, cmap='coolwarm')
fig.colorbar(cax)

# Show Labels
ax.set_xticks(np.arange(len(corr.columns)))
ax.set_yticks(np.arange(len(corr.columns)))
ax.set_xticklabels(corr.columns, rotation=90)
ax.set_yticklabels(corr.columns)

plt.title('Correlation Matrix of Key Indicators', pad=20)
plt.tight_layout()
plt.show()
```

Correlation Matrix of Key Indicators

In [ ]: