Matchup: ABD vs Bumrah

In [1]:
```
import warnings
warnings.filterwarnings('ignore')

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

# to display all rows columns
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.expand_frame_repr', False)
pd.set_option('max_colwidth',-1)
```

In [2]:
```
df= pd.read_csv('C:\\Users\\Smital Bhalerao\\Desktop\\IPL_ball_by_ball_updated.csv')
```

In [3]:
```
df.head(1)
```

Out[3]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_striker	bowler	runs_off_bat	ex
0	335982	2008	2008-04-18	M Chinnaswamy Stadium	2	6.8	Royal Challengers Bangalore	Kolkata Knight Riders	MV Boucher	CL White	AB Agarkar	4	

In [4]:
```
df.innings.unique()
```

Out[4]:
```
array([2, 1, 4, 3, 6, 5], dtype=int64)
```

In [5]:
```
# 1 & 2 are the match inngins
# 3 & 4 are the superover innings
# 5 & 6 are the double superover innings
```

In [6]:
```
df= df[ (df.innings == 1) | (df.innings == 2) ]
```

In [7]:
```
df.innings.unique()
```

Out[7]:
```
array([2, 1], dtype=int64)
```

In [8]:
```
# what are the numbers when ABD faces Bumrah?
# step 1: Filter by player names
# step 2: use these names & assign it to striker and bowler
# step 3: get the required columns
```

In [9]:
```
df.bowling_team.unique()
```

Out[9]:
```
array(['Kolkata Knight Riders', 'Royal Challengers Bangalore',
       'Delhi Daredevils', 'Chennai Super Kings', 'Rajasthan Royals',
       'Kings XI Punjab', 'Mumbai Indians', 'Deccan Chargers',
       'Kochi Tuskers Kerala', 'Pune Warriors', 'Sunrisers Hyderabad',
       'Rising Pune Supergiants', 'Gujarat Lions',
       'Rising Pune Supergiant', 'Delhi Capitals', 'Punjab Kings'],
      dtype=object)
```

In [10]:
```
df[df.bowling_team== 'Mumbai Indians']['bowler'].unique()
```

Out[10]:
```
array(['DS Kulkarni', 'Harbhajan Singh', 'A Nehra', 'AM Nayar',
       'ST Jayasuriya', 'SM Pollock', 'MA Khote', 'DJ Bravo',
       'VS Yeligati', 'SD Chitnis', 'CRD Fernando', 'DJ Thornely',
       'RR Raje', 'DR Smith', 'A Nel', 'SL Malinga', 'Z Khan',
       'SR Tendulkar', 'JP Duminy', 'GR Napier', 'C Nanda', 'AM Rahane',
       'RA Shaikh', 'R McLaren', 'R Sathish', 'AG Murtaza', 'KA Pollard',
       'AN Ahmed', 'STR Binny', 'JEC Franklin', 'MM Patel', 'RG Sharma',
       'A Symonds', 'TL Suman', 'RW Price', 'PP Ojha', 'RP Singh',
       'CJ McKay', 'NLTC Perera', 'RJ Peterson', 'R Shukla', 'JJ Bumrah',
       'MG Johnson', 'JDP Oram', 'R Dhawan', 'YS Chahal', 'P Suyal',
       'GJ Maxwell', 'NM Coulter-Nile', 'CJ Anderson', 'P Kumar',
       'LMP Simmons', 'S Gopal', 'K Santokie', 'M de Lange',
       'R Vinay Kumar', 'J Suchith', 'MJ McClenaghan', 'HH Pandya',
       'TG Southee', 'KH Pandya', 'N Rana', 'KV Sharma', 'M Markande',
       'Mustafizur Rahman', 'PJ Sangwan', 'BCJ Cutting', 'A Dananjaya',
       'Rasikh Salam', 'RD Chahar', 'JP Behrendorff', 'AS Joseph',
       'J Yadav', 'AS Roy', 'BB Sran', 'TA Boult', 'JL Pattinson',
       'M Jansen', 'AF Milne', 'JDS Neesham', 'PP Chawla'], dtype=object)
```

In [11]:
```
df[df.batting_team== 'Royal Challengers Bangalore']['striker'].unique()
```

Out[11]:
```
array(['MV Boucher', 'W Jaffer', 'JH Kallis', 'CL White', 'V Kohli',
       'R Dravid', 'P Kumar', 'Z Khan', 'SB Joshi', 'AA Noffke',
       'B Akhil', 'LRPL Taylor', 'S Chanderpaul', 'R Vinay Kumar',
       'B Chipli', 'DW Steyn', 'Misbah-ul-Haq', 'DT Patil', 'A Kumble',
       'J Arunkumar', 'Abdur Razzak', 'SP Goswami', 'KP Pietersen',
       'RV Uthappa', 'JD Ryder', 'R Bishnoi', 'KV Sharma', 'Pankaj Singh',
       'MK Pandey', 'RE van der Merwe', 'KP Appanna', 'D du Preez',
       'EJG Morgan', 'A Mithun', 'S Sriram', 'AUK Pathan',
       'AB de Villiers', 'TM Dilshan', 'SS Tiwary', 'MA Agarwal',
       'DL Vettori', 'CA Pujara', 'JJ van der Wath', 'R Ninan',
       'S Aravind', 'CH Gayle', 'J Syed Mohammad', 'M Kaif',
       'LA Pomersbach', 'KB Arun Karthik', 'CK Langeveldt', 'AB McDonald',
       'HV Patel', 'RR Bhatkal', 'M Muralitharan', 'P Parameswaran',
       'KK Nair', 'DT Christian', 'MC Henriques', 'M Kartik',
       'JD Unadkat', 'R Rampaul', 'KL Rahul', 'A Mukund', 'Yuvraj Singh',
       'PA Patel', 'NJ Maddinson', 'JA Morkel', 'YV Takawale', 'MA Starc',
       'AB Dinda', 'S Rana', 'VR Aaron', 'RR Rossouw', 'YS Chahal',
       'VH Zol', 'AN Ahmed', 'KD Karthik', 'Mandeep Singh', 'DJG Sammy',
       'SA Abbott', 'D Wiese', 'Iqbal Abdulla', 'MS Bisla', 'SN Khan',
       'KM Jadhav', 'SR Watson', 'TM Head', 'KW Richardson', 'STR Binny',
       'Sachin Baby', 'Parvez Rasool', 'CJ Jordan', 'TS Mills',
       'A Choudhary', 'P Negi', 'Vishnu Vinod', 'AF Milne', 'S Badree',
       'CR Woakes', 'BB McCullum', 'Q de Kock', 'Washington Sundar',
       'CJ Anderson', 'UT Yadav', 'Mohammed Siraj', 'M Vohra',
       'C de Grandhomme', 'TG Southee', 'M Ashwin', 'MM Ali',
       'SO Hetmyer', 'S Dube', 'NA Saini', 'P Ray Barman', 'MP Stoinis',
       'AD Nath', 'Gurkeerat Singh', 'H Klaasen', 'D Padikkal',
       'JR Philippe', 'AJ Finch', 'I Udana', 'CH Morris', 'Shahbaz Ahmed',
       'GJ Maxwell', 'RM Patidar', 'KA Jamieson', 'DR Sams', 'KS Bharat',
       'PWH de Silva', 'TH David', 'GHS Garton'], dtype=object)
```

In [12]:
```
# player 1: JJ Bumrah
# player 2: AB de Villiers
```

In [13]:
```
req_df= df[(df.striker == 'AB de Villiers') & (df.bowler == 'JJ Bumrah')]
```

In [14]:
```
req_df.head()
```

Out[14]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_striker	bowler	runs_off_bat
95691	729287	2014	2014-04-19	Dubai International Cricket Stadium	2	6.1	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	PA Patel	JJ Bumrah	2
95692	729287	2014	2014-04-19	Dubai International Cricket Stadium	2	6.2	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	PA Patel	JJ Bumrah	1
95695	729287	2014	2014-04-19	Dubai International Cricket Stadium	2	6.4	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	PA Patel	JJ Bumrah	1
95928	729287	2014	2014-04-19	Dubai International Cricket Stadium	2	11.6	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	PA Patel	JJ Bumrah	0
95942	729287	2014	2014-04-19	Dubai International Cricket Stadium	2	11.1	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	PA Patel	JJ Bumrah	6

In [15]:
```
# No. of runs scored?
# No. of balls faced?
# No. of times dismissed?
```

In [16]:
```
req_df.runs_off_bat
```

Out[16]:
```
95691     2
95692     1
95695     1
95928     0
95942     6
95943     0
95944     1
95946     0
100873    0
100874    0
100875    0
112402    0
119405    6
119406    6
119407    0
119408    1
119467    1
119472    1
119480    0
119504    2
119505    1
119522    1
119524    4
119525    2
119526    2
125636    1
125638    1
132075    1
132076    0
132077    0
132078    0
132079    0
132080    0
132099    1
139430    1
139431    6
139433    1
166261    1
166273    0
166276    0
```

```
166277    1
166304    1
166306    1
166308    0
166309    0
172149    0
172151    4
172152    0
172153    0
172200    0
172201    0
172206    0
172212    3
172215    1
172225    4
172226    4
172227    0
172228    0
172229    1
172252    0
181411    6
181414    1
181415    4
181423    6
181425    0
181426    6
181427    0
181428    4
190678    1
190679    0
193682    1
193687    1
193694    4
193695    2
193696    4
193697    1
193699    1
193724    0
193738    1
202698    0
202709    0
202710    4
202711    0
```

```
202713    1
202714    6
202715    0
Name: runs_off_bat, dtype: int64
```

In [17]:
```
# runs scored
sum(req_df.runs_off_bat)
```

Out[17]: 125

In [18]:
```
# balls faced
len(req_df)
```

Out[18]: 86

In [19]:
```
# i.e 86 balls and 125 runs
```

In [20]:
```
# here we need to get out information
req_df[req_df.player_dismissed == 'AB de Villiers']
```

Out[20]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_striker	bowler	runs_off_bat
100873	733983	2014	2014-05-06	Wankhede Stadium	2	12.4	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	V Kohli	JJ Bumrah	0
112402	829737	2015	2015-04-19	M Chinnaswamy Stadium	2	14.2	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	D Wiese	JJ Bumrah	0
202698	1254108	2021	2021-09-26	Dubai International Cricket Stadium	1	18.5	Royal Challengers Bangalore	Mumbai Indians	AB de Villiers	DT Christian	JJ Bumrah	0

In [21]:
```
len(req_df[req_df.player_dismissed == 'AB de Villiers'])
```

Out[21]: 3

In [22]:
```
# strike rate
100*sum(req_df.runs_off_bat)/len(req_df)
```

Out[22]:
```
145.34883720930233
```

In [23]:
```
# comparision against all batsman bumrah has bowled
```

In [24]:
```
df.head(1)
```

Out[24]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_striker	bowler	runs_off_bat	ex
0	335982	2008	2008-04-18	M Chinnaswamy Stadium	2	6.8	Royal Challengers Bangalore	Kolkata Knight Riders	MV Boucher	CL White	AB Agarkar	4	

In [25]:
```
bumrah_df = df[df.bowler== 'JJ Bumrah']
```

In [26]:
```
bumrah_df.head()
```

Out[26]:

	match_id	season	start_date	venue	innings	ball	batting_team	bowling_team	striker	non_striker	bowler	runs_off_bat
76627	597999	2013	2013-04-04	M Chinnaswamy Stadium	1	12.6	Royal Challengers Bangalore	Mumbai Indians	CH Gayle	KB Arun Karthik	JJ Bumrah	1
76628	597999	2013	2013-04-04	M Chinnaswamy Stadium	1	12.5	Royal Challengers Bangalore	Mumbai Indians	KB Arun Karthik	CH Gayle	JJ Bumrah	1
76629	597999	2013	2013-04-04	M Chinnaswamy Stadium	1	12.4	Royal Challengers Bangalore	Mumbai Indians	KK Nair	CH Gayle	JJ Bumrah	0
76630	597999	2013	2013-04-04	M Chinnaswamy Stadium	1	12.3	Royal Challengers Bangalore	Mumbai Indians	CH Gayle	KK Nair	JJ Bumrah	1
76631	597999	2013	2013-04-04	M Chinnaswamy Stadium	1	12.2	Royal Challengers Bangalore	Mumbai Indians	CH Gayle	KK Nair	JJ Bumrah	0

In [27]:
```
# runs scored by this batsman
bumrah_df.groupby('striker')['runs_off_bat'].sum()
```

```
MC Henriques        11
MJ Guptill           9
MJ Santner           2
MK Pandey           61
MK Tiwary           30
MM Ali              10
MP Stoinis          14
MS Dhoni            56
Mandeep Singh       17
Mohammad Nabi       15
Mohammed Shami       1
N Jagadeesan         0
N Pooran             7
N Rana              16
NLTC Perera          8
NS Naik              2
NV Ojha              1
P Dubey              1
P Negi              27
PA Patel            12
```

In [28]:
```
bdf1= bumrah_df.groupby('striker')['runs_off_bat'].sum()
```

In [29]:
```
bumrah_df.groupby('striker')['ball'].count()
```

Out[29]:
```
striker
A Mishra              5
AB de Villiers       86
AD Nath               4
AD Russell           41
AJ Finch             29
AJ Turner             1
AJ Tye                7
AK Markram            2
AM Rahane            35
AR Patel             32
AS Rajpoot            6
AT Carey              6
AT Rayudu            34
Abdul Samad          10
Abhishek Sharma      11
B Kumar               8
BA Stokes            22
BB McCullum          23
```

In [30]:
```
bdf2 = bumrah_df.groupby('striker')['ball'].count()
```

In [31]:
```
bdf2.head()
```

Out[31]:
```
striker
A Mishra          5
AB de Villiers    86
AD Nath           4
AD Russell        41
AJ Finch          29
Name: ball, dtype: int64
```

In [32]:
```
bdf1= pd.DataFrame(bumrah_df.groupby('striker')['runs_off_bat'].sum()).reset_index()
```

In [33]:
```
bdf1.head()
```

Out[33]:

	striker	runs_off_bat
0	A Mishra	1
1	AB de Villiers	125
2	AD Nath	4
3	AD Russell	51
4	AJ Finch	24

In [34]:
```
bdf2 = pd.DataFrame(bumrah_df.groupby('striker')['ball'].count()).reset_index()
```

In [35]:
```
bdf2.head()
```

Out[35]:

	striker	ball
0	A Mishra	5
1	AB de Villiers	86
2	AD Nath	4
3	AD Russell	41
4	AJ Finch	29

In [36]:
```
bdf3 = bdf1.merge(bdf2, on='striker', how= 'left')
```

In [37]:
```
bdf3.head(1)
```

Out[37]:

	striker	runs_off_bat	ball
0	A Mishra	1	5

In [38]:
```
# strike rate
bdf3['strike_rate']= 100*bdf3['runs_off_bat']/bdf3['ball']
```

In [39]:
```
bdf3.head(1)
```

Out[39]:

	striker	runs_off_bat	ball	strike_rate
0	A Mishra	1	5	20.0

In [40]:
```
# min criteria : 30 balls
```

In [41]:
```
bdf3 = bdf3[bdf3.ball >= 30]
```

In [42]:
```
bdf3.head()
```

Out[42]:

	striker	runs_off_bat	ball	strike_rate
1	AB de Villiers	125	86	145.348837
3	AD Russell	51	41	124.390244
8	AM Rahane	43	35	122.857143
9	AR Patel	21	32	65.625000
12	AT Rayudu	48	34	141.176471

In [43]:
```
abd_df = df[df.striker== 'AB de Villiers']
```

In [44]:
```
# runs scored by this bowler
abddf1= pd.DataFrame(abd_df.groupby('bowler')['runs_off_bat'].sum()).reset_index()
```

In [45]:
```
abddf1.head()
```

Out[45]:

	bowler	runs_off_bat
0	A Ashish Reddy	46
1	A Chandila	26
2	A Flintoff	34
3	A Kumble	39
4	A Mishra	40

In [46]:
```
# balls faced
abddf2= pd.DataFrame(abd_df.groupby('bowler')['ball'].count()).reset_index()
```

In [47]:
```
abddf2.head()
```

Out[47]:

	bowler	ball
0	A Ashish Reddy	18
1	A Chandila	11
2	A Flintoff	12
3	A Kumble	41
4	A Mishra	37

In [48]:
```
abddf3 = abddf1.merge(abddf2, on='bowler', how= 'left')
```

In [49]:
```
abddf3.head(1)
```

Out[49]:

	bowler	runs_off_bat	ball
0	A Ashish Reddy	46	18

In [50]:
```
# strike rate
abddf3['strike_rate']= 100*abddf3['runs_off_bat']/abddf3['ball']
```

In [51]:
```
abddf3.head()
```

Out[51]:

	bowler	runs_off_bat	ball	strike_rate
0	A Ashish Reddy	46	18	255.555556
1	A Chandila	26	11	236.363636
2	A Flintoff	34	12	283.333333
3	A Kumble	39	41	95.121951
4	A Mishra	40	37	108.108108

In [52]:
```
# min criteria: 30 balls
```

In [53]:
```
abddf3= abddf3[abddf3.ball >= 30]
```

In [54]:
```
# bdf3, abddf3
```

In [55]:
```
bdf3
```

Out[55]:

	striker	runs_off_bat	ball	strike_rate
1	AB de Villiers	125	86	145.348837
3	AD Russell	51	41	124.390244
8	AM Rahane	43	35	122.857143
9	AR Patel	21	32	65.625000
12	AT Rayudu	48	34	141.176471
28	CH Gayle	37	53	69.811321
36	DA Warner	54	47	114.893617
49	F du Plessis	58	34	170.588235
50	G Gambhir	29	33	87.878788
52	GJ Maxwell	44	39	112.820513
63	JC Buttler	37	33	112.121212
68	JP Duminy	70	33	212.121212
76	KD Karthik	54	33	163.636364
78	KL Rahul	111	87	127.586207
79	KM Jadhav	41	37	110.810811
92	MK Pandey	61	33	184.848485
96	MS Dhoni	56	58	96.551724
120	RA Jadeja	47	40	117.500000
124	RR Pant	47	43	109.302326
126	RV Uthappa	52	36	144.444444
128	S Dhawan	95	77	123.376623
135	SK Raina	50	39	128.205128
141	SPD Smith	68	57	119.298246
142	SR Watson	25	34	73.529412

	striker	runs_off_bat	ball	strike_rate
143	SS Iyer	59	40	147.500000
146	SV Samson	48	46	104.347826
158	V Kohli	126	85	148.235294
163	WP Saha	37	44	84.090909

In [56]:
```
bdf3.reset_index(inplace= True, drop= True)
```

In [57]:
```
abddf3.reset_index(inplace= True, drop= True)
```

In [58]:
```
bdf3.sort_values('strike_rate', ascending = False)
```

Out[58]:

	striker	runs_off_bat	ball	strike_rate
11	JP Duminy	70	33	212.121212
15	MK Pandey	61	33	184.848485
7	F du Plessis	58	34	170.588235
12	KD Karthik	54	33	163.636364
26	V Kohli	126	85	148.235294
24	SS Iyer	59	40	147.500000
0	AB de Villiers	125	86	145.348837
19	RV Uthappa	52	36	144.444444
4	AT Rayudu	48	34	141.176471
21	SK Raina	50	39	128.205128
13	KL Rahul	111	87	127.586207
1	AD Russell	51	41	124.390244
20	S Dhawan	95	77	123.376623
2	AM Rahane	43	35	122.857143
22	SPD Smith	68	57	119.298246
17	RA Jadeja	47	40	117.500000
6	DA Warner	54	47	114.893617
9	GJ Maxwell	44	39	112.820513
10	JC Buttler	37	33	112.121212
14	KM Jadhav	41	37	110.810811
18	RR Pant	47	43	109.302326
25	SV Samson	48	46	104.347826
16	MS Dhoni	56	58	96.551724
8	G Gambhir	29	33	87.878788

	striker	runs_off_bat	ball	strike_rate
27	WP Saha	37	44	84.090909
23	SR Watson	25	34	73.529412
5	CH Gayle	37	53	69.811321
3	AR Patel	21	32	65.625000

In [59]:
```
abddf3.sort_values('strike_rate', ascending = False)
```

Out[59]:

	bowler	runs_off_bat	ball	strike_rate
8	HH Pandya	88	39	225.641026
2	AD Russell	87	39	223.076923
15	JP Faulkner	62	30	206.666667
5	CH Morris	71	35	202.857143
19	Mohammed Shami	59	30	196.666667
30	SL Malinga	124	64	193.750000
33	Sandeep Sharma	107	57	187.719298
28	SB Jakati	55	30	183.333333
17	M Ashwin	55	31	177.419355
22	PV Tambe	54	32	168.750000
4	B Kumar	68	43	158.139535
18	MC Henriques	57	37	154.054054
6	DJ Bravo	72	47	153.191489
11	IK Pathan	67	44	152.272727
34	Shakib Al Hasan	49	33	148.484848
14	JJ Bumrah	125	86	145.348837
12	Imran Tahir	58	41	141.463415
27	S Nadeem	77	56	137.500000
9	Harbhajan Singh	110	81	135.802469
31	SP Narine	53	40	132.500000
7	DS Kulkarni	50	38	131.578947
24	RA Jadeja	111	93	119.354839
21	PP Ojha	39	33	118.181818
29	SK Warne	43	38	113.157895

	bowler	runs_off_bat	ball	strike_rate
23	R Ashwin	69	61	113.114754
10	I Sharma	37	34	108.823529
1	A Mishra	40	37	108.108108
32	SR Watson	53	50	106.000000
25	Rashid Khan	45	43	104.651163
16	KH Pandya	51	49	104.081633
20	PP Chawla	53	52	101.923077
3	AR Patel	71	70	101.428571
0	A Kumble	39	41	95.121951
26	S Gopal	30	34	88.235294
13	JH Kallis	36	42	85.714286

Visualizing the battle between them

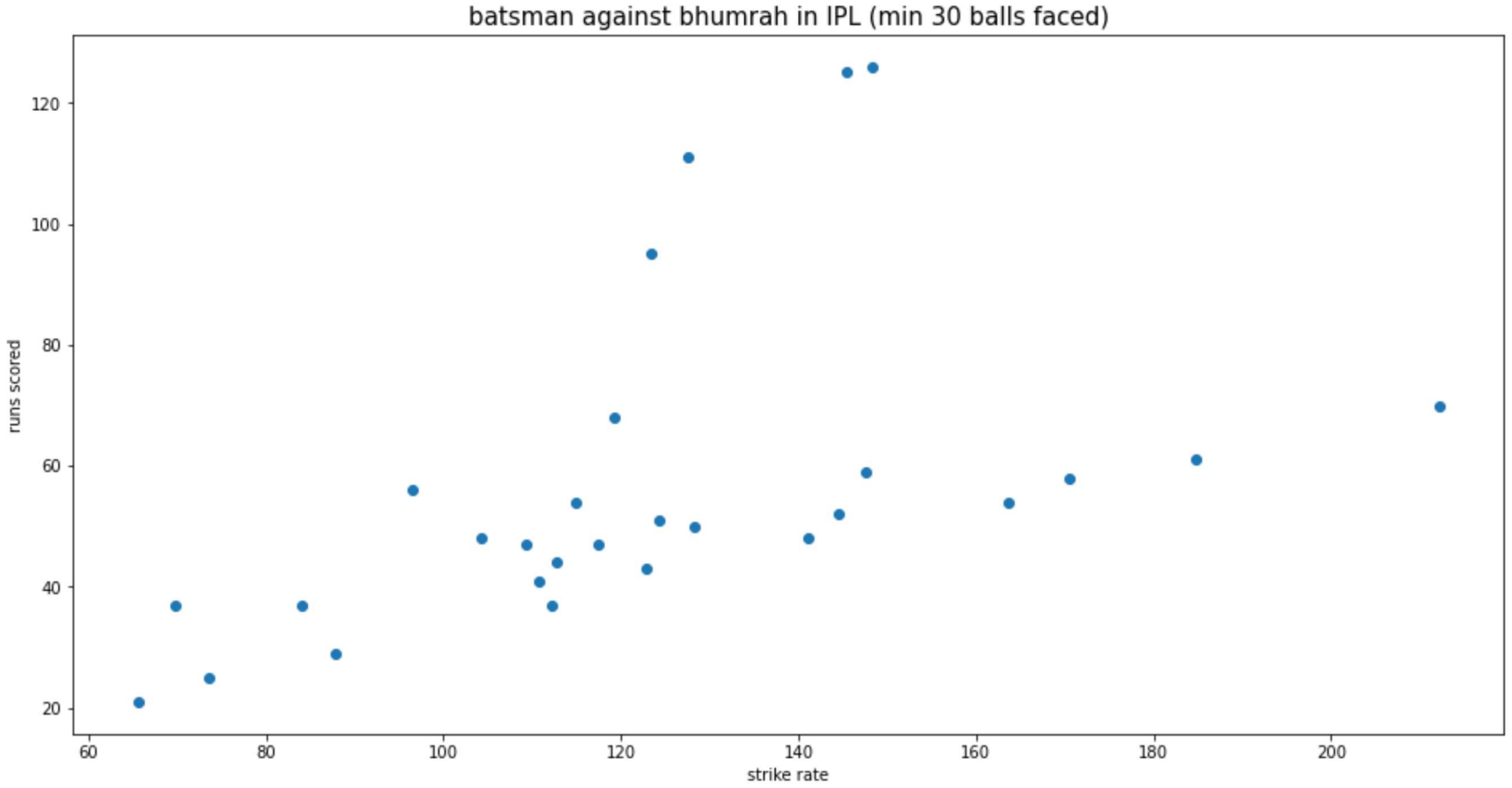
Bumrah against batsman

In [60]:
```
bdf3.head()
```

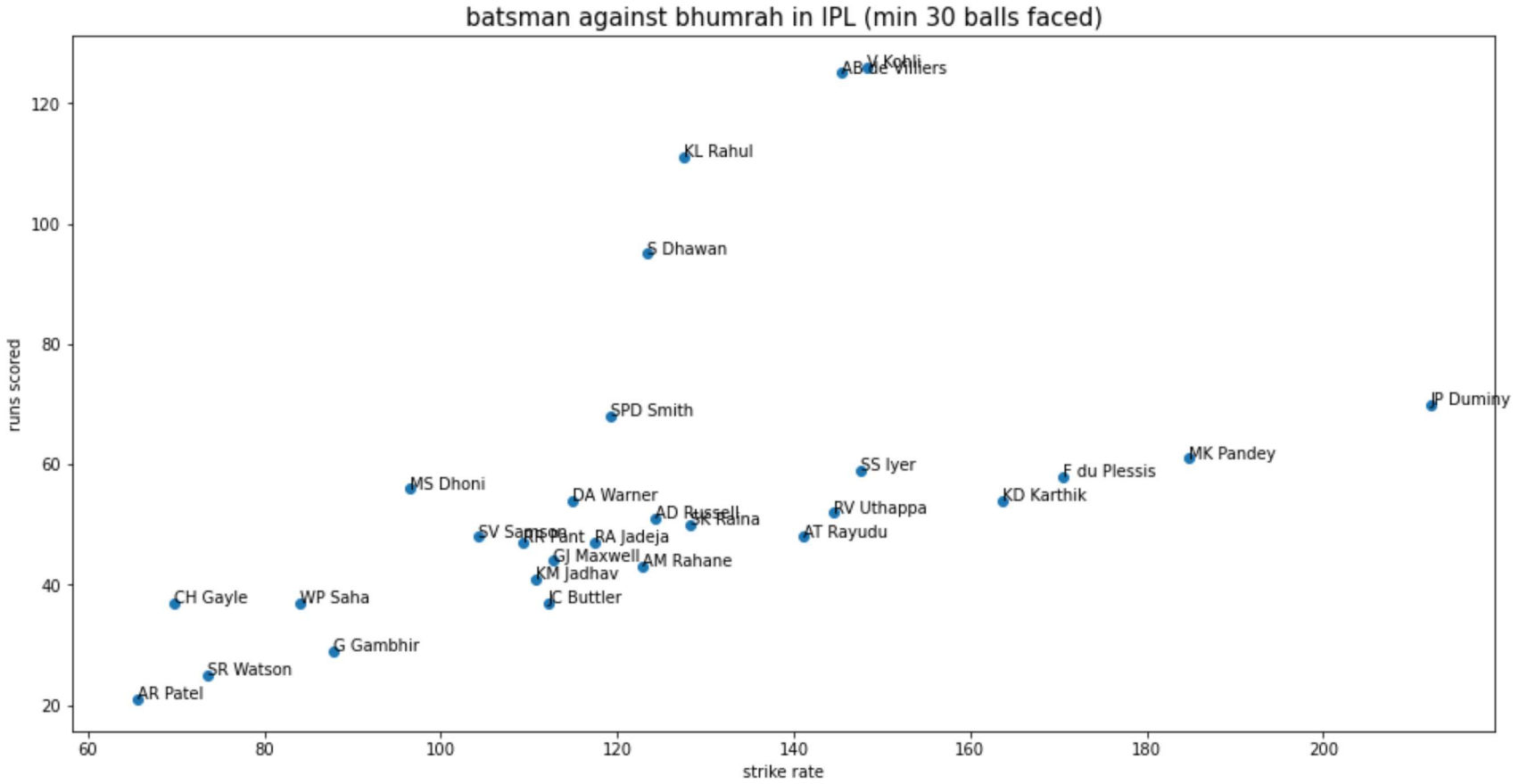
Out[60]:

	striker	runs_off_bat	ball	strike_rate
0	AB de Villiers	125	86	145.348837
1	AD Russell	51	41	124.390244
2	AM Rahane	43	35	122.857143
3	AR Patel	21	32	65.625000
4	AT Rayudu	48	34	141.176471

In [61]:
```
plt.figure(figsize=(16,8))
plt.scatter(bdf3.strike_rate, bdf3.runs_off_bat)
plt.title("batsman against bhumrah in IPL (min 30 balls faced)", fontsize= 15)
plt.xlabel('strike rate')
plt.ylabel('runs scored')
plt.show()
```



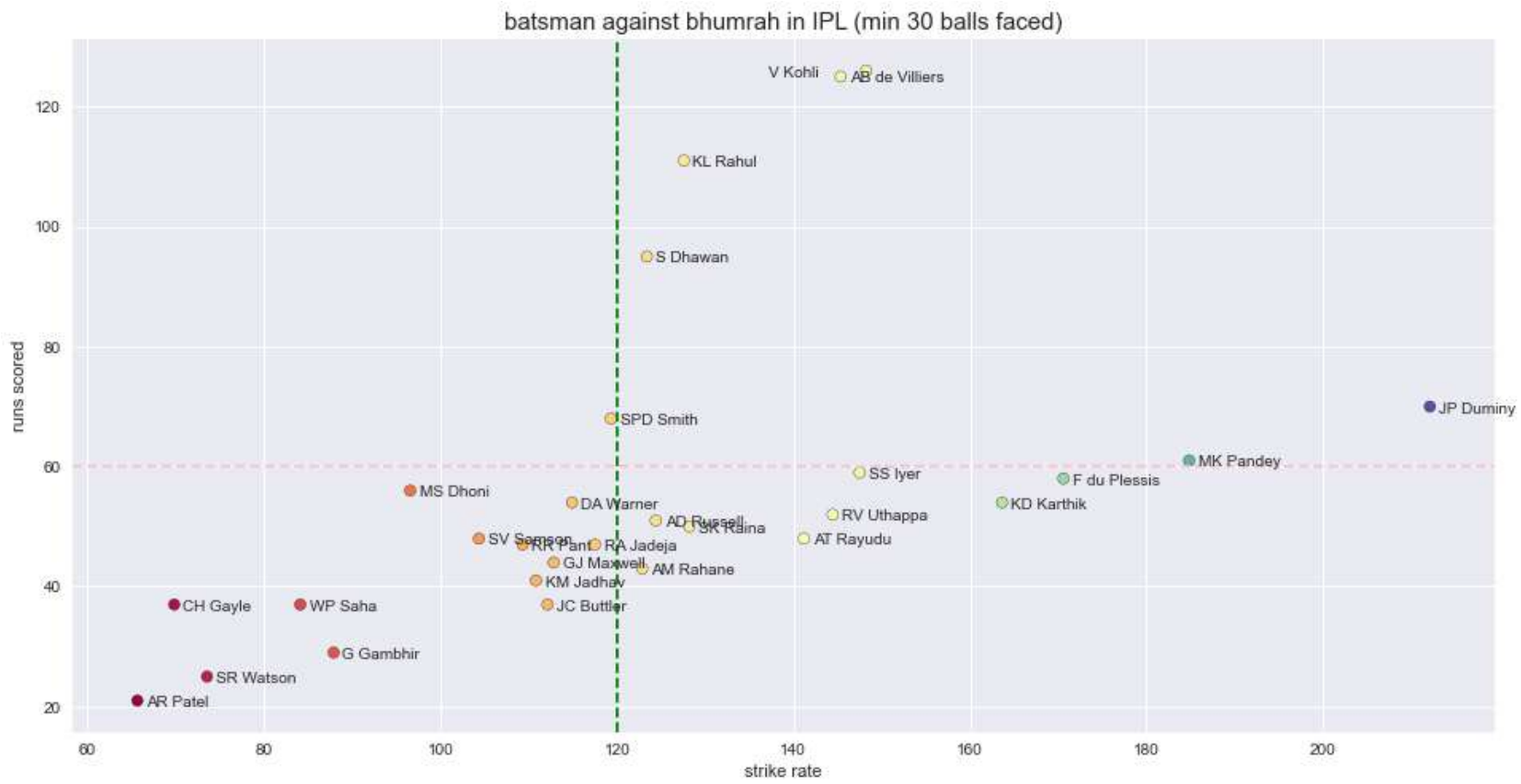
In [62]:
```
## add player name to each value we will use for loop
## # plt.text(x,y,text)
plt.figure(figsize=(16,8))
plt.scatter(bdf3.strike_rate, bdf3.runs_off_bat)
for i in range(len(bdf3)):
    plt.text(bdf3['strike_rate'][i],bdf3['runs_off_bat'][i], bdf3['striker'][i])
plt.title("batsman against bhumrah in IPL (min 30 balls faced)", fontsize= 15)
plt.xlabel('strike rate')
plt.ylabel('runs scored')
plt.show()
```



In [72]:
```
## push virat kohli name to the left
## for left use '-'   and for right side use '+'
plt.figure(figsize=(16,8))
plt.scatter(bdf3.strike_rate, bdf3.runs_off_bat, c=bdf3.strike_rate, cmap='Spectral',edgecolor='k')

for i in range(len(bdf3)):
    if  bdf3['striker'][i] == 'V Kohli':
        plt.text(bdf3['strike_rate'][i] - 11,bdf3['runs_off_bat'][i] - 1, bdf3['striker'][i])
    else:
        plt.text(bdf3['strike_rate'][i] + 1,bdf3['runs_off_bat'][i] - 1, bdf3['striker'][i])

# for horizontal line
# ls is for line style
plt.axvline(120, ls='--', color= 'green')
# for horizontal line
plt.axhline(60, ls='--', color= 'pink')
plt.title("batsman against bhumrah in IPL (min 30 balls faced)", fontsize= 15)
plt.xlabel('strike rate')
plt.ylabel('runs scored')
plt.show()
```



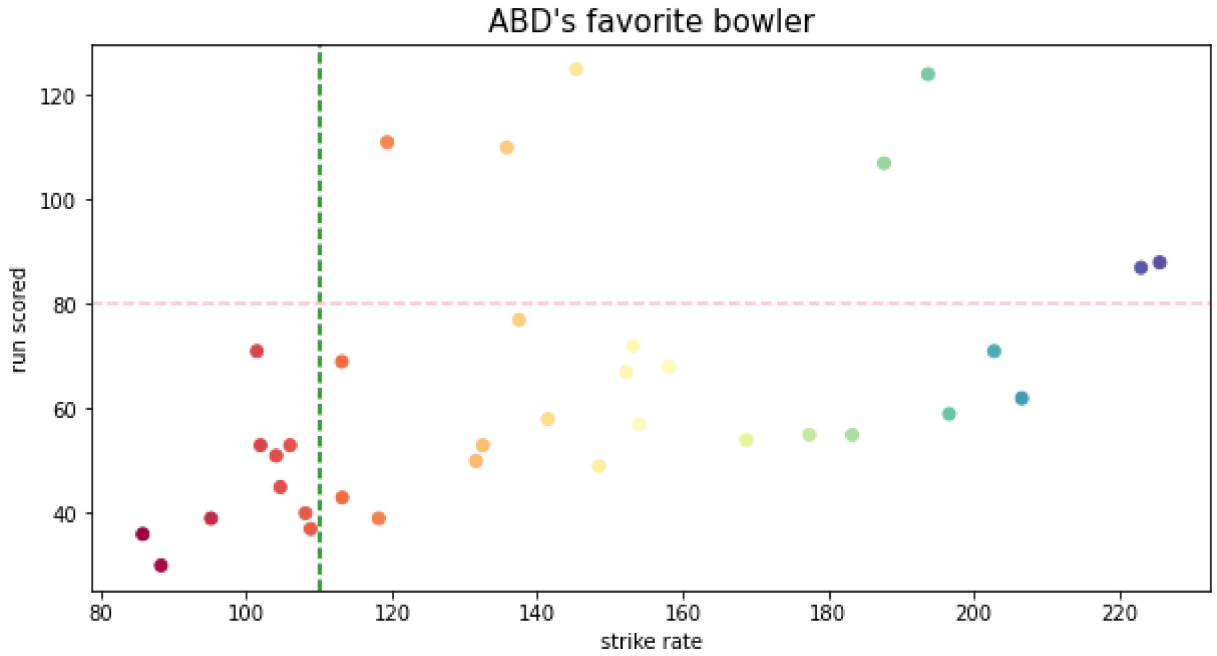
ABD against bowler

In [64]:
```
abddf3.head()
```

Out[64]:

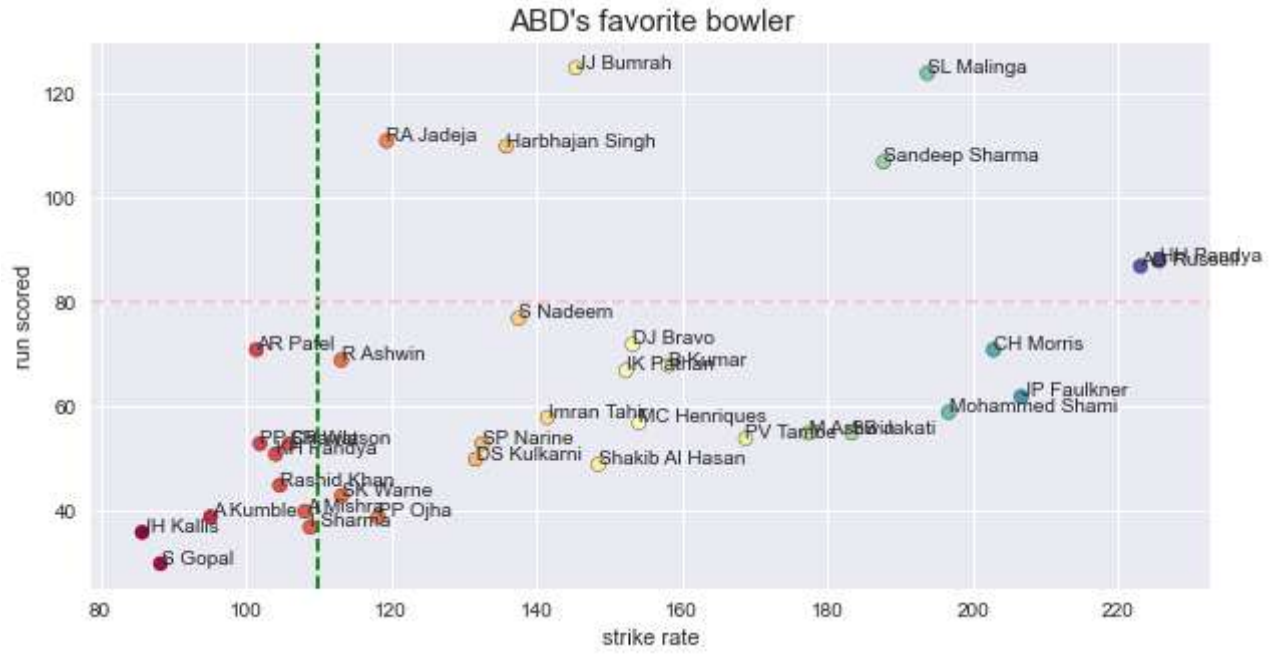
	bowler	runs_off_bat	ball	strike_rate
0	A Kumble	39	41	95.121951
1	A Mishra	40	37	108.108108
2	AD Russell	87	39	223.076923
3	AR Patel	71	70	101.428571
4	B Kumar	68	43	158.139535

In [65]:
```
plt.figure(figsize=(10,5))
plt.scatter(abddf3.strike_rate, abddf3.runs_off_bat, c=abddf3.strike_rate, cmap='Spectral');
plt.axvline(110, ls='--', color= 'green')
plt.axhline(80, ls='--', color= 'pink')
plt.title("ABD's favorite bowler", fontsize= 15)
plt.xlabel('strike rate')
plt.ylabel('run scored')
plt.show()
```



In [69]:
```
plt.figure(figsize=(10,5))
plt.scatter(abddf3.strike_rate, abddf3.runs_off_bat, c=abddf3.strike_rate, cmap='Spectral',edgecolor='black');
for i in range(len(abddf3)):
    if  abddf3['bowler'][i] == 'JJ Bumrah':
        plt.text(abddf3['strike_rate'][i] ,abddf3['runs_off_bat'][i],abddf3['bowler'][i])
    else:
        plt.text(abddf3['strike_rate'][i],abddf3['runs_off_bat'][i],abddf3['bowler'][i])

# for horizontal line
# ls is for line style
plt.axvline(110, ls='--', color= 'green')
# for horizontal line
plt.axhline(80, ls='--', color= 'pink')
plt.title("ABD's favorite bowler", fontsize= 15)
plt.xlabel('strike rate')
plt.ylabel('run scored')
plt.show()
```



In [ ]: