

DA FISAC

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Perform the analysis on the given dataset and write the observed insights about the relationship between the market value and the following categories:

Position Country Age Club Players

Also, compare the two most valuable players based on various parameters. Submit the report along with the implementation.

1. Loading the libraries and reading the csv

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
data = pd.read_csv("players.csv")
```

2. Exploratory Analysis

data

	Unnamed: 0	Name	Position	Age	\
0	0	Kylian Mbappé	Centre-Forward	22	
1	1	Erling Haaland	Centre-Forward	21	
2	2	Harry Kane	Centre-Forward	28	
3	3	Jack Grealish	Left Winger	26	
4	4	Mohamed Salah	Right Winger	29	
...
495	495	Giorgian de Arrascaeta	Attacking Midfield	27	
496	496	Ayoze Pérez	Second Striker	28	
497	497	Alex Meret	Goalkeeper	24	
498	498	Duje Caleta-Car	Centre-Back	25	
499	499	Aritz Elustondo	Centre-Back	27	

	Markey Value In Millions(£)	Country	
Club \			
0	144.0	France	Paris Saint-
Germain			
1	135.0	Norway	Borussia
Dortmund			
2	108.0	England	Tottenham
Hotspur			
3	90.0	England	Manchester
City			

4		90.0	Egypt		Liverpool	
FC						
..		
.						
495		16.2	Uruguay	Clube de Regatas do		
Flamengo						
496		16.2	Spain		Leicester	
City						
497		16.2	Italy		SSC	
Napoli						
498		16.2	Croatia		Olympique	
Marseille						
499		16.2	Spain		Real	
Sociedad						
	Matches	Goals	Own Goals	Assists	Yellow Cards	Second Yellow
Cards \						
0	16	7	0	11	3	
0						
1	10	13	0	4	1	
0						
2	16	7	0	2	2	
0						
3	15	2	0	3	1	
0						
4	15	15	0	6	1	
0						
..	
...						
495	0	0	0	0	0	
0						
496	8	1	0	3	0	
0						
497	5	0	0	0	0	
0						
498	8	0	0	0	2	
0						
499	15	3	0	1	4	
0						
	Red Cards	Number Of Substitute In		Number Of Substitute Out		
0	0		0		8	
1	0		0		1	
2	0		2		2	
3	0		2		8	
4	0		0		3	
..	
495	0		0		0	
496	1		2		5	

497	0	0	0
498	0	0	2
499	0	1	1

[500 rows x 16 columns]

display(data.head())

display(data.tail())

	Unnamed: 0	Name	Position	Age	\
0	0	Kylian Mbappé	Centre-Forward	22	
1	1	Erling Haaland	Centre-Forward	21	
2	2	Harry Kane	Centre-Forward	28	
3	3	Jack Grealish	Left Winger	26	
4	4	Mohamed Salah	Right Winger	29	

	Markey Value In Millions(£)	Country	Club	Matches
Goals \				
0	144.0	France	Paris Saint-Germain	16
7				
1	135.0	Norway	Borussia Dortmund	10
13				
2	108.0	England	Tottenham Hotspur	16
7				
3	90.0	England	Manchester City	15
2				
4	90.0	Egypt	Liverpool FC	15
15				

	Own Goals	Assists	Yellow Cards	Second Yellow Cards	Red Cards	\
0	0	11	3	0	0	
1	0	4	1	0	0	
2	0	2	2	0	0	
3	0	3	1	0	0	
4	0	6	1	0	0	

	Number Of Substitute In	Number Of Substitute Out
0	0	8
1	0	1
2	2	2
3	2	8
4	0	3

	Unnamed: 0	Name	Position	Age	\
495	495	Giorgian de Arrascaeta	Attacking Midfield	27	
496	496	Ayoze Pérez	Second Striker	28	
497	497	Alex Meret	Goalkeeper	24	
498	498	Duje Caleta-Car	Centre-Back	25	
499	499	Aritz Elustondo	Centre-Back	27	

Markey Value In Millions(£)		Country	
Club \			
495	16.2	Uruguay	Clube de Regatas do
Flamengo			
496	16.2	Spain	Leicester
City			
497	16.2	Italy	SSC
Napoli			
498	16.2	Croatia	Olympique
Marseille			
499	16.2	Spain	Real
Sociedad			

Matches	Goals	Own Goals	Assists	Yellow Cards	Second Yellow
Cards \					
495	0	0	0	0	
0					
496	8	1	0	3	0
0					
497	5	0	0	0	0
0					
498	8	0	0	0	2
0					
499	15	3	0	1	4
0					

Red Cards	Number Of Substitute In	Number Of Substitute Out
495	0	0
496	1	2
497	0	0
498	0	0
499	0	1

```

data = data.rename(columns=
                    {'Markey Value In Millions(£)': 'Market_value', 'Own
Goals': 'Own_goals',
                    'Yellow Cards': 'Yellow_cards', 'Second Yellow Cards':
'Second_yellow_cards',
                    'Red Cards': 'Red_cards', 'Number Of Substitute In':
'Substitute_in',
                    'Number Of Substitute Out': 'Substitute_out'})

data.drop(columns=['Unnamed: 0'], axis=1, inplace=True)

data.columns

Index(['Name', 'Position', 'Age', 'Market_value', 'Country', 'Club',
'Matches',
      'Goals', 'Own_goals', 'Assists', 'Yellow_cards',
'Second_yellow_cards',

```

```
    'Red_cards', 'Substitute_in', 'Substitute_out'],
    dtype='object')
```

```
data.index
```

```
RangeIndex(start=0, stop=500, step=1)
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 500 entries, 0 to 499
```

```
Data columns (total 15 columns):
```

#	Column	Non-Null Count	Dtype
0	Name	500 non-null	object
1	Position	500 non-null	object
2	Age	500 non-null	int64
3	Market_value	500 non-null	float64
4	Country	500 non-null	object
5	Club	500 non-null	object
6	Matches	500 non-null	int64
7	Goals	500 non-null	int64
8	Own_goals	500 non-null	int64
9	Assists	500 non-null	int64
10	Yellow_cards	500 non-null	int64
11	Second_yellow_cards	500 non-null	int64
12	Red_cards	500 non-null	int64
13	Substitute_in	500 non-null	int64
14	Substitute_out	500 non-null	int64

```
dtypes: float64(1), int64(10), object(4)
```

```
memory usage: 58.7+ KB
```

```
data.dtypes
```

Name	object
Position	object
Age	int64
Market_value	float64
Country	object
Club	object
Matches	int64
Goals	int64
Own_goals	int64
Assists	int64
Yellow_cards	int64
Second_yellow_cards	int64
Red_cards	int64
Substitute_in	int64
Substitute_out	int64
dtype:	object

```
print("We have %0.f rows and %0.f columns"%
      (data.shape[0],data.shape[1]))
```

We have 500 rows and 15 columns

```
data.describe()
```

	Age	Market_value	Matches	Goals	Own_goals	\
count	500.000000	500.000000	500.000000	500.000000	500.000000	
mean	24.968000	31.537800	12.396000	2.160000	0.030000	
std	3.165916	17.577697	4.342453	2.880102	0.170758	
min	16.000000	16.200000	0.000000	0.000000	0.000000	
25%	23.000000	19.800000	10.000000	0.000000	0.000000	
50%	25.000000	25.200000	13.000000	1.000000	0.000000	
75%	27.000000	36.000000	16.000000	3.000000	0.000000	
max	36.000000	144.000000	24.000000	23.000000	1.000000	

	Assists	Yellow_cards	Second_yellow_cards	Red_cards	\
count	500.000000	500.000000	500.000000	500.000000	
mean	1.51200	1.592000	0.036000	0.046000	
std	1.85276	1.445585	0.186477	0.209695	
min	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	0.000000	
50%	1.000000	1.000000	0.000000	0.000000	
75%	2.000000	2.000000	0.000000	0.000000	
max	12.000000	7.000000	1.000000	1.000000	

	Substitute_in	Substitute_out
count	500.000000	500.000000
mean	2.394000	3.744000
std	2.517825	3.293046
min	0.000000	0.000000
25%	0.000000	1.000000
50%	2.000000	3.000000
75%	3.250000	6.000000
max	13.000000	20.000000

```
data.isnull()
```

	Name	Position	Age	Market_value	Country	Club	Matches
Goals	\						
0	False	False	False	False	False	False	False
False							
1	False	False	False	False	False	False	False
False							
2	False	False	False	False	False	False	False
False							
3	False	False	False	False	False	False	False
False							
4	False	False	False	False	False	False	False
False							

..
...							
495	False	False	False	False	False	False	False
False							
496	False	False	False	False	False	False	False
False							
497	False	False	False	False	False	False	False
False							
498	False	False	False	False	False	False	False
False							
499	False	False	False	False	False	False	False
False							
	Own_goals	Assists	Yellow_cards	Second_yellow_cards	Red_cards		
\							
0	False	False	False	False	False	False	
1	False	False	False	False	False	False	
2	False	False	False	False	False	False	
3	False	False	False	False	False	False	
4	False	False	False	False	False	False	
..
495	False	False	False	False	False	False	
496	False	False	False	False	False	False	
497	False	False	False	False	False	False	
498	False	False	False	False	False	False	
499	False	False	False	False	False	False	
	Substitute_in	Substitute_out					
0	False	False					
1	False	False					
2	False	False					
3	False	False					
4	False	False					
..					
495	False	False					
496	False	False					
497	False	False					
498	False	False					
499	False	False					

```
[500 rows x 15 columns]
```

```
data.isna().sum()
```

```
Name          0
Position       0
Age            0
Market_value   0
Country        0
Club           0
Matches        0
Goals          0
Own_goals      0
Assists        0
Yellow_cards   0
Second_yellow_cards 0
Red_cards      0
Substitute_in   0
Substitute_out  0
dtype: int64
```

```
data['Club'].unique()
```

```
array(['Paris Saint-Germain', 'Borussia Dortmund', 'Tottenham
Hotspur',
      'Manchester City', 'Liverpool FC', 'Chelsea FC',
      'Manchester United', 'FC Barcelona', 'Bayern Munich',
      'Inter Milan', 'Atlético de Madrid', 'West Ham United',
      'Real Sociedad', 'Juventus FC', 'SS Lazio', 'Real Madrid',
      'Bayer 04 Leverkusen', 'Arsenal FC', 'Sevilla FC', 'SSC
Napoli',
      'Leicester City', 'Everton FC', 'AC Milan', 'Villarreal CF',
      'ACF Fiorentina', 'RB Leipzig', 'AS Roma', 'Crystal Palace',
      'Wolverhampton Wanderers', 'Valencia CF', 'Leeds United',
      'LOSC Lille', 'Aston Villa', 'Olympique Lyon', 'OGC Nice',
      'AS Monaco', 'Atalanta BC', 'US Sassuolo', 'Torino FC',
      'Ajax Amsterdam', 'Brentford FC', 'Southampton FC',
      'Newcastle United', 'VfL Wolfsburg', 'FC Porto',
      'Olympique Marseille', 'Eintracht Frankfurt',
      'Borussia Mönchengladbach', 'Watford FC', 'Stade Rennais FC',
      'Clube de Regatas do Flamengo', 'VfB Stuttgart', 'Club Brugge
KV',
      'Sporting CP', 'Brighton & Hove Albion', 'Dynamo Kyiv',
      'Athletic Bilbao', 'Real Betis Balompié', 'Zenit St.
Petersburg',
      'Burnley FC', 'SL Benfica', 'TSG 1899 Hoffenheim', 'Norwich
City',
      'PSV Eindhoven', 'KRC Genk', 'Club Atlético Vélez Sarsfield',
      'Club Atlético River Plate', 'FC Metz', 'UC Sampdoria',
```



```

'Red Bull Salzburg', 'Bologna FC 1909', 'Shakhtar Donetsk',
'Cagliari Calcio', 'Getafe CF', 'Al-Rayyan SC', 'Rubin Kazan',
'Feyenoord Rotterdam', 'RCD Espanyol Barcelona', 'UD Almería',
'Sheffield United', 'Celta de Vigo'], dtype=object)

data.Club.nunique()
81

data.Country.unique()
array(['France', 'Norway', 'England', 'Egypt', 'Belgium', 'Brazil',
'Netherlands', 'Portugal', 'Germany', 'Senegal', 'Korea,
South',
'Spain', 'Argentina', 'Canada', 'Morocco', 'Italy', 'Serbia',
'Slovenia', 'Uruguay', 'Scotland', 'Nigeria', 'Slovakia',
'Poland',
'Cote d'Ivoire', 'Austria', 'United States', 'Turkey',
'Mexico',
'Croatia', 'Czech Republic', 'Algeria', 'Burkina Faso',
'Sweden',
'Ghana', 'Denmark', 'Jamaica', 'Colombia', 'Guinea',
'Switzerland',
'Ukraine', 'Russia', 'DR Congo', 'Hungary', 'Mali', 'Japan',
'Cameroon', 'Iran', 'Montenegro', 'Gabon', 'Albania', 'Zambia',
'The Gambia', 'Israel', 'Georgia', 'Venezuela', 'Wales',
'Peru'],
      dtype=object)

data.Country.nunique()
57

data.Position.unique()
array(['Centre-Forward', 'Left Winger', 'Right Winger',
'Attacking Midfield', 'Central Midfield', 'Defensive Midfield',
'Right-Back', 'Centre-Back', 'Second Striker', 'Left-Back',
'Goalkeeper', 'Left Midfield', 'Right Midfield'], dtype=object)

data.Position.nunique()
13

data['New_Position'] = np.where((data['Position'] == 'Centre-Forward')
|
                                (data['Position'] == 'Left Winger') |
                                (data['Position'] == 'Right Winger') |
                                (data['Position'] == 'Second
Striker')), 'Attacker',
                                np.where((data['Position'] ==
'Attacking Midfield') |

```

```

Midfield') |
'Defensive Midfield') |
Midfield') |
Midfield'), 'Midfielder',
'Goalkeeper',
'Goalkeeper', 'Defender'))))

```

data

	Name	Position	Age	Market_value	
Country \					
0	Kylian Mbappé	Centre-Forward	22	144.0	
France					
1	Erling Haaland	Centre-Forward	21	135.0	
Norway					
2	Harry Kane	Centre-Forward	28	108.0	
England					
3	Jack Grealish	Left Winger	26	90.0	
England					
4	Mohamed Salah	Right Winger	29	90.0	
Egypt					
..	
...					
495	Giorgian de Arrascaeta	Attacking Midfield	27	16.2	
Uruguay					
496	Ayoze Pérez	Second Striker	28	16.2	
Spain					
497	Alex Meret	Goalkeeper	24	16.2	
Italy					
498	Duje Caleta-Car	Centre-Back	25	16.2	
Croatia					
499	Aritz Elustondo	Centre-Back	27	16.2	
Spain					
	Club	Matches	Goals	Own_goals	Assists
\					
0	Paris Saint-Germain	16	7	0	11
1	Borussia Dortmund	10	13	0	4
2	Tottenham Hotspur	16	7	0	2
3	Manchester City	15	2	0	3

4	Liverpool FC	15	15	0	6
..
495	Clube de Regatas do Flamengo	0	0	0	0
496	Leicester City	8	1	0	3
497	SSC Napoli	5	0	0	0
498	Olympique Marseille	8	0	0	0
499	Real Sociedad	15	3	0	1

	Yellow_cards	Second_yellow_cards	Red_cards	Substitute_in \
0	3	0	0	0
1	1	0	0	0
2	2	0	0	2
3	1	0	0	2
4	1	0	0	0
..
495	0	0	0	0
496	0	0	1	2
497	0	0	0	0
498	2	0	0	0
499	4	0	0	1

	Substitute_out	New_Position
0	8	Attacker
1	1	Attacker
2	2	Attacker
3	8	Attacker
4	3	Attacker
..
495	0	Midfielder
496	5	Attacker
497	0	Goalkeeper
498	2	Defender
499	1	Defender

[500 rows x 16 columns]

```
data['Market_value'] = data['Market_value'].astype(int)
data.Market_value.dtype
dtype('int64')
data
```

Country \		Name	Position	Age	Market_value	
0	France	Kylian Mbappé	Centre-Forward	22	144	
1	Norway	Erling Haaland	Centre-Forward	21	135	
2	England	Harry Kane	Centre-Forward	28	108	
3	England	Jack Grealish	Left Winger	26	90	
4	Egypt	Mohamed Salah	Right Winger	29	90	
..	
495	Uruguay	Giorgian de Arrascaeta	Attacking Midfield	27	16	
496	Spain	Ayoze Pérez	Second Striker	28	16	
497	Italy	Alex Meret	Goalkeeper	24	16	
498	Croatia	Duje Caleta-Car	Centre-Back	25	16	
499	Spain	Aritz Elustondo	Centre-Back	27	16	
\		Club	Matches	Goals	Own_goals	Assists
0		Paris Saint-Germain	16	7	0	11
1		Borussia Dortmund	10	13	0	4
2		Tottenham Hotspur	16	7	0	2
3		Manchester City	15	2	0	3
4		Liverpool FC	15	15	0	6
..	
495		Clube de Regatas do Flamengo	0	0	0	0
496		Leicester City	8	1	0	3
497		SSC Napoli	5	0	0	0
498		Olympique Marseille	8	0	0	0
499		Real Sociedad	15	3	0	1
Yellow_cards		Second_yellow_cards	Red_cards	Substitute_in \		

0	3	0	0	0
1	1	0	0	0
2	2	0	0	2
3	1	0	0	2
4	1	0	0	0
..
495	0	0	0	0
496	0	0	1	2
497	0	0	0	0
498	2	0	0	0
499	4	0	0	1

	Substitute_out	New_Position
0	8	Attacker
1	1	Attacker
2	2	Attacker
3	8	Attacker
4	3	Attacker
..
495	0	Midfielder
496	5	Attacker
497	0	Goalkeeper
498	2	Defender
499	1	Defender

[500 rows x 16 columns]

```
data['Goals.per.game'] = (data['Goals']/data['Matches']).round(2)
data['Assists.per.game'] = (data['Assists']/data['Matches']).round(2)
data
```

	Name	Position	Age	Market_value
Country \				
0	Kylian Mbappé	Centre-Forward	22	144
France				
1	Erling Haaland	Centre-Forward	21	135
Norway				
2	Harry Kane	Centre-Forward	28	108
England				
3	Jack Grealish	Left Winger	26	90
England				
4	Mohamed Salah	Right Winger	29	90
Egypt				
..
...				
495	Giorgian de Arrascaeta	Attacking Midfield	27	16
Uruguay				
496	Ayoze Pérez	Second Striker	28	16
Spain				
497	Alex Meret	Goalkeeper	24	16

Italy					
498	Duje Caleta-Car	Centre-Back	25		16
Croatia					
499	Aritz Elustondo	Centre-Back	27		16
Spain					
	Club	Matches	Goals	Own_goals	Assists
\					
0	Paris Saint-Germain	16	7	0	11
1	Borussia Dortmund	10	13	0	4
2	Tottenham Hotspur	16	7	0	2
3	Manchester City	15	2	0	3
4	Liverpool FC	15	15	0	6
..
495	Clube de Regatas do Flamengo	0	0	0	0
496	Leicester City	8	1	0	3
497	SSC Napoli	5	0	0	0
498	Olympique Marseille	8	0	0	0
499	Real Sociedad	15	3	0	1
	Yellow_cards	Second_yellow_cards	Red_cards	Substitute_in	\
0	3	0	0	0	
1	1	0	0	0	
2	2	0	0	2	
3	1	0	0	2	
4	1	0	0	0	
..	
495	0	0	0	0	
496	0	0	1	2	
497	0	0	0	0	
498	2	0	0	0	
499	4	0	0	1	
	Substitute_out	New_Position	Goals.per.game	Assists.per.game	
0	8	Attacker	0.44	0.69	
1	1	Attacker	1.30	0.40	
2	2	Attacker	0.44	0.12	
3	8	Attacker	0.13	0.20	
4	3	Attacker	1.00	0.40	
..	

495	0	Midfielder	NaN	NaN
496	5	Attacker	0.12	0.38
497	0	Goalkeeper	0.00	0.00
498	2	Defender	0.00	0.00
499	1	Defender	0.20	0.07

[500 rows x 18 columns]

3. Market Value x Categories

3.1 Position

data

	Name	Position	Age	Market_value
Country \				
0	Kylian Mbappé	Centre-Forward	22	144
France				
1	Erling Haaland	Centre-Forward	21	135
Norway				
2	Harry Kane	Centre-Forward	28	108
England				
3	Jack Grealish	Left Winger	26	90
England				
4	Mohamed Salah	Right Winger	29	90
Egypt				
..
...				
495	Giorgian de Arrascaeta	Attacking Midfield	27	16
Uruguay				
496	Ayoze Pérez	Second Striker	28	16
Spain				
497	Alex Meret	Goalkeeper	24	16
Italy				
498	Duje Caleta-Car	Centre-Back	25	16
Croatia				
499	Aritz Elustondo	Centre-Back	27	16
Spain				

	Club	Matches	Goals	Own_goals	Assists
\					
0	Paris Saint-Germain	16	7	0	11
1	Borussia Dortmund	10	13	0	4
2	Tottenham Hotspur	16	7	0	2
3	Manchester City	15	2	0	3
4	Liverpool FC	15	15	0	6

```

..      ...      ...      ...      ...      ...
495  Clube de Regatas do Flamengo      0      0      0      0
496      Leicester City      8      1      0      3
497      SSC Napoli      5      0      0      0
498      Olympique Marseille      8      0      0      0
499      Real Sociedad      15      3      0      1

```

```

      Yellow_cards  Second_yellow_cards  Red_cards  Substitute_in \
0      3      0      0      0
1      1      0      0      0
2      2      0      0      2
3      1      0      0      2
4      1      0      0      0
..      ...      ...      ...      ...
495      0      0      0      0
496      0      0      1      2
497      0      0      0      0
498      2      0      0      0
499      4      0      0      1

```

```

      Substitute_out  New_Position  Goals.per.game  Assists.per.game
0      8      Attacker      0.44      0.69
1      1      Attacker      1.30      0.40
2      2      Attacker      0.44      0.12
3      8      Attacker      0.13      0.20
4      3      Attacker      1.00      0.40
..      ...      ...      ...      ...
495      0      Midfielder      NaN      NaN
496      5      Attacker      0.12      0.38
497      0      Goalkeeper      0.00      0.00
498      2      Defender      0.00      0.00
499      1      Defender      0.20      0.07

```

```
[500 rows x 18 columns]
```

```
data.New_Position.value_counts()
```

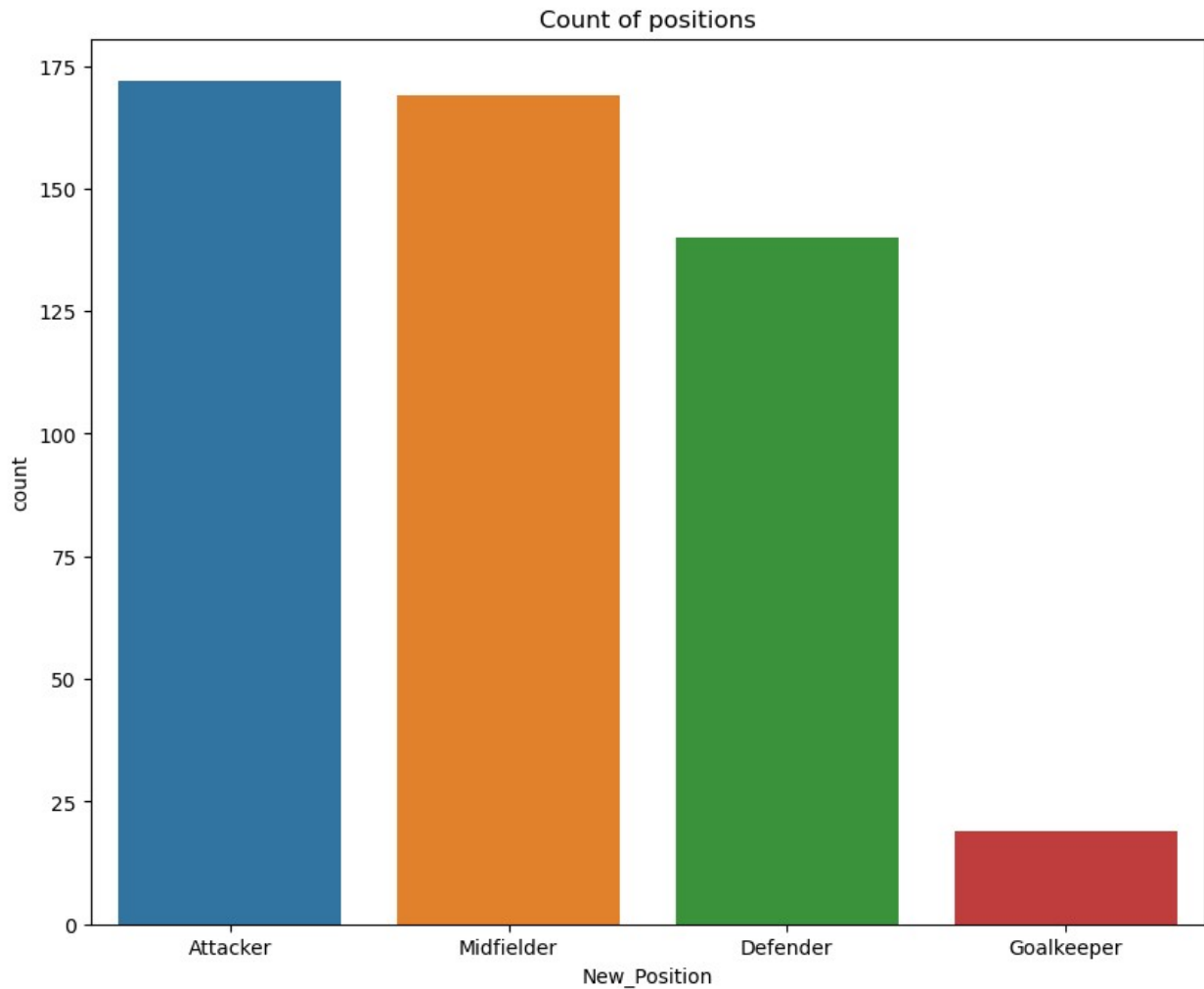
```

New_Position
Attacker      172
Midfielder    169
Defender      140
Goalkeeper     19
Name: count, dtype: int64

```



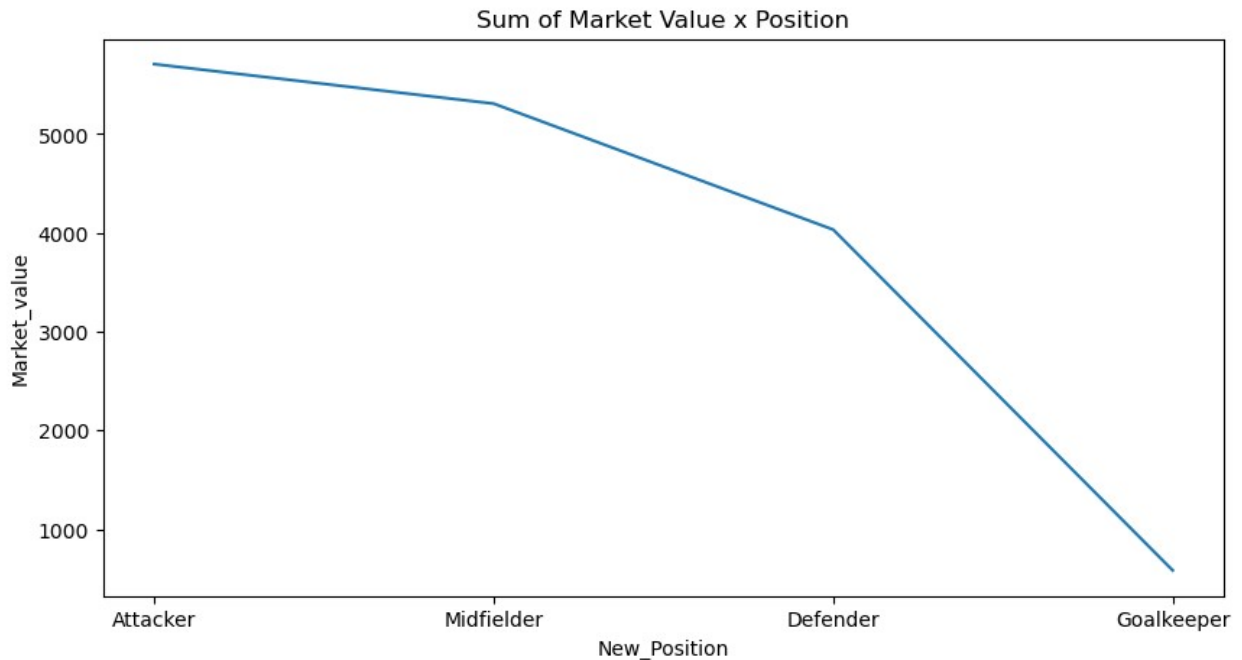
```
plt.figure(figsize=(10,8))
sns.countplot(data=data, x='New_Position')
plt.title("Count of positions")
Text(0.5, 1.0, 'Count of positions')
```



```
x =
data.groupby('New_Position').Market_value.sum().sort_values(ascending=
False).head(10)
x
New_Position
Attacker      5706
Midfielder    5306
Defender      4031
Goalkeeper     582
Name: Market_value, dtype: int64
```

```
plt.figure(figsize=(10,5))
plt.title("Sum of Market Value x Position")
sns.lineplot(data=x)
```

```
<Axes: title={'center': 'Sum of Market Value x Position'},
xlabel='New_Position', ylabel='Market_value'>
```

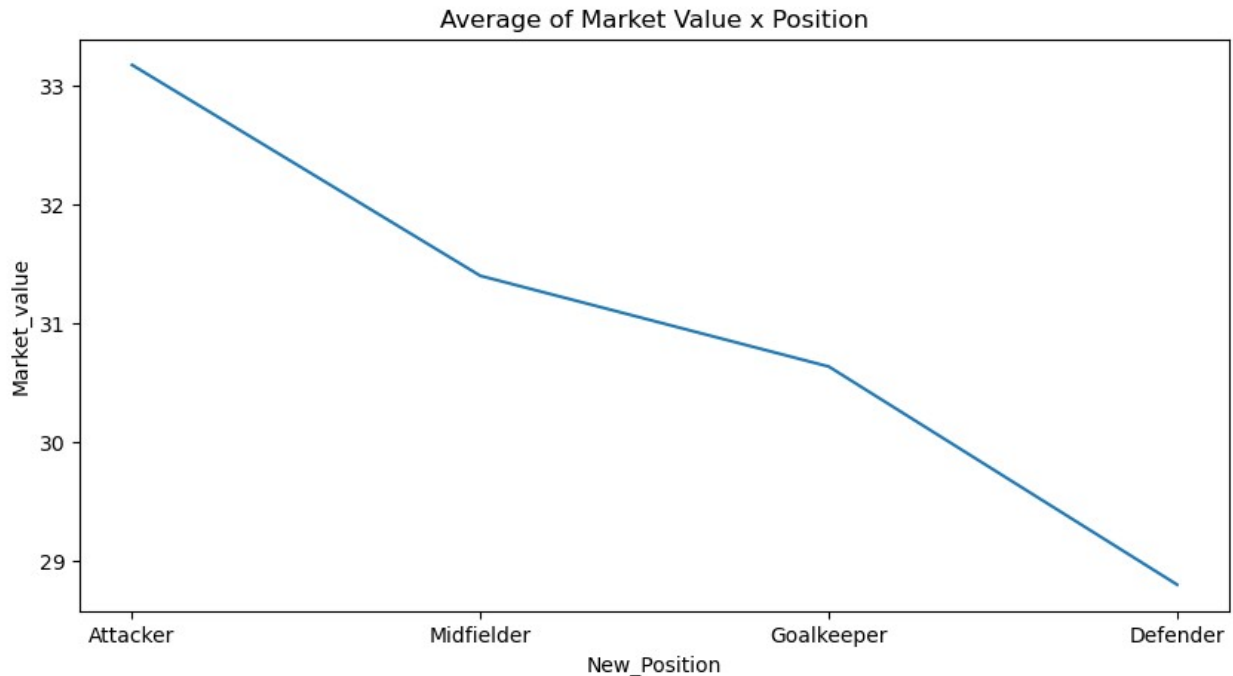


```
y =
data.groupby('New_Position').Market_value.mean().sort_values(ascending
=False).head(10)
y
```

```
New_Position
Attacker      33.174419
Midfielder    31.396450
Goalkeeper    30.631579
Defender      28.792857
Name: Market_value, dtype: float64
```

```
plt.figure(figsize=(10,5))
plt.title("Average of Market Value x Position")
sns.lineplot(data=y)
```

```
<Axes: title={'center': 'Average of Market Value x Position'},
xlabel='New_Position', ylabel='Market_value'>
```



```
data.Position.value_counts()
```

```
Position
Centre-Back      87
Central Midfield  74
Centre-Forward   70
Right Winger     48
Left Winger      46
Attacking Midfield 41
Defensive Midfield 41
Right-Back       30
Left-Back        23
Goalkeeper       19
Second Striker   8
Left Midfield     8
Right Midfield    5
Name: count, dtype: int64
```

```
c=data.groupby('Position').Market_value.sum().sort_values(ascending = False)
```

```
c
```

```
Position
Centre-Back      2557
Central Midfield  2401
Centre-Forward   2348
Left Winger      1632
Right Winger     1447
Attacking Midfield 1324
```

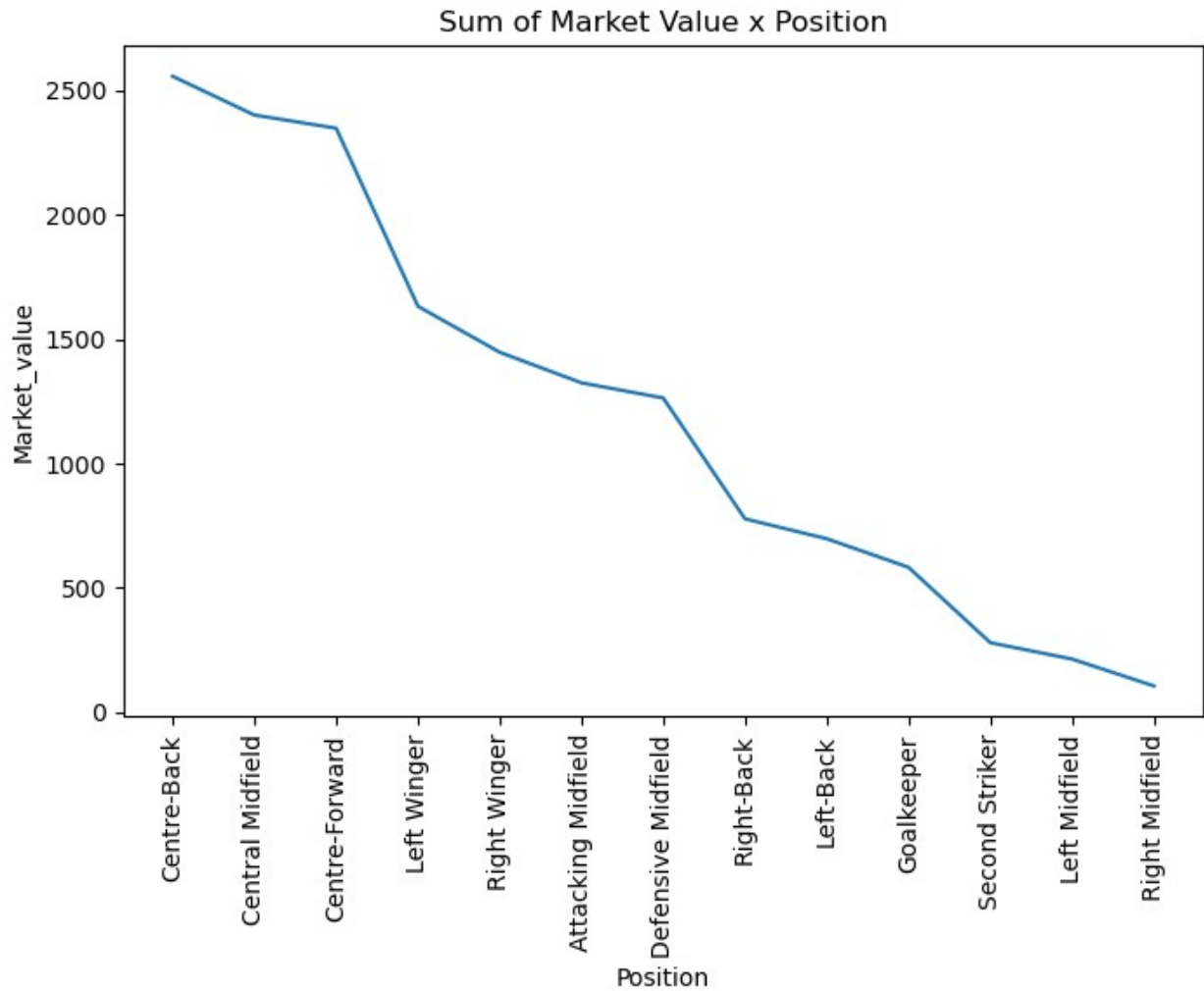
```
Defensive Midfield    1263
Right-Back            777
Left-Back             697
Goalkeeper            582
Second Striker        279
Left Midfield         213
Right Midfield        105
Name: Market_value, dtype: int64
```

```
data.groupby('Position').Market_value.agg(['max',
'min']).sort_values(by=['max', 'min'], ascending = False).head(10)
```

	max	min
Position		
Centre-Forward	144	16
Attacking Midfield	90	16
Left Winger	90	16
Right Winger	90	16
Central Midfield	81	16
Defensive Midfield	81	16
Centre-Back	67	16
Right-Back	67	16
Goalkeeper	63	16
Left-Back	63	16

```
plt.figure(figsize=(8,5))
plt.title("Sum of Market Value x Position")
plt.xticks(rotation=90)
sns.lineplot(data=c)
```

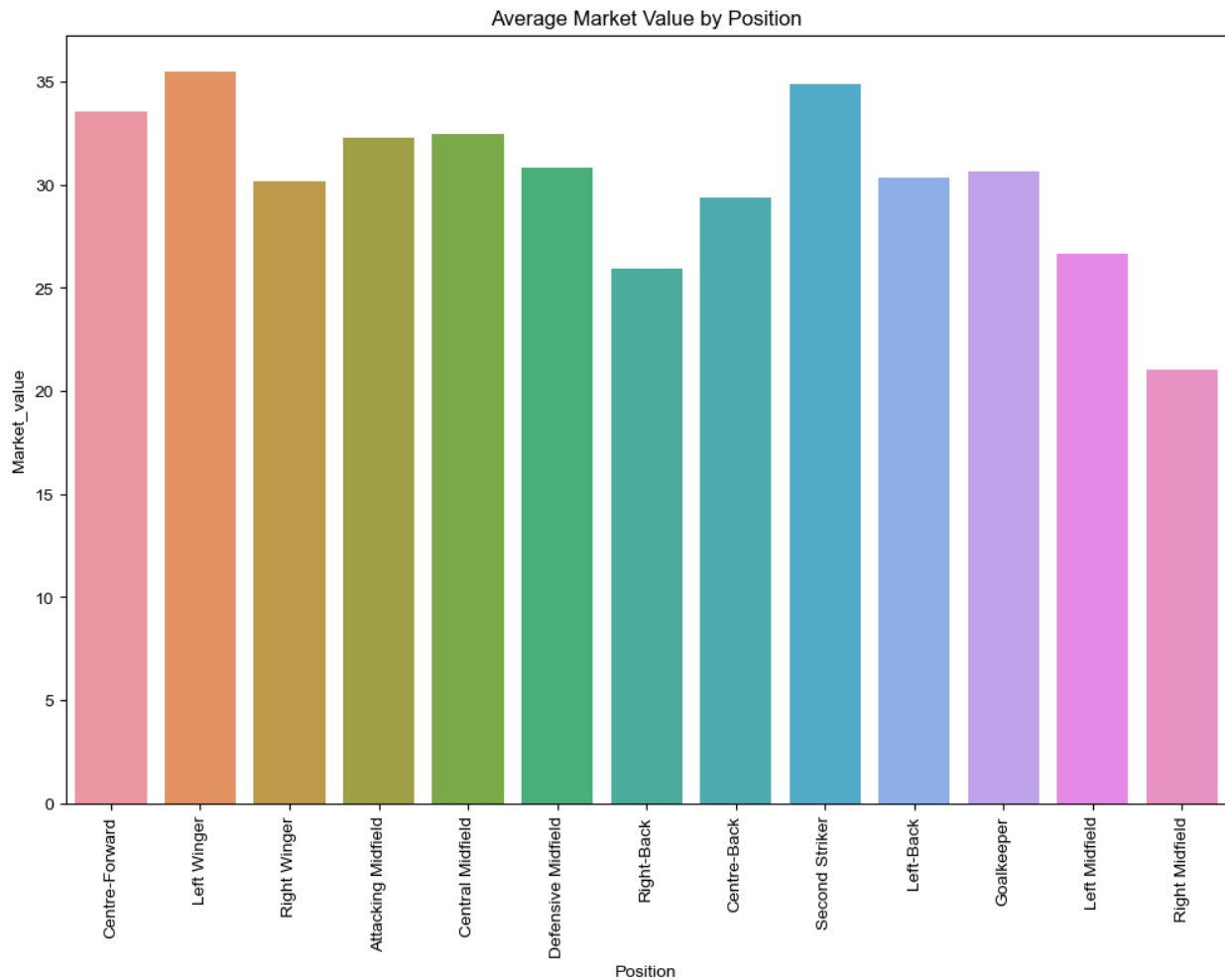
```
<Axes: title={'center': 'Sum of Market Value x Position'},
xlabel='Position', ylabel='Market_value'>
```



```
data.groupby("Position").Market_value.mean().sort_values(ascending=False)
```

```
Position
Left Winger      35.478261
Second Striker   34.875000
Centre-Forward   33.542857
Central Midfield  32.445946
Attacking Midfield 32.292683
Defensive Midfield 30.804878
Goalkeeper       30.631579
Left-Back        30.304348
Right Winger     30.145833
Centre-Back      29.390805
Left Midfield    26.625000
Right-Back       25.900000
Right Midfield   21.000000
Name: Market_value, dtype: float64
```

```
plt.figure(figsize=(12, 8))
sns.barplot(data=data, x='Position', y='Market_value', errorbar=None)
plt.title('Average Market Value by Position')
sns.set_style("white")
plt.xticks(rotation=90)
plt.show()
```



3.2 Country

```
data.Country.value_counts().head(10)
```

Country	
England	67
France	58
Spain	52
Brazil	41
Germany	29
Portugal	26
Italy	26

```
Argentina      22
Netherlands    17
Belgium        14
Name: count, dtype: int64
```

```
data.groupby('Country').Market_value.sum().sort_values(ascending=False)
.head(10)
```

```
Country
England      2227
France        1878
Spain         1556
Brazil        1263
Germany        999
Portugal       881
Italy          847
Argentina      645
Netherlands    565
Belgium        519
Name: Market_value, dtype: int64
```

```
data.groupby('Country').Market_value.agg(['max',
'min']).sort_values(by=['max', 'min'], ascending = False).head(10)
```

	max	min
Country		
France	144	16
Norway	135	16
England	108	16
Egypt	90	90
Belgium	90	16
Brazil	90	16
Netherlands	81	19
Germany	81	16
Portugal	81	16
Korea, South	76	76

```
data.groupby('Country').Market_value.mean().sort_values(ascending =
False).head(10)
```

```
Country
Egypt      90.000000
Korea, South  76.000000
Slovenia    63.000000
Norway      62.333333
Slovakia    54.000000
Canada      47.000000
Morocco     37.250000
Belgium     37.071429
Ghana       36.000000
```

```

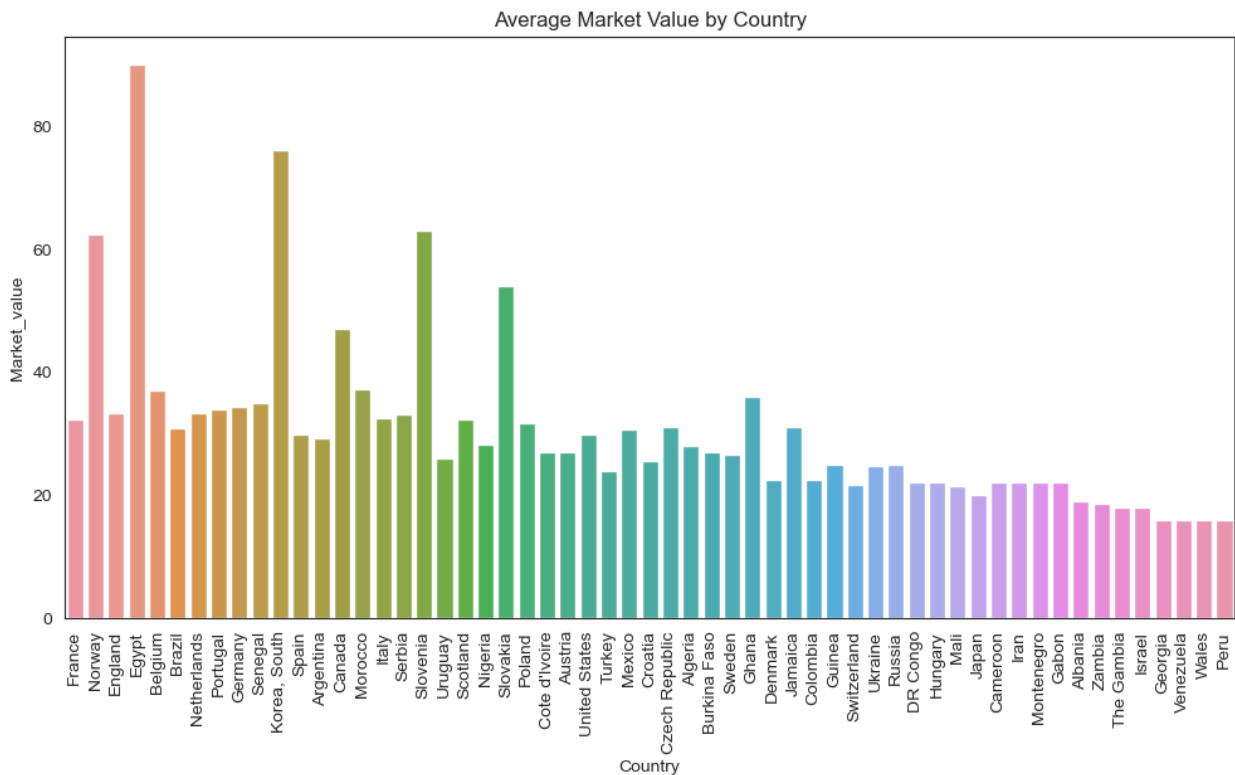
Senegal          35.000000
Name: Market_value, dtype: float64

selected_countries = ['Slovenia', 'Norway', 'Slovakia', 'Canada',
                      'Marocco', 'Belgium', 'Ghana', 'Senegal']
counts = data[data['Country'].isin(selected_countries)]
counts['Country'].value_counts()
counts

Country
Belgium      14
Senegal       6
Norway        3
Canada        2
Slovenia      1
Slovakia      1
Ghana         1
Name: count, dtype: int64

plt.figure(figsize=(12, 6))
sns.barplot(data=data, x='Country', y='Market_value', errorbar=None)
plt.title('Average Market Value by Country')
plt.xticks(rotation=90)
plt.show()

```



3.3 Age

```
data.Age.value_counts()
```

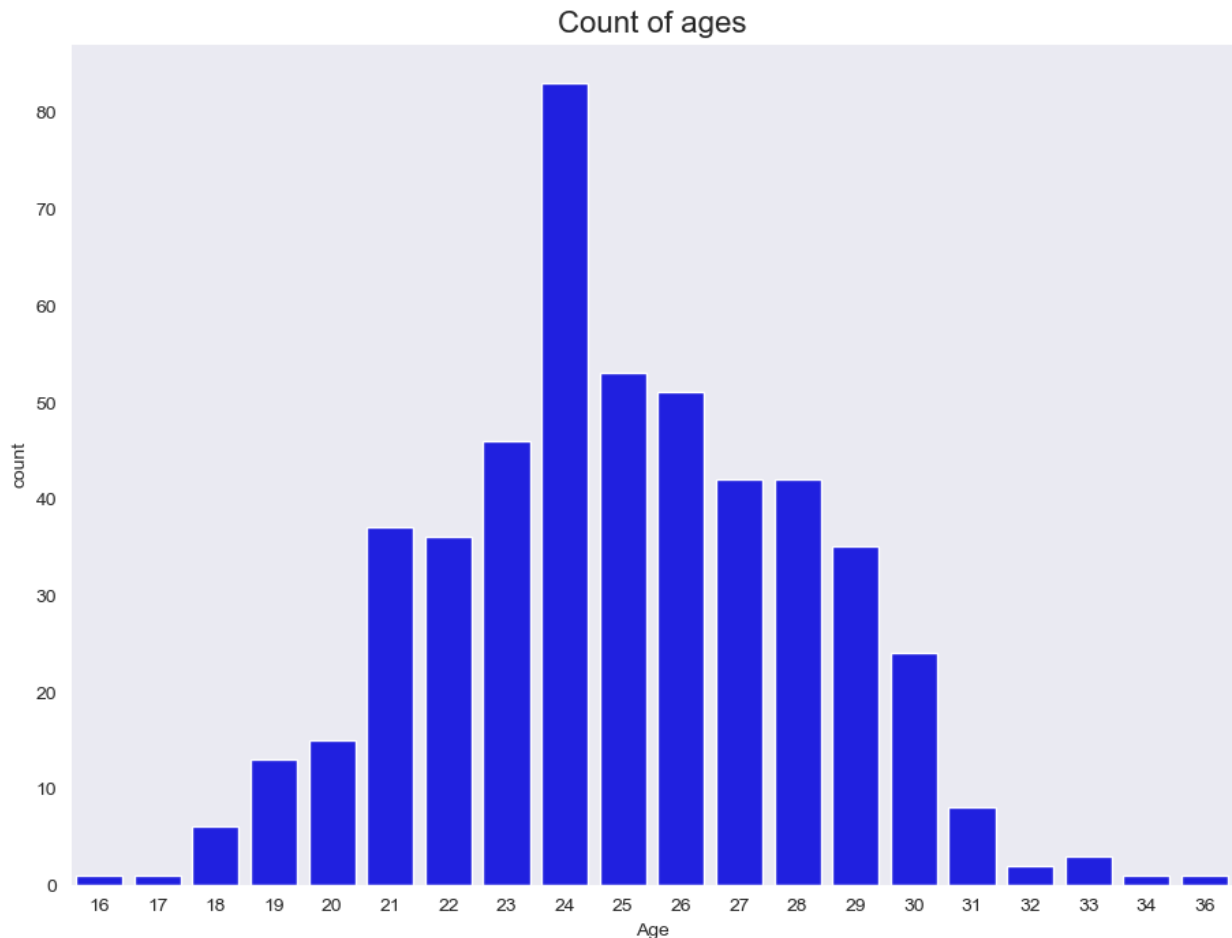
Age

24	83
25	53
26	51
23	46
27	42
28	42
21	37
22	36
29	35
30	24
20	15
19	13
31	8
18	6
33	3
32	2
34	1
36	1
17	1
16	1

Name: count, dtype: int64

```
plt.figure(figsize=(11,8))
sns.set_style("dark")
plt.title("Count of ages", fontsize=16)
plt.xlabel("Age")
sns.countplot(data=data, x="Age", color='blue')
```

```
<Axes: title={'center': 'Count of ages'}, xlabel='Age',
ylabel='count'>
```



```
plt.figure(figsize=(12, 8))
sns.distplot(data['Age'], hist=True, color='Blue')
plt.title("Density Plot of the Ages", fontsize=16)
```

```
/var/folders/v9/wqt89x5x19x474d778y927kc0000gn/T/
ipykernel_33487/1149527092.py:2: UserWarning:
```

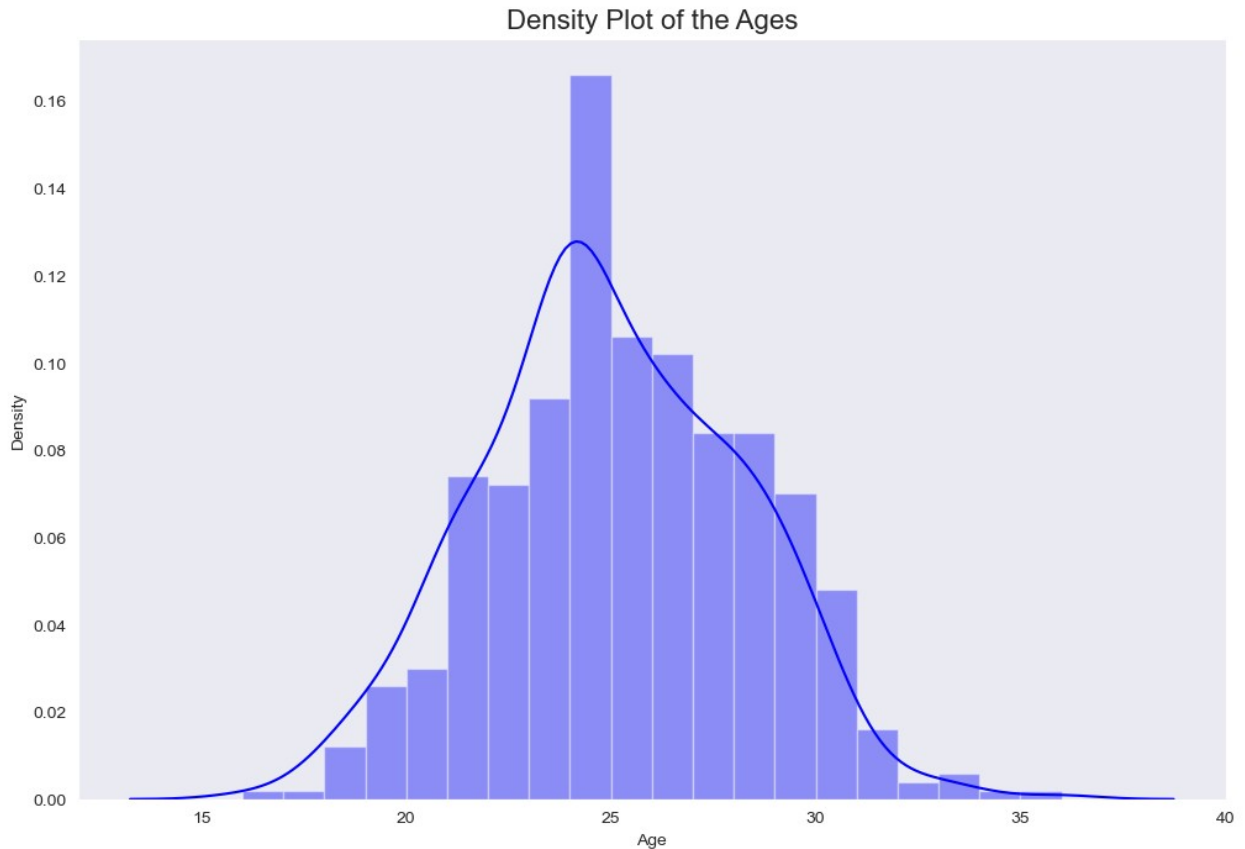
```
`distplot` is a deprecated function and will be removed in seaborn
v0.14.0.
```

Please adapt your code to use either ``displot`` (a figure-level function with similar flexibility) or ``histplot`` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see <https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751>

```
sns.distplot(data['Age'], hist=True, color='Blue')
```

```
Text(0.5, 1.0, 'Density Plot of the Ages')
```



```
data.groupby('Age').Market_value.sum().sort_values(ascending=False).head(10)
```

Age

24	2526
26	1694
25	1409
28	1380
29	1350
22	1275
23	1271
27	1261
21	1185
30	729

Name: Market_value, dtype: int64

```
data.groupby('Age').Market_value.mean().sort_values(ascending=False).head(10)
```

Age

34	72.000000
18	46.666667
36	40.000000
29	38.571429

```

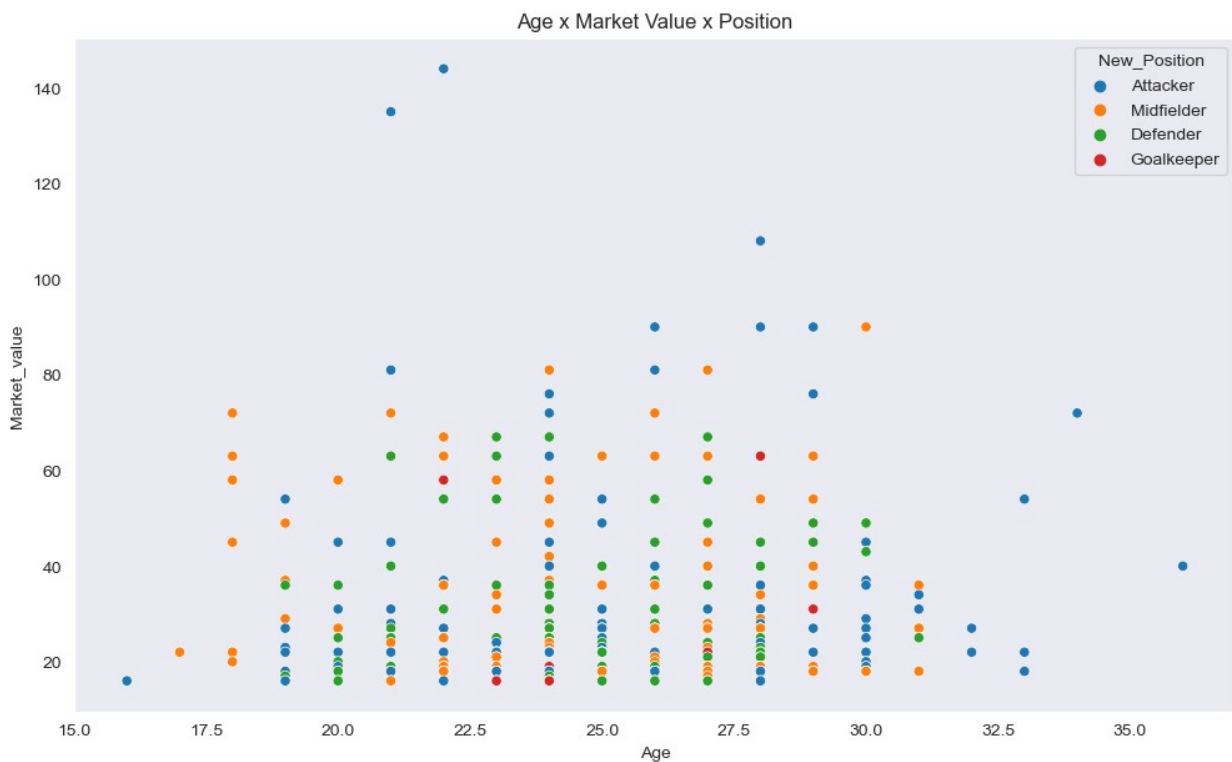
22    35.416667
26    33.215686
28    32.857143
21    32.027027
33    31.333333
24    30.433735
Name: Market_value, dtype: float64

```

```

plt.figure(figsize=(12,7))
plt.title("Age x Market Value x Position")
sns.scatterplot(data=data, x='Age', y='Market_value',
hue='New_Position')
sns.set_style("darkgrid")

```



3.4 Clubs

```

data.Club.unique()

array(['Paris Saint-Germain', 'Borussia Dortmund', 'Tottenham
Hotspur',
      'Manchester City', 'Liverpool FC', 'Chelsea FC',
      'Manchester United', 'FC Barcelona', 'Bayern Munich',
      'Inter Milan', 'Atlético de Madrid', 'West Ham United',
      'Real Sociedad', 'Juventus FC', 'SS Lazio', 'Real Madrid',
      'Bayer 04 Leverkusen', 'Arsenal FC', 'Sevilla FC', 'SSC
Napoli',

```

```

'Leicester City', 'Everton FC', 'AC Milan', 'Villarreal CF',
'ACF Fiorentina', 'RB Leipzig', 'AS Roma', 'Crystal Palace',
'Wolverhampton Wanderers', 'Valencia CF', 'Leeds United',
'LOSC Lille', 'Aston Villa', 'Olympique Lyon', 'OGC Nice',
'AS Monaco', 'Atalanta BC', 'US Sassuolo', 'Torino FC',
'Ajax Amsterdam', 'Brentford FC', 'Southampton FC',
'Newcastle United', 'VfL Wolfsburg', 'FC Porto',
'Olympique Marseille', 'Eintracht Frankfurt',
'Borussia Mönchengladbach', 'Watford FC', 'Stade Rennais FC',
'Clube de Regatas do Flamengo', 'VfB Stuttgart', 'Club Brugge
KV',
'Sporting CP', 'Brighton & Hove Albion', 'Dynamo Kyiv',
'Athletic Bilbao', 'Real Betis Balompié', 'Zenit St.
Petersburg',
'Burnley FC', 'SL Benfica', 'TSG 1899 Hoffenheim', 'Norwich
City',
'PSV Eindhoven', 'KRC Genk', 'Club Atlético Vélez Sarsfield',
'Club Atlético River Plate', 'FC Metz', 'UC Sampdoria',
'Red Bull Salzburg', 'Bologna FC 1909', 'Shakhtar Donetsk',
'Catagari Calcio', 'Getafe CF', 'Al-Rayyan SC', 'Rubin Kazan',
'Feyenoord Rotterdam', 'RCD Espanyol Barcelona', 'UD Almería',
'Sheffield United', 'Celta de Vigo'], dtype=object)

```

```

top_20_clubs = data.Club.value_counts().head(20)
top_20_clubs

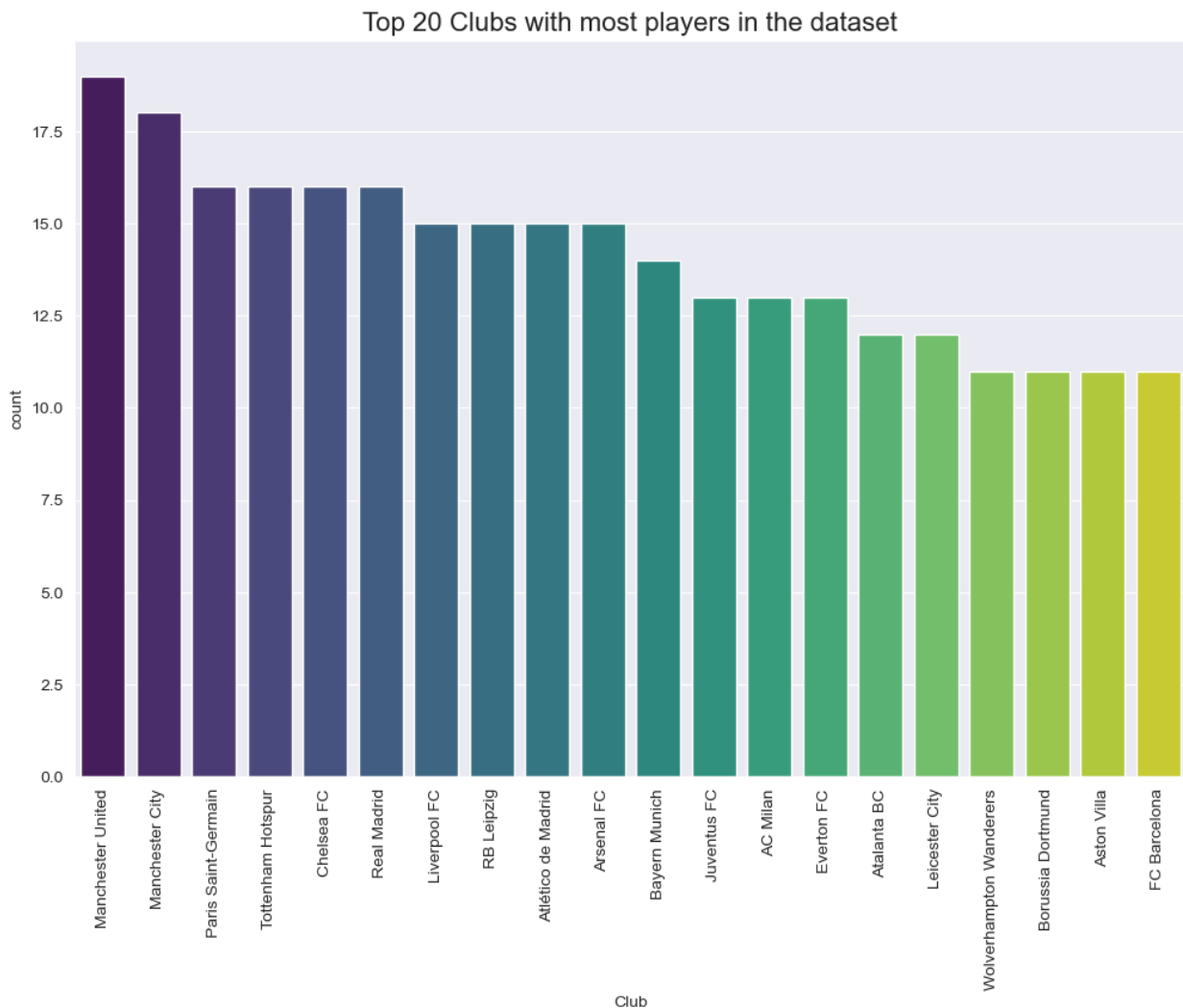
```

```

Club
Manchester United      19
Manchester City        18
Paris Saint-Germain    16
Tottenham Hotspur     16
Chelsea FC             16
Real Madrid            16
Liverpool FC           15
RB Leipzig             15
Atlético de Madrid    15
Arsenal FC             15
Bayern Munich          14
Juventus FC            13
AC Milan               13
Everton FC             13
Atalanta BC          12
Leicester City         12
Wolverhampton Wanderers 11
Borussia Dortmund      11
Aston Villa            11
FC Barcelona           11
Name: count, dtype: int64

```

```
plt.figure(figsize=(12, 8))
plt.title("Top 20 Clubs with most players in the dataset",
fontsize=16)
sns.countplot(data=data, x='Club', order=top_20_clubs.index,
palette='viridis')
plt.xticks(rotation=90)
plt.show()
```



```
data.groupby('Club').Market_value.sum().sort_values(ascending =
False).nlargest(20)
```

Club	Market_value
Manchester City	937
Paris Saint-Germain	772
Manchester United	754
Chelsea FC	704
Bayern Munich	683

Liverpool FC	677
Atlético de Madrid	615
Real Madrid	590
Tottenham Hotspur	530
FC Barcelona	448
Juventus FC	447
Borussia Dortmund	422
Arsenal FC	403
Leicester City	385
RB Leipzig	375
Inter Milan	373
AC Milan	354
SSC Napoli	351
Everton FC	316
Aston Villa	284

Name: Market_value, dtype: int64

```
top_20_clubs_value =
data.groupby('Club').Market_value.mean().sort_values(ascending =
False).nlargest(20)
top_20_clubs_value
```

Club	
Manchester City	52.055556
Bayern Munich	48.785714
Paris Saint-Germain	48.250000
Inter Milan	46.625000
Liverpool FC	45.133333
Chelsea FC	44.000000
Atlético de Madrid	41.000000
FC Barcelona	40.727273
Manchester United	39.684211
Borussia Dortmund	38.363636
Real Madrid	36.875000
SSC Napoli	35.100000
Juventus FC	34.384615
Sevilla FC	33.666667
Tottenham Hotspur	33.125000
SS Lazio	33.000000
Bayer 04 Leverkusen	32.500000
Leicester City	32.083333
West Ham United	31.714286
Torino FC	31.000000

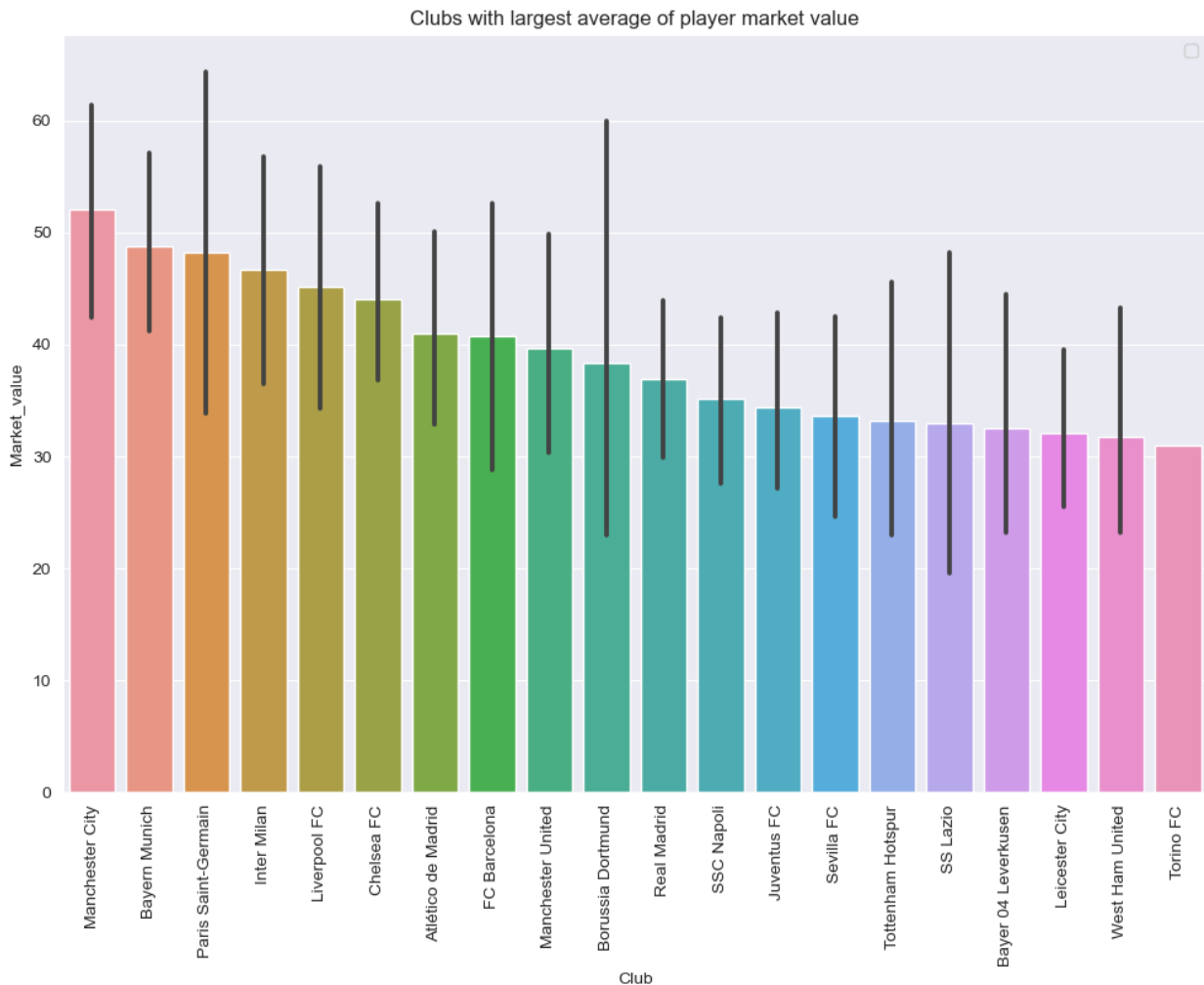
Name: Market_value, dtype: float64

```
plt.figure(figsize=(12,8))
plt.title("Clubs with largest average of player market value")
sns.barplot(data=data, x='Club', y='Market_value',
order=top_20_clubs_value.index)
sns.set_style("dark")
```

```
plt.xticks(rotation=90)
plt.legend()
```

No artists with labels found to put in legend. Note that artists whose label start with an underscore are ignored when legend() is called with no argument.

```
<matplotlib.legend.Legend at 0x15ef93450>
```



3.5 Players

```
data.Name.unique()
```

```
array(['Kylian Mbappé', 'Erling Haaland', 'Harry Kane', 'Jack Grealish',
      'Mohamed Salah', 'Romelu Lukaku', 'Kevin De Bruyne', 'Neymar',
      'Jadon Sancho', 'Frenkie de Jong', 'Bruno Fernandes',
      'Joshua Kimmich', 'Raheem Sterling', 'Marcus Rashford',
      'Sadio Mané', 'Heung-min Son', 'Pedri', 'Phil Foden',
```


'Lautaro Martínez', 'Marcos Llorente', 'Lionel Messi',
 'Mason Mount', 'Trent Alexander-Arnold', 'Rúben Dias',
 'Marquinhos', 'Jude Bellingham', 'João Félix', 'Alphonso
 Davies',
 'Achraf Hakimi', 'Declan Rice', 'Rodri', 'Mikel Oyarzabal',
 'Federico Chiesa', 'Matthijs de Ligt', 'Kai Havertz',
 'Sergej Milinković-Savić', 'Bernardo Silva', 'Raphaël Varane',
 'Serge Gnabry', 'Leon Goretzka', 'Jan Oblak', 'Casemiro',
 'Florian Wirtz', 'Bukayo Saka', 'Federico Valverde',
 'Gianluigi Donnarumma', 'Nicolò Barella', 'Andrew Robertson',
 'Ansu Fati', 'Jules Koundé', 'Victor Osimhen', 'Gabriel Jesus',
 'Dayot Upamecano', 'Alessandro Bastoni', 'Wilfred Ndidi',
 'José María Giménez', 'Fabinho', 'Milan Skriniar', 'Leroy
 Sané',
 'Paul Pogba', 'Thibaut Courtois', 'Alisson', 'Koke',
 'Robert Lewandowski', 'Eduardo Camavinga', 'Richarlison',
 'Franck Kessié', 'Youri Tielemans', 'Kingsley Coman',
 'N'Golo Kanté', 'João Cancelo', 'Timo Werner', 'Virgil van
 Dijk',
 'Marco Verratti', 'Marc-André ter Stegen', 'David Alaba',
 'Jamal Musiala', 'Mason Greenwood', 'Pau Torres', 'Ferran
 Torres',
 'Vinícius Júnior', 'Dušan Vlahovic', 'Theo Hernández',
 'Christian Pulisic', 'James Maddison', 'Dani Olmo',
 'Ferland Mendy', 'Ousmane Dembélé', 'Ederson', 'Paulo Dybala',
 'Piotr Zielinski', 'Harry Maguire', 'Antoine Griezmann',
 'Stefan de Vrij', 'Lorenzo Insigne', 'Kalidou Koulibaly',
 'Christopher Nkunku', 'Reece James', 'Tanguy Ndombélé',
 'Fabián Ruiz', 'Diogo Jota', 'Diego Carlos', 'Caglar Söyüncü',
 'Hirving Lozano', 'Dominic Calvert-Lewin', 'Lorenzo
 Pellegrini',
 'Lucas Hernández', 'Aymeric Laporte', 'Memphis Depay',
 'Wilfried Zaha', 'Álvaro Morata', 'Jorginho', 'Mateo Kovacic',
 'Cristiano Ronaldo', 'Giovanni Reyna', 'Moussa Diaby',
 'Tomas Soucek', 'Rúben Neves', 'Luke Shaw', 'Riyad Mahrez',
 'Nuno Mendes', 'Edmond Tapsoba', 'Aaron Wan-Bissaka',
 'Wesley Fofana', 'Youssef En-Nesyri', 'Éder Militão',
 'Nicolò Zaniolo', 'Carlos Soler', 'Kalvin Phillips',
 'Alexander Isak', 'Mikel Merino', 'Ben White', 'Martin
 Ødegaard',
 'Fikayo Tomori', 'Presnel Kimpembe', 'Ángel Correa',
 'Rodrigo de Paul', 'Thomas Partey', 'Thomas Lemar', 'André
 Silva',
 'Gerard Moreno', 'Raphaël Guerreiro', 'Pierre-Emile Höjbjerg',
 'Marcelo Brozovic', 'Saúl Ñíguez', 'Yannick Carrasco',
 'Roberto Firmino', 'Luis Alberto', 'Ilkay Gündogan',
 'Ismaël Bennacer', 'Tammy Abraham', 'Ben Chilwell', 'Hakim
 Ziyech',
 'Ciro Immobile', 'Jonathan David', 'Pedro Neto', 'Douglas

Luiz',
'Lucas Paquetá', 'Dejan Kulusevski', 'Amine Gouiri',
'Aurélien Tchouaméni', 'Rodrygo', 'Harvey Barnes', 'Houssem
Aouar',
'Leon Bailey', 'Moise Kean', 'Arthur', 'Ibrahima Konaté',
'Cristian Romero', 'Benjamin Pavard', 'Nicolas Pépé',
'Emiliano Buendía', 'Scott McTominay', 'Marco Asensio',
'Mario Hermoso', 'Angeliño', 'Robin Gosens', 'Manuel
Locatelli',
'José Gayà', 'Andreas Christensen', 'Anthony Martial',
'Domenico Berardi', 'Andrea Belotti', 'Niklas Süle',
'Wissam Ben Yedder', 'Lucas Digne', 'Emiliano Martínez',
'Antonio Rüdiger', 'Mauro Icardi', 'Ryan Gravenberch',
'Jordan Veretout', 'Duván Zapata', 'Raphinha',
'Callum Hudson-Odoi', 'Davinson Sánchez', 'Ollie Watkins',
'Naby Keïta', 'Kieran Tierney', 'Ivan Toney', 'Ante Rebić',
'James Ward-Prowse', 'Nathan Aké', 'Kurt Zouma', 'Marcel
Sabitzer',
'Yérémy Pino', 'Bryan Gil', 'Bruno Guimarães', 'Matheus Cunha',
'Edouard Mendy', 'Curtis Jones', 'Sergio Dest',
'Rodrigo Bentancur', 'Donyell Malen', 'Jarrod Bowen',
'Nikola Vlasić', 'Manuel Akanji', 'Allan Saint-Maximin',
'Joan Jordán', 'Renato Sanches', 'Gianluca Mancini', 'Joe
Gomez',
'Tyrone Mings', 'Wout Weghorst', 'Joaquín Correa',
'Ricardo Pereira', 'Dele Alli', 'Ruslan Malinovskyi',
'Adama Traoré', 'John McGinn', 'Lucas Ocampos', 'John Stones',
'Adrien Rabiot', 'Leander Dendoncker', 'Matteo Politano',
'Hakan Calhanoglu', 'Jesús Corona', 'Luis Muriel', 'Kevin
Volland',
'Thomas Müller', 'Georginio Wijnaldum', 'Toni Kroos',
'Benoît Badiashile', 'Maxence Lacroix', 'Boubacar Kamara',
'Emile Smith Rowe', 'Evan N'Dicka', 'Sven Botman',
'Boubakary Soumaré', 'Merih Demiral', 'Marcus Thuram',
'Florian Neuhaus', 'Aleksandr Golovin', 'Timothy Castagne',
'Patrik Schick', 'Nélson Semedo', 'Raúl Jiménez',
'Oleksandr Zinchenko', 'Kyle Walker', 'Ismaila Sarr',
'Sandro Tonali', 'Denis Zakaria', 'Xaver Schlager',
'Lukas Klostermann', 'Sébastien Haller', 'Matthias Ginter',
'Thorgan Hazard', 'Jérémy Doku', 'Gabriel Barbosa',
'Konrad Laimer', 'Emre Can', 'Leonardo Spinazzola', 'Gavi',
'Ilaix Moriba', 'Silas Katompa Mvumpa', 'Antony', 'Roger
Ibañez',
'Fábio Silva', 'Lisandro Martínez', 'Luis Díaz', 'Ronald
Araújo',
'Renan Lodi', 'Emerson Royal', 'Dominik Szoboszlai',
'Charles De Ketelaere', 'Gabriel', 'Pedro Gonçalves',
'Nikola Milenković', 'Ezri Konsa', 'Yves Bissouma', 'Maxi
Gómez',

'Rafael Leão', 'Daichi Kamada', 'Arnaut Danjuma',
 'André Zambo Anguissa', 'Robin Le Normand', 'Nordi Mukiele',
 'Ben Godfrey', 'Noa Lang', 'Weston McKennie', 'Ridle Baku',
 'Jonathan Ikoné', 'Jonathan Bamba', 'Saïd Benrahma',
 'Donny van de Beek', 'Sergio Reguilón', 'Jason Denayer',
 'Viktor Tsygankov', 'Davide Calabria', 'Daniel Podence',
 'Iñaki Williams', 'Jan Bednarek', 'Abdou Diallo', 'Thilo
 Kehrer',
 'Gonçalo Guedes', 'Nabil Fekir', 'Nico Elvedi', 'Mike Maignan',
 'Sardar Azmoun', 'James Tarkowski', 'Iñigo Martínez',
 'Remo Freuler', 'Lewis Dunk', 'Daniel Carvajal', 'Jordan
 Pickford',
 'Conor Coady', 'Abdoulaye Doucouré', 'Michael Keane',
 'Stefan Savic', 'Lucas Moura', 'Pablo Sarabia', 'Thiago',
 'Pierre-Emerick Aubameyang', 'Eden Hazard', 'Karim Benzema',
 'Nicolás González', 'Amadou Haidara', 'Rafa Silva', 'Otávio',
 'Victor Lindelöf', 'Giovanni Di Lorenzo', 'Odilon Kossounou',
 'Rayan Cherki', 'Brahim Díaz', 'Mario Pasalic', 'Marten de
 Roon',
 'Andrej Kramaric', 'Gabriel Martinelli', 'Dwight McNeil',
 'Max Aarons', 'David Neres', 'Mattéo Guendouzi', 'Cody Gakpo',
 'Matty Cash', 'Francisco Trincão', 'Marash Kumbulla',
 'Sasa Kalajdzic', 'Patson Daka', 'Giovani Lo Celso',
 'Guido Rodríguez', 'Joe Willock', 'Todd Cantwell',
 'Christoph Baumgartner', 'Malcom', 'Orel Mangala',
 'Ramy Bensebaini', 'Steven Bergwijn', 'Kasper Dolberg',
 'Paul Onuachu', 'Joachim Andersen', 'Dean Henderson', 'Alex
 Iwobi',
 'Jonathan Tah', 'Alejandro Grimaldo', 'Fred', 'Patrick
 Bamford',
 'Eric Dier', 'Leandro Paredes', 'Berat Djimsiti', 'Jesse
 Lingard',
 'Danny Ings', 'Allan', 'Callum Wilson', 'Granit Xhaka',
 'Alexandre Lacazette', 'João Palhinha', 'Yussuf Poulsen',
 'Thiago Almada', 'Julián Álvarez', 'Sofiane Diop', 'Pape Sarr',
 'Pedro Porro', 'Darwin Núñez', 'Illan Meslier', 'Mikkel
 Damsgaard',
 'Karim Adeyemi', 'Enock Mwepu', 'Musa Barrow', 'Eberechi Eze',
 'Eric García', 'Aaron Ramsdale', 'Martín Zubimendi',
 'Samuel Chukwueze', 'Dodô', 'Manor Solomon', 'Marc Guehi',
 'Hamed Junior Traorè', 'Yusuf Yazici', 'Tetê', 'Pablo Fornals',
 'Alfonso Pedraza', 'Igor Zubeldia', 'Mason Holgate', 'Ché
 Adams',
 'Gerson', 'Tyler Adams', 'Matteo Pessina', 'Takehiro Tomiyasu',
 'Jeff Reine-Adélaïde', 'Dani Ceballos', 'Nahitan Nández',
 'Gaetano Castrovilli', 'Kelechi Iheanacho', 'Mauro Arambarri',
 'Yerry Mina', 'Marc Cucurella', 'Unai Simón', 'Luka Jovic',
 'Alex Telles', 'Yeray Álvarez', 'Zeki Celik', 'Harry Winks',
 'Diego Llorente', 'Juan Musso', 'Moussa Dembélé', 'André

```
Gomes',
      'Neal Maupay', 'Jéréemie Boga', 'Álex Remiro', 'Bryan
Cristante',
      'Alessio Romagnoli', 'Julian Weigl', 'Arkadiusz Milik',
      'Héctor Bellerín', 'Julian Brandt', 'Tiemoué Bakayoko',
      'Filip Kostic', 'Danilo', 'Bertrand Traoré', 'Erik Lamela',
      'Emil Forsberg', 'Portu', 'Kieran Trippier', 'James Rodríguez',
      'Julian Draxler', 'Philippe Coutinho', 'Alex Sandro',
      'Sergio Canales', 'Jordan Henderson', 'Ángel Di María',
      'Josko Gvardiol', 'Joakim Maehle', 'Maximilian Arnold',
      'Mohamed Simakan', 'Rayan Aït Nouri', 'Amad Diallo',
      'Tariq Lamptey', 'Noni Madueke', 'Khvicha Kvaratskhelia',
      'Wendel',
      'William Saliba', 'Marcos Senesi', 'Youssoufa Moukoko',
      'Luiz Felipe', 'Nicolás De La Cruz', 'Ryan Sessegnon',
      'Axel Disasi', 'Alexis Saelemaekers', 'Yangel Herrera',
      'Cengiz Ünder', 'Kyle Walker-Peters', 'Noussair Mazraoui',
      'Umar Sadiq', 'Sander Berge', 'Manuel Lazzari', 'Éverton',
      'Daniel James', 'Lucas Torreira', 'Tom Davies', 'Renato Tapia',
      'David Raya', 'Gregor Kobel', 'Wilmar Barrios', 'Gelson
Martins',
      'Rob Holding', 'Adam Armstrong', 'Giorgian de Arrascaeta',
      'Ayoze Pérez', 'Alex Meret', 'Duje Caleta-Car', 'Aritz
Elustondo'],
      dtype=object)
```

```
top_10 = data.sort_values(ascending = False,
by='Market_value').head(10)
top_10
```

	Name	Position	Age	Market_value	Country
0	Kylian Mbappé	Centre-Forward	22	144	France
1	Erling Haaland	Centre-Forward	21	135	Norway
2	Harry Kane	Centre-Forward	28	108	England
4	Mohamed Salah	Right Winger	29	90	Egypt
5	Romelu Lukaku	Centre-Forward	28	90	Belgium
6	Kevin De Bruyne	Attacking Midfield	30	90	Belgium
7	Neymar	Left Winger	29	90	Brazil
3	Jack Grealish	Left Winger	26	90	England
8	Jadon Sancho	Left Winger	21	81	England
9	Frenkie de Jong	Central Midfield	24	81	Netherlands

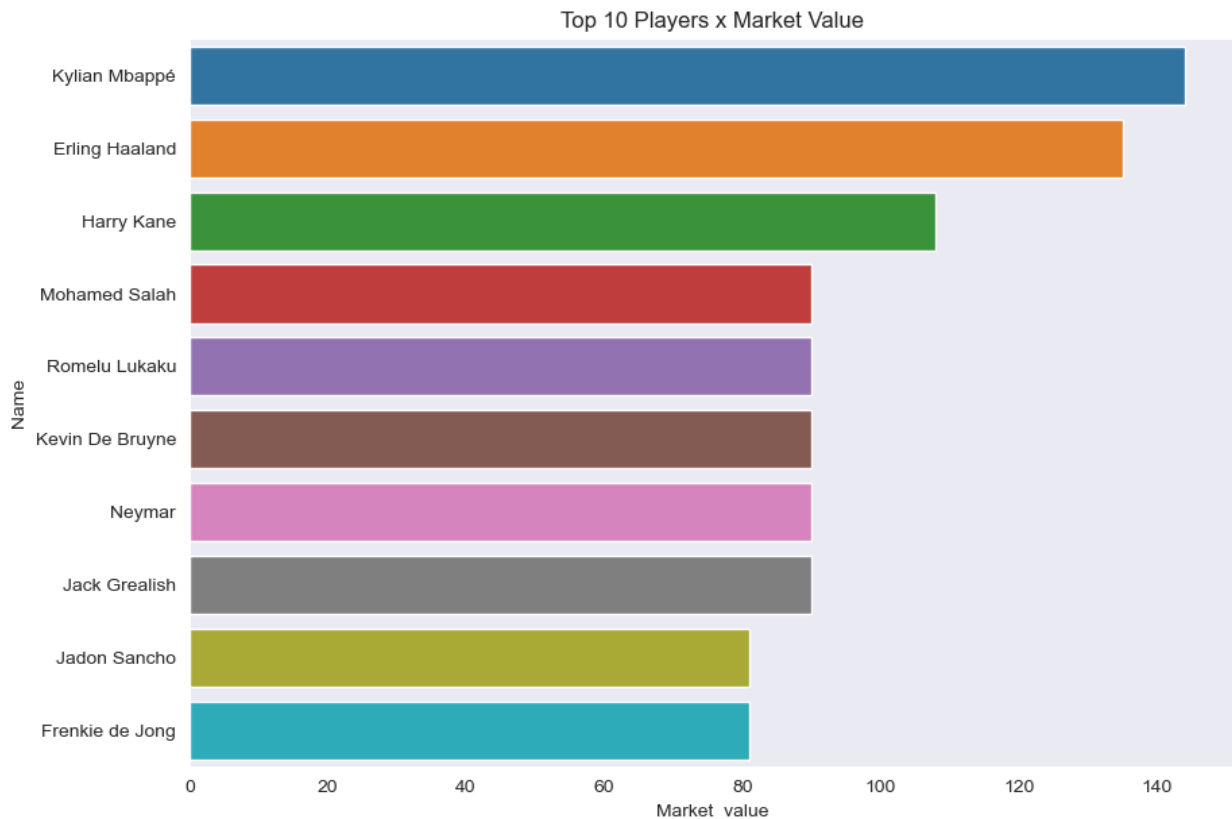
	Club	Matches	Goals	Own_goals	Assists
Yellow_cards \					
0	Paris Saint-Germain	16	7	0	11
3					
1	Borussia Dortmund	10	13	0	4
1					
2	Tottenham Hotspur	16	7	0	2
2					
4	Liverpool FC	15	15	0	6
1					
5	Chelsea FC	11	4	0	1
0					
6	Manchester City	14	3	0	1
1					
7	Paris Saint-Germain	11	3	0	3
3					
3	Manchester City	15	2	0	3
1					
8	Manchester United	13	0	0	0
0					
9	FC Barcelona	13	0	0	2
2					

	Second_yellow_cards	Red_cards	Substitute_in	Substitute_out
New_Position \				
0	0	0	0	8
Attacker				
1	0	0	0	1
Attacker				
2	0	0	2	2
Attacker				
4	0	0	0	3
Attacker				
5	0	0	1	2
Attacker				
6	0	0	4	6
Midfielder				
7	0	0	0	3
Attacker				
3	0	0	2	8
Attacker				
8	0	0	7	5
Attacker				
9	1	0	0	2
Midfielder				

	Goals.per.game	Assists.per.game
0	0.44	0.69

1	1.30	0.40
2	0.44	0.12
4	1.00	0.40
5	0.36	0.09
6	0.21	0.07
7	0.27	0.27
3	0.13	0.20
8	0.00	0.00
9	0.00	0.15

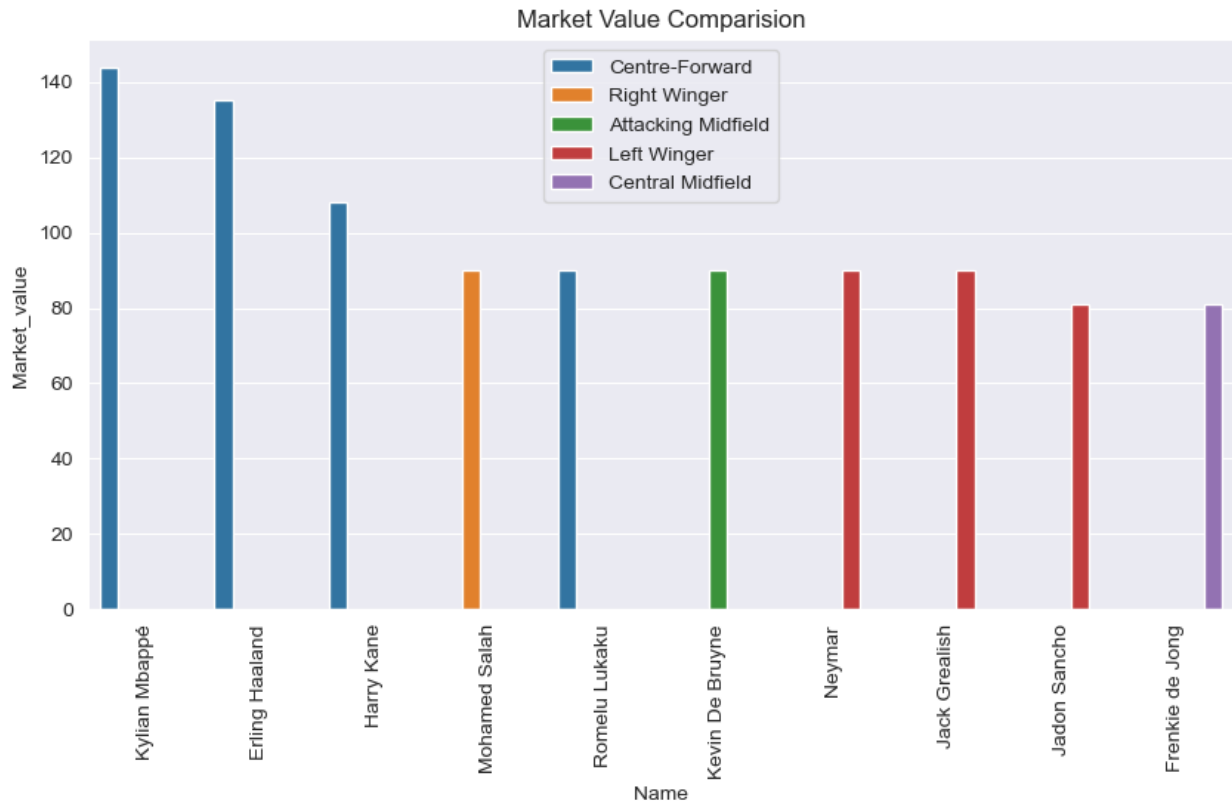
```
plt.figure(figsize=(10,7))
plt.title("Top 10 Players x Market Value")
sns.barplot(data=top_10, y="Name", x="Market_value")
sns.set_style("darkgrid")
```



visualizing

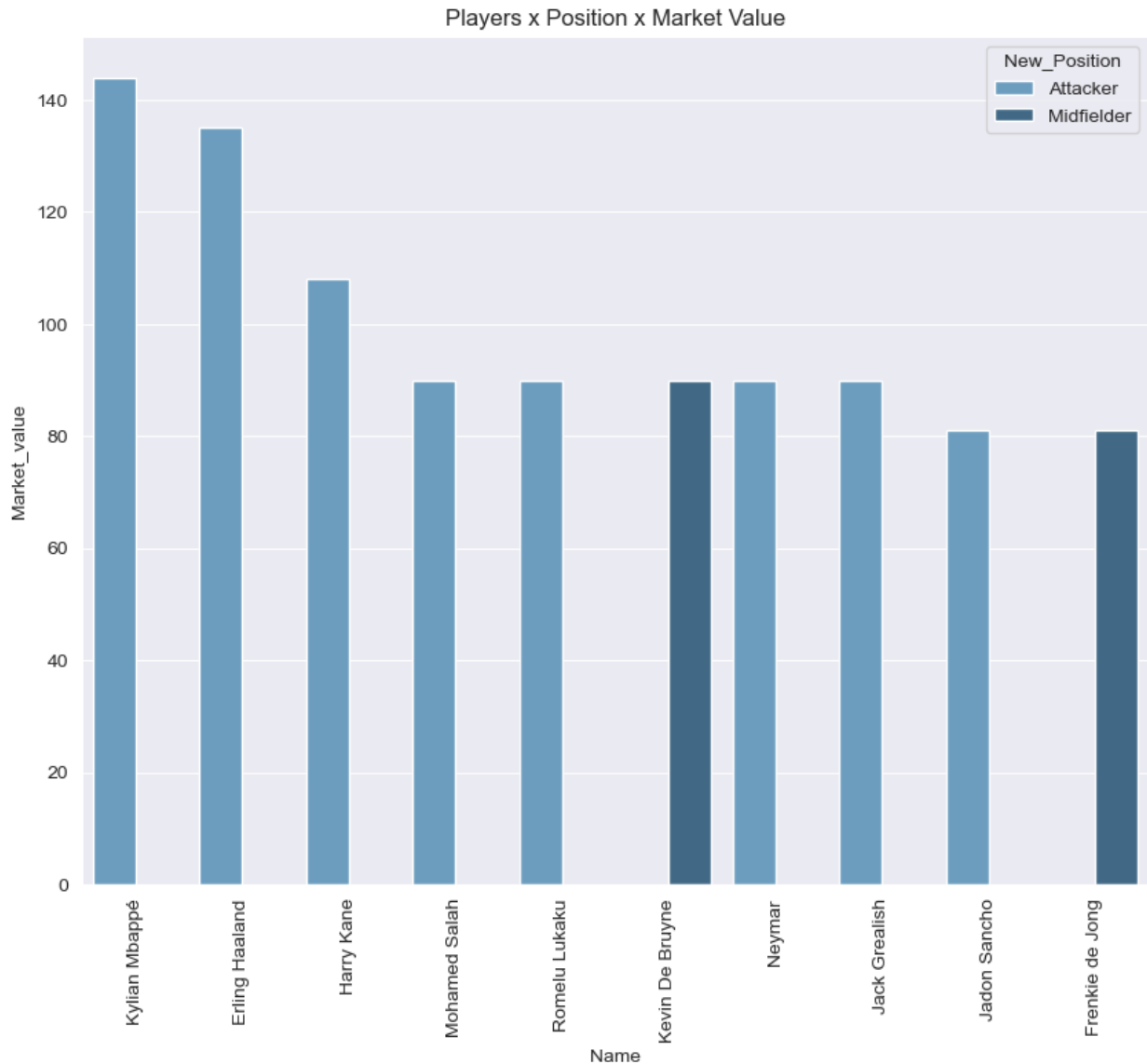
```
plt.figure(figsize=(10,5))
plt.title("Market Value Comparision")
sns.barplot(x='Name', y='Market_value', hue='Position', data=top_10)
plt.xticks(rotation=90)
plt.legend()
```

<matplotlib.legend.Legend at 0x15eb5e2d0>



```
plt.figure(figsize=(10,8))
plt.title("Players x Position x Market Value")
plt.xticks(rotation=90)
sns.set_style("dark")
sns.barplot(x='Name', y='Market_value', hue='New_Position',
data=top_10, palette='Blues_d')

<Axes: title={'center': 'Players x Position x Market Value'},
xlabel='Name', ylabel='Market_value'>
```



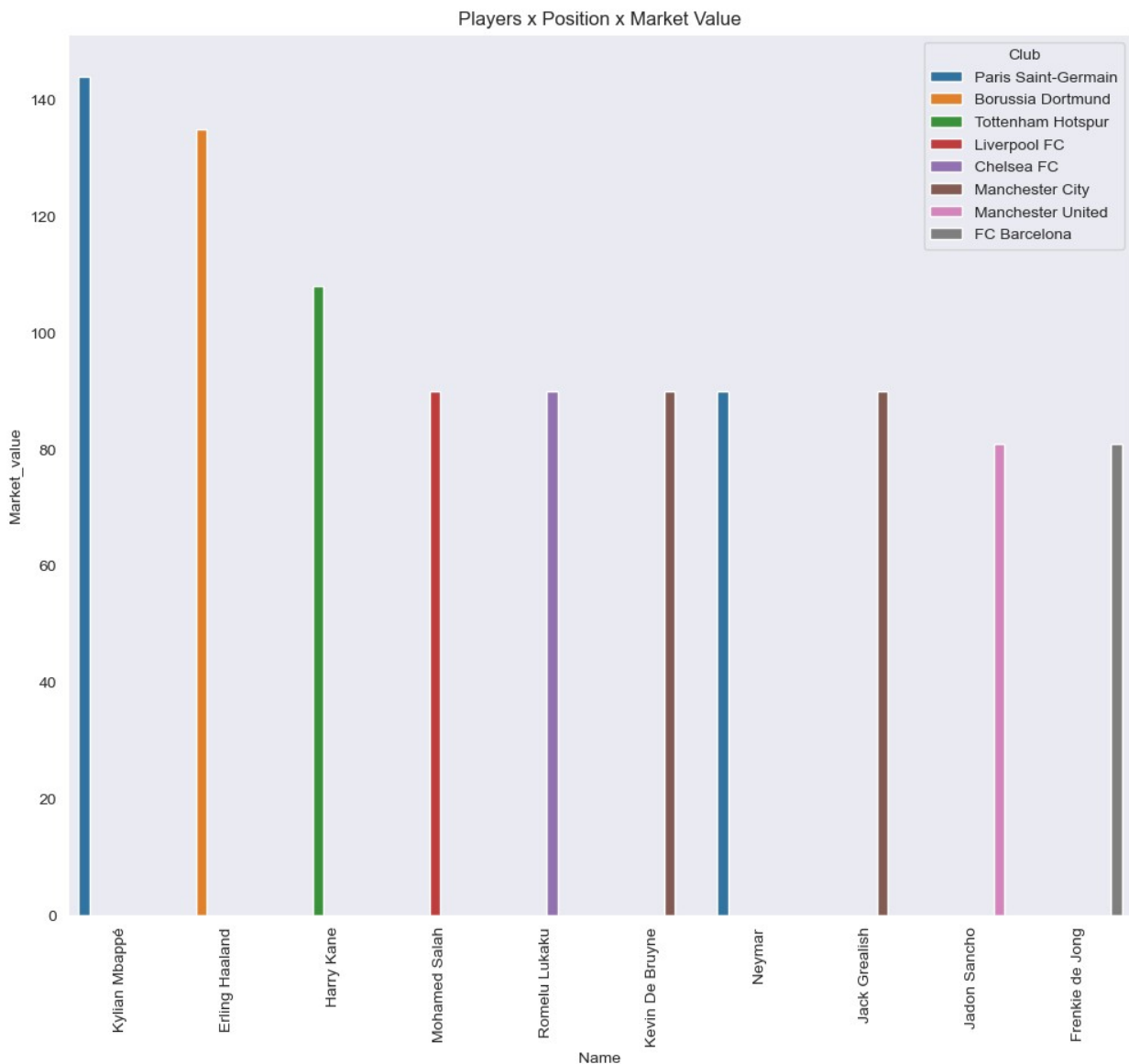
```
data.groupby(['Name',
'Club']).Market_value.sum().sort_values(ascending =
False).nlargest(10)
```

Name	Club	
Kylian Mbappé	Paris Saint-Germain	144
Erling Haaland	Borussia Dortmund	135
Harry Kane	Tottenham Hotspur	108
Neymar	Paris Saint-Germain	90
Mohamed Salah	Liverpool FC	90
Kevin De Bruyne	Manchester City	90
Romelu Lukaku	Chelsea FC	90
Jack Grealish	Manchester City	90
Bruno Fernandes	Manchester United	81

Raheem Sterling Manchester City 81
Name: Market_value, dtype: int64

```
plt.figure(figsize=(12,10))  
plt.title("Players x Position x Market Value")  
plt.xticks(rotation=90)  
sns.set_style("dark")  
sns.barplot(x='Name', y='Market_value', hue='Club', data=top_10)
```

```
<Axes: title={'center': 'Players x Position x Market Value'},  
xlabel='Name', ylabel='Market_value'>
```



```
top_2 = data[data['Name'].isin(['Erling Haaland', 'Kylian Mbappé'])]  
top_2
```

	Name	Position	Age	Market_value	Country	\
0	Kylian Mbappé	Centre-Forward	22	144	France	
1	Erling Haaland	Centre-Forward	21	135	Norway	

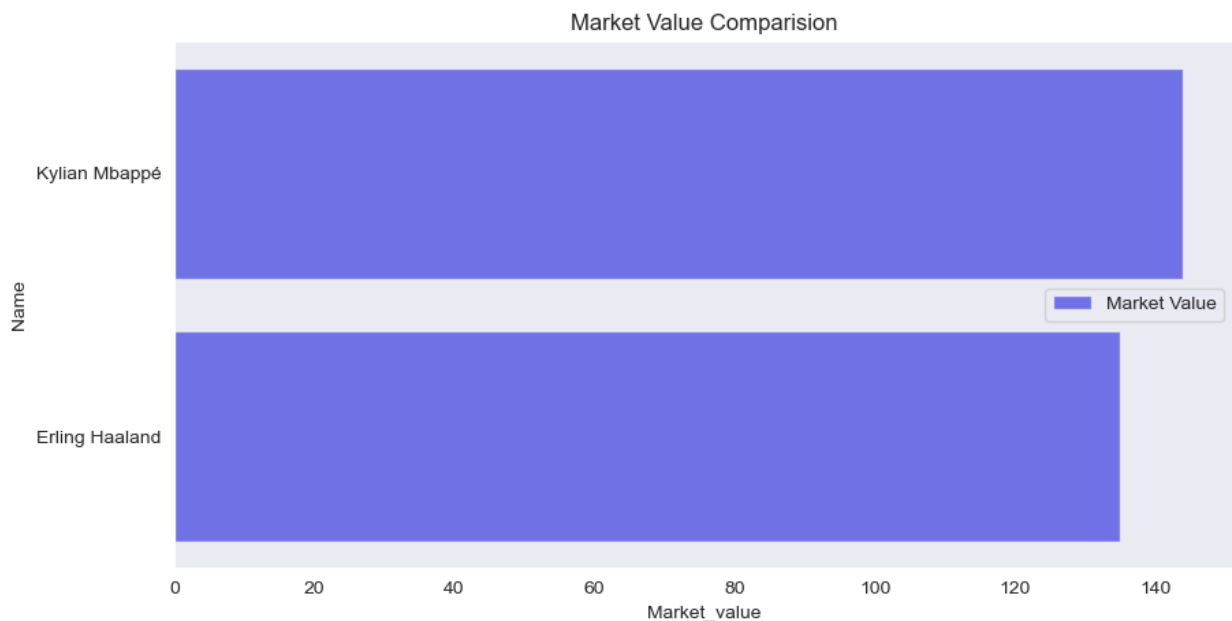
	Club	Matches	Goals	Own_goals	Assists
0	Paris Saint-Germain	16	7	0	11
1	Borussia Dortmund	10	13	0	4

	Second_yellow_cards	Red_cards	Substitute_in	Substitute_out
0	0	0	0	8
1	0	0	0	1

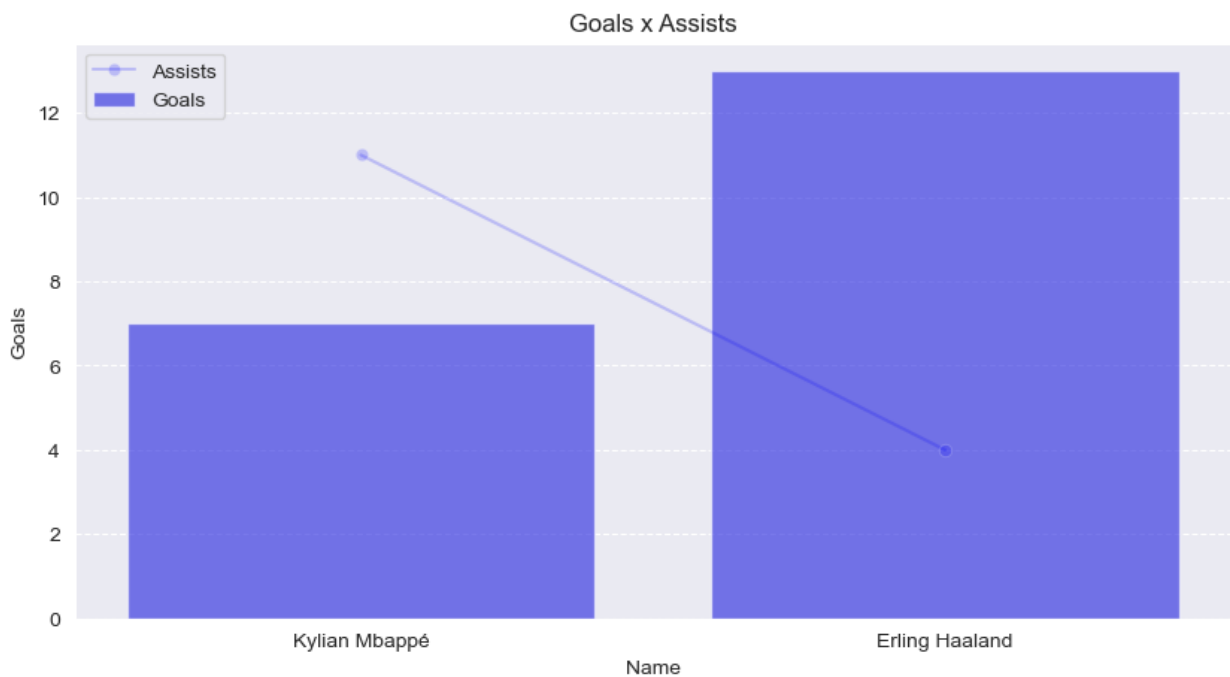
	Goals.per.game	Assists.per.game
0	0.44	0.69
1	1.30	0.40

```
plt.figure(figsize=(10,5))
plt.title("Market Value Comparision")
sns.set_style("darkgrid")
sns.barplot(y='Name', x='Market_value', data=top_2, color='blue',
alpha=0.6, label='Market Value')
plt.legend()
```

<matplotlib.legend.Legend at 0x15ee68410>



```
plt.figure(figsize=(10,5))
plt.title("Goals x Assists")
sns.barplot(x='Name', y='Goals', data=top_2, color='blue', alpha=0.6,
label='Goals')
sns.lineplot(data=top_2['Assists'], color='blue', alpha=0.2,
marker='o', label='Assists')
plt.grid(True, axis='y', linestyle='--', alpha=1.0)
sns.set_style("dark")
plt.legend()
plt.show()
```



```
plt.figure(figsize=(10,5))
plt.title("Avg Goals x Avg Assists")
sns.barplot(x='Name', y='Goals.per.game', data=top_2, color='blue',
alpha=0.6, label='Average goals per game')
sns.lineplot(data=top_2['Assists.per.game'], color='blue', alpha=0.2,
marker='o', label='Average Assists per game')
plt.grid(True, axis='y', linestyle='--', alpha=0.7)
sns.set_style("white")
plt.legend()
plt.show()
```

