ODI Men's Cricket Analysis (2002 to 2023)

- By: Sufiyan Ahmed Khan

Objectives of this Analysis

- Number of Matches Per Season
- Wins per team
- Most matches played on venues
- Most player of the match winners
- Toss Decision
- Top 15 Run Scorers
- Top 15 Wicket Takers in ODIs
- India v Pakistan head-to-head performance
- England vs Australia head-to-head performance
- Win percentage by toss
- Most Numbers of Wins by toss
- Top Run Scorer batsman by Year (2003-2023)
- Top Wicket Taker Bowler by Year (2003-2023)
- Most Runs and Wickets by Players from Top 6 Cricket Playing Nations

(In addition to the analysis, I've added comments throughout the code to make it easier to understand wherever possible.)

In [354…

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import os
```

In [25]:

```
file_path = r"C:\Users\LENOVO\Downloads\ODI_Cricket_Match_Data.csv"
```

In [26]:

```
match_data_path = r"C:\Users\LENOVO\Downloads\ODI_Cricket_Match_Data\ODI_Match_Data.cs
```

ODI_Match_Info

In [30]:

```
odi_match_data = pd.read_csv(match_data_path)
```

```
C:\Users\LENOVO\AppData\Local\Temp\ipykernel_7212\791151935.py:1: DtypeWarning: Colum
ns (1) have mixed types. Specify dtype option on import or set low_memory=False.
  odi_match_data = pd.read_csv(match_data_path)
```

In [31]:

```
odi_match_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1265103 entries, 0 to 1265102
Data columns (total 23 columns):
 #   Column                  Non-Null Count    Dtype  
---  ------                  --------------    -----  
 0   match_id                1265103 non-null  int64  
 1   season                  1265103 non-null  object 
 2   start_date              1265103 non-null  object 
 3   venue                   1265103 non-null  object 
 4   innings                 1265103 non-null  int64  
 5   ball                    1265103 non-null  float64
 6   batting_team            1265103 non-null  object 
 7   bowling_team            1265103 non-null  object 
 8   striker                 1265103 non-null  object 
 9   non_striker             1265103 non-null  object 
 10  bowler                  1265103 non-null  object 
 11  runs_off_bat            1265103 non-null  int64  
 12  extras                  1265103 non-null  int64  
 13  wides                   28990 non-null    float64
 14  noballs                 5058 non-null     float64
 15  byes                    1962 non-null     float64
 16  legbyes                 12903 non-null    float64
 17  penalty                 18 non-null       float64
 18  wicket_type             34474 non-null    object 
 19  player_dismissed        34474 non-null    object 
 20  other_wicket_type       0 non-null        float64
 21  other_player_dismissed  0 non-null        float64
 22  cricsheet_id            1265103 non-null  int64  
dtypes: float64(8), int64(5), object(10)
memory usage: 222.0+ MB
```

In [32]:
```
odi_match_data.head()
```

Out[32]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_s
0	1389389	2023/24	2023-09-24	Holkar Cricket Stadium, Indore	1	0.1	India	Australia	RD Gaikwad	Shu
1	1389389	2023/24	2023-09-24	Holkar Cricket Stadium, Indore	1	0.2	India	Australia	RD Gaikwad	Shu
2	1389389	2023/24	2023-09-24	Holkar Cricket Stadium, Indore	1	0.3	India	Australia	RD Gaikwad	Shu
3	1389389	2023/24	2023-09-24	Holkar Cricket Stadium, Indore	1	0.4	India	Australia	RD Gaikwad	Shu
4	1389389	2023/24	2023-09-24	Holkar Cricket Stadium, Indore	1	0.5	India	Australia	RD Gaikwad	Shu

5 rows × 23 columns

In [37]:
```
odi_match_data.shape
```
Out[37]:
```
(1265103, 23)
```

In [41]:
```
odi_match_data.isnull().sum()
```

Out[41]:
```
match_id                      0
season                        0
start_date                    0
venue                         0
innings                       0
ball                          0
batting_team                  0
bowling_team                  0
striker                       0
non_striker                   0
bowler                        0
runs_off_bat                  0
extras                        0
wides                   1236113
noballs                 1260045
byes                    1263141
legbyes                 1252200
penalty                 1265085
wicket_type             1230629
player_dismissed        1230629
other_wicket_type       1265103
other_player_dismissed  1265103
cricsheet_id                  0
dtype: int64
```

In [47]:
```
# The code odi_match_data[odi_match_data.duplicated(keep=False)] is used to identify a
# in the odi_match_data DataFrame.
# The keep=False argument ensures that all instances of the duplicated rows are shown,
# This is useful for detecting and potentially removing duplicates in your dataset.

odi_match_data[odi_match_data.duplicated(keep=False)]
```

Out[47]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	
22333	1377770	2023	2023-07-02	Queens Sports Club, Bulawayo	1	12.1	Zimbabwe	Sri Lanka	SC
22342	1377770	2023	2023-07-02	Queens Sports Club, Bulawayo	1	12.1	Zimbabwe	Sri Lanka	SC
103976	1325549	2022	2022-08-18	Harare Sports Club	2	1.1	India	Zimbabwe	
103985	1325549	2022	2022-08-18	Harare Sports Club	2	1.1	India	Zimbabwe	
368977	1130737	2017/18	2018-01-15	Shere Bangla National Stadium, Mirpur	2	27.1	Bangladesh	Zimbabwe	Tar
368986	1130737	2017/18	2018-01-15	Shere Bangla National Stadium, Mirpur	2	27.1	Bangladesh	Zimbabwe	Tar
542492	656425	2014/15	2015-02-23	Hagley Oval	1	1.1	England	Scotland	
542501	656425	2014/15	2015-02-23	Hagley Oval	1	1.1	England	Scotland	
618837	636162	2013/14	2014-01-24	Western Australia Cricket Association Ground	1	1.1	England	Australia	
618846	636162	2013/14	2014-01-24	Western Australia Cricket Association Ground	1	1.1	England	Australia	
666740	566925	2013	2013-06-05	Trent Bridge	1	48.1	England	New Zealand	EJC
666749	566925	2013	2013-06-05	Trent Bridge	1	48.1	England	New Zealand	EJC
757076	516210	2011	2011-08-22	R Premadasa Stadium	2	9.1	Sri Lanka	Australia	Jaya
757085	516210	2011	2011-08-22	R Premadasa Stadium	2	9.1	Sri Lanka	Australia	Jaya
894617	350043	2009	2009-09-04	Kennington Oval	2	2.1	England	Australia	A
894626	350043	2009	2009-09-04	Kennington Oval	2	2.1	England	Australia	A
957646	345470	2008	2008-06-12	Shere Bangla National	1	9.1	Bangladesh	India	

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	
				Stadium					
957655	345470	2008	2008-06-12	Shere Bangla National Stadium	1	9.1	Bangladesh	India	
975729	325803	2007/08	2008-01-30	Iqbal Stadium	1	4.1	Zimbabwe	Pakistan	SC
975738	325803	2007/08	2008-01-30	Iqbal Stadium	1	4.1	Zimbabwe	Pakistan	SC
1035452	247468	2006/07	2007-03-19	Queen's Park Oval, Port of Spain	1	28.1	India	Bermuda	\
1035461	247468	2006/07	2007-03-19	Queen's Park Oval, Port of Spain	1	28.1	India	Bermuda	\
1203843	64852	2003/04	2003-11-30	Harare Sports Club	2	9.1	West Indies	Zimbabwe	
1203852	64852	2003/04	2003-11-30	Harare Sports Club	2	9.1	West Indies	Zimbabwe	
1231584	65803	2002/03	2003-04-03	Sharjah Cricket Association Stadium	1	11.1	Pakistan	Zimbabwe	
1231593	65803	2002/03	2003-04-03	Sharjah Cricket Association Stadium	1	11.1	Pakistan	Zimbabwe	
1238932	65270	2002/03	2003-03-03	Willowmoore Park, Benoni	1	40.1	Canada	New Zealand	Co
1238941	65270	2002/03	2003-03-03	Willowmoore Park, Benoni	1	40.1	Canada	New Zealand	Co
1254477	65241	2002/03	2003-02-12	Boland Bank Park, Paarl	2	5.1	Netherlands	India	
1254486	65241	2002/03	2003-02-12	Boland Bank Park, Paarl	2	5.1	Netherlands	India	

In [50]:
```
#removing duplicates
odi_match_data.drop_duplicates(inplace=True)
```

In [51]:
```
# The code odi_match_data.dtypes is used to check the data types of each column in the
# It helps you understand what type of data (e.g., integer, float, object, datetime) e
# which is important for ensuring data is processed and analyzed correctly.

odi_match_data.dtypes
```

Out[51]:
```
match_id                    int64
season                     object
start_date                 object
venue                      object
innings                     int64
ball                      float64
batting_team               object
bowling_team               object
striker                    object
non_striker                object
bowler                     object
runs_off_bat                int64
extras                      int64
wides                     float64
noballs                   float64
byes                      float64
legbyes                   float64
penalty                   float64
wicket_type                object
player_dismissed           object
other_wicket_type         float64
other_player_dismissed    float64
cricsheet_id                int64
dtype: object
```

In [55]:
```
# The code odi_match_data.describe() is used to generate summary statistics for the nu
# DataFrame. It provides key metrics such as count, mean, standard deviation, minimum,
# median (50th percentile), 75th percentile, and maximum.
# This is useful for getting a quick overview of the data distribution and identifying

odi_match_data.describe()
```

Out[55]:

	match_id	innings	ball	runs_off_bat	extras	wides	nob
count	1.265088e+06	1.265088e+06	1.265088e+06	1.265088e+06	1.265088e+06	28989.000000	5058.000
mean	7.121266e+05	1.456583e+00	2.265872e+01	7.895166e-01	4.896260e-02	1.204215	1.036
std	4.282248e+05	4.982084e-01	1.382096e+01	1.255691e+00	2.944327e-01	0.792695	0.320
min	6.481400e+04	1.000000e+00	1.000000e-01	0.000000e+00	0.000000e+00	1.000000	1.000
25%	3.353520e+05	1.000000e+00	1.060000e+01	0.000000e+00	0.000000e+00	1.000000	1.000
50%	6.490990e+05	1.000000e+00	2.210000e+01	0.000000e+00	0.000000e+00	1.000000	1.000
75%	1.144494e+06	2.000000e+00	3.420000e+01	1.000000e+00	0.000000e+00	1.000000	1.000
max	1.395701e+06	4.000000e+00	4.990000e+01	7.000000e+00	6.000000e+00	5.000000	5.000

ODI_Match_Info

In [33]:
```
odi_match_info = pd.read_csv(match_info_path)
```

In [34]:
```
odi_match_info.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2379 entries, 0 to 2378
Data columns (total 18 columns):
 #   Column           Non-Null Count  Dtype 
---  ------           --------------  ----- 
 0   id               2379 non-null   int64 
 1   season           2379 non-null   object
 2   city             2069 non-null   object
 3   date             2379 non-null   object
 4   team1            2379 non-null   object
 5   team2            2379 non-null   object
 6   toss_winner      2379 non-null   object
 7   toss_decision    2379 non-null   object
 8   result           2379 non-null   object
 9   dl_applied       2379 non-null   int64 
 10  winner           2259 non-null   object
 11  win_by_runs      2379 non-null   int64 
 12  win_by_wickets   2379 non-null   int64 
 13  player_of_match  2228 non-null   object
 14  venue            2379 non-null   object
 15  umpire1          2379 non-null   object
 16  umpire2          2379 non-null   object
 17  umpire3          2097 non-null   object
dtypes: int64(4), object(14)
memory usage: 334.7+ KB
```

In [35]:
```
odi_match_info.head()
```

Out[35]:

	id	season	city	date	team1	team2	toss_winner	toss_decision	result
0	1389389	2023/24	Indore	2023/09/24	India	Australia	Australia	field	D/L
1	1336129	2023	Nottingham	2023/09/23	England	Ireland	Ireland	field	normal
2	1395701	2023	Dhaka	2023/09/23	New Zealand	Bangladesh	New Zealand	bat	normal
3	1389388	2023/24	Chandigarh	2023/09/22	Australia	India	India	field	normal
4	1395700	2023	Dhaka	2023/09/21	New Zealand	Bangladesh	Bangladesh	field	normal

In [42]:
```
odi_match_info.shape
```

Out[42]:
```
(2379, 18)
```

In [44]:
```
odi_match_info.isnull().sum()
```

Out[44]:
```
id                   0
season               0
city               310
date                 0
team1                0
team2                0
toss_winner          0
toss_decision        0
result               0
dl_applied           0
winner             120
win_by_runs          0
win_by_wickets       0
player_of_match    151
venue                0
umpire1              0
umpire2              0
umpire3            282
dtype: int64
```

In [48]:
```
odi_match_info[odi_match_info.duplicated(keep=False)]
```

Out[48]:

id	season	city	date	team1	team2	toss_winner	toss_decision	result	dl_applied	winner	win_by

In [52]:
```
#removing duplicates
odi_match_info.drop_duplicates(inplace=True)
```

In [53]:
```
odi_match_info.dtypes
```

Out[53]:
```
id                  int64
season             object
city               object
date               object
team1              object
team2              object
toss_winner        object
toss_decision      object
result             object
dl_applied          int64
winner             object
win_by_runs         int64
win_by_wickets      int64
player_of_match    object
venue              object
umpire1            object
umpire2            object
umpire3            object
dtype: object
```

In [54]:
```
odi_match_info.describe()
```

Out[54]:

	id	dl_applied	win_by_runs	win_by_wickets
count	2.379000e+03	2379.000000	2379.000000	2379.000000
mean	7.114354e+05	0.084489	34.680538	2.750736
std	4.287345e+05	0.278179	53.989592	3.238695
min	6.481400e+04	0.000000	0.000000	0.000000
25%	3.353495e+05	0.000000	0.000000	0.000000
50%	6.490950e+05	0.000000	0.000000	0.000000
75%	1.144488e+06	0.000000	58.000000	6.000000
max	1.395701e+06	1.000000	317.000000	10.000000

In [56]:

```
#exploring categorical columns

# The code odi_match_info['team1'].value_counts() is used to count the occurrences
# of each unique value in the 'team1' column of the odi_match_info DataFrame.
# This helps you understand how many times each team appears as team1 in the dataset,
# providing insights into the distribution of matches among different teams.

odi_match_info['team1'].value_counts()
```

Out[56]:

```
Australia                   254
India                       252
England                     225
Sri Lanka                   192
Bangladesh                  191
New Zealand                 182
South Africa                172
West Indies                 172
Zimbabwe                    144
Pakistan                    139
Ireland                      83
Afghanistan                  66
Scotland                     50
United Arab Emirates         47
Netherlands                  26
Kenya                        25
Canada                       24
Namibia                      23
Papua New Guinea             23
Oman                         22
United States of America     22
Nepal                        21
Hong Kong                    10
Bermuda                       7
Africa XI                     5
Jersey                        2
Name: team1, dtype: int64
```

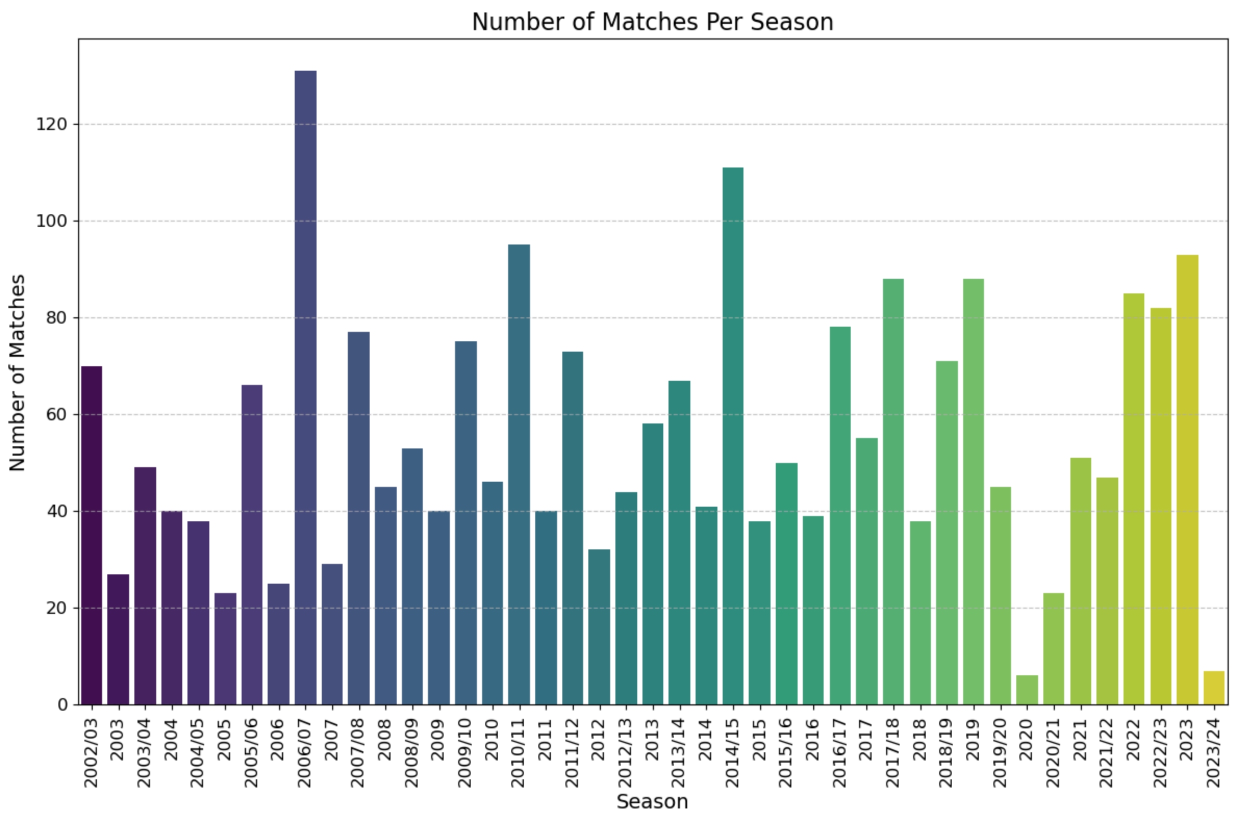
In [57]:

```
# The code odi_match_info['city'].value_counts() is used to count how many times each
# of the odi_match_info DataFrame. This helps you understand the distribution of match
# identifying which cities have hosted the most matches.

odi_match_info['city'].value_counts()
```

Out[57]:
```
Mirpur                89
Colombo               87
London                83
Bulawayo              63
Harare                57
                      ..
Jamshedpur             1
Lincoln                1
Bready                 1
Tarouba                1
Pietermaritzburg       1
Name: city, Length: 145, dtype: int64
```

Number of Matches Per Season

In [61]:
```python
plt.figure(figsize=(12, 8))
sns.countplot(x='season', data=odi_match_info, palette='viridis', order=sorted(odi_mat

plt.title('Number of Matches Per Season', fontsize=16)
plt.xlabel('Season', fontsize=14)
plt.ylabel('Number of Matches', fontsize=14)
plt.xticks(rotation=90, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```

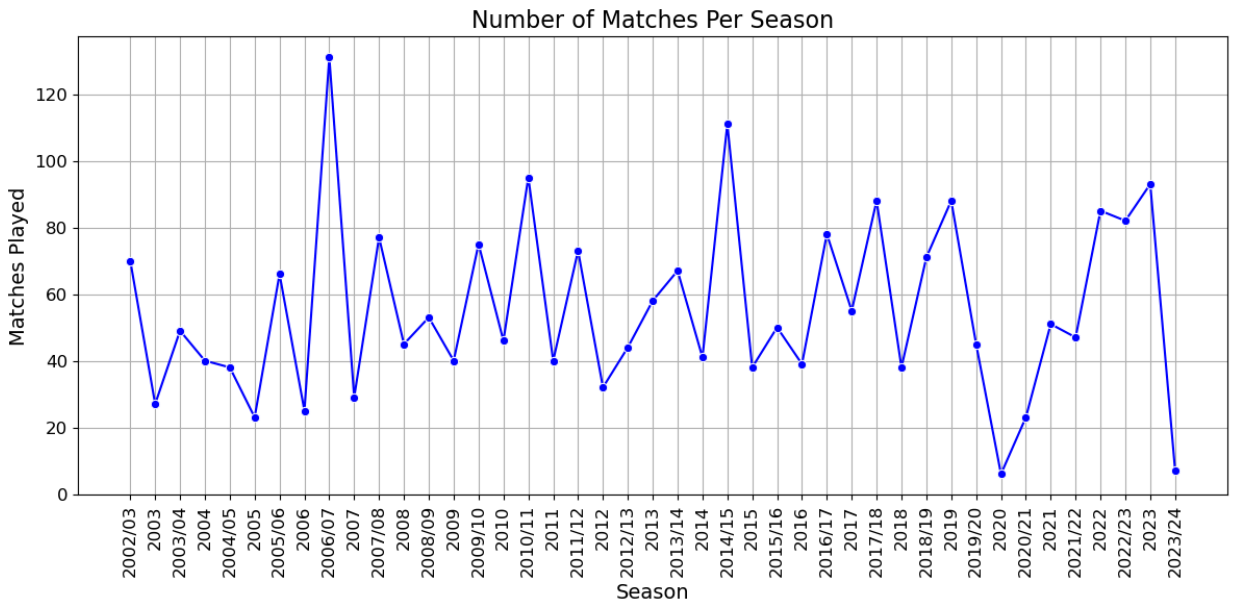


In [66]:
```python
# This code is used to count the number of matches played in each season (year) and th
# chronological order. This helps you organize and analyze the frequency of matches ov
# making it easier to spot trends and patterns across different seasons.
```

```
matches_per_season = odi_match_info['season'].value_counts().sort_index()
```

In [69]:

```
plt.figure(figsize=(12, 6))
sns.lineplot(x=matches_per_season.index, y=matches_per_season, marker='o', linestyle='

# Enhancements
plt.title('Number of Matches Per Season', fontsize=16)
plt.xlabel('Season', fontsize=14)
plt.ylabel('Matches Played', fontsize=14)
plt.xticks(rotation=90, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(True)
plt.tight_layout()

# Display the plot
plt.show()
```



Wins per team

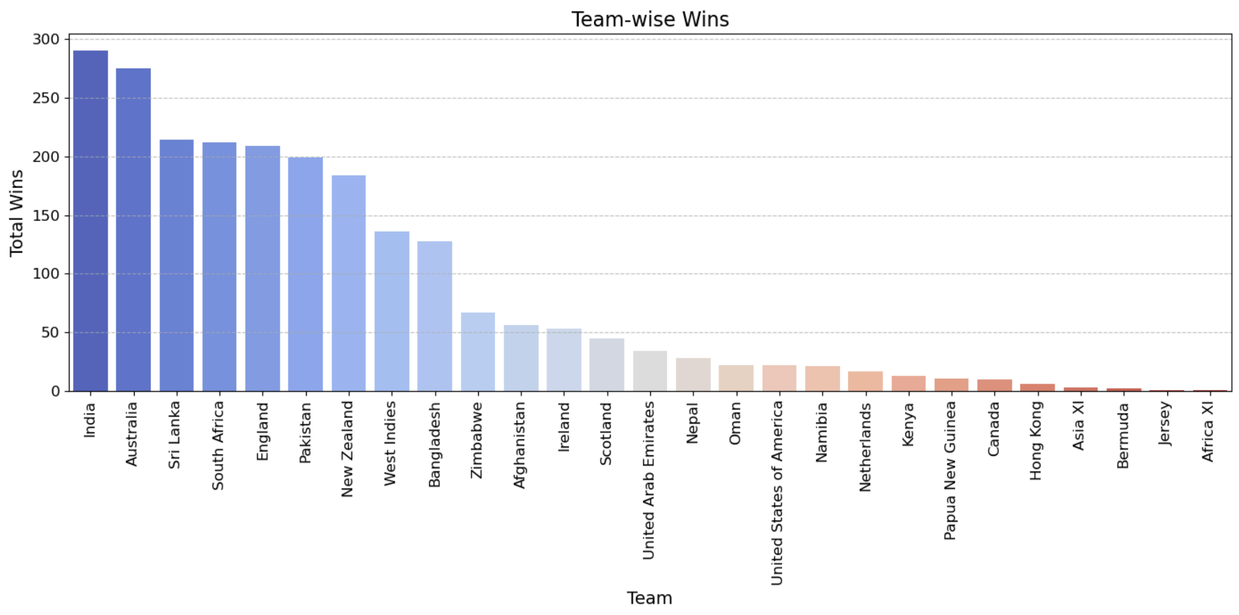
In [284…

```
#calculation wins per team
team_wins = odi_match_info['winner'].value_counts()

# This code is used to calculate the number of matches won by each team. It counts how
# as the winner in the 'winner' column of the odi_match_info DataFrame,
# providing a summary of team performance in terms of total wins.
```

In [74]:

```
plt.figure(figsize=(14, 7))
sns.barplot(x=team_wins.index, y=team_wins.values, palette='coolwarm')

# Enhancements
plt.title('Team-wise Wins', fontsize=16)
plt.xlabel('Team', fontsize=14)
plt.ylabel('Total Wins', fontsize=14)
plt.xticks(rotation=90, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
```

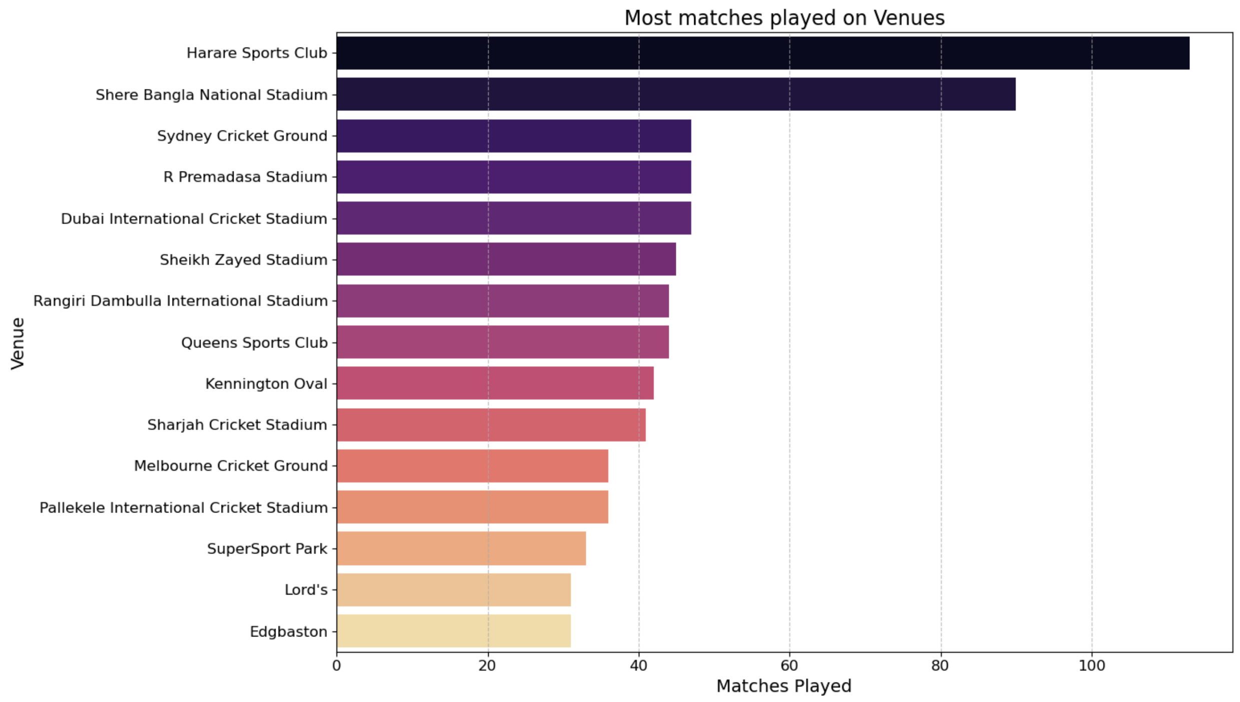
```
# Display the plot
plt.show()
```



Most matches played on venues

In [76]:
```
# most matches played on venues
top_venues = odi_match_info['venue'].value_counts().head(15)

# The code is used to identify the top 15 venues where the most ODI matches have been
# It counts the number of matches held at each venue and selects the top 15, giving yo
# used cricket venues.
```

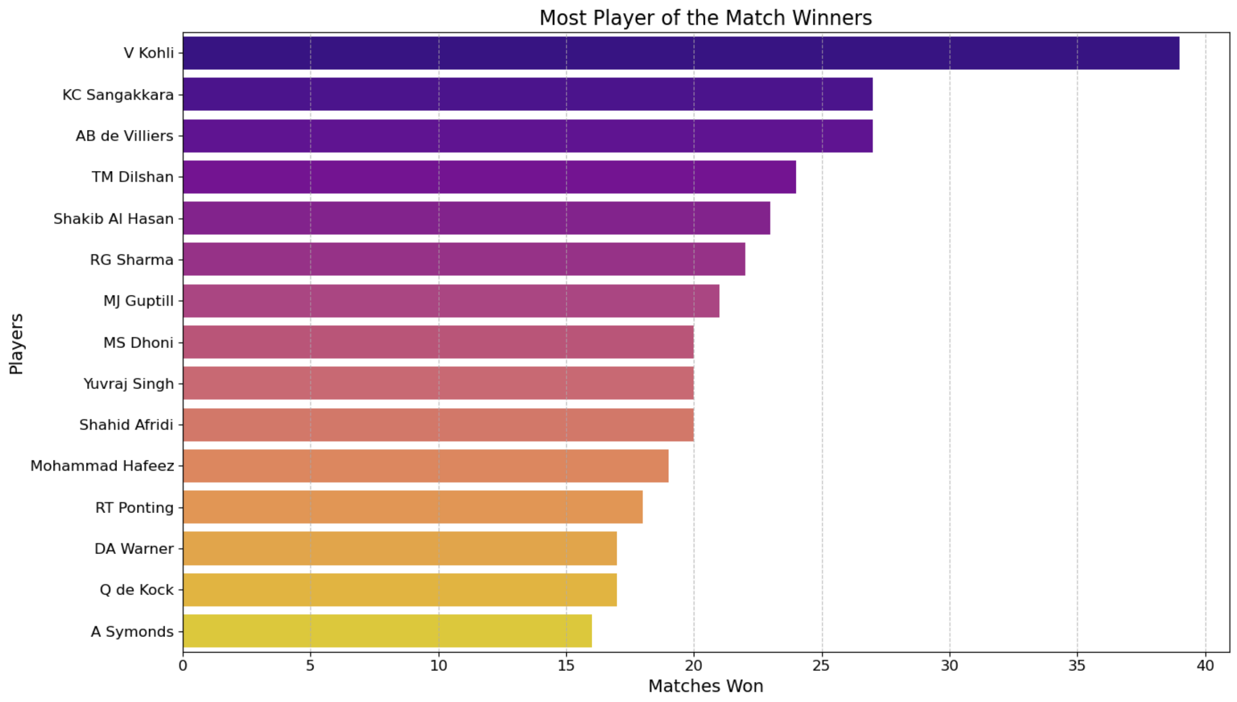
In [81]:
```
# Create the bar plot with horizontal bars
plt.figure(figsize=(14, 8))
sns.barplot(x=top_venues.values, y=top_venues.index, palette='magma')

# Enhancements
plt.title('Most matches played on Venues', fontsize=16)
plt.xlabel('Matches Played', fontsize=14)
plt.ylabel('Venue', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='x', linestyle='--', alpha=0.7)
plt.tight_layout()

# Display the plot
plt.show()
```



Most player of the match winners

In [83]:
```
#Most player of the match winners
top_players = odi_match_info['player_of_match'].value_counts().head(15)
```

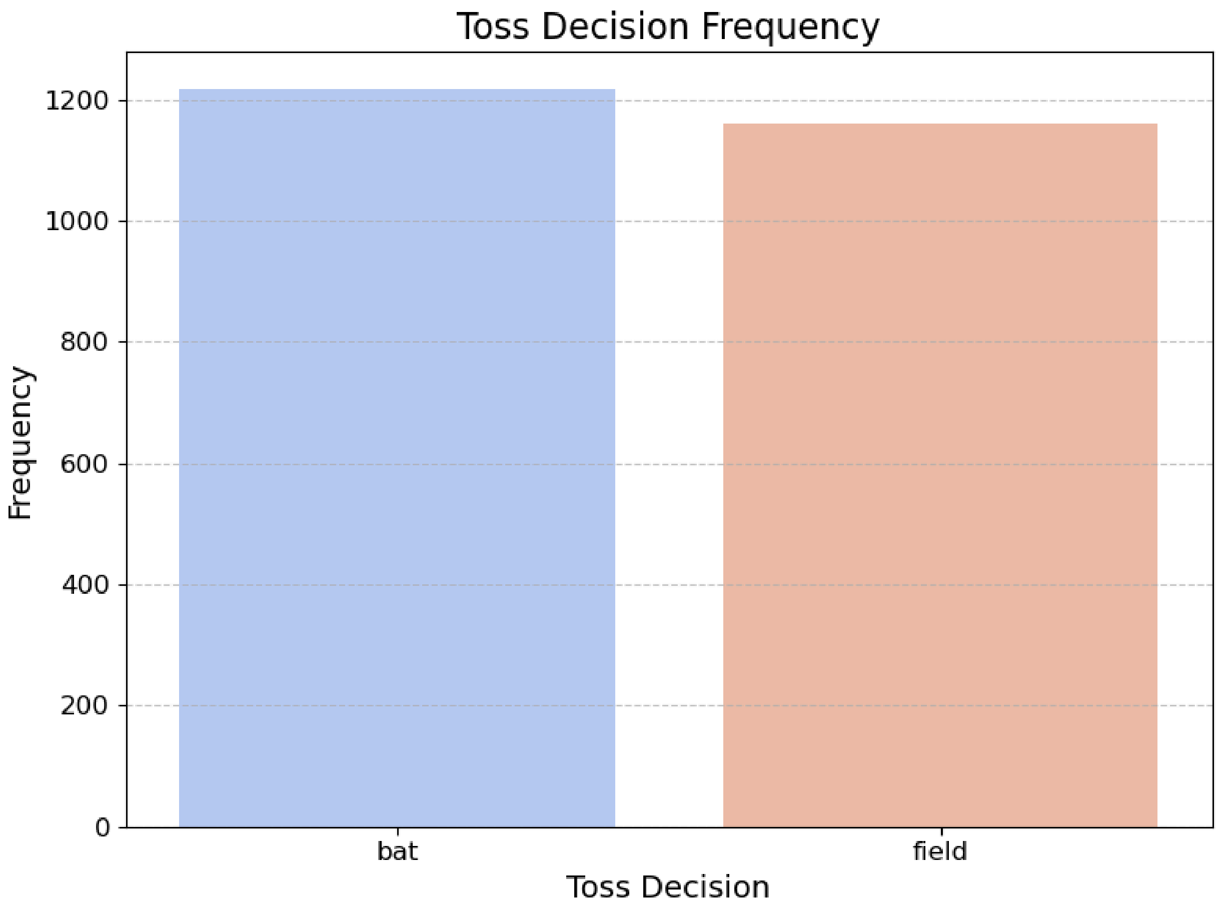
In [86]:
```
plt.figure(figsize=(14, 8))
sns.barplot(x=top_players.values, y=top_players.index, palette='plasma')

# Enhancements
plt.title('Most Player of the Match Winners', fontsize=16)
plt.xlabel('Matches Won', fontsize=14)
plt.ylabel('Players', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='x', linestyle='--', alpha=0.7)
plt.tight_layout()

# Display the plot
plt.show()
```



Toss Decision

```
In [87]: #toss decision
         toss_decision = odi_match_info['toss_decision'].value_counts()
```

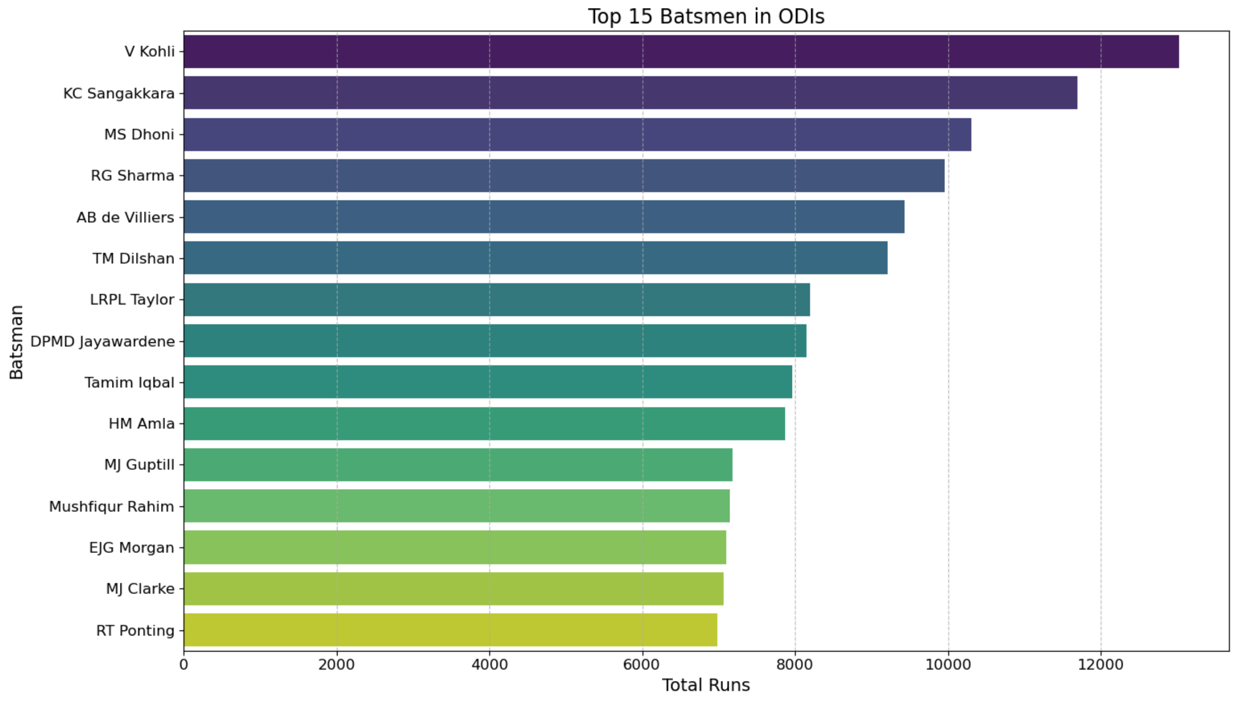
```
In [90]: plt.figure(figsize=(8, 6))
         sns.barplot(x=toss_decision.index, y=toss_decision.values, palette='coolwarm')

         # Enhancements
         plt.title('Toss Decision Frequency', fontsize=16)
         plt.xlabel('Toss Decision', fontsize=14)
         plt.ylabel('Frequency', fontsize=14)
         plt.xticks(fontsize=12)
         plt.yticks(fontsize=12)
         plt.grid(axis='y', linestyle='--', alpha=0.7)
         plt.tight_layout()

         # Display the plot
         plt.show()
```



Top 15 Run Scorers

In [91]:
```
# This code is used to calculate the total runs scored by each batsman and then identi
# It groups the data by batsman, sums their runs, sorts the totals in descending order
# highlighting the most prolific batsmen in the dataset.

batsmen_total_runs = odi_match_data.groupby(['striker'])['runs_off_bat'].sum().sort_va
```

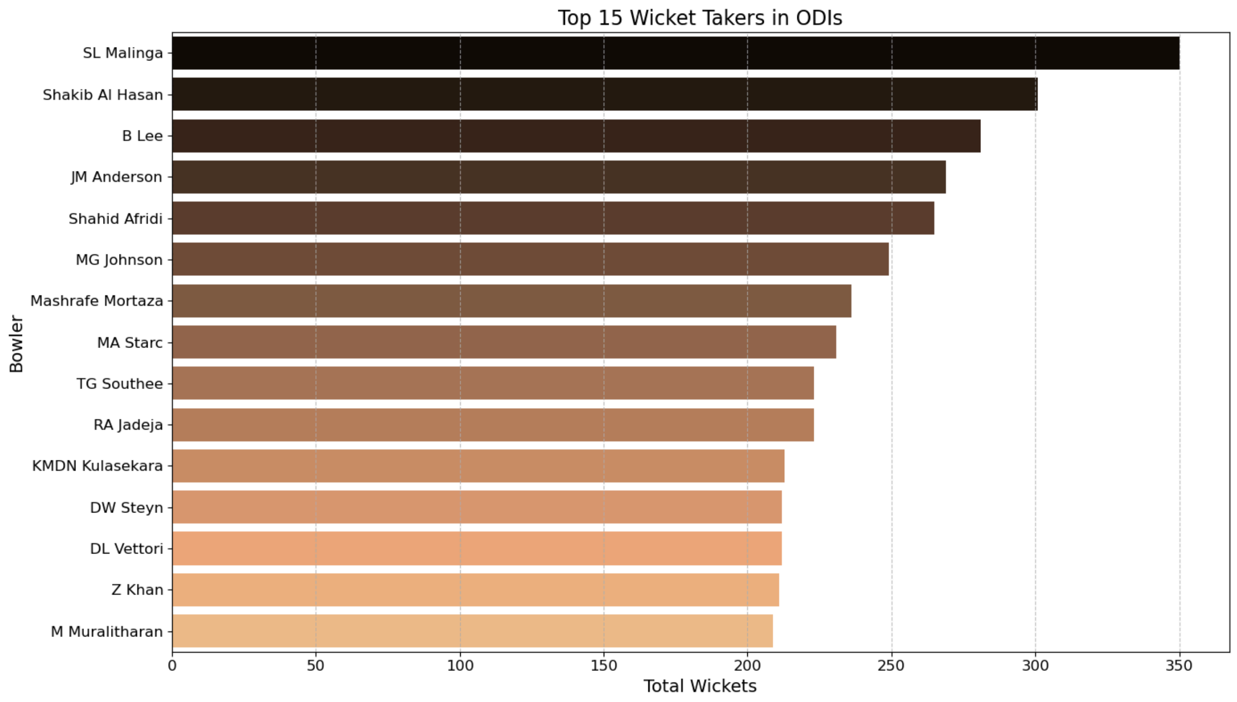
In [93]:
```
plt.figure(figsize=(14, 8))
sns.barplot(x=batsmen_total_runs.values, y=batsmen_total_runs.index, palette='viridis'

# Enhancements
plt.title('Top 15 Batsmen in ODIs', fontsize=16)
plt.xlabel('Total Runs', fontsize=14)
plt.ylabel('Batsman', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='x', linestyle='--', alpha=0.7)
plt.tight_layout()

# Display the plot
plt.show()
```



Top 15 Wicket Takers in ODIs

In [96]:
```
# This code is used to identify the top 15 bowlers with the most wickets. It filters t
# where a wicket was taken, groups the data by bowler, counts the number of wickets ea
# sorts these counts in descending order, and selects the top 15 bowlers,
# highlighting the most successful bowlers in the dataset.

top_bowlers_wickets = odi_match_data[odi_match_data['wicket_type'].notnull()].groupby(
```

In [100…
```
plt.figure(figsize=(14, 8))
sns.barplot(x=top_bowlers_wickets.values, y=top_bowlers_wickets.index, palette='copper

# Enhancements
plt.title('Top 15 Wicket Takers in ODIs', fontsize=16)
plt.xlabel('Total Wickets', fontsize=14)
plt.ylabel('Bowler', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='x', linestyle='--', alpha=0.7)
plt.tight_layout()

# Display the plot
plt.show()
```



Biggest cricket rivals head-to-head performance

India v Pakistan head-to-head performance

In [118…

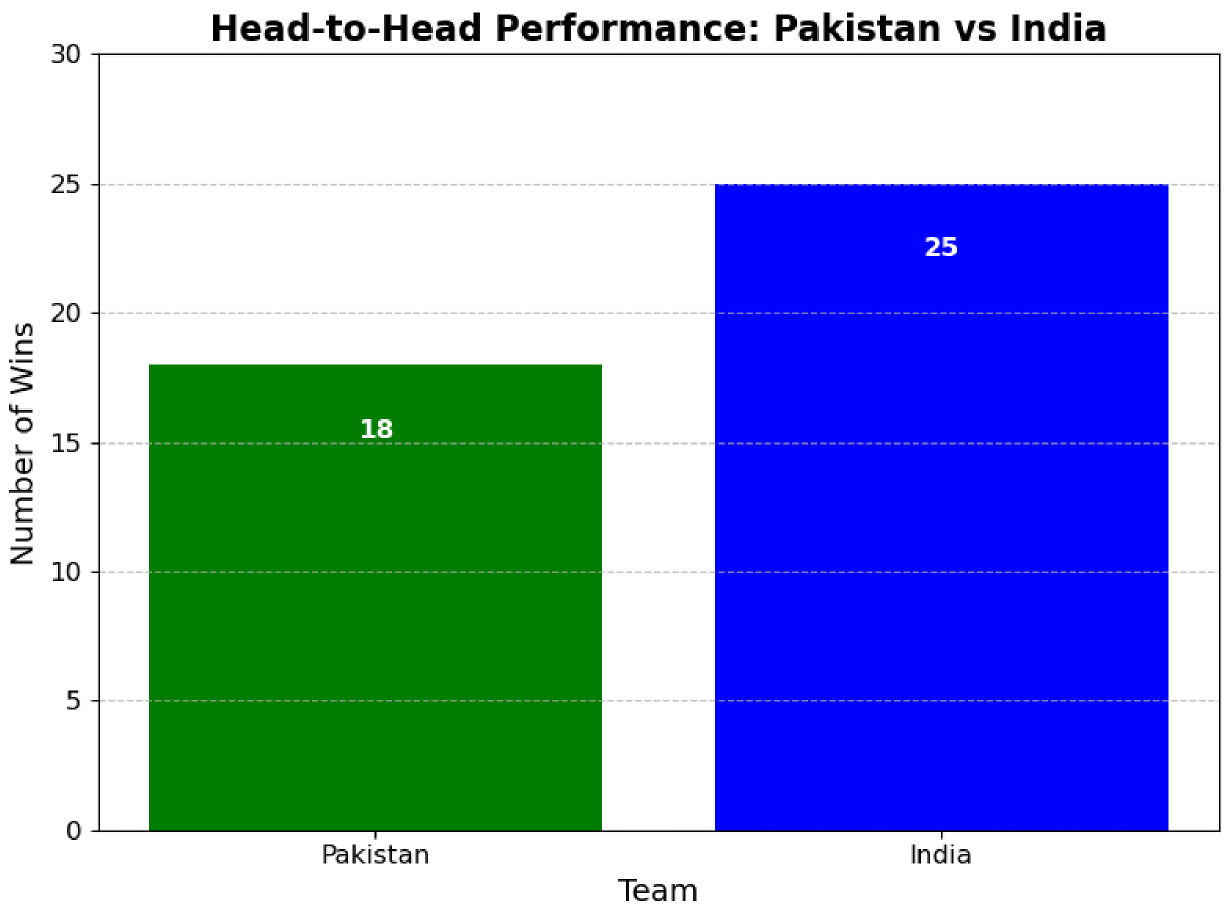
```
# Pakistan vs India head-to-head performance
pak_ind_matches = odi_match_info[
    ((odi_match_info['team1'] == 'Pakistan') & (odi_match_info['team2'] == 'India')) |
    ((odi_match_info['team1'] == 'India') & (odi_match_info['team2'] == 'Pakistan'))
]

# This code is used to filter the dataset to include only the matches played between P
# This helps isolate the specific head-to-head matches between these two teams for fur
```

In [119…

```
# Counting wins
pak_wins = pak_ind_matches[pak_ind_matches['winner'] == 'Pakistan'].shape[0]
ind_wins = pak_ind_matches[pak_ind_matches['winner'] == 'India'].shape[0]

# The code is used to count the number of matches won by each team in the head-to-head

# • pak_wins counts how many of these matches were won by Pakistan.
# • ind_wins counts how many were won by India.

#This provides a summary of the win-loss record between the two teams.
```

In [131…

```
plt.figure(figsize=(8, 6))
bars = plt.bar(['Pakistan', 'India'], [pak_wins, ind_wins], color=['green', 'blue'])

# Enhancements
plt.title('Head-to-Head Performance: Pakistan vs India', fontsize=16, fontweight='bold
plt.xlabel('Team', fontsize=14)
plt.ylabel('Number of Wins', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.ylim(0, max(pak_wins, ind_wins) + 5)  # Adding some space above the highest bar
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

# Adding text labels inside the bars
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height - 3, f'{int(height)}',
             ha='center', va='bottom', color='white', fontsize=12, fontweight='bold')

# Display the plot
plt.show()
```



England vs Australia head-to-head performance

In [121…

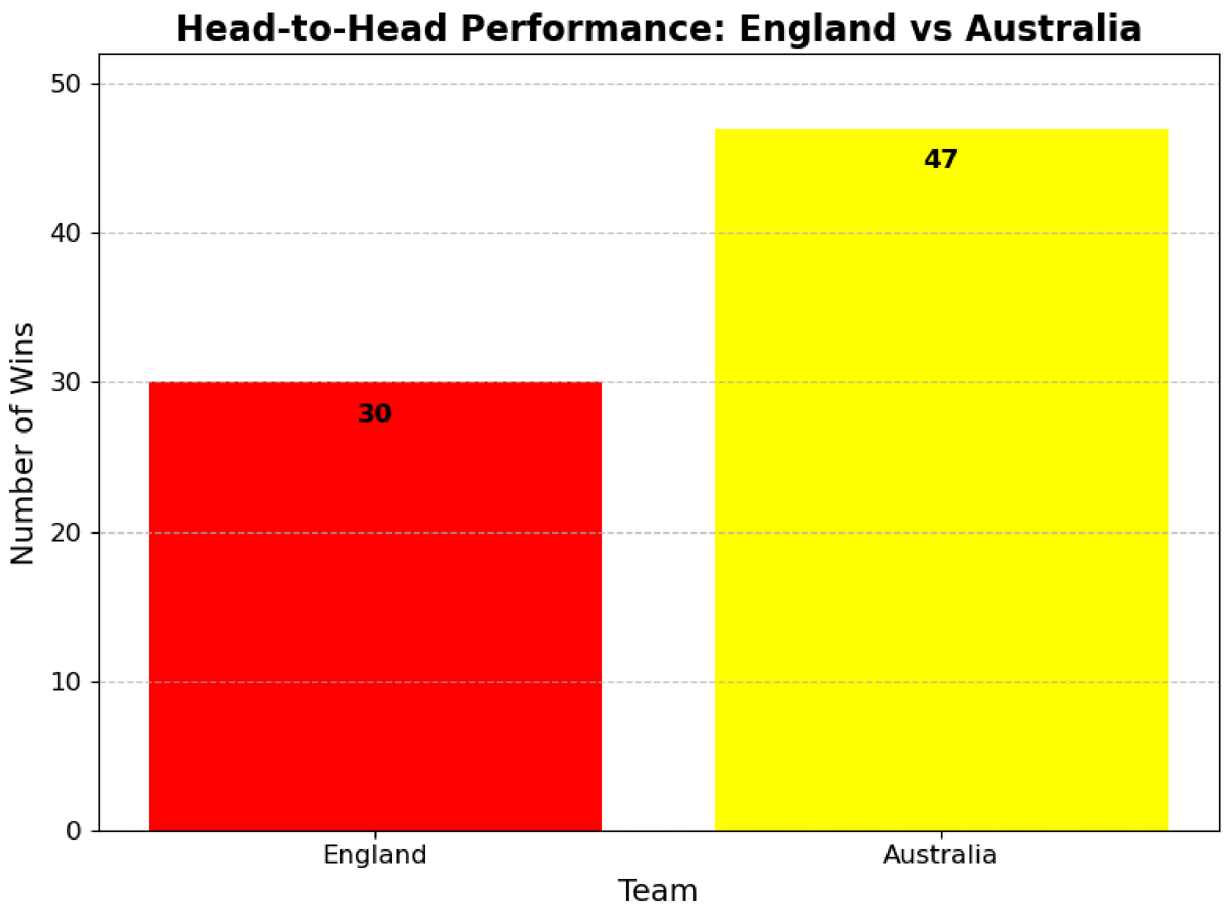
```
# The code is used to filter the dataset to include only the matches played between En
# This allows you to isolate and analyze the head-to-head performance between these tw

eng_aus_matches = odi_match_info[
    ((odi_match_info['team1'] == 'England') & (odi_match_info['team2'] == 'Australia')
    ((odi_match_info['team1'] == 'Australia') & (odi_match_info['team2'] == 'England')
]
```

In [122…

```
# Counting wins
eng_wins = eng_aus_matches[eng_aus_matches['winner'] == 'England'].shape[0]
aus_wins = eng_aus_matches[eng_aus_matches['winner'] == 'Australia'].shape[0]

# This code used to count the number of matches won by each team in the head-to-head m
# • eng_wins counts how many of these matches were won by England.
# • aus_wins counts how many were won by Australia.
```

In [132…

```
import matplotlib.pyplot as plt

# Plotting the results
plt.figure(figsize=(8, 6))
bars = plt.bar(['England', 'Australia'], [eng_wins, aus_wins], color=['red', 'yellow']

# Enhancements
plt.title('Head-to-Head Performance: England vs Australia', fontsize=16, fontweight='b
plt.xlabel('Team', fontsize=14)
plt.ylabel('Number of Wins', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.ylim(0, max(eng_wins, aus_wins) + 5)  # Adding some space above the highest bar
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

# Adding text labels inside the bars
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height - 3, f'{int(height)}',
             ha='center', va='bottom', color='black', fontsize=12, fontweight='bold')

# Display the plot
plt.show()
```



Win percentage by toss

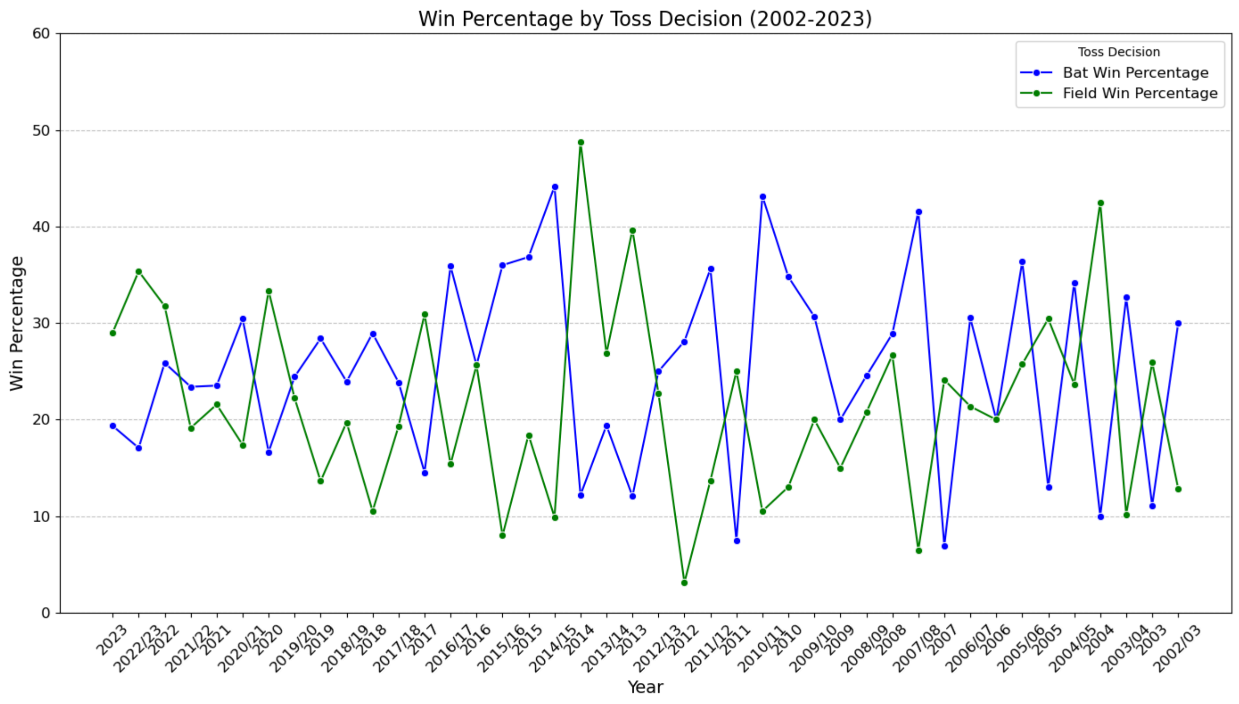
In [ ]:
```
# Filter data for matches from 2002 to 2023
filtered_data = odi_match_info[(odi_match_info['season'] >= '2002') & (odi_match_info[

# This code is used to filter the dataset odi_match_info to include only the matches p

# • odi_match_info[...]: Applies a filter to the DataFrame based on the specified cond
# • (odi_match_info['season'] >= '2002'): Checks if the season is greater than or equa
# &: Combines two conditions, ensuring both must be true (logical AND).
# • (odi_match_info['season'] <= '2023'): Checks if the season is less than or equal t

# The result is a new DataFrame filtered_data containing only the rows (matches) from
```

In [140…
```
# Calculate win percentages for each toss decision year by year
win_percentage_by_year = []
```

In [141…
```
for year in filtered_data['season'].unique():
    yearly_data = filtered_data[filtered_data['season'] == year]
    total_matches = len(yearly_data)

    bat_wins = ((yearly_data['toss_decision'] == 'bat') & (yearly_data['winner'] == ye
    field_wins = ((yearly_data['toss_decision'] == 'field') & (yearly_data['winner'] =

    bat_win_percentage = (bat_wins / total_matches) * 100
    field_win_percentage = (field_wins / total_matches) * 100

    win_percentage_by_year.append({
        'year': year,
        'bat_win_percentage': bat_win_percentage,
        'field_win_percentage': field_win_percentage
    })
```

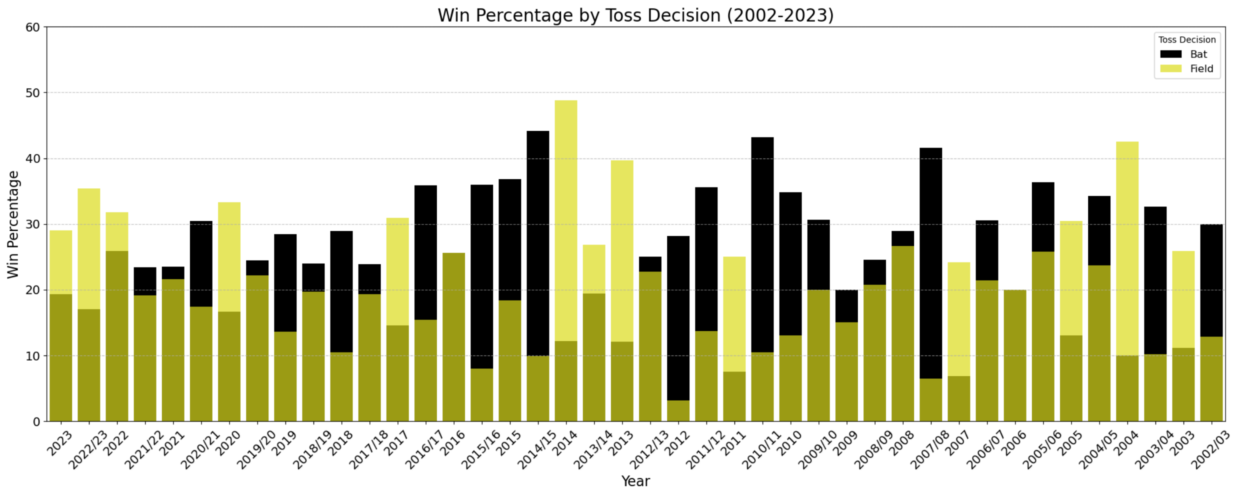
In [144…
```
# Convert to DataFrame
win_percentage_df = pd.DataFrame(win_percentage_by_year)

# This code is used to convert the list of dictionaries win_percentage_by_year into a
# This makes it easier to analyze, manipulate, and visualize the data, as DataFrames p
# for handling structured data in Python.
```

In [146…
```
# Plotting the results
plt.figure(figsize=(14, 8))
sns.lineplot(x='year', y='bat_win_percentage', data=win_percentage_df, marker='o', lab
sns.lineplot(x='year', y='field_win_percentage', data=win_percentage_df, marker='o', l

# Enhancements
plt.title('Win Percentage by Toss Decision (2002-2023)', fontsize=16)
plt.xlabel('Year', fontsize=14)
plt.ylabel('Win Percentage', fontsize=14)
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.ylim(0, 60)  # Set limit from 0 to 60 for percentage
plt.legend(title='Toss Decision', fontsize=12)
plt.tight_layout()
plt.show()
```



In [167…

```
# Plotting the results for each year
plt.figure(figsize=(20, 8))  # Increased figure width for better spacing on the x-axis
sns.barplot(x='year', y='bat_win_percentage', data=win_percentage_df, color='black', l
sns.barplot(x='year', y='field_win_percentage', data=win_percentage_df, color='yellow'

# Enhancements
plt.title('Win Percentage by Toss Decision (2002-2023)', fontsize=20)
plt.xlabel('Year', fontsize=16)
plt.ylabel('Win Percentage', fontsize=16)
plt.ylim(0, 60)  # Set y-axis limit to 0-60
plt.xticks(rotation=45, fontsize=14)
plt.yticks(fontsize=14)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.legend(title='Toss Decision', fontsize=12)
plt.tight_layout()

plt.show()
```



Most Numbers of Wins by toss

In [161…
```
# Filter data for matches from 2002 to 2023
filtered_data = odi_match_info[(odi_match_info['season'] >= '2002') & (odi_match_info[
```

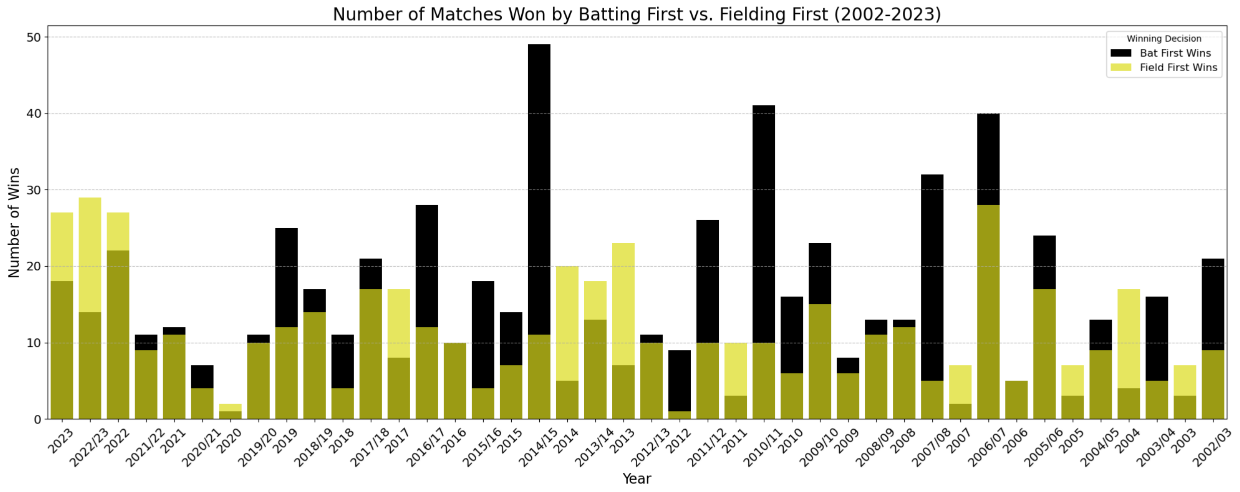
In [285…
```
# The code is used to create a subset of the odi_match_info DataFrame that includes on
# the years 2002 and 2023. Here's a breakdown of the key elements:

# • odi_match_info[...]: Applies a filter to the odi_match_info DataFrame, returning a
# • (odi_match_info['season'] >= '2002'): Filters the DataFrame to include only rows w
# • &: Combines the two conditions, ensuring that both must be true (logical AND).
# • (odi_match_info['season'] <= '2023'): Filters the DataFrame to include only rows w
```

In [162…
```
# Calculate the number of wins by bat first and field first per year
wins_by_year = []
```

In [163…
```
for year in filtered_data['season'].unique():
    yearly_data = filtered_data[filtered_data['season'] == year]

    # Counting wins where team that won batted first or fielded first
    bat_first_wins = ((yearly_data['toss_decision'] == 'bat') & (yearly_data['winner']
    field_first_wins = ((yearly_data['toss_decision'] == 'field') & (yearly_data['winn

    wins_by_year.append({
        'year': year,
        'bat_first_wins': bat_first_wins,
        'field_first_wins': field_first_wins
    })
```

In [164…
```
# Convert to DataFrame
wins_df = pd.DataFrame(wins_by_year)
```

In [166…
```
# Plotting the results for each year
plt.figure(figsize=(20, 8))  # Adjusting figure size for better spacing on the x-axis
sns.barplot(x='year', y='bat_first_wins', data=wins_df, color='black', label='Bat Firs
sns.barplot(x='year', y='field_first_wins', data=wins_df, color='yellow', label='Field

# Enhancements
plt.title('Number of Matches Won by Batting First vs. Fielding First (2002-2023)', for
plt.xlabel('Year', fontsize=16)
plt.ylabel('Number of Wins', fontsize=16)
plt.xticks(rotation=45, fontsize=14)
plt.yticks(fontsize=14)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.legend(title='Winning Decision', fontsize=12)
plt.tight_layout()

plt.show()
```



Top Run Scorer batsman by Year (2003-2023)

In [223…
```
# Convert the 'start_date' column to datetime
odi_match_data['start_date'] = pd.to_datetime(odi_match_data['start_date'], errors='co
```

In [299…
```
# The above code converts the 'start_date' column in the odi_match_data DataFrame to a
# using the pd.to_datetime() function. Here's why this is important:

# • pd.to_datetime(): Converts the data in the 'start_date' column from strings (or ot
# • errors='coerce': Ensures that any invalid or unparseable date entries are converte
```

In [224…
```
# Extract the year
odi_match_data['Year'] = odi_match_data['start_date'].dt.year
```

In [225…
```
# Aggregate runs by year and batsman (striker)
yearly_runs = odi_match_data.groupby(['Year', 'striker'])['runs_off_bat'].sum().reset_
```

In [298…
```
# The above code aggregates the total runs scored by each batsman (striker) for each y
# Here's a breakdown of the key functions used:

# • odi_match_data.groupby(['Year', 'striker']): Groups the data by both Year and stri
# • ['runs_off_bat'].sum(): Sums the runs_off_bat (runs scored by the batsman) within
# • .reset_index(): Converts the grouped data back into a DataFrame, with the grouped
```

In [226…
```
# Identify the top scorer for each year
top_scorers_each_year = yearly_runs.loc[yearly_runs.groupby('Year')['runs_off_bat'].id
```

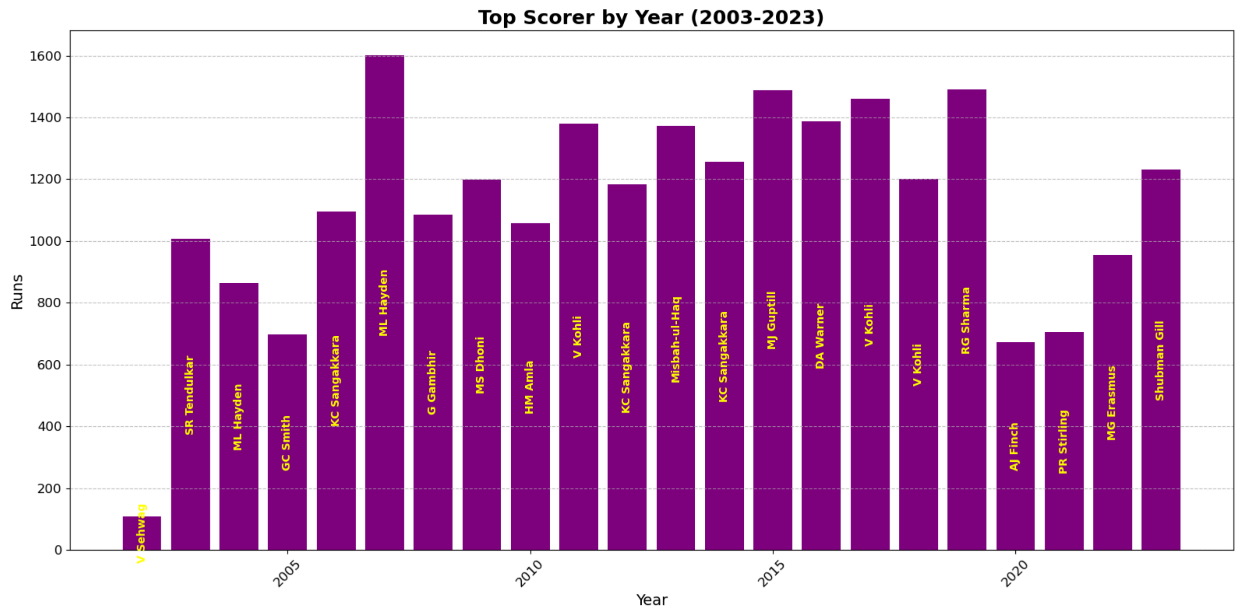
In [301…
```
# The above code identifies the top run-scorer (the batsman who scored the most runs)

# • yearly_runs.groupby('Year')['runs_off_bat'].idxmax():

   # •This groups the yearly_runs DataFrame by Year.
   # • For each year, it finds the index (idxmax()) of the row where the runs_off_bat

# • yearly_runs.loc[...]:

  #  • Using .loc[], the code selects the rows from yearly_runs corresponding to these
  #  • The result is a DataFrame containing the top scorer (batsman with the most runs
```

In [237…

```
# Filter the data for years 2003 to 2023
top_scorers_each_year = top_scorers_each_year[top_scorers_each_year['Year'].between(20
```

In [270…

```
# Plotting the bar graph
plt.figure(figsize=(16, 8))  # Slightly increased figure size for better spacing
plt.bar(top_scorers_each_year['Year'], top_scorers_each_year['runs_off_bat'], color='p

# Adding text labels inside each bar
for i in range(len(top_scorers_each_year)):
    plt.text(top_scorers_each_year['Year'].iloc[i],
             top_scorers_each_year['runs_off_bat'].iloc[i] / 2,  # Position the text i
             top_scorers_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=10, color='yellow', fontw

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top Scorer by Year (2003-2023)', fontsize=18, fontweight='bold')
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



Top Wicket Taker Bowler by Year (2003-2023)

In [ ]:

```
# Convert the 'start_date' column to datetime already done above

# Extract the year already done above
```

In [247…

```
# Filter the data to only include instances where a wicket was taken
wicket_data = odi_match_data[odi_match_data['wicket_type'].notnull()]
```

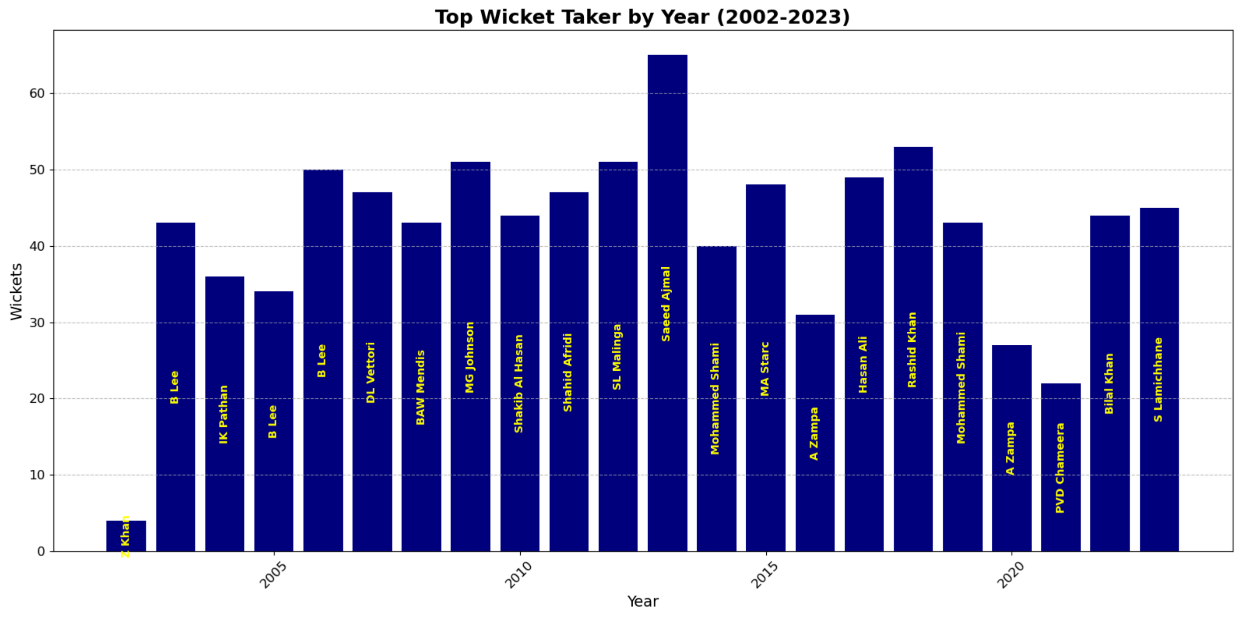
In [248…

```
# Aggregate wickets by year and bowler
yearly_wickets = wicket_data.groupby(['Year', 'bowler'])['wicket_type'].count().reset_
```

In [249…
```
# Identify the top wicket-taker for each year
top_wicket_takers_each_year = yearly_wickets.loc[yearly_wickets.groupby('Year')['wicke
```

In [250…
```
# Filter the data for years 2002 to 2023
top_wicket_takers_each_year = top_wicket_takers_each_year[top_wicket_takers_each_year[
```

In [300…
```
# Plot the results
plt.figure(figsize=(16, 8))  # Adjusting figure size for better spacing
plt.bar(top_wicket_takers_each_year['Year'], top_wicket_takers_each_year['wicket_type'

# Adding text labels inside each bar
for i in range(len(top_wicket_takers_each_year)):
    plt.text(top_wicket_takers_each_year['Year'].iloc[i],
             top_wicket_takers_each_year['wicket_type'].iloc[i] / 2,  # Position the t
             top_wicket_takers_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=10, color='yellow', fontw

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top Wicket Taker by Year (2002-2023)', fontsize=18, fontweight='bold')
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



Most Runs and Wickets by Players from Top 6 Cricket Playing Nations

1. Pakistan

Most Runs by Pakistani Batsman (2002-2023)

In [291…

```
# Convert the 'start_date' column to datetime already done above

# Extract the year already done above
```

In [286…

```
# Filter the data to include only Pakistani batsmen (assuming 'batting_team' column ex
pakistani_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'Pakistan']
```

In [287…

```
# Aggregate runs by year and batsman (striker)
yearly_runs_pakistani = pakistani_batsmen_data.groupby(['Year', 'striker'])['runs_off_
```

In [288…

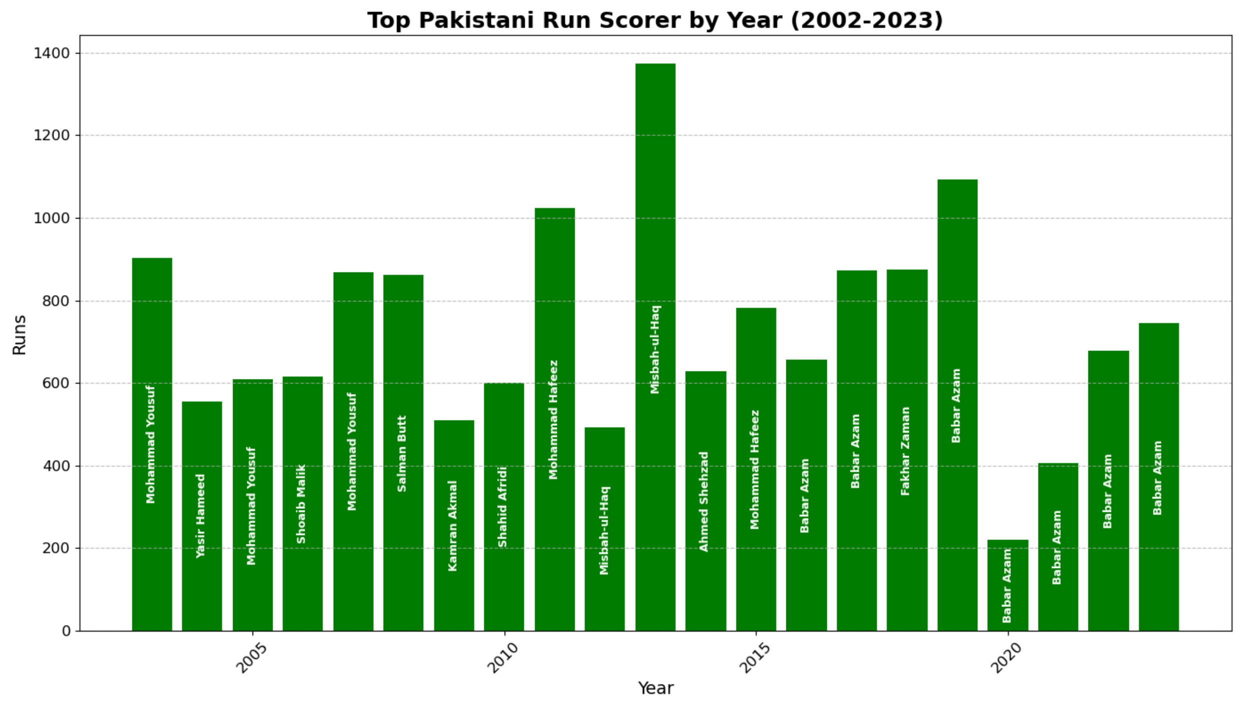
```
# Identify the top scorer for each year
top_scorers_pakistani_each_year = yearly_runs_pakistani.loc[yearly_runs_pakistani.grou
```

In [289…

```
# Filter the data for years 2002 to 2023
top_scorers_pakistani_each_year = top_scorers_pakistani_each_year[top_scorers_pakistar
```

In [338…

```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_pakistani_each_year['Year'], top_scorers_pakistani_each_year['runs

# Adding text labels inside each bar
for i in range(len(top_scorers_pakistani_each_year)):
    plt.text(top_scorers_pakistani_each_year['Year'].iloc[i],
             top_scorers_pakistani_each_year['runs_off_bat'].iloc[i] / 2,  # Position
             top_scorers_pakistani_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top Pakistani Run Scorer by Year (2002-2023)', fontsize=18, fontweight='bol
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



Most Wickets by Pakistani Bowler (2002-2023)

In [302…
```
# Convert the 'start_date' column to datetime already done above

# Extract the year already done above
```

In [292…
```
# Filter the data to include only Pakistani bowlers (assuming 'bowling_team' column ex
pakistani_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'Pakistan']
```

In [293…
```
# Filter the data to include only instances where a wicket was taken
wicket_data_pakistani = pakistani_bowlers_data[pakistani_bowlers_data['wicket_type'].r
```

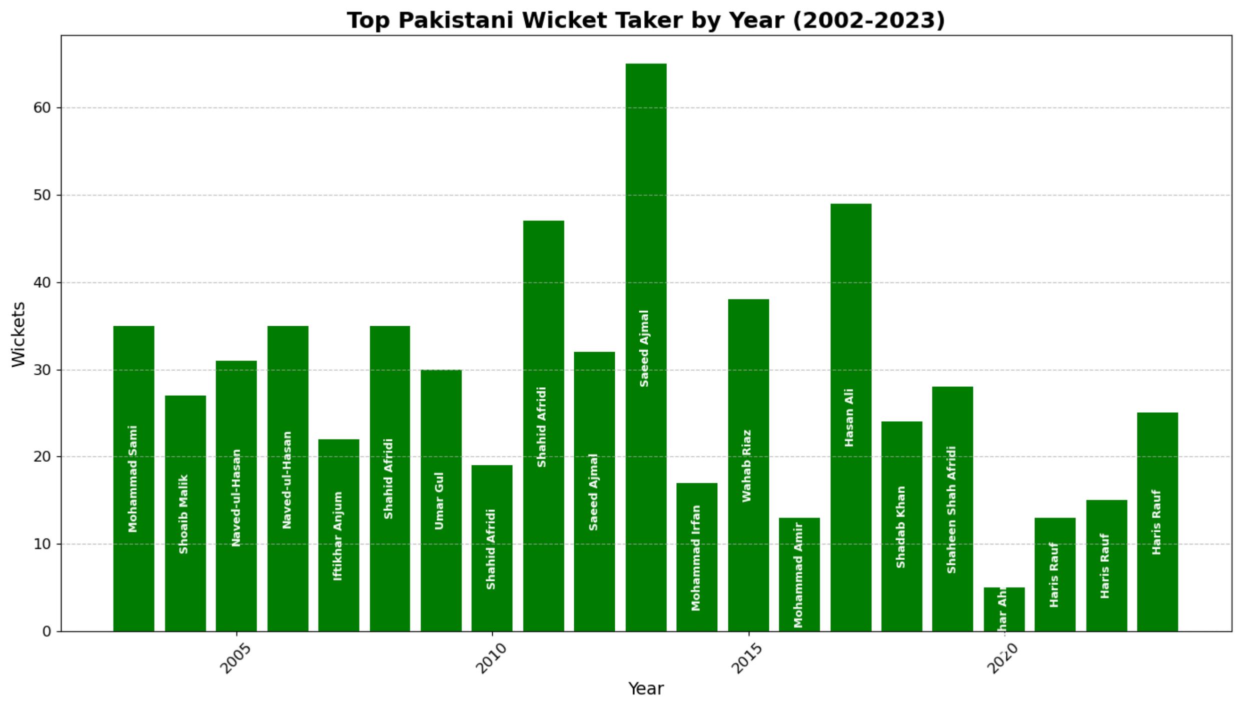
In [294…
```
# Aggregate wickets by year and bowler
yearly_wickets_pakistani = wicket_data_pakistani.groupby(['Year', 'bowler'])['wicket_t
```

In [295…
```
# Identify the top wicket-taker for each year
top_wicket_takers_pakistani_each_year = yearly_wickets_pakistani.loc[yearly_wickets_pa
```

In [296…
```
# Filter the data for years 2002 to 2023
top_wicket_takers_pakistani_each_year = top_wicket_takers_pakistani_each_year[top_wick
```

In [339…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_wicket_takers_pakistani_each_year['Year'], top_wicket_takers_pakistani_eac

# Adding text labels inside each bar
for i in range(len(top_wicket_takers_pakistani_each_year)):
    plt.text(top_wicket_takers_pakistani_each_year['Year'].iloc[i],
             top_wicket_takers_pakistani_each_year['wicket_type'].iloc[i] / 2,  # Posi
             top_wicket_takers_pakistani_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
```

```
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top Pakistani Wicket Taker by Year (2002-2023)', fontsize=18, fontweight='b
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



2. India

Most Runs by Indian Batsman (2002-2023)

In [2]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

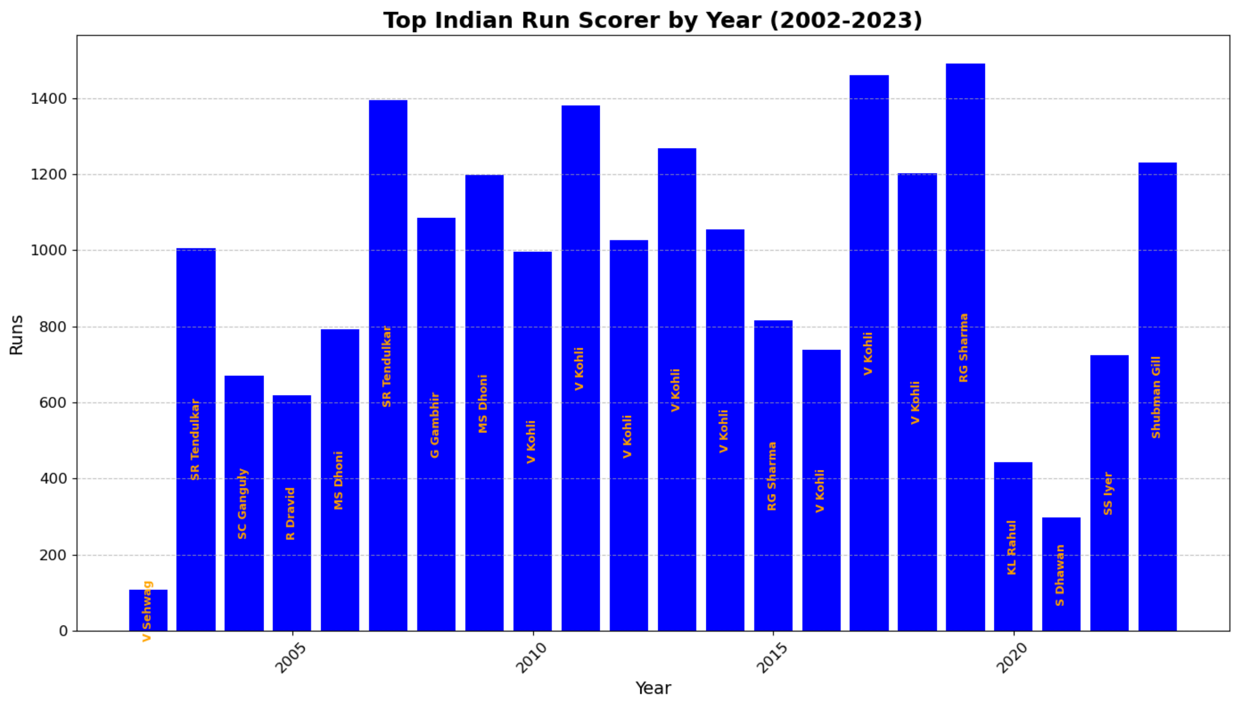
In [303…
```
# Filter the data to include only Indian batsmen (assuming 'batting_team' column exist
indian_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'India']
```

In [304…
```
# Aggregate runs by year and batsman (striker)
yearly_runs_indian = indian_batsmen_data.groupby(['Year', 'striker'])['runs_off_bat'].
```

In [305…
```
# Identify the top scorer for each year
top_scorers_indian_each_year = yearly_runs_indian.loc[yearly_runs_indian.groupby('Year
```

In [306…
```
# Filter the data for years 2002 to 2023
top_scorers_indian_each_year = top_scorers_indian_each_year[top_scorers_indian_each_ye
```

In [341…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_indian_each_year['Year'], top_scorers_indian_each_year['runs_off_b

# Adding text labels inside each bar
for i in range(len(top_scorers_indian_each_year)):
    plt.text(top_scorers_indian_each_year['Year'].iloc[i],
             top_scorers_indian_each_year['runs_off_bat'].iloc[i] / 2,  # Position the
             top_scorers_indian_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='orange', fontwe

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top Indian Run Scorer by Year (2002-2023)', fontsize=18, fontweight='bold')
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



Most Wickets by Indian Bowler (2002-2023)

```
In [3]: # Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

        # Extract the year already done in Top Run Scorer Batsman
```

```
In [308… # Filter the data to include only Indian bowlers (assuming 'bowling_team' column exist
         indian_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'India']
```

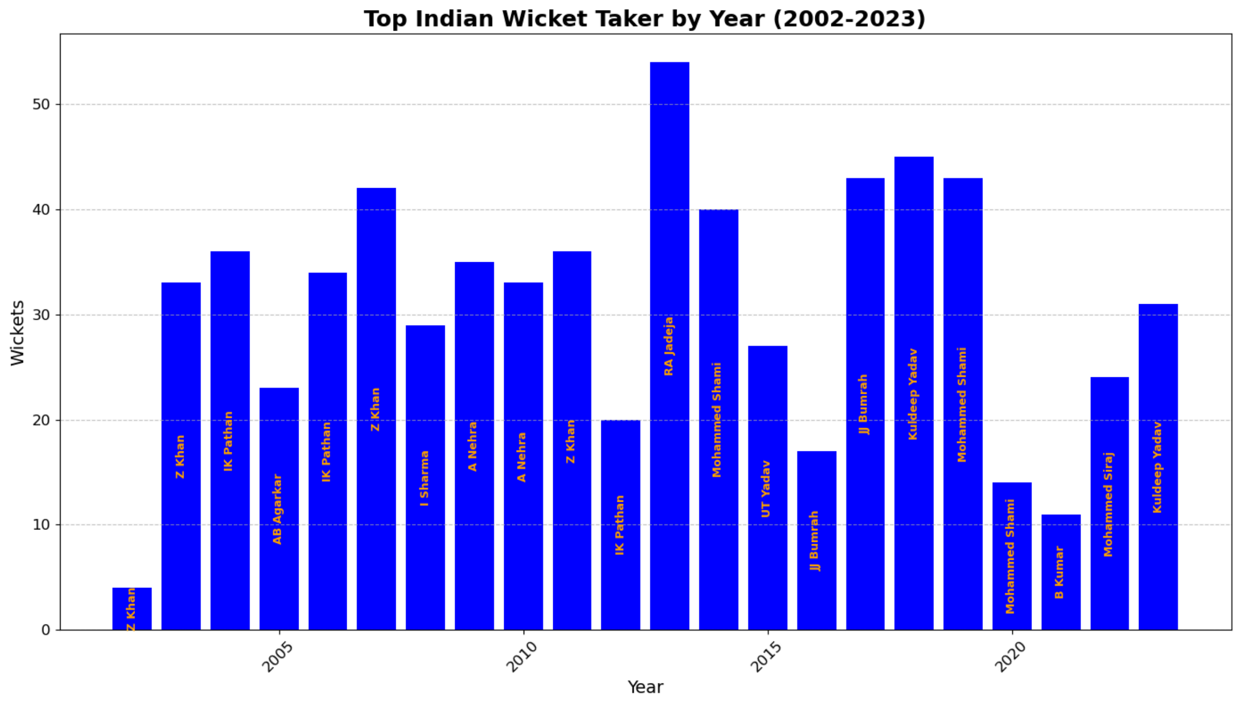
```
In [309… # Filter the data to include only instances where a wicket was taken
         wicket_data_indian = indian_bowlers_data[indian_bowlers_data['wicket_type'].notnull()]
```

```
In [310… # Aggregate wickets by year and bowler
         yearly_wickets_indian = wicket_data_indian.groupby(['Year', 'bowler'])['wicket_type'].
```

```
In [311…  # Identify the top wicket-taker for each year
          top_wicket_takers_indian_each_year = yearly_wickets_indian.loc[yearly_wickets_indian.g
```

```
In [312…  # Filter the data for years 2002 to 2023
          top_wicket_takers_indian_each_year = top_wicket_takers_indian_each_year[top_wicket_tak
```

```
In [342…  # Plot the results
          plt.figure(figsize=(14, 8))
          plt.bar(top_wicket_takers_indian_each_year['Year'], top_wicket_takers_indian_each_year

          # Adding text labels inside each bar
          for i in range(len(top_wicket_takers_indian_each_year)):
              plt.text(top_wicket_takers_indian_each_year['Year'].iloc[i],
                       top_wicket_takers_indian_each_year['wicket_type'].iloc[i] / 2,  # Positic
                       top_wicket_takers_indian_each_year['bowler'].iloc[i],
                       ha='center', va='center', rotation=90, fontsize=9, color='orange', fontwe

          # Enhancements
          plt.xlabel('Year', fontsize=14)
          plt.ylabel('Wickets', fontsize=14)
          plt.title('Top Indian Wicket Taker by Year (2002-2023)', fontsize=18, fontweight='bolc
          plt.xticks(rotation=45, fontsize=12)
          plt.yticks(fontsize=12)
          plt.grid(axis='y', linestyle='--', alpha=0.7)
          plt.tight_layout()

          plt.show()
```



3. Australia

Most Runs by Australian Batsman (2002-2023)

In [4]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

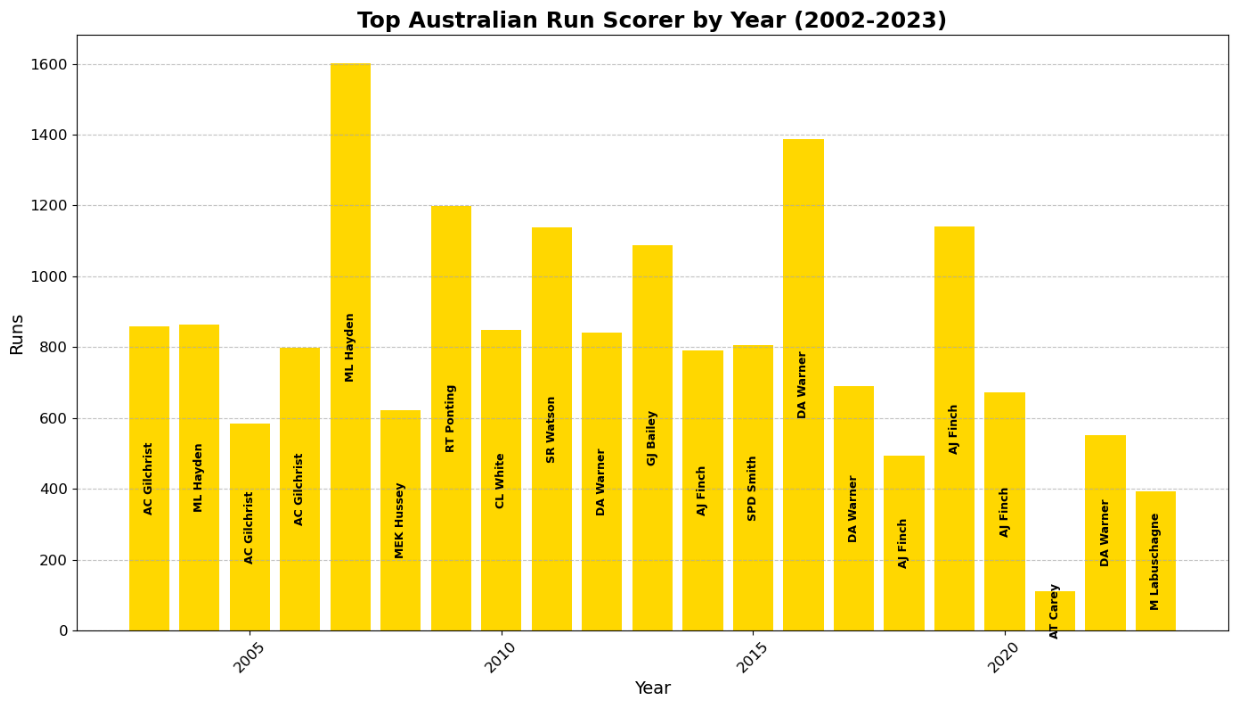
In [314…
```
# Filter the data to include only Australian batsmen (assuming 'batting_team' column e
australian_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'Australia'
```

In [315…
```
# Aggregate runs by year and batsman (striker)
yearly_runs_australian = australian_batsmen_data.groupby(['Year', 'striker'])['runs_of
```

In [316…
```
# Identify the top scorer for each year
top_scorers_australian_each_year = yearly_runs_australian.loc[yearly_runs_australian.g
```

In [317…
```
# Filter the data for years 2002 to 2023
top_scorers_australian_each_year = top_scorers_australian_each_year[top_scorers_austra
```

In [343…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_australian_each_year['Year'], top_scorers_australian_each_year['ru

# Adding text labels inside each bar
for i in range(len(top_scorers_australian_each_year)):
    plt.text(top_scorers_australian_each_year['Year'].iloc[i],
             top_scorers_australian_each_year['runs_off_bat'].iloc[i] / 2,  # Positior
             top_scorers_australian_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='black', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top Australian Run Scorer by Year (2002-2023)', fontsize=18, fontweight='bc
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



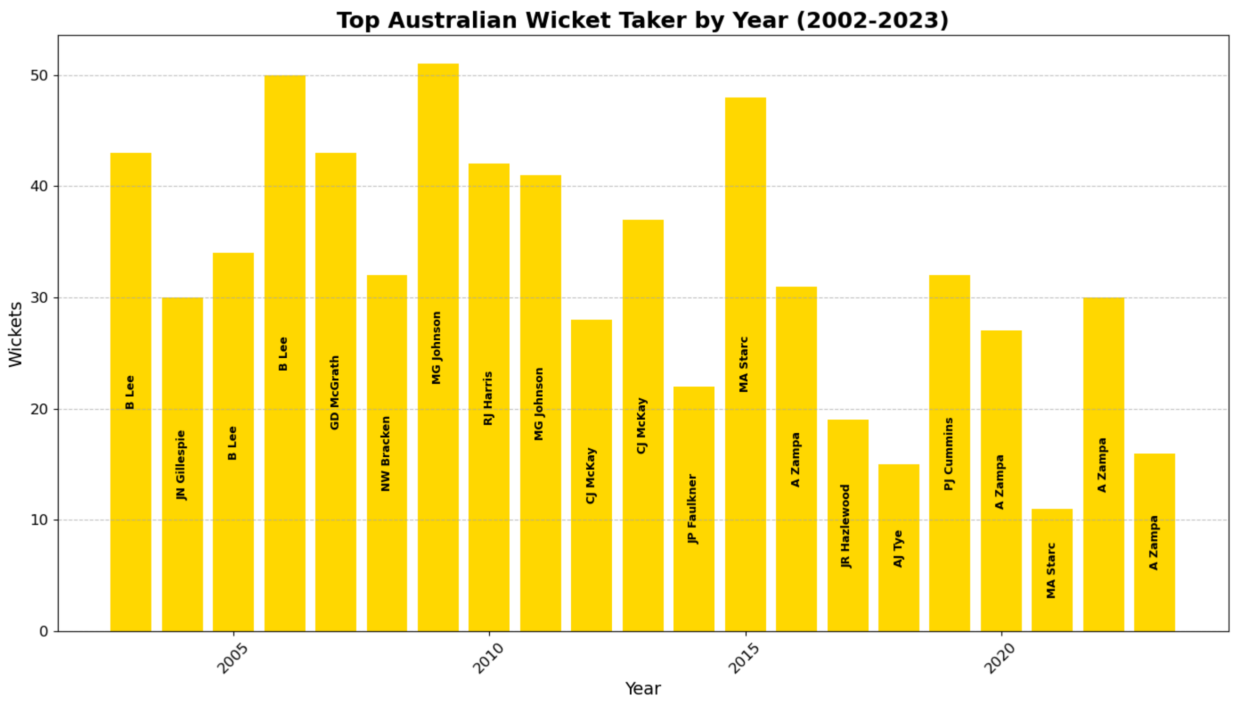
Most Wickets by Australian Bowler (2002-2023)

In [5]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [322…
```
# Filter the data to include only Australian bowlers (assuming 'bowling_team' column e
australian_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'Australia'
```

In [323…
```
# Filter the data to include only instances where a wicket was taken
wicket_data_australian = australian_bowlers_data[australian_bowlers_data['wicket_type'

# Aggregate wickets by year and bowler
yearly_wickets_australian = wicket_data_australian.groupby(['Year', 'bowler'])['wicket

# Identify the top wicket-taker for each year
top_wicket_takers_australian_each_year = yearly_wickets_australian.loc[yearly_wickets_

# Filter the data for years 2002 to 2023
top_wicket_takers_australian_each_year = top_wicket_takers_australian_each_year[top_wi
```

In [345…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_wicket_takers_australian_each_year['Year'], top_wicket_takers_australian_e

# Adding text labels inside each bar
for i in range(len(top_wicket_takers_australian_each_year)):
    plt.text(top_wicket_takers_australian_each_year['Year'].iloc[i],
             top_wicket_takers_australian_each_year['wicket_type'].iloc[i] / 2,  # Pos
             top_wicket_takers_australian_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='black', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top Australian Wicket Taker by Year (2002-2023)', fontsize=18, fontweight='
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



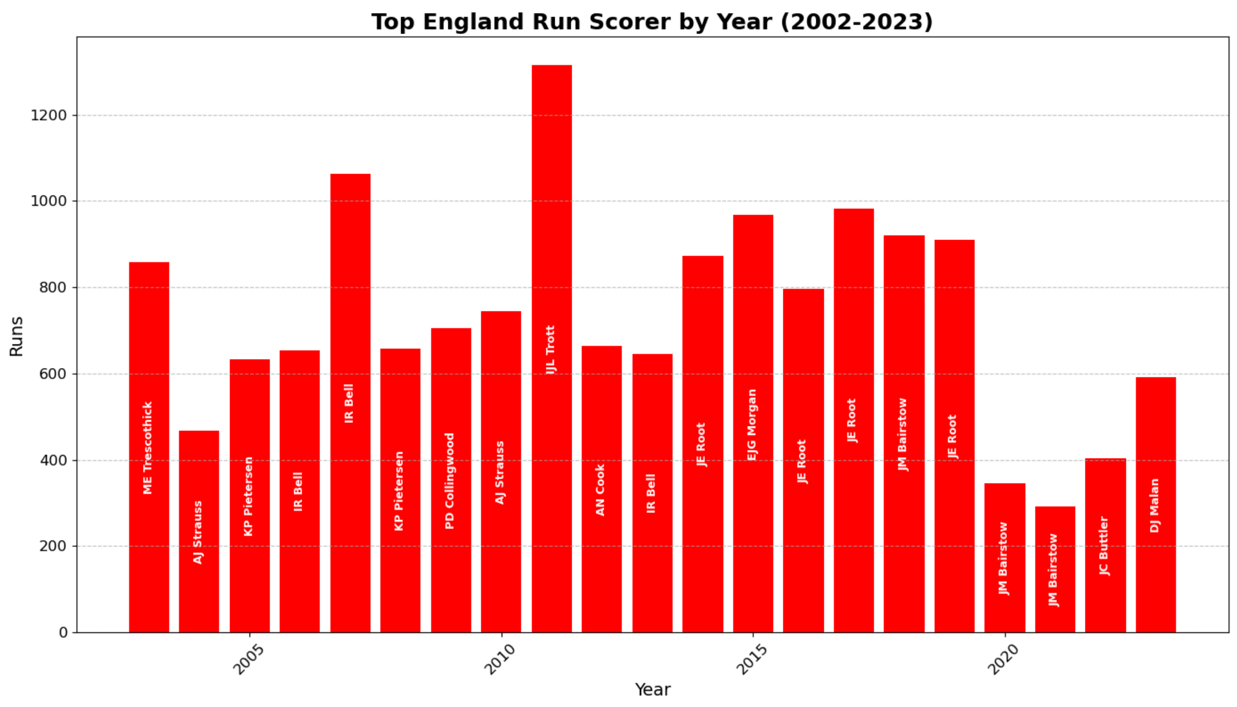
4. England

Most Runs by English Batsman (2002-2023)

In [6]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [325…
```
# Filter the data to include only England batsmen (assuming 'batting_team' column exis
england_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'England']

# Aggregate runs by year and batsman (striker)
yearly_runs_england = england_batsmen_data.groupby(['Year', 'striker'])['runs_off_bat'

# Identify the top scorer for each year
top_scorers_england_each_year = yearly_runs_england.loc[yearly_runs_england.groupby('Y

# Filter the data for years 2002 to 2023
top_scorers_england_each_year = top_scorers_england_each_year[top_scorers_england_each
```

In [346…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_england_each_year['Year'], top_scorers_england_each_year['runs_off
# Adding text labels inside each bar
for i in range(len(top_scorers_england_each_year)):
    plt.text(top_scorers_england_each_year['Year'].iloc[i],
             top_scorers_england_each_year['runs_off_bat'].iloc[i] / 2,  # Position th
             top_scorers_england_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top England Run Scorer by Year (2002-2023)', fontsize=18, fontweight='bold'
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



Most Wickets by English Bowler (2002-2023)

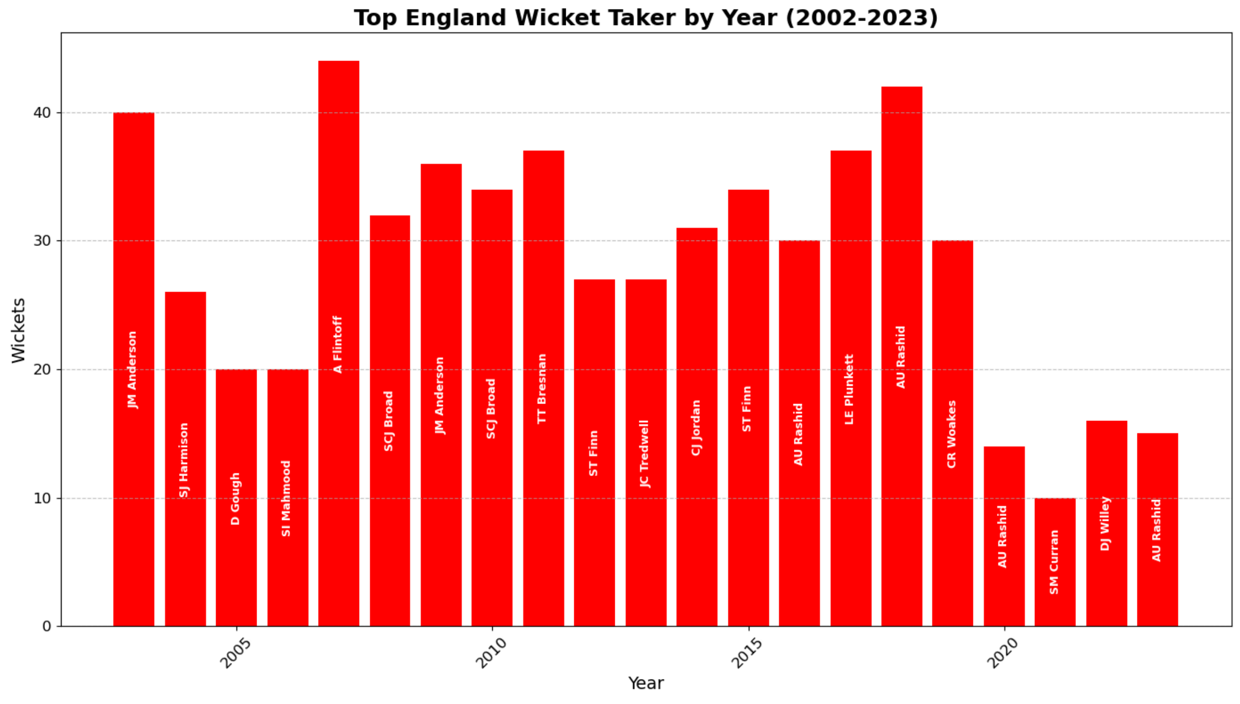
In [7]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [327…
```
# Filter the data to include only England bowlers (assuming 'bowling_team' column exis
england_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'England']

# Filter the data to include only instances where a wicket was taken
wicket_data_england = england_bowlers_data[england_bowlers_data['wicket_type'].notnull

# Aggregate wickets by year and bowler
yearly_wickets_england = wicket_data_england.groupby(['Year', 'bowler'])['wicket_type'

# Identify the top wicket-taker for each year
top_wicket_takers_england_each_year = yearly_wickets_england.loc[yearly_wickets_englar
```

```
# Filter the data for years 2002 to 2023
top_wicket_takers_england_each_year = top_wicket_takers_england_each_year[top_wicket_t
```

In [349…

```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_wicket_takers_england_each_year['Year'], top_wicket_takers_england_each_ye

# Adding text labels inside each bar
for i in range(len(top_wicket_takers_england_each_year)):
    plt.text(top_wicket_takers_england_each_year['Year'].iloc[i],
             top_wicket_takers_england_each_year['wicket_type'].iloc[i] / 2,  # Positi
             top_wicket_takers_england_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top England Wicket Taker by Year (2002-2023)', fontsize=18, fontweight='bol
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



5. South Africa

Most Runs by South African Batsman (2002-2023)

In [8]:

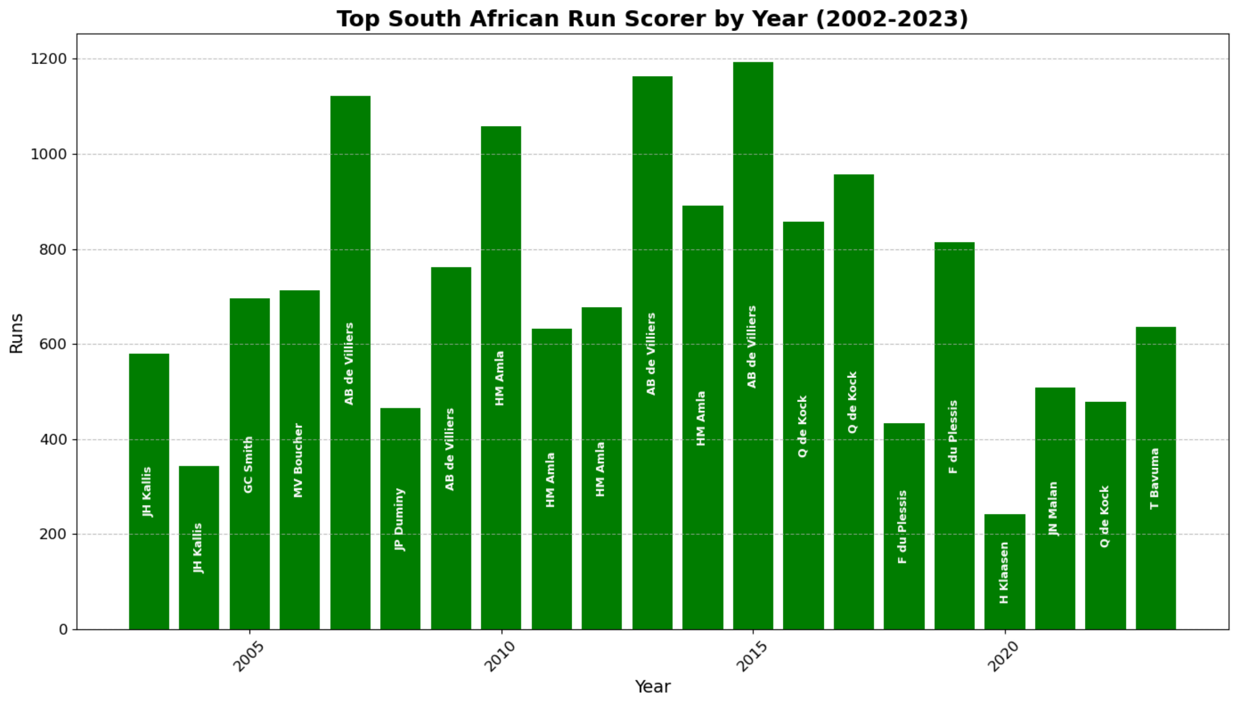
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [329…

```
# Filter the data to include only South African batsmen (assuming 'batting_team' colum
south_african_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'South A

# Aggregate runs by year and batsman (striker)
yearly_runs_south_african = south_african_batsmen_data.groupby(['Year', 'striker'])['r

# Identify the top scorer for each year
top_scorers_south_african_each_year = yearly_runs_south_african.loc[yearly_runs_south_

# Filter the data for years 2002 to 2023
top_scorers_south_african_each_year = top_scorers_south_african_each_year[top_scorers_
```

In [350…

```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_south_african_each_year['Year'], top_scorers_south_african_each_ye

# Adding text labels inside each bar
for i in range(len(top_scorers_south_african_each_year)):
    plt.text(top_scorers_south_african_each_year['Year'].iloc[i],
             top_scorers_south_african_each_year['runs_off_bat'].iloc[i] / 2,  # Posit
             top_scorers_south_african_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top South African Run Scorer by Year (2002-2023)', fontsize=18, fontweight=
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```

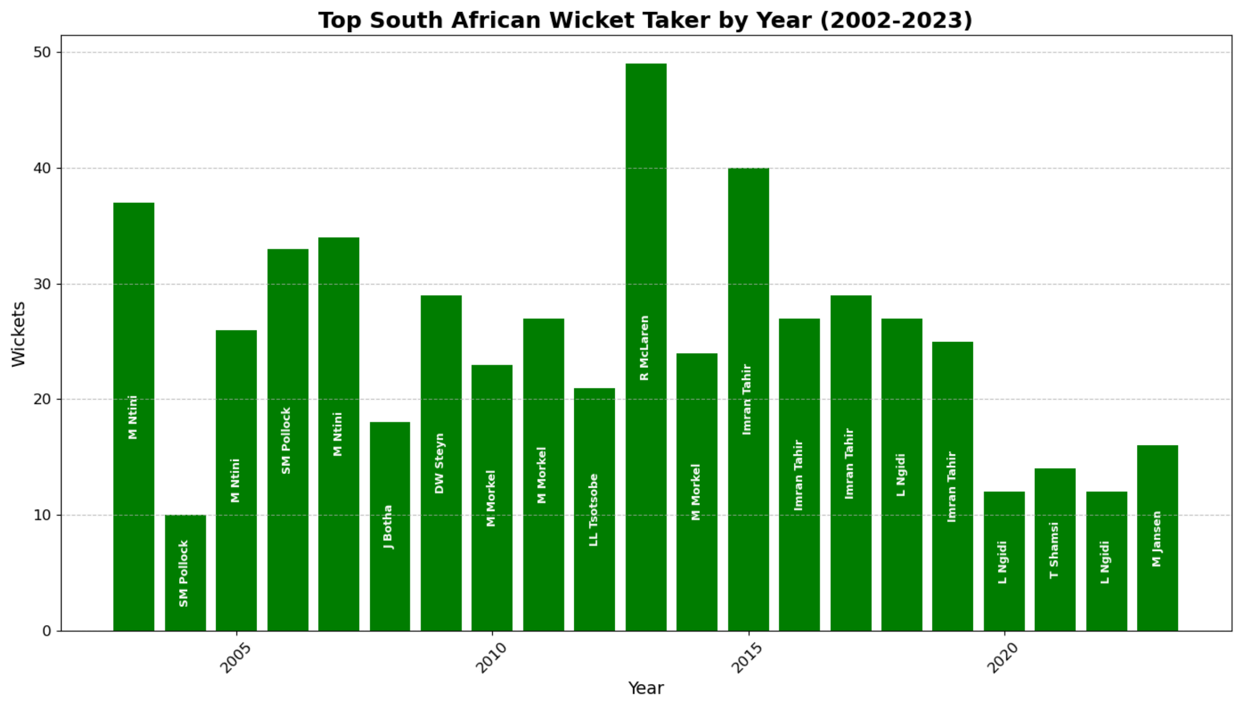


Most Wickets by South African Bowler (2002-2023)

In [9]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [331…
```
# Filter the data to include only South African bowlers (assuming 'bowling_team' colum
south_african_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'South A

# Filter the data to include only instances where a wicket was taken
wicket_data_south_african = south_african_bowlers_data[south_african_bowlers_data['wic

# Aggregate wickets by year and bowler
yearly_wickets_south_african = wicket_data_south_african.groupby(['Year', 'bowler'])['

# Identify the top wicket-taker for each year
top_wicket_takers_south_african_each_year = yearly_wickets_south_african.loc[yearly_wi

# Filter the data for years 2002 to 2023
top_wicket_takers_south_african_each_year = top_wicket_takers_south_african_each_year[
```

In [351…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_wicket_takers_south_african_each_year['Year'], top_wicket_takers_south_afr

# Adding text labels inside each bar
for i in range(len(top_wicket_takers_south_african_each_year)):
    plt.text(top_wicket_takers_south_african_each_year['Year'].iloc[i],
             top_wicket_takers_south_african_each_year['wicket_type'].iloc[i] / 2,  #
             top_wicket_takers_south_african_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top South African Wicket Taker by Year (2002-2023)', fontsize=18, fontweigh
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



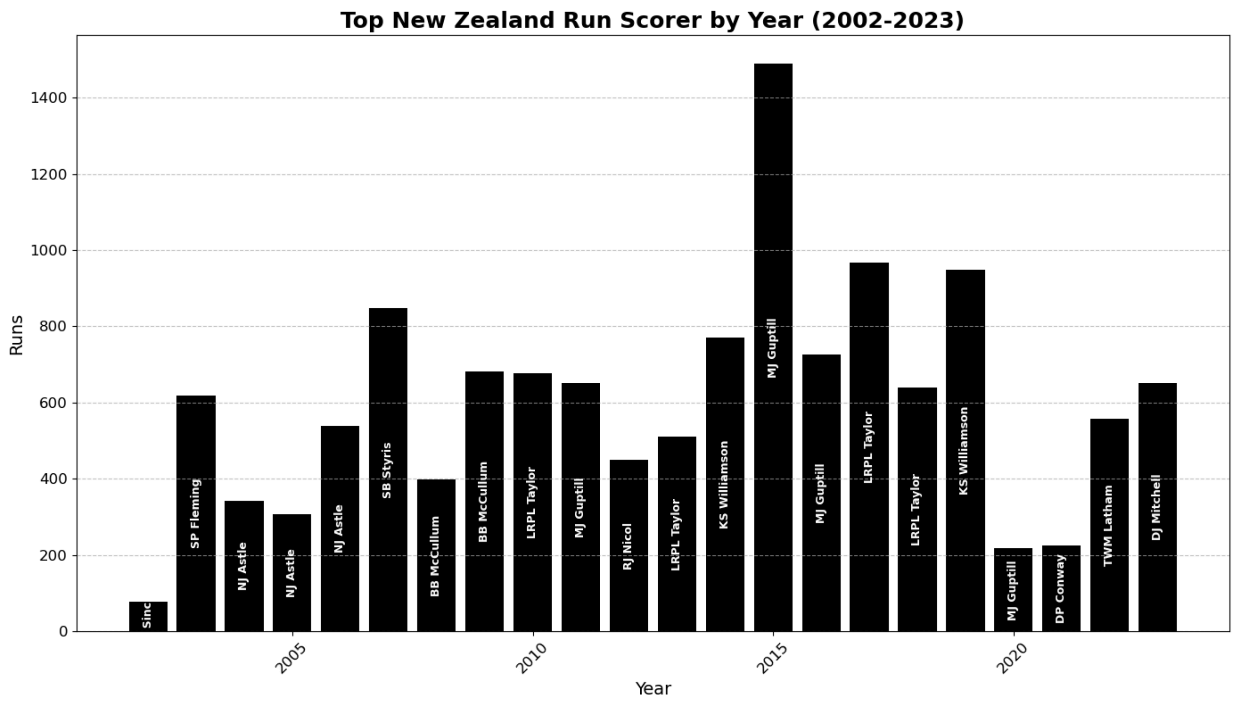
6. New Zealand

Most Runs by New Zealand Batsman (2002-2023)

In [10]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [333…
```
# Filter the data to include only New Zealand batsmen (assuming 'batting_team' column
nz_batsmen_data = odi_match_data[odi_match_data['batting_team'] == 'New Zealand']

# Aggregate runs by year and batsman (striker)
yearly_runs_nz = nz_batsmen_data.groupby(['Year', 'striker'])['runs_off_bat'].sum().re

# Identify the top scorer for each year
top_scorers_nz_each_year = yearly_runs_nz.loc[yearly_runs_nz.groupby('Year')['runs_off

# Filter the data for years 2002 to 2023
top_scorers_nz_each_year = top_scorers_nz_each_year[top_scorers_nz_each_year['Year'].b
```

In [352…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_scorers_nz_each_year['Year'], top_scorers_nz_each_year['runs_off_bat'], co

# Adding text labels inside each bar
for i in range(len(top_scorers_nz_each_year)):
    plt.text(top_scorers_nz_each_year['Year'].iloc[i],
             top_scorers_nz_each_year['runs_off_bat'].iloc[i] / 2,  # Position the tex
             top_scorers_nz_each_year['striker'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Runs', fontsize=14)
plt.title('Top New Zealand Run Scorer by Year (2002-2023)', fontsize=18, fontweight='b
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



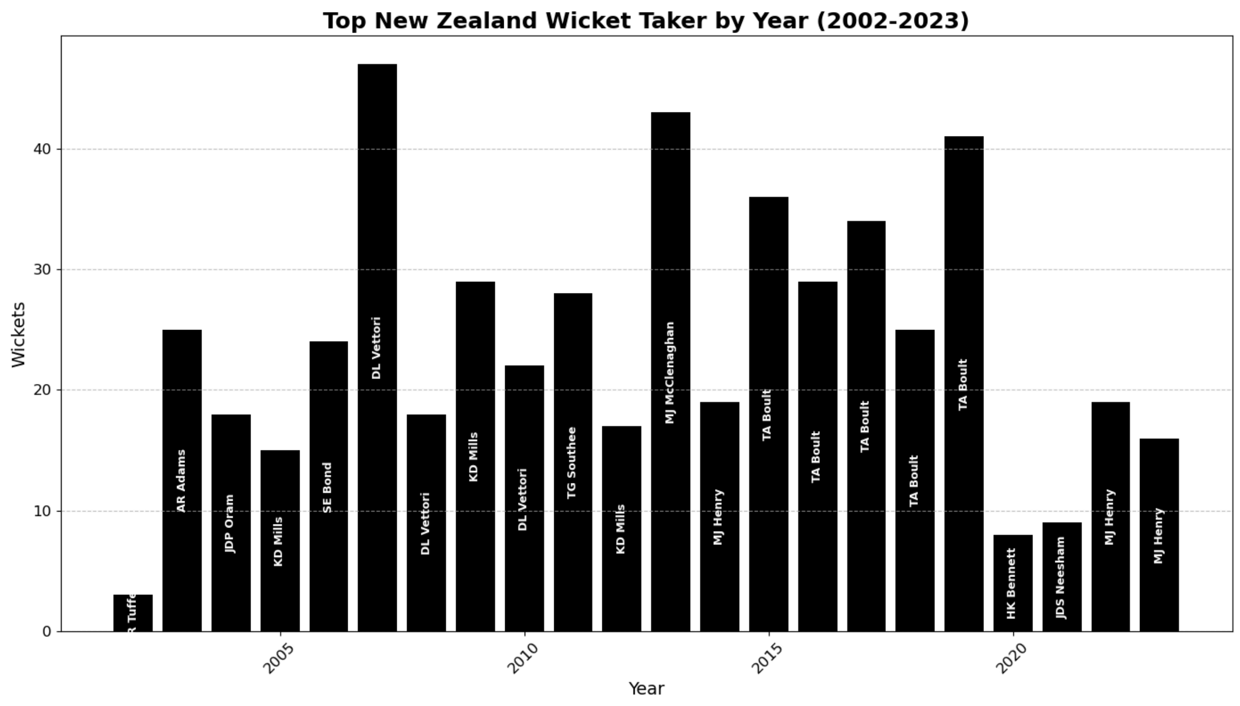
Most Wickets by New Zealand Bowler (2002-2023)

In [11]:
```
# Convert the 'start_date' column to datetime already done in Top Run Scorer Batsman

# Extract the year already done in Top Run Scorer Batsman
```

In [335…
```
# Filter the data to include only New Zealand bowlers (assuming 'bowling_team' column
nz_bowlers_data = odi_match_data[odi_match_data['bowling_team'] == 'New Zealand']

# Filter the data to include only instances where a wicket was taken
wicket_data_nz = nz_bowlers_data[nz_bowlers_data['wicket_type'].notnull()]

# Aggregate wickets by year and bowler
yearly_wickets_nz = wicket_data_nz.groupby(['Year', 'bowler'])['wicket_type'].count().

# Identify the top wicket-taker for each year
top_wicket_takers_nz_each_year = yearly_wickets_nz.loc[yearly_wickets_nz.groupby('Year

# Filter the data for years 2002 to 2023
top_wicket_takers_nz_each_year = top_wicket_takers_nz_each_year[top_wicket_takers_nz_e
```

In [353…
```
# Plot the results
plt.figure(figsize=(14, 8))
plt.bar(top_wicket_takers_nz_each_year['Year'], top_wicket_takers_nz_each_year['wicket

# Adding text labels inside each bar
```

```
for i in range(len(top_wicket_takers_nz_each_year)):
    plt.text(top_wicket_takers_nz_each_year['Year'].iloc[i],
             top_wicket_takers_nz_each_year['wicket_type'].iloc[i] / 2,  # Position th
             top_wicket_takers_nz_each_year['bowler'].iloc[i],
             ha='center', va='center', rotation=90, fontsize=9, color='white', fontwei

# Enhancements
plt.xlabel('Year', fontsize=14)
plt.ylabel('Wickets', fontsize=14)
plt.title('Top New Zealand Wicket Taker by Year (2002-2023)', fontsize=18, fontweight=
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()

plt.show()
```



In [ ]: