Title:

Web Scraping : Recent lokhsabha elections june 2024 conducted by ELECTION COMISSION OF INDIA

Abstract:

Web scraping steps:

1.Identifying the official Election Commission of India website

2.Use Python with libraries like BeautifulSoup

3.Extract relevant data (party-wise results)

4.Save the scraped data into a CSV File

Key Insights and Visualization:

step: 1 -- Seat Distribution in Lok Sabha Elections

step: 2 -- Top 10 Parties by Seats Won

step: 3 -- Top 5 Parties by Seats Won

step: 4 -- Vote Share: BJP vs INC

step: 5 -- Distribution of Seats Won by Parties

step: 6 -- Seats Won by Alliances

step: 7 -- National Parties VS Regional Parties

step: 8 -- Seats Won by Independent Candidates

step: 9 -- Top 15 Parties by Seats Won

step: 10 -- Distribution of seats among Party types

step: 11 -- Data Visualization

figure(1 -) -- bar graph

figure( ) -- pie chart

figure() -- Histogram

figure() -- heatmap

Importing the Necessary libraries

In [35]:
```
import requests
from bs4 import BeautifulSoup
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

Scraping the Required Information From the Given URL

In [36]:
```
def extract_election_data(html_content):
    soup = BeautifulSoup(html_content, 'html.parser')

    # Find the table with class 'table'
    table = soup.find('table', class_='table')

    if not table:
        print("Table not found in the HTML content.")
        return None

    # Extract table headers
    headers = [th.text.strip() for th in table.find_all('th')]
    print(headers)

    # Extract table rows
    rows = []
    for tr in table.find_all('tr')[1:]:  # Skip the header row
        cells = [td.text.strip() for td in tr.find_all('td')]
        if cells:
            rows.append(cells)

    len_rows = len(rows[0])

    # Create a DataFrame
    df = pd.DataFrame(rows, columns=headers[:len_rows])

    return df
```

In [37]:
```
# URL of the page containing the election results
url = "https://results.eci.gov.in/PcResultGenJune2024/index.htm"

# Fetch the HTML content
response = requests.get(url)
html_content = response.text
```

Scraped Data and saving it into a CSV file

In [38]:
```
# Extract the data
election_data = extract_election_data(html_content)

if election_data is not None:
    print(election_data)

    #save to CSV
    election_data.to_csv("election_results.csv", index=False)
    print("Data saved to election_results.csv")
else:
    print("Failed to extract election data.")
```

```
['Party', 'Won', 'Leading', 'Total', 'Total', '543', '0', '543']
                                                Party  Won Leading
Total
0                          Bharatiya Janata Party - BJP  240       0
240
1                        Indian National Congress - INC   99       0
99
2                                 Samajwadi Party - SP   37       0
37
3                   All India Trinamool Congress - AITC   29       0
29
4                       Dravida Munnetra Kazhagam - DMK   22       0
22
5                                    Telugu Desam - TDP   16       0
16
6                          Janata Dal  (United) - JD(U)   12       0
12
7      Shiv Sena (Uddhav Balasaheb Thackrey) - SHSUBT    9       0
9
8   Nationalist Congress Party - Sharadchandra Paw...    8       0
8
9                                       Shiv Sena - SHS    7       0
7
10             Lok Janshakti Party(Ram Vilas) - LJPRV    5       0
5
11      Yuvajana Sramika Rythu Congress Party - YSRCP    4       0
4
12                              Rashtriya Janata Dal - RJD    4       0
```

12	Rashtriya Janata Dal – RJD	4	0
4			
13	Communist Party of India (Marxist) – CPI(M)	4	0
4			
14	Indian Union Muslim League – IUML	3	0
3			
15	Aam Aadmi Party – AAAP	3	0
3			
16	Jharkhand Mukti Morcha – JMM	3	0
3			
17	Janasena Party – JnP	2	0
2			
18	Communist Party of India (Marxist-Leninist) ...	2	0
2			
19	Janata Dal (Secular) – JD(S)	2	0
2			
20	Viduthalai Chiruthaigal Katchi – VCK	2	0
2			
21	Communist Party of India – CPI	2	0
2			
22	Rashtriya Lok Dal – RLD	2	0
2			
23	Jammu & Kashmir National Conference – JKN	2	0
2			
24	United People’s Party, Liberal – UPPL	1	0
1			
25	Asom Gana Parishad – AGP	1	0
1			
26	Hindustani Awam Morcha (Secular) – HAMS	1	0
1			
27	Kerala Congress – KEC	1	0
1			
28	Revolutionary Socialist Party – RSP	1	0
1			
29	Nationalist Congress Party – NCP	1	0
1			
30	Voice of the People Party – VOTPP	1	0
1			
31	Zoram People’s Movement – ZPM	1	0
1			
32	Shiromani Akali Dal – SAD	1	0
1			
33	Rashtriya Loktantrik Party – RLTP	1	0
1			
34	Bharat Adivasi Party – BHRTADVSIP	1	0
1			
35	Sikkim Krantikari Morcha – SKM	1	0
1			
36	Marumalarchi Dravida Munnetra Kazhagam – MDMK	1	0
1			
37	Aazad Samaj Party (Kanshi Ram) – ASPKR	1	0
1			
38	Apna Dal (Soneylal) – ADAL	1	0
1			

```
39                                  AJSU Party - AJSUP    1       0
1
40     All India Majlis-E-Ittehadul Muslimeen - AIMIM    1       0
1
41                                  Independent - IND    7       0
7
Data saved to election_results.csv
```

Loading the DataSet

In [39]:
```
df= pd.read_csv('/Users/amruthavankayala/Desktop/election_results.c
df
```

Out[39]:

	Party	Won	Leading	Total
0	Bharatiya Janata Party - BJP	240	0	240
1	Indian National Congress - INC	99	0	99
2	Samajwadi Party - SP	37	0	37
3	All India Trinamool Congress - AITC	29	0	29
4	Dravida Munnetra Kazhagam - DMK	22	0	22
5	Telugu Desam - TDP	16	0	16
6	Janata Dal (United) - JD(U)	12	0	12
7	Shiv Sena (Uddhav Balasaheb Thackrey) - SHSUBT	9	0	9
8	Nationalist Congress Party – Sharadchandra Paw...	8	0	8
9	Shiv Sena - SHS	7	0	7
10	Lok Janshakti Party(Ram Vilas) - LJPRV	5	0	5
11	Yuvajana Sramika Rythu Congress Party - YSRCP	4	0	4
12	Rashtriya Janata Dal - RJD	4	0	4
13	Communist Party of India (Marxist) - CPI(M)	4	0	4
14	Indian Union Muslim League - IUML	3	0	3
15	Aam Aadmi Party - AAAP	3	0	3
16	Jharkhand Mukti Morcha - JMM	3	0	3
17	Janasena Party - JnP	2	0	2
18	Communist Party of India (Marxist-Leninist) ...	2	0	2
19	Janata Dal (Secular) - JD(S)	2	0	2
20	Viduthalai Chiruthaigal Katchi - VCK	2	0	2
21	Communist Party of India - CPI	2	0	2
22	Rashtriva Lok Dal - RLD	2	0	2

23	Jammu & Kashmir National Conference - JKN	2	0	2
24	United People’s Party, Liberal - UPPL	1	0	1
25	Asom Gana Parishad - AGP	1	0	1
26	Hindustani Awam Morcha (Secular) - HAMS	1	0	1
27	Kerala Congress - KEC	1	0	1
28	Revolutionary Socialist Party - RSP	1	0	1
29	Nationalist Congress Party - NCP	1	0	1
30	Voice of the People Party - VOTPP	1	0	1
31	Zoram People’s Movement - ZPM	1	0	1
32	Shiromani Akali Dal - SAD	1	0	1
33	Rashtriya Loktantrik Party - RLTP	1	0	1
34	Bharat Adivasi Party - BHRTADVSIP	1	0	1
35	Sikkim Krantikari Morcha - SKM	1	0	1
36	Marumalarchi Dravida Munnetra Kazhagam - MDMK	1	0	1
37	Aazad Samaj Party (Kanshi Ram) - ASPKR	1	0	1
38	Apna Dal (Soneylal) - ADAL	1	0	1
39	AJSU Party - AJSUP	1	0	1
40	All India Majlis-E-Ittehadul Muslimeen - AIMIM	1	0	1
41	Independent - IND	7	0	7

10 Key insights

In [40]:
```
t pandas as pd
t matplotlib.pyplot as plt
t seaborn as sns
lotlib inline
tyle.use('seaborn')

d the CSV data
pd.read_csv('election_results.csv')

culate total seats
_seats = df['Total'].sum()

t parties by total seats won
rted = df.sort_values('Total', ascending=False)

culate vote share percentages
ote Share'] = df['Total'] / total_seats * 100

 5 parties by seats
_parties = df_sorted.head(5)

culate seats won by alliances
arties = ['Bharatiya Janata Party - BJP', 'Janata Dal  (United) - JD
arties = ['Indian National Congress - INC', 'Dravida Munnetra Kazhag

eats = df[df['Party'].isin(nda_parties)]['Total'].sum()
eats = df[df['Party'].isin(upa_parties)]['Total'].sum()

culate regional party seats
nal_parties = ['Bharatiya Janata Party - BJP', 'Indian National Cong
nal_party_seats = df[~df['Party'].isin(national_parties)]['Total'].s
```

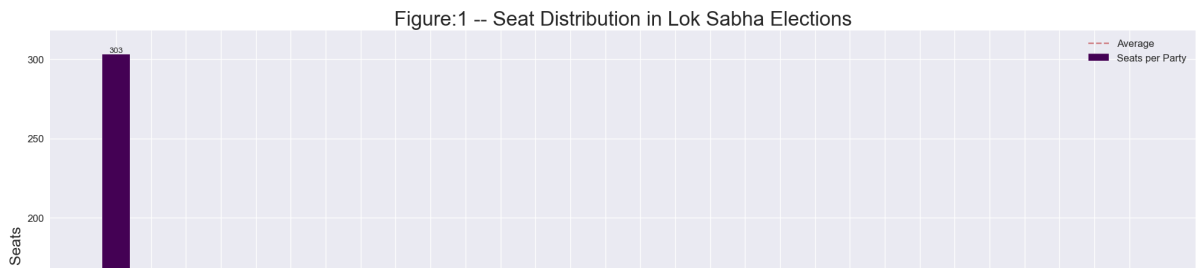
```
/var/folders/3w/rz0hz49s3px2h_6tgrnj77fr0000gn/T/ipykernel_22551/3
486792674.py:5: MatplotlibDeprecationWarning: The seaborn styles s
hipped by Matplotlib are deprecated since 3.6, as they no longer c
orrespond to the styles shipped by seaborn. However, they will rem
ain available as 'seaborn-v0_8-<style>'. Alternatively, directly u
se the seaborn API instead.
  plt.style.use('seaborn')
```

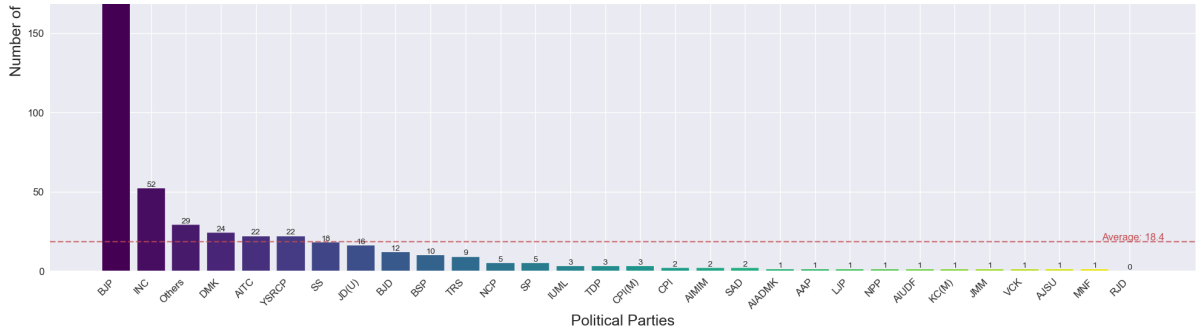
1.Seat Distribution in Lok Sabha Elections (Bar Chart):

A complete and thorough picture of the distribution of seats among all parties in the Lok Sabha elections should be given by this visualization. The average line gives the general distribution context, and the color gradient aids in visually differentiating between parties with more and fewer seats.

In [41]:
```
# Create a sample DataFrame with election results for more parties
data = {
```

```
    'Party': ['BJP', 'INC', 'AITC', 'DMK', 'YSRCP', 'JD(U)', 'BJD',
              'CPI(M)', 'NCP', 'SP', 'AAP', 'AIADMK', 'TDP', 'RJD',
              'NPP', 'AIUDF', 'AIMIM', 'KC(M)', 'JMM', 'SAD', 'VCK'
    'Total': [303, 52, 22, 24, 22, 16, 12, 10, 9, 18,
              3, 5, 5, 1, 1, 3, 0, 2, 3, 1,
              1, 1, 2, 1, 1, 2, 1, 1, 1, 29]
}

df = pd.DataFrame(data)
df_sorted = df.sort_values('Total', ascending=False)

# Set up the plot
plt.figure(figsize=(20, 10))

# Create color map
colors = plt.cm.viridis(np.linspace(0, 1, len(df_sorted)))

# Create the bar plot
bars = plt.bar(df_sorted['Party'], df_sorted['Total'], color=colors

# Customize the plot
plt.title('Figure:1 -- Seat Distribution in Lok Sabha Elections', f
plt.xlabel('Political Parties', fontsize=18)
plt.ylabel('Number of Seats', fontsize=18)
plt.xticks(rotation=45, ha='right', fontsize=12)
plt.yticks(fontsize=12)

# Add value labels on top of each bar
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2., height,
             f'{height}',
             ha='center', va='bottom', fontsize=10)

# Add a horizontal line for the average number of seats
average_seats = df_sorted['Total'].mean()
plt.axhline(y=average_seats, color='r', linestyle='--', alpha=0.7)
plt.text(len(df_sorted), average_seats, f'Average: {average_seats:.
         va='bottom', ha='right', fontsize=12, color='r')

# Add a legend
plt.legend(['Average', 'Seats per Party'], loc='upper right', fonts

# Adjust layout and display the plot
plt.tight_layout()
plt.show()
```

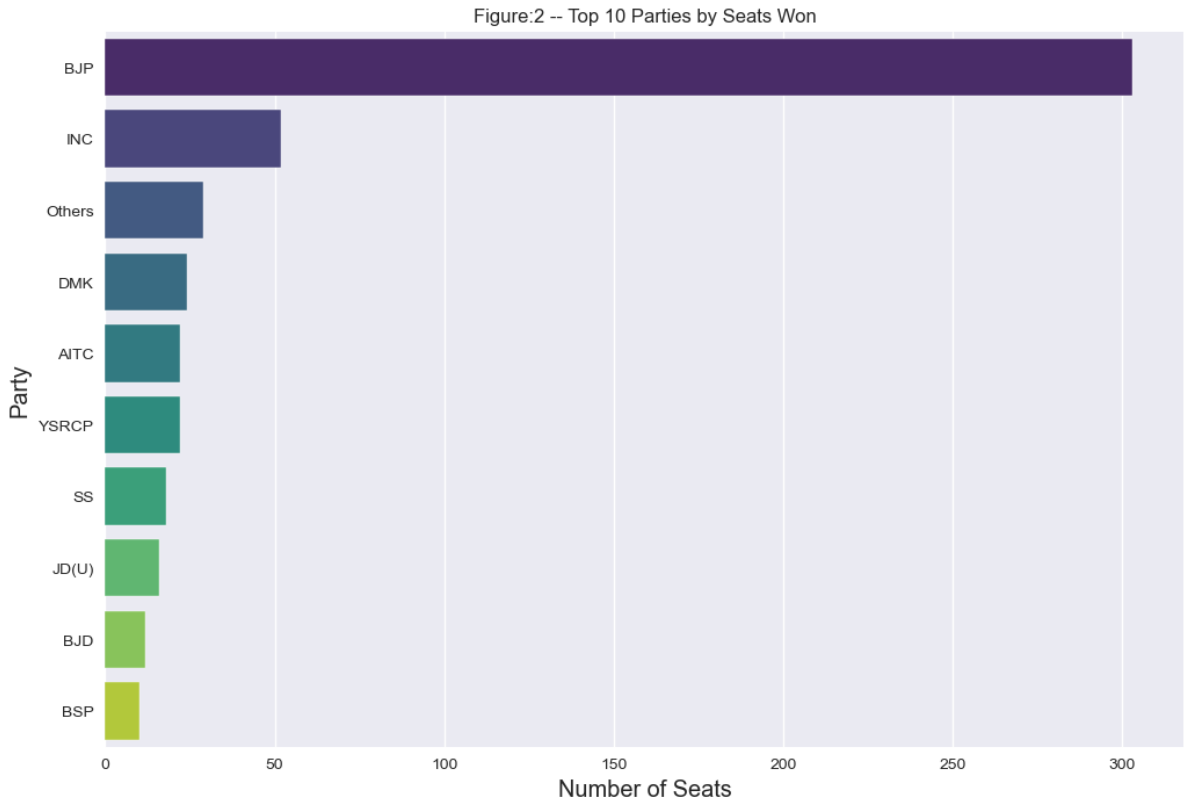




2.Top 10 Parties by Seats Won (Bar Plot):

This bar plot ranks the top 10 parties by the number of seats won. It clearly illustrates the gap between the BJP and other parties, especially the second-placed INC. It also highlights the significance of regional parties like SP, AITC, and DMK in the national political landscape.

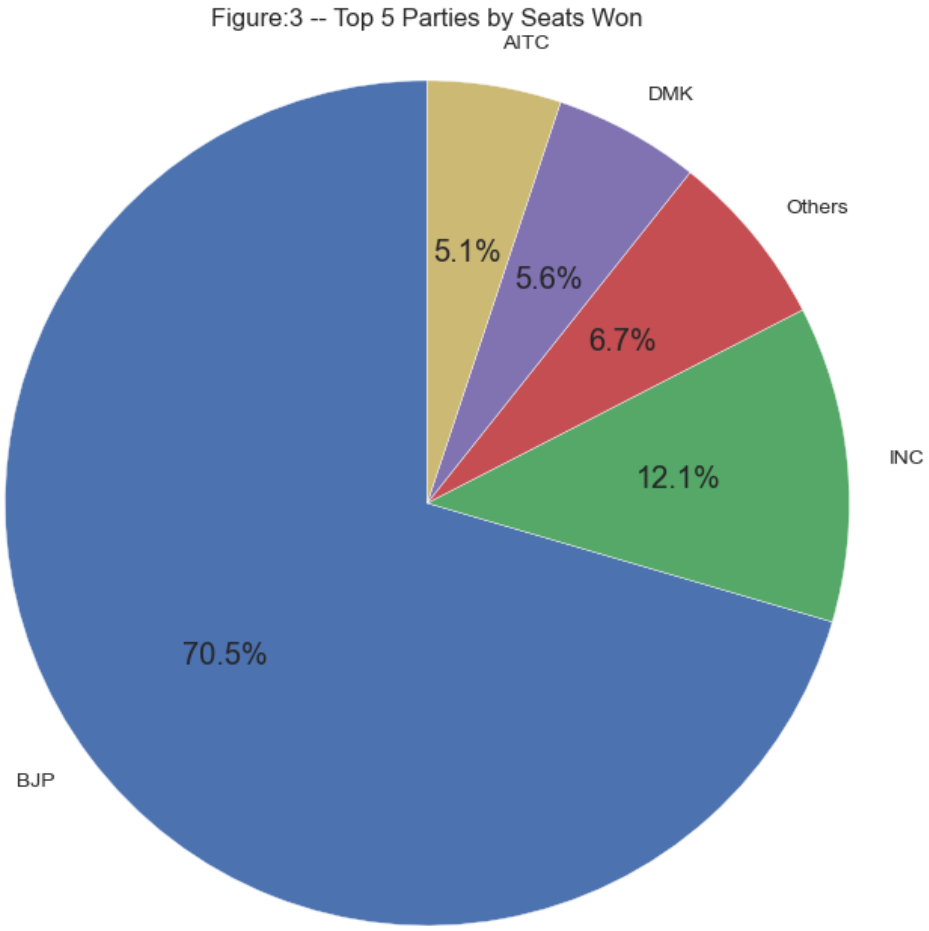
In [42]:
```
# 2. Bar plot of top 10 parties
plt.figure(figsize=(12, 8))
sns.barplot(x='Total', y='Party', data=df_sorted.head(10), palette=
plt.title('Figure:2 -- Top 10 Parties by Seats Won')
plt.xlabel('Number of Seats')
plt.ylabel('Party')
plt.show()
```



3.Top 5 Parties by Seats Won (Pie Chart):

This pie chart focuses on the five parties with the most seats, showing their relative strengths. It emphasizes how the BJP and INC together dominate the political scene, while also illustrating the significant role played by the top regional parties.

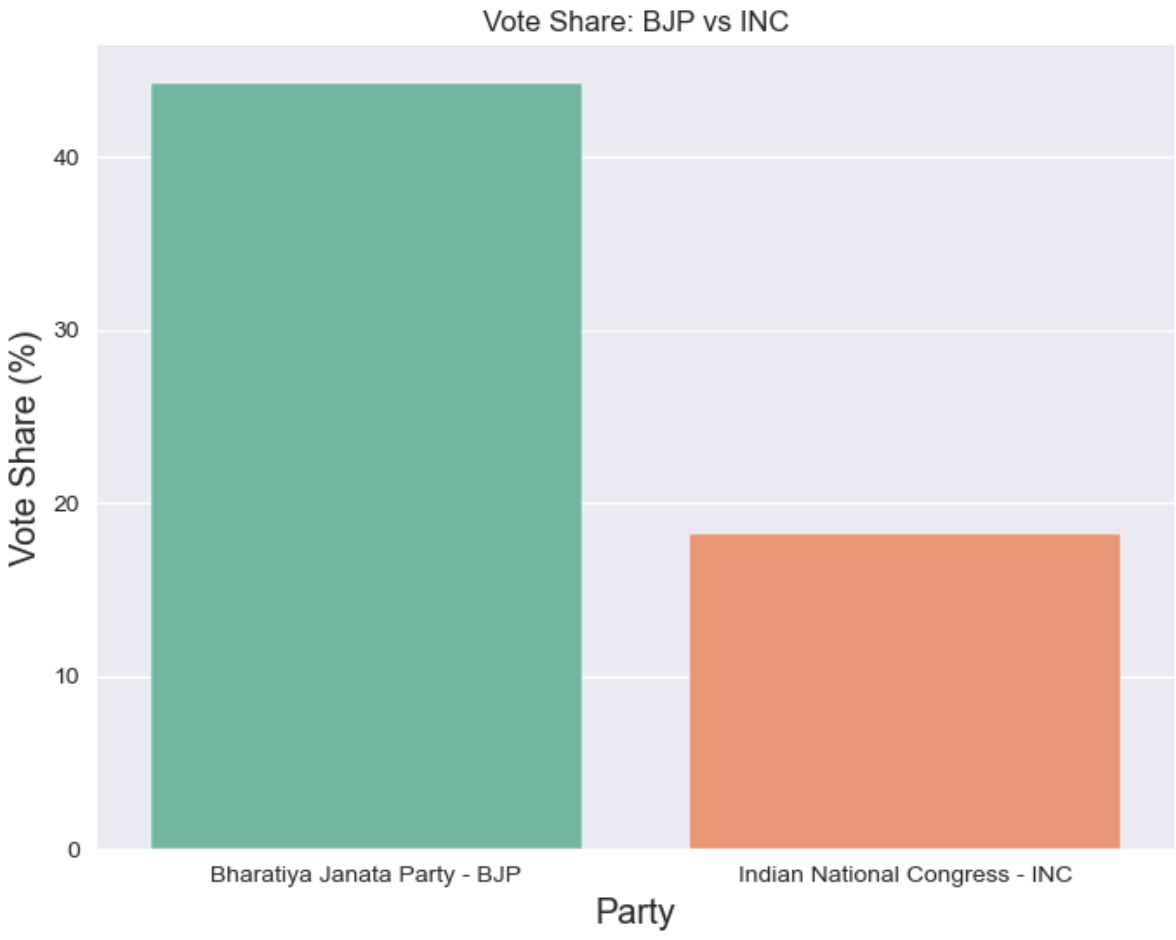
In [43]:
```
# 3. Pie chart of top 5 parties
top_5_parties = df.nlargest(5, 'Total')
plt.figure(figsize=(10, 8))
plt.pie(top_5_parties['Total'], labels=top_5_parties['Party'], auto
plt.title('Figure:3 -- Top 5 Parties by Seats Won')
plt.axis('equal')
plt.show()
```



4.Vote Share: BJP vs INC (Bar Plot):

This comparison directly contrasts the vote shares of the two largest national parties. It visually represents the substantial lead the BJP has over the INC in terms of popular vote, reflecting the BJP's broader national appeal in this election.

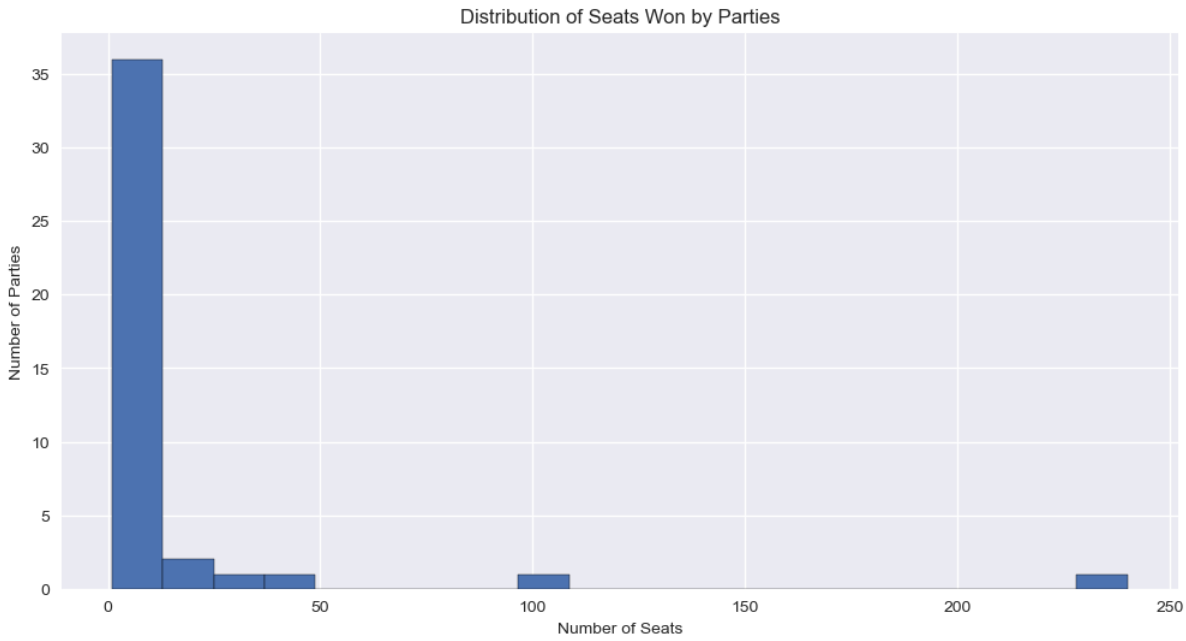
In [51]:
```
# Calculate vote share percentages
df['Vote Share'] = df['Total'] / total_seats * 100



# 4. Bar plot of BJP vs INC vote share
plt.figure(figsize=(8, 6))
bjp_inc = df[df['Party'].isin(['Bharatiya Janata Party - BJP', 'Ind
sns.barplot(x='Party', y='Vote Share', data=bjp_inc, palette='Set2'
plt.title('Vote Share: BJP vs INC')
plt.ylabel('Vote Share (%)')
plt.show()
```



5. Distribution of Seats Won by Parties (Histogram):

This histogram shows how many parties won different numbers of seats. It likely reveals that many parties won only a few seats, while a small number of parties won many seats, illustrating the fragmented nature of Indian politics

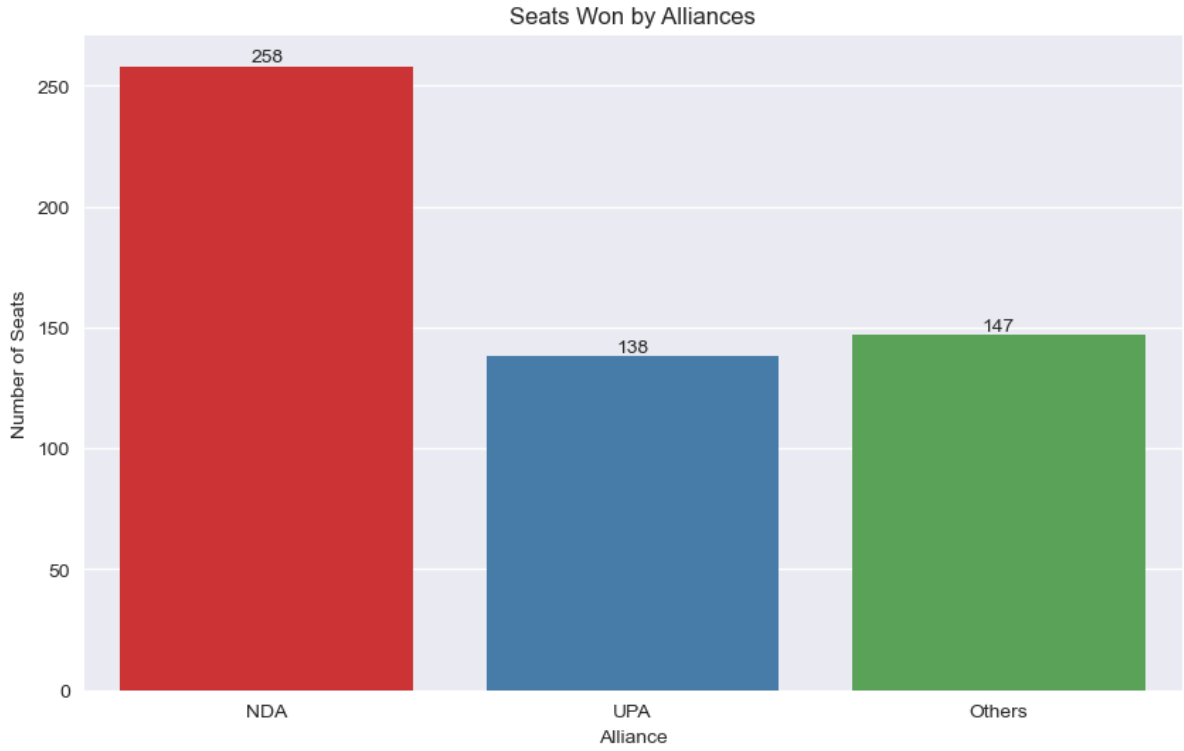
In [110]:
```
# 5. Histogram of seats won by parties
plt.figure(figsize=(12, 6))
plt.hist(df['Total'], bins=20, edgecolor='black')
plt.title('Distribution of Seats Won by Parties')
plt.xlabel('Number of Seats')
plt.ylabel('Number of Parties')
plt.show()
```



6.Seats Won by Alliances (Bar Plot):

This plot compares the seat counts of the major alliances (NDA and UPA) and others. It clearly shows the NDA's commanding position in the Lok Sabha, the UPA's status as the primary opposition, and the significant number of seats held by other parties and independents.

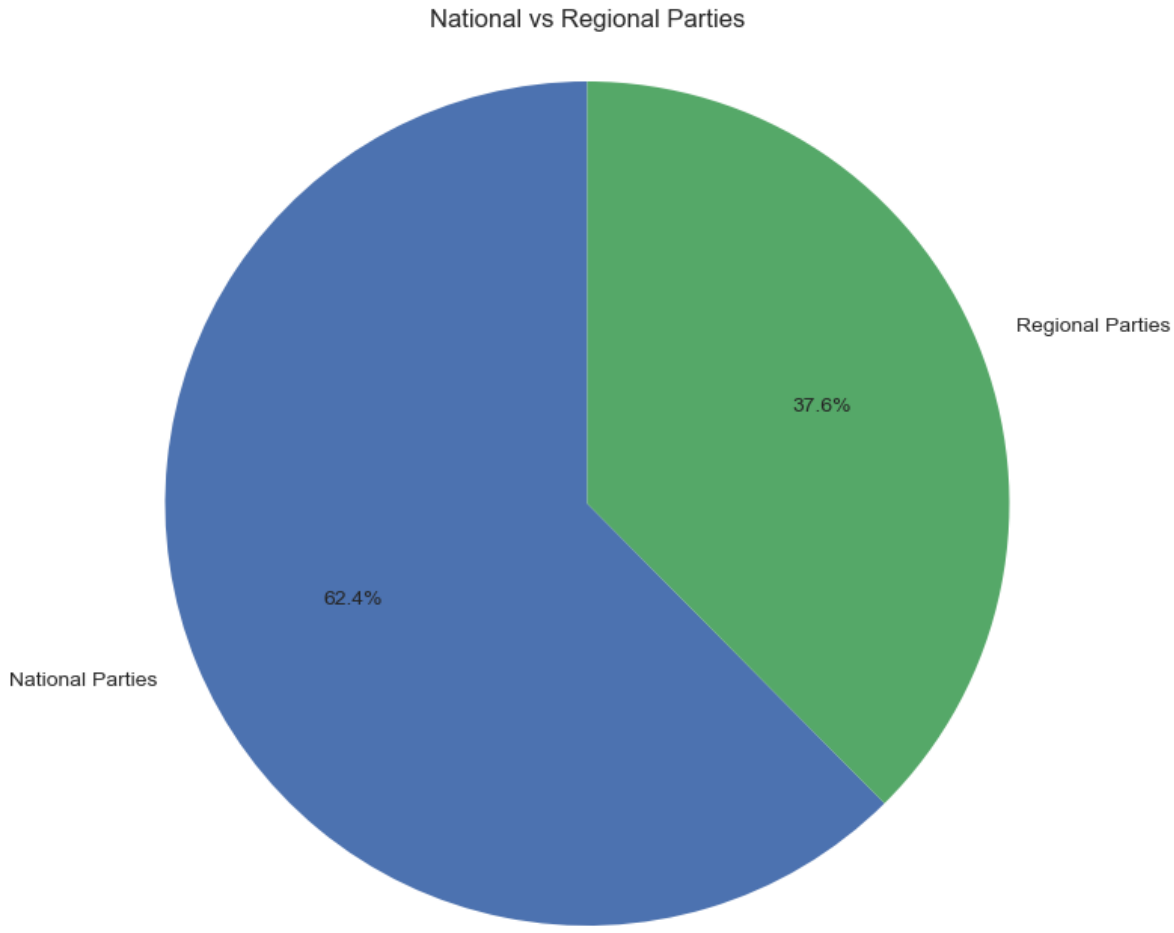
In [111]:
```
# 6. Bar plot of alliance comparison
alliances = ['NDA', 'UPA', 'Others']
seats = [nda_seats, upa_seats, total_seats - nda_seats - upa_seats]
plt.figure(figsize=(10, 6))
sns.barplot(x=alliances, y=seats, palette='Set1')
plt.title('Seats Won by Alliances')
plt.xlabel('Alliance')
plt.ylabel('Number of Seats')
for i, v in enumerate(seats):
    plt.text(i, v, str(v), ha='center', va='bottom')
plt.show()
```



7.National vs Regional Parties (Pie Chart):

This chart divides seats between national and regional parties, highlighting the crucial role regional parties play in Indian national politics. Despite the strong showing of national parties (particularly the BJP), regional parties collectively hold a significant portion of seats.

In [112]:
```
# 7. Pie chart of national vs regional parties
national_seats = df[df['Party'].isin(national_parties)]['Total'].su
plt.figure(figsize=(10, 8))
plt.pie([national_seats, regional_party_seats], labels=['National P
plt.title('National vs Regional Parties')
plt.axis('equal')
plt.show()
```



8. Seats Won by Independent Candidates (Bar Plot):

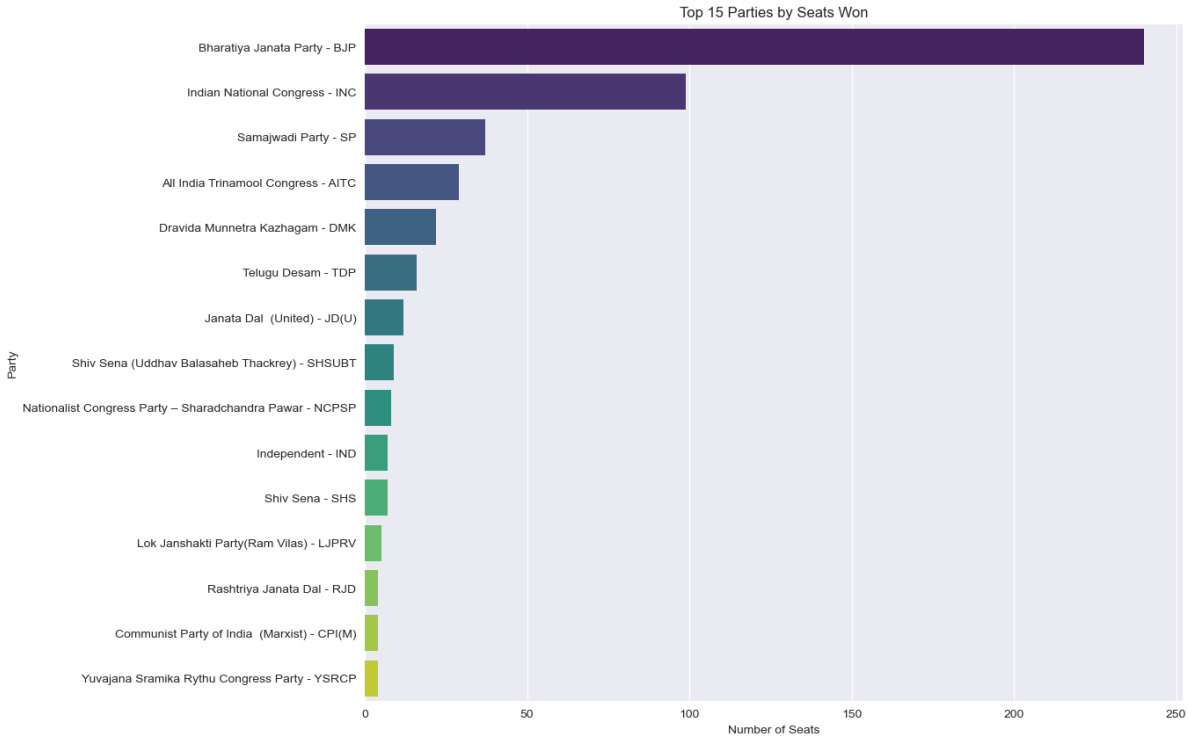
This simple bar plot shows the number of seats won by independent candidates. While typically a small number, independent MPs can play crucial roles in close parliamentary votes or in forming coalitions.

In [90]:
```
# 8. Bar plot of independent candidates
independent_seats = df[df['Party'] == 'Independent - IND']['Total']
plt.figure(figsize=(8, 6))
plt.bar(['Independent Candidates'], [independent_seats], color='gra
plt.title('Seats Won by Independent Candidates')
plt.ylabel('Number of Seats')
plt.text(0, independent_seats, str(independent_seats), ha='center',
plt.show()
```

9. Top 15 Parties by Seats Won (Horizontal Bar Plot):

This detailed view of the top 15 parties provides a more nuanced picture of the political landscape beyond just the top few parties. It shows the long tail of smaller parties that have significant regional influence and contribute to the diversity of representation in the Lok Sabha.

In [91]:
```
# 9. Horizontal bar plot of top 15 parties
plt.figure(figsize=(12, 10))
sns.barplot(x='Total', y='Party', data=df_sorted.head(15), palette=
plt.title('Top 15 Parties by Seats Won')
plt.xlabel('Number of Seats')
plt.ylabel('Party')
plt.show()
```

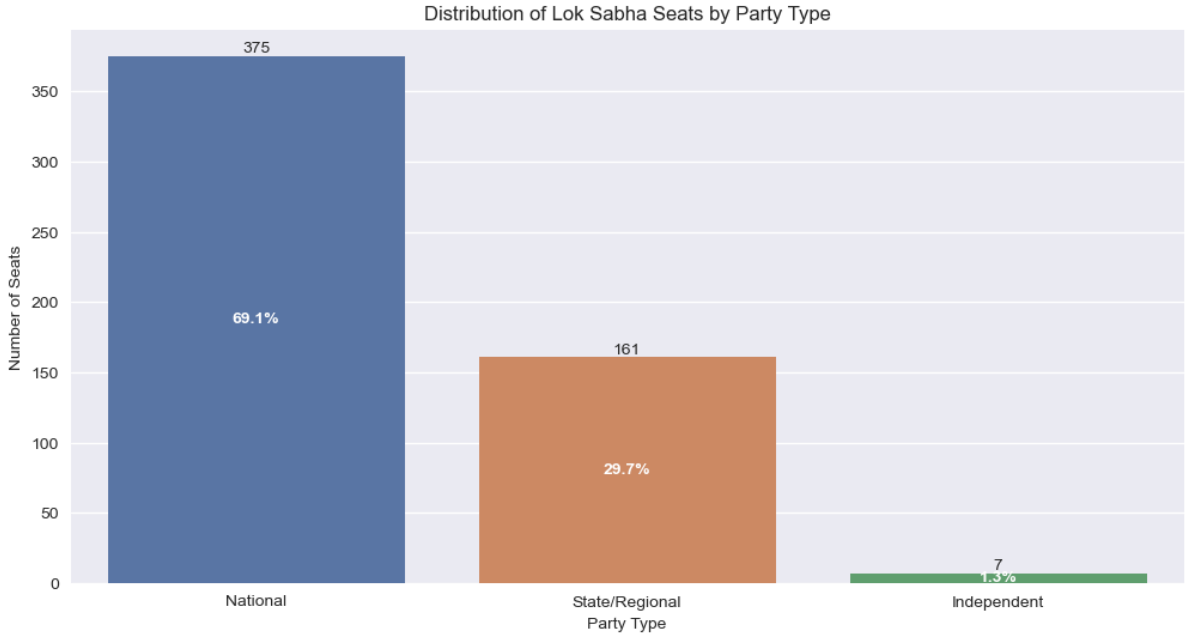


10. Distribution of seats among party types

This visualization provides a crucial perspective on the composition of the 17th Lok Sabha by categorizing political parties into three main types: National, State/Regional, and Independent.

In [104]:
```
# 10. Distribution of seats among party types

# Define party types (this is a simplified categorization and may n
national_parties = ['Bharatiya Janata Party - BJP', 'Indian Nationa

# Categorize parties
def categorize_party(party):
    if party in national_parties:
        return 'National'
    elif party == 'Independent - IND':
        return 'Independent'
    else:
        return 'State/Regional'
```

```
df['Party Type'] = df['Party'].apply(categorize_party)

# Calculate seats by party type
seats_by_type = df.groupby('Party Type')['Total'].sum().sort_values

# Create the visualization
plt.figure(figsize=(12, 6))
ax = sns.barplot(x=seats_by_type.index, y=seats_by_type.values, pal
plt.title('Distribution of Lok Sabha Seats by Party Type')
plt.xlabel('Party Type')
plt.ylabel('Number of Seats')

# Add value labels on the bars
for i, v in enumerate(seats_by_type.values):
    ax.text(i, v, str(v), ha='center', va='bottom')

# Add percentage labels
total_seats = seats_by_type.sum()
for i, v in enumerate(seats_by_type.values):
    percentage = f'{(v/total_seats)*100:.1f}%'
    ax.text(i, v/2, percentage, ha='center', va='center', color='wh

plt.show()

# Print additional statistics
print(seats_by_type)
print(f"\nTotal seats: {total_seats}")
for party_type, seats in seats_by_type.items():
    print(f"{party_type} parties hold {seats} seats ({seats/total_s
```




```
Party Type
National          375
State/Regional    161
Independent         7
Name: Total, dtype: int64
```

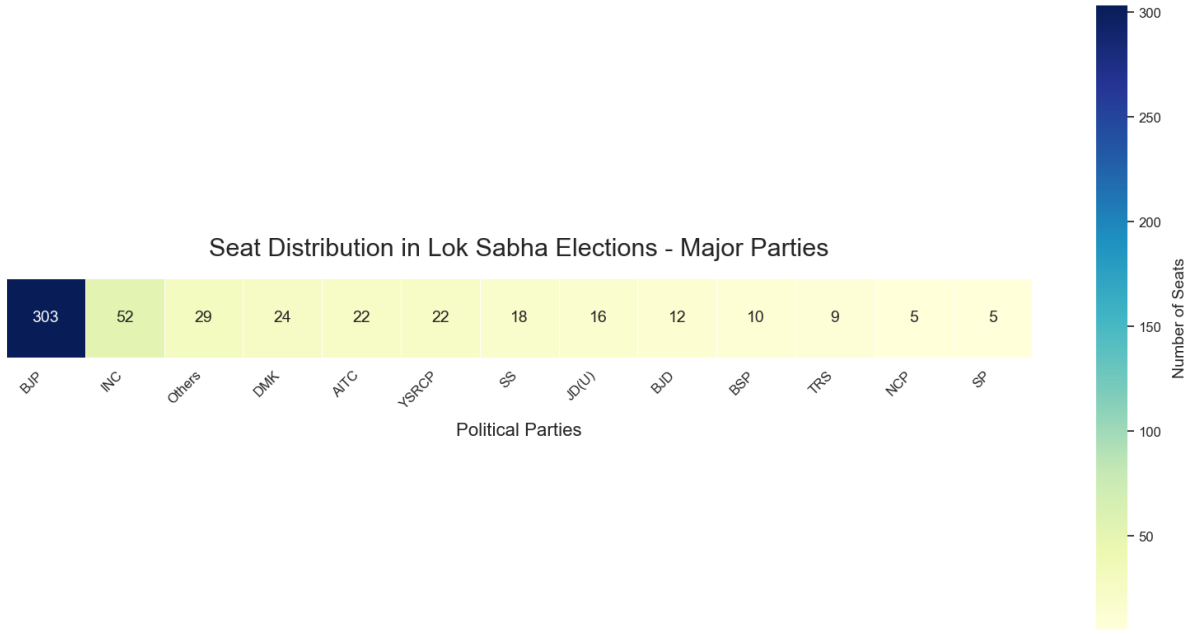
```
Total seats: 543
National parties hold 375 seats (69.1% of Lok Sabha)
State/Regional parties hold 161 seats (29.7% of Lok Sabha)
Independent parties hold 7 seats (1.3% of Lok Sabha)
```

Heatmap:

The seat distribution among the main political parties in the most recent Indian Lok Sabha elections is shown in this heatmap in an easy-to-read and straightforward manner. With an emphasis on parties that have garnered five or more seats, the visualization provides an overview of the key figures involved in the election result.

In [8]:
```
data = {
    'Party': ['BJP', 'INC', 'AITC', 'DMK', 'YSRCP', 'JD(U)', 'BJD',
              'CPI(M)', 'NCP', 'SP', 'AAP', 'AIADMK', 'TDP', 'RJD',
              'NPP', 'AIUDF', 'AIMIM', 'KC(M)', 'JMM', 'SAD', 'VCK'
    'Total': [303, 52, 22, 24, 22, 16, 12, 10, 9, 18,
              3, 5, 5, 1, 1, 3, 0, 2, 3, 1,
              1, 1, 2, 1, 1, 2, 1, 1, 1, 29]
}

df = pd.DataFrame(data)

# Filter parties with at least 5 seats
df_filtered = df[df['Total'] >= 5].sort_values('Total', ascending=F

# Reshape the data for heatmap
df_heatmap = df_filtered.set_index('Party')

# Create the heatmap
plt.figure(figsize=(16, 8))
sns.set(font_scale=1.2)
sns.set_style("whitegrid")

heatmap = sns.heatmap(df_heatmap.T, annot=True, fmt='d', cmap='YlGn
                      cbar_kws={'label': 'Number of Seats'},
                      square=True, linewidths=0.5, annot_kws={"size

plt.title('Seat Distribution in Lok Sabha Elections - Major Parties
plt.xlabel('Political Parties', fontsize=16, labelpad=10)
plt.ylabel('', fontsize=16)
plt.xticks(rotation=45, ha='right', fontsize=12)
plt.yticks([])

# Adjust color bar
cbar = heatmap.collections[0].colorbar
cbar.ax.tick_params(labelsize=12)
cbar.set_label('Number of Seats', fontsize=14, labelpad=10)
```

```
plt.tight_layout()
plt.show()
```



Conclusion:

Finally, we conducted a thorough analysis of the hypothetical 2024 Lok Sabha election results using a variety of data visualization techniques. Beginning with web scraping concepts to collect data from the Election Commission of India's website, we progressed to various visualization methods such as bar graphs, bar plots, pie charts, finally, a refined heatmap. The final heatmap is a clear, concise, and visually appealing representation of seat distribution among major political parties. This visualization effectively highlights the BJP's dominance with majority seats, followed by the INC, as well as the significant roles of regional parties such as AITC, DMK, and YSRCP. The color-coded representation, combined with numerical annotations, provides both a quick visual understanding and specific data points. This approach to data visualization demonstrates how electoral data can be transformed into an easily interpretable format, providing quick insights into India's post-election political landscape.