In [5]:
```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt
df=pd.read_excel('insta.xlsx')
df.head()
```

Out[5]:

	rank	channel_info	influence_score	posts	followers	avg_likes	60_day_eng_rate	new_post_avg_like	total_likes	country
0	1	cristiano	92	3.3k	475.8m	8.7m	0.0139	6.5m	29.0b	Spain
1	2	kyliejenner	91	6.9k	366.2m	8.3m	0.0162	5.9m	57.4b	United States
2	3	leomessi	90	0.89k	357.3m	6.8m	0.0124	4.4m	6.0b	NaN
3	4	selenagomez	93	1.8k	342.7m	6.2m	0.0097	3.3m	11.5b	United States
4	5	therock	91	6.8k	334.1m	1.9m	0.002	665.3k	12.5b	United States

In [7]:
```
df.isnull().sum()
```

Out[7]:
```
rank                0
channel_info        0
influence_score     0
posts               0
followers           0
avg_likes           0
60_day_eng_rate     0
new_post_avg_like   0
total_likes         0
country            62
dtype: int64
```

In [9]:
```
df.shape
```

Out[9]:
```
(200, 10)
```

In [11]:
```
replace = {'b': 'e9', 'm': 'e6', 'k': 'e3', '%': ''}
columns_to_convert = ['total_likes', 'posts', 'followers',
                      'avg_likes', '60_day_eng_rate', 'new_post_avg_like']

# Replace and convert columns
df[columns_to_convert] = df[columns_to_convert].replace(replace, regex=True).astype(float)
```

In [13]:
```
df.head()
```

Out[13]:

	rank	channel_info	influence_score	posts	followers	avg_likes	60_day_eng_rate	new_post_avg_like	total_likes	cou
0	1	cristiano	92	3300.0	475800000.0	8700000.0	0.0139	6500000.0	2.900000e+10	
1	2	kyliejenner	91	6900.0	366200000.0	8300000.0	0.0162	5900000.0	5.740000e+10	U S
2	3	leomessi	90	890.0	357300000.0	6800000.0	0.0124	4400000.0	6.000000e+09	
3	4	selenagomez	93	1800.0	342700000.0	6200000.0	0.0097	3300000.0	1.150000e+10	U S
4	5	therock	91	6800.0	334100000.0	1900000.0	0.0020	665300.0	1.250000e+10	U S

In [15]:
```
df['country']=df['country'].bfill().ffill()
```

In [17]:
```
df.head()
```

Out[17]:

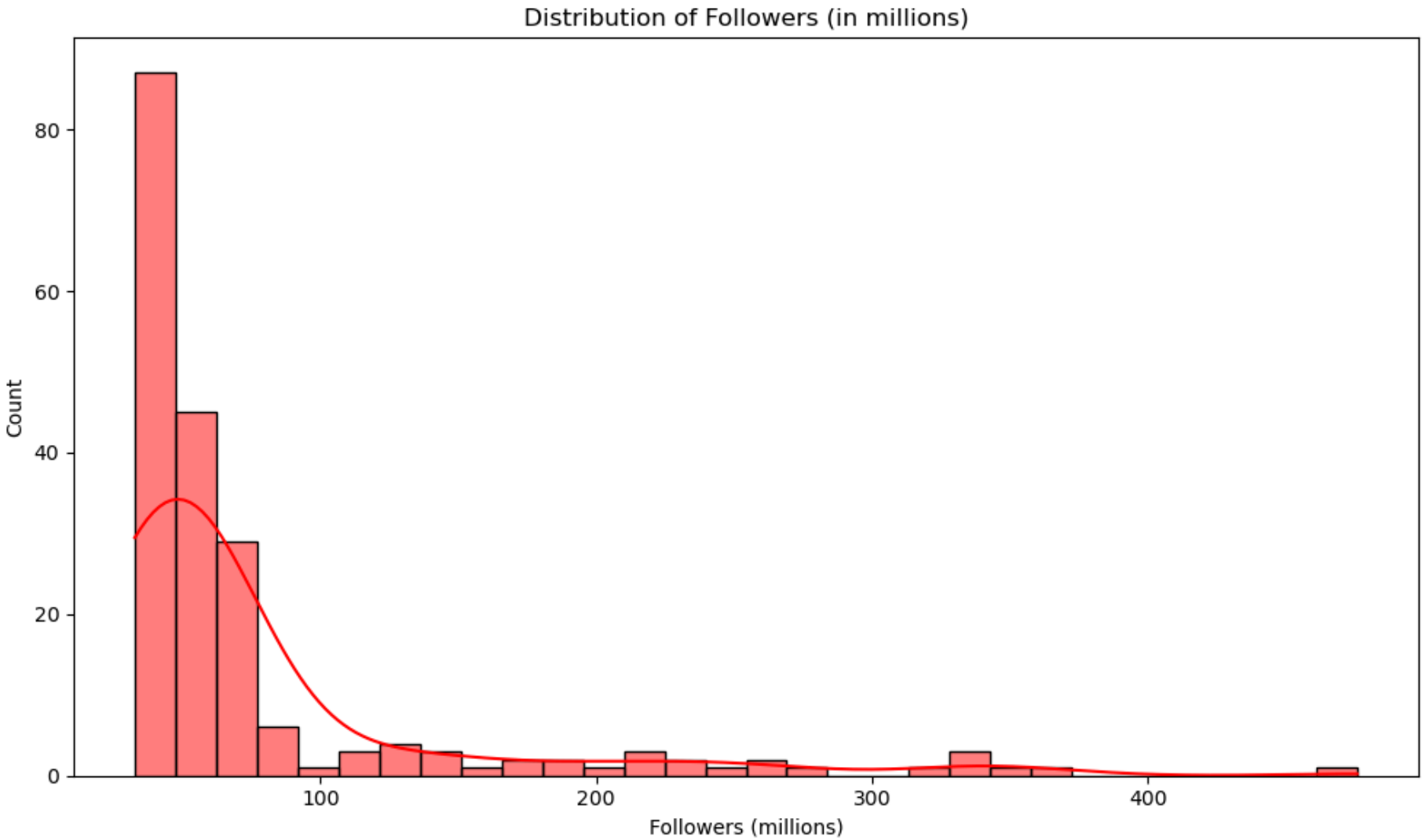
	rank	channel_info	influence_score	posts	followers	avg_likes	60_day_eng_rate	new_post_avg_like	total_likes	cou
0	1	cristiano	92	3300.0	475800000.0	8700000.0	0.0139	6500000.0	2.900000e+10	
1	2	kyliejenner	91	6900.0	366200000.0	8300000.0	0.0162	5900000.0	5.740000e+10	U S
2	3	leomessi	90	890.0	357300000.0	6800000.0	0.0124	4400000.0	6.000000e+09	U S
3	4	selenagomez	93	1800.0	342700000.0	6200000.0	0.0097	3300000.0	1.150000e+10	U S
4	5	therock	91	6800.0	334100000.0	1900000.0	0.0020	665300.0	1.250000e+10	U S

In [19]:
```
df.isnull().sum()
```

Out[19]:
```
rank                0
channel_info        0
influence_score     0
posts               0
followers           0
avg_likes           0
60_day_eng_rate     1
new_post_avg_like   0
total_likes         0
country             0
dtype: int64
```

Distribution of Followers

In [21]:
```
plt.figure(figsize=(10, 6))
sns.histplot(df['followers'] / 1e6, bins=30, color='red', kde=True)
plt.title("Distribution of Followers (in millions)")
plt.xlabel("Followers (millions)")
plt.ylabel("Count")
plt.tight_layout()
plt.show()
```

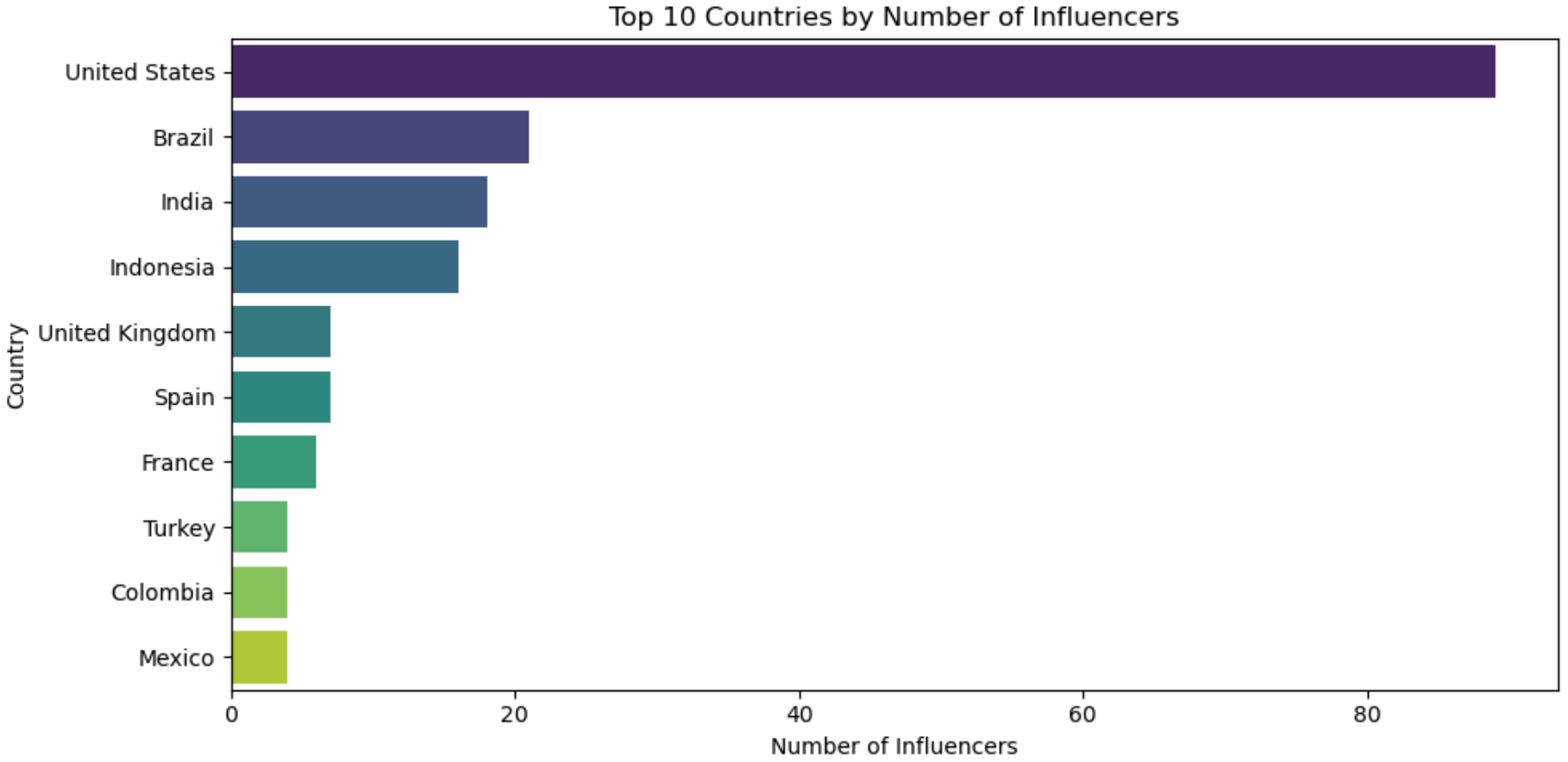


Top 10 Countries By Influencer Count

In [23]:
```
top_countries = df['country'].value_counts().head(10)

plt.figure(figsize=(10, 5))
sns.barplot(x=top_countries.values, y=top_countries.index, palette='viridis')
plt.title("Top 10 Countries by Number of Influencers")
```

```
plt.xlabel("Number of Influencers")
plt.ylabel("Country")
plt.tight_layout()
plt.show()
```

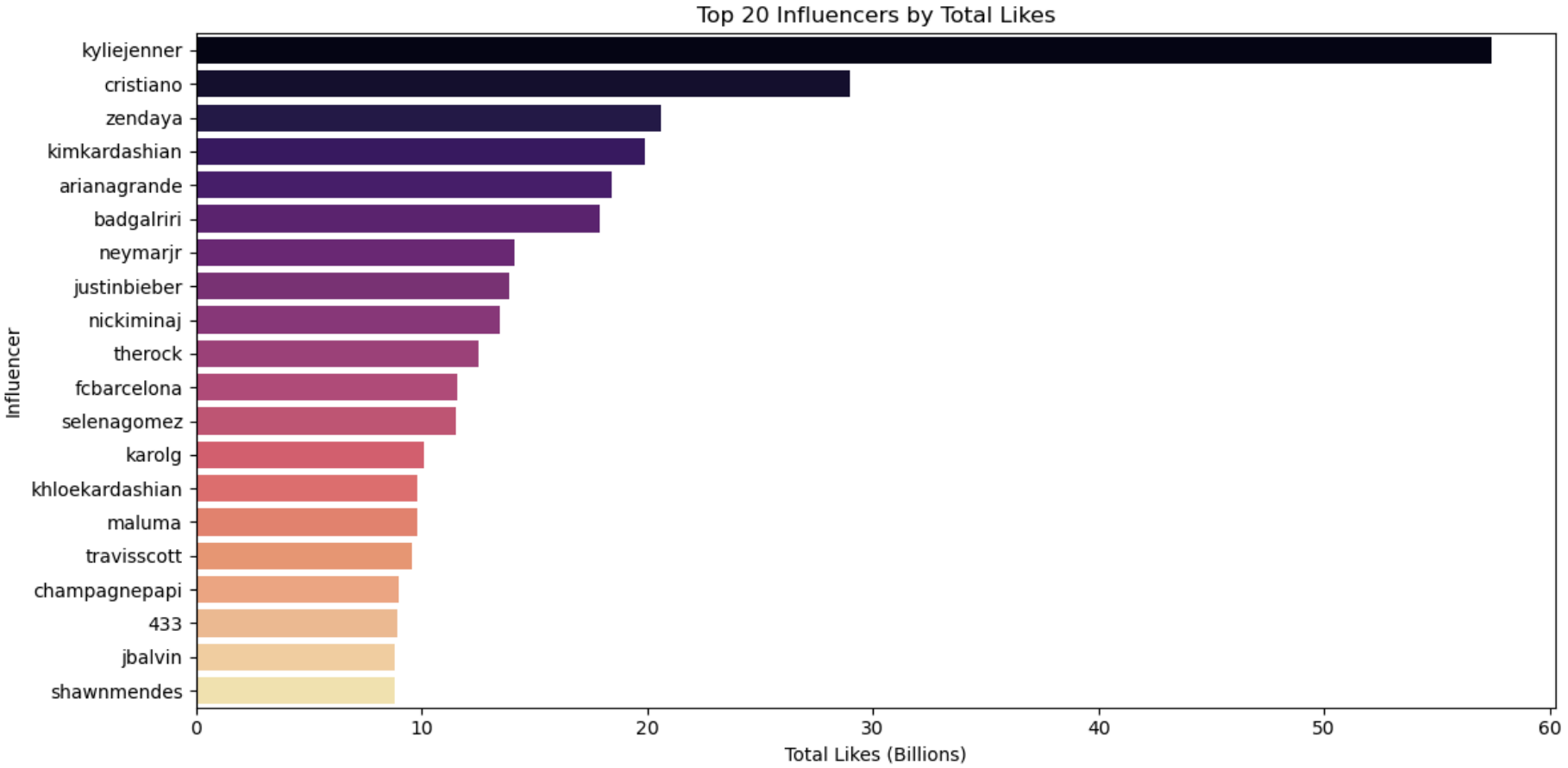
```
/var/folders/pm/cnlmdnjj5g1ct4r7rrx83vnr0000gn/T/ipykernel_4822/183342791.py:4: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

  sns.barplot(x=top_countries.values, y=top_countries.index, palette='viridis')
```



Top 20 Influencers by Total Likes

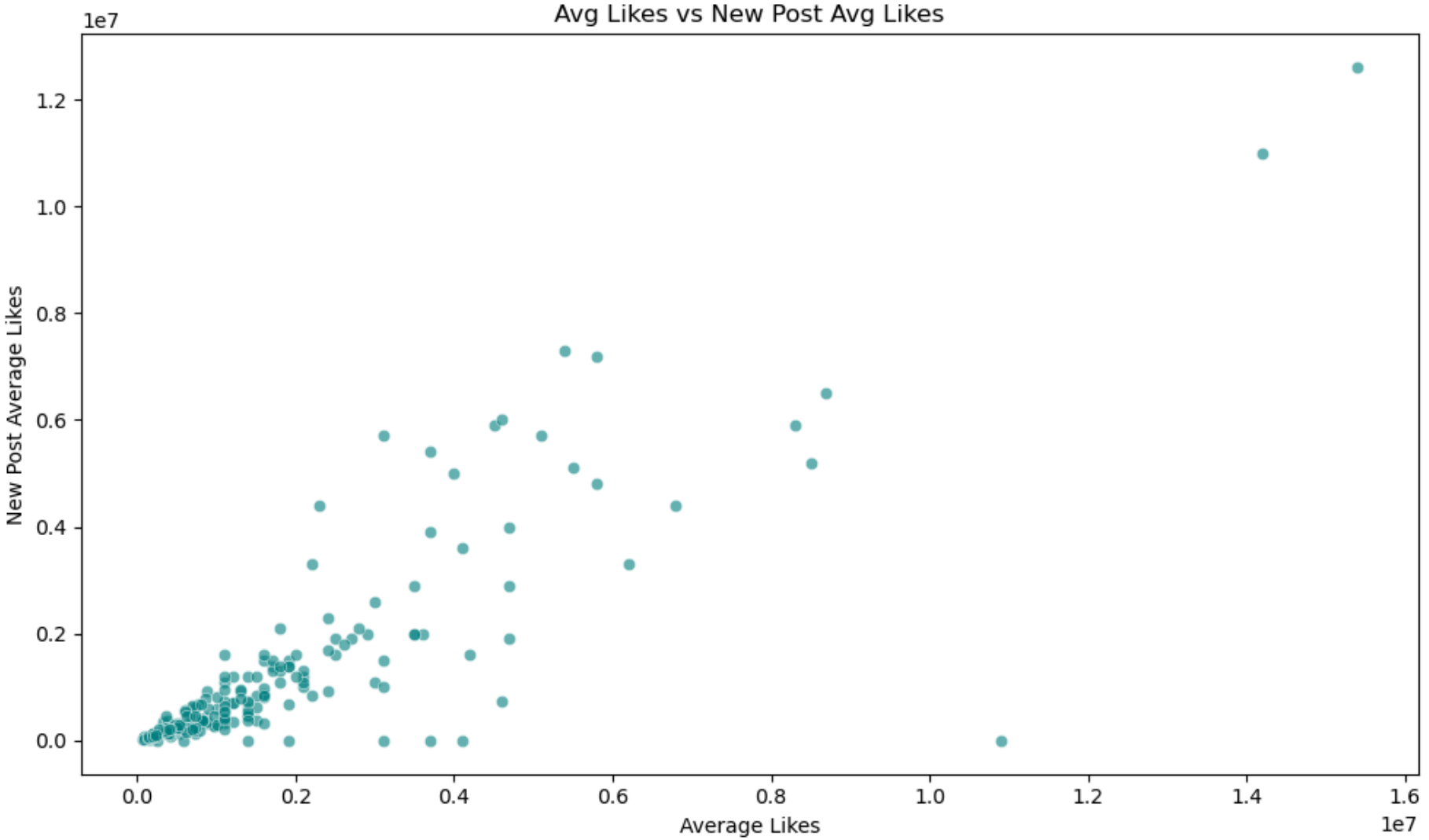
In [25]:
```
top_liked = df.sort_values(by='total_likes', ascending=False).head(20)

plt.figure(figsize=(12, 6))
sns.barplot(y=top_liked['channel_info'], x=top_liked['total_likes'] / 1e9, palette='magma')
plt.title("Top 20 Influencers by Total Likes")
plt.xlabel("Total Likes (Billions)")
plt.ylabel("Influencer")
plt.tight_layout()
plt.show()
```

```
/var/folders/pm/cnlmdnjj5g1ct4r7rrx83vnr0000gn/T/ipykernel_4822/4048472697.py:4: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

  sns.barplot(y=top_liked['channel_info'], x=top_liked['total_likes'] / 1e9, palette='magma')
```



Average Likes vs New Post Average Likes

In [27]:
```
plt.figure(figsize=(10, 6))
sns.scatterplot(data=df, x='avg_likes', y='new_post_avg_like', alpha=0.6, color='teal')
plt.title("Avg Likes vs New Post Avg Likes")
plt.xlabel("Average Likes")
plt.ylabel("New Post Average Likes")
plt.tight_layout()
plt.show()
```

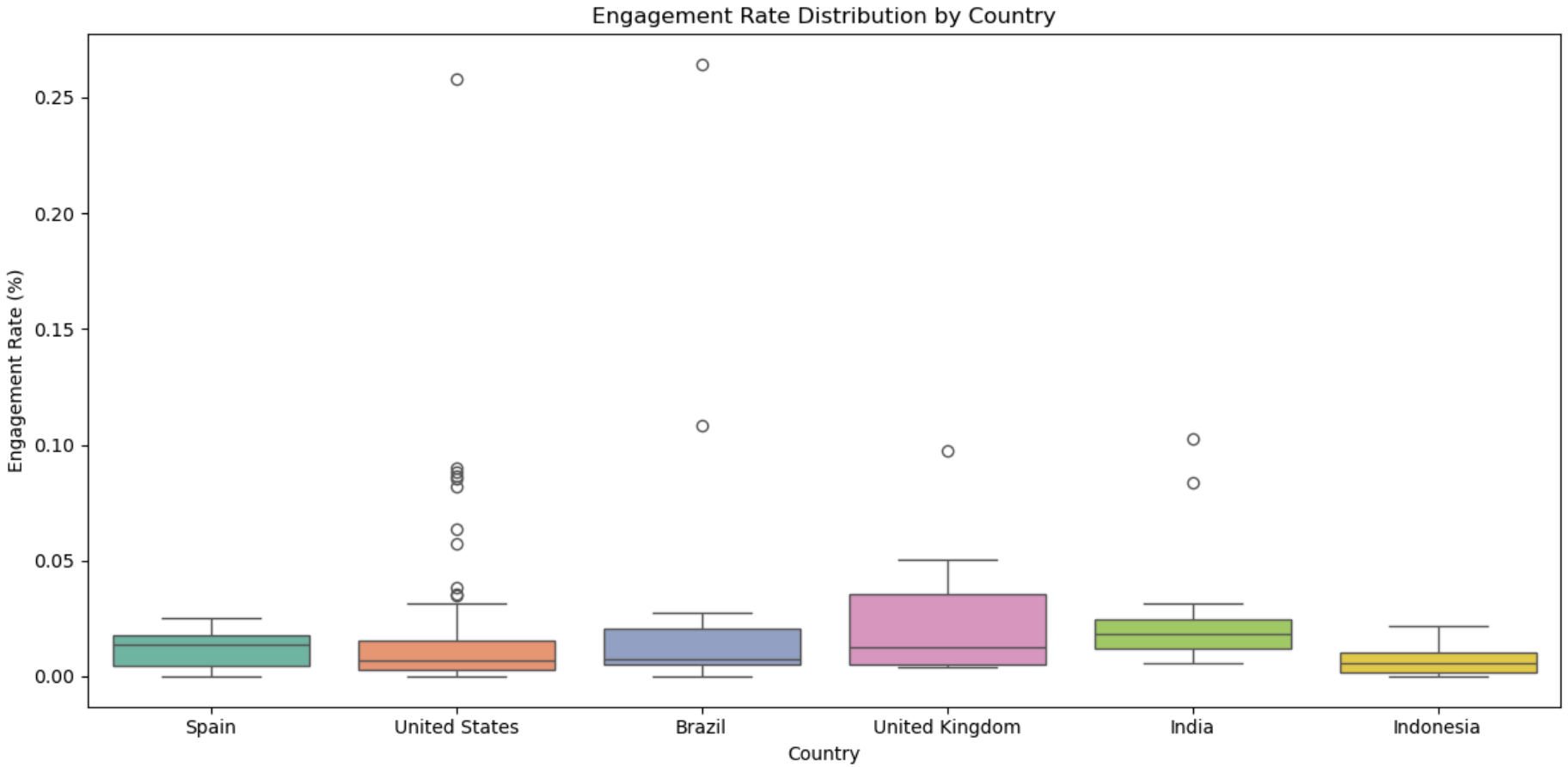


Boxplot: Engagement Rate by Country (Top 6 Only)

In [29]:
```
top_countries = df['country'].value_counts().nlargest(6).index
filtered = df[df['country'].isin(top_countries)]

plt.figure(figsize=(12, 6))
sns.boxplot(x='country', y='60_day_eng_rate', data=filtered, palette='Set2')
```

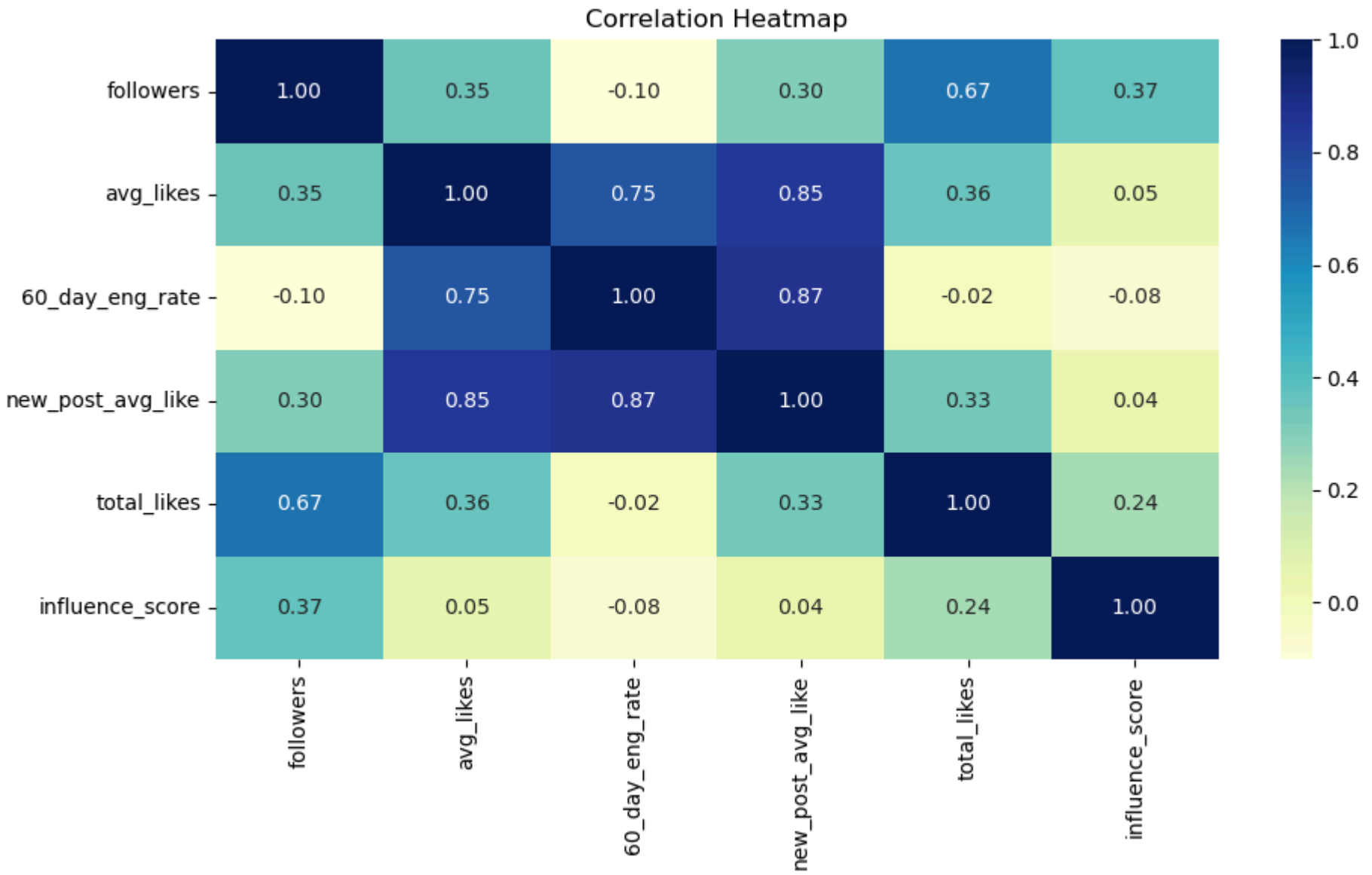
```
plt.title("Engagement Rate Distribution by Country")
plt.xlabel("Country")
plt.ylabel("Engagement Rate (%)")
plt.tight_layout()
plt.show()
```

```
/var/folders/pm/cnlmdnjj5g1ct4r7rrx83vnr0000gn/T/ipykernel_4822/3869602318.py:5: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

  sns.boxplot(x='country', y='60_day_eng_rate', data=filtered, palette='Set2')
```



Heatmap: Top Features vs Influence Score

In [31]:
```
plt.figure(figsize=(10, 6))
sns.heatmap(df[['followers', 'avg_likes', '60_day_eng_rate', 'new_post_avg_like', 'total_likes', 'influence_score']
            annot=True, cmap='YlGnBu', fmt=".2f")
plt.title("Correlation Heatmap")
plt.tight_layout()
plt.show()
```



In [47]:
```
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_absolute_error,mean_squared_error,r2_score
```

In [49]:
```
df['like_follower_ratio'] = df['total_likes'] / df['followers']
df['post_follower_ratio'] = df['posts'] / df['followers']
df['avg_likes_ratio'] = df['avg_likes'] / df['followers']
```

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

Out[51]:

	rank	channel_info	influence_score	posts	followers	avg_likes	60_day_eng_rate	new_post_avg_like	total_likes	cou
0	1	cristiano	92	3300.0	475800000.0	8700000.0	0.0139	6500000.0	2.900000e+10	
1	2	kyliejenner	91	6900.0	366200000.0	8300000.0	0.0162	5900000.0	5.740000e+10	U S
2	3	leomessi	90	890.0	357300000.0	6800000.0	0.0124	4400000.0	6.000000e+09	U S
3	4	selenagomez	93	1800.0	342700000.0	6200000.0	0.0097	3300000.0	1.150000e+10	U S
4	5	therock	91	6800.0	334100000.0	1900000.0	0.0020	665300.0	1.250000e+10	U S

In [53]:
```
X = df[['followers', 'avg_likes', '60_day_eng_rate',
        'new_post_avg_like', 'like_follower_ratio',
        'post_follower_ratio']]
y = df['influence_score']
```

In [55]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y,test_size=0.2,random_state=42)
X_train.shape,X_test.shape,y_train.shape,y_test.shape
```

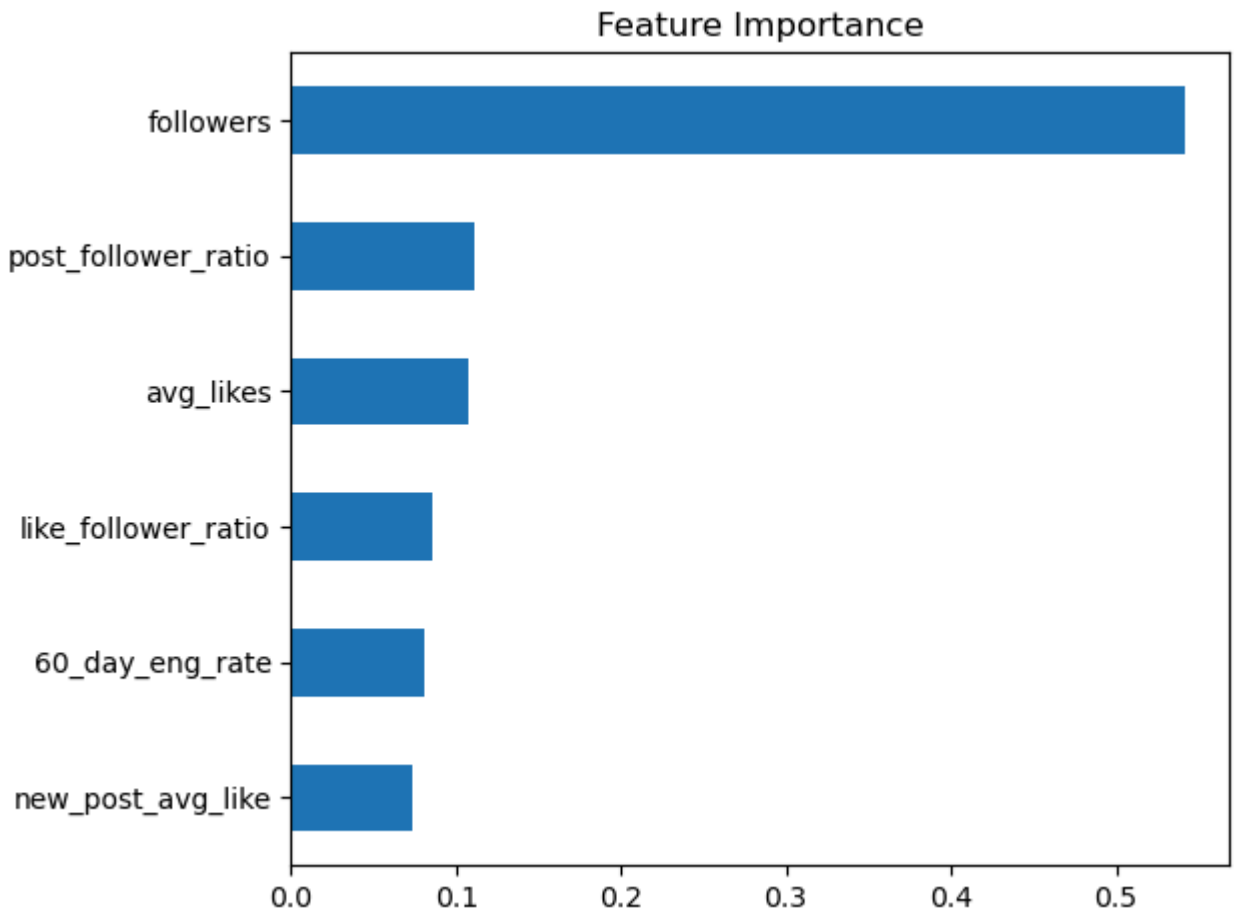
Out[55]:
```
((160, 6), (40, 6), (160,), (40,))
```

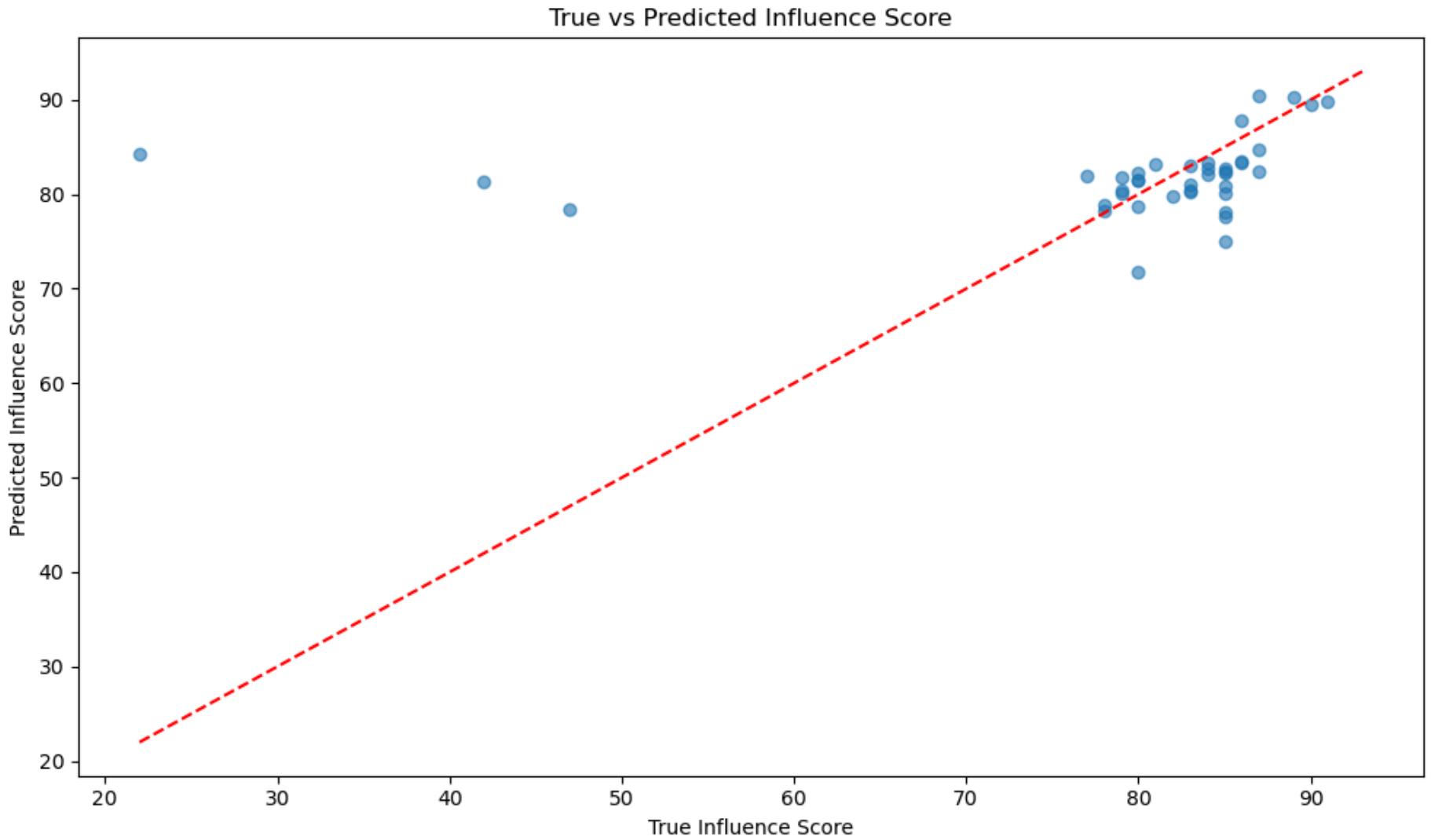
In [57]:
```
# Scale features
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

# Initialize and train Random Forest Regressor
model = RandomForestRegressor(n_estimators=100, random_state=42)
model.fit(X_train_scaled, y_train)
```

```
# Predict and evaluate
y_pred = model.predict(X_test_scaled)
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

print(f"Mean Squared Error: {mse}")
print(f"R² Score: {r2}")
```

```
Mean Squared Error: 171.79258749999997
R² Score: -0.01610707143147594
```

In [59]:
```
# Plot feature importances
feature_importances = pd.Series(model.feature_importances_, index=X.columns)
feature_importances.sort_values().plot(kind='barh', title='Feature Importance')
plt.tight_layout()
plt.show()

# Plot actual vs predicted
plt.figure(figsize=(10, 6))
plt.scatter(y_test, y_pred, alpha=0.6)
plt.plot([y.min(), y.max()], [y.min(), y.max()], '--', color='red')
plt.xlabel('True Influence Score')
plt.ylabel('Predicted Influence Score')
plt.title('True vs Predicted Influence Score')
plt.tight_layout()
plt.show()
```


Feature Importance
followers
post_follower_ratio
avg_likes
like_follower_ratio
60_day_eng_rate
new_post_avg_like
0.0
0.1
0.2
0.3
0.4
0.5


True vs Predicted Influence Score
Predicted Influence Score
True Influence Score
20
30
40
50
60
70
80
90

In [ ]: