Task 2 - Let’s read the CSV file with some more analytical and statistical analysis like head(), describe() etc

Importing Necesary dependencies

In [1]:

```python
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud, STOPWORDS
import numpy as np
import pandas as pd
import nltk
nltk.download('stopwords')
from scipy import stats
import warnings,os
import re



from sklearn.model_selection import train_test_split
from sklearn.pipeline import Pipeline
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression

from subprocess import check_output
import warnings
warnings.filterwarnings('ignore')
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\PC\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

In [2]:

```python
df = pd.read_csv('combined_data.csv')
df.head()
```

Out[2]:

	author	date	Comment	like_count	reply_count	comment_length
0	@maryamadirie8722	2024-04-19T09:43:45Z	Cadaab ka rabi bilaash uma san mujrimiin Rabiy...	0	0	61
1	@hagiohaji7937	2024-04-19T03:35:24Z	Beenaale gacan ku dhiigle tuug, hala dilo.	0	0	42
2	@fadumawarsamemumin4232	2024-04-18T12:17:27Z	All Shaba a le lagu Haye Polis dada cun ah Qam...	0	0	96
3	@user-we3ty2ct8f	2024-04-17T22:02:09Z	Hadu I yaqaano ha ii abtiriyo kulahaa kk ma ho...	0	0	125
4	@abdiali4991	2024-04-17T08:07:17Z	Sarkaal kan bistoolda loo dibtay waa ina asaga...	0	0	117

In [3]:
```
df.describe()
```

Out[3]:

	like_count	reply_count	comment_length
count	2527.000000	2527.000000	2527.000000
mean	2.000000	0.237831	96.521567
std	9.466614	1.211593	112.602332
min	0.000000	0.000000	1.000000
25%	0.000000	0.000000	36.000000
50%	0.000000	0.000000	68.000000
75%	1.000000	0.000000	118.500000
max	171.000000	27.000000	1775.000000

In [4]:
```
len(df)
```

Out[4]:
```
2527
```

Task 3 - Let’s clean the data by removing the extra data and outliers, dropping or filling the missing values, etc. Create the final dataframe for further analysis

Cheking For duplicate values

In [5]:
```
df.duplicated().sum()
```

Out[5]:
```
1
```

Droping Duplicate Values

In [6]:
```
df.drop_duplicates(inplace=True)
```

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

Out[7]:
```
0
```

Check for missing values

In [8]:
```
df.isna().sum()
```

Out[8]:
```
author            0
date              0
Comment           0
like_count        0
reply_count       0
comment_length    0
dtype: int64
```

In [9]:
```
# Remove rows with missing values
df_cleaned = df.dropna()
```

In [10]:
```
df=df_cleaned
```

Task 4: Lets analyze and visualize the distribution of post length and word counts?

Calculate word count

In [11]:
```
word_count = df['word_count'] = df['Comment'].apply(lambda x: len(x.split()))
```

In [12]:
```
word_count
```

Out[12]:
```
0       10
1        7
2       18
3       22
4       19
        ..
2522     3
2523     3
2524    17
2525     4
2526    12
Name: Comment, Length: 2526, dtype: int64
```

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

Out[13]:

	author	date	Comment	like_count	reply_count	comment_length	word_count
0	@maryamadirie8722	2024-04-19T09:43:45Z	Cadaab ka rabi bilaash uma san mujrimiin Rabiy...	0	0	61	10
1	@hagiohaji7937	2024-04-19T03:35:24Z	Beenaale gacan ku dhiigle tuug, hala dilo.	0	0	42	7
2	@fadumawarsamemumin4232	2024-04-18T12:17:27Z	All Shaba a le lagu Haye Polis dada cun ah Qam...	0	0	96	18
3	@user-we3ty2ct8f	2024-04-17T22:02:09Z	Hadu I yaqaano ha ii abtiriyo kulahaa kk ma ho...	0	0	125	22
4	@abdiali4991	2024-04-17T08:07:17Z	Sarkaal kan bistoolda loo dibtay waa ina asaga...	0	0	117	19

Summary Statistics

Before visualizing, it's often useful to look at summary statistics to get a sense of the distribution

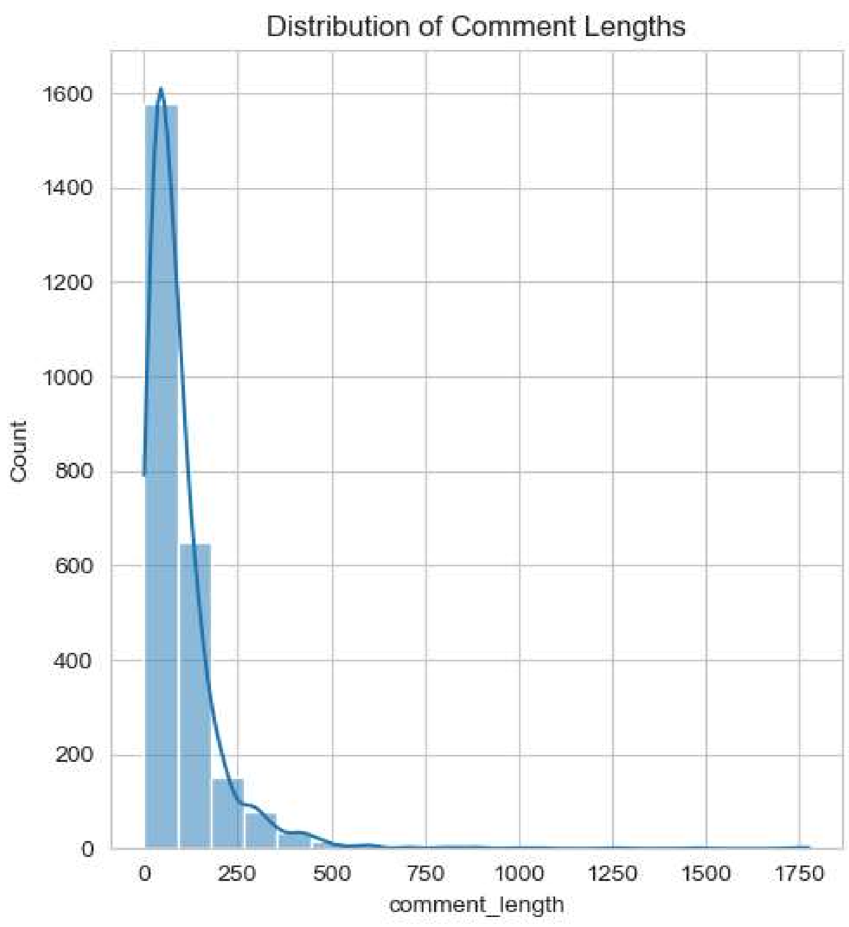
In [14]:
```
# Display summary statistics for post length and word count
summary_stats = df[['comment_length', 'word_count']].describe()
print(summary_stats)

```

```
       comment_length   word_count
count     2526.000000  2526.000000
mean        96.545131    15.173793
std        112.618396    17.951119
min          1.000000     1.000000
25%         36.000000     6.000000
50%         68.000000    11.000000
75%        118.750000    19.000000
max       1775.000000   298.000000
```

Visualizing the Distribution

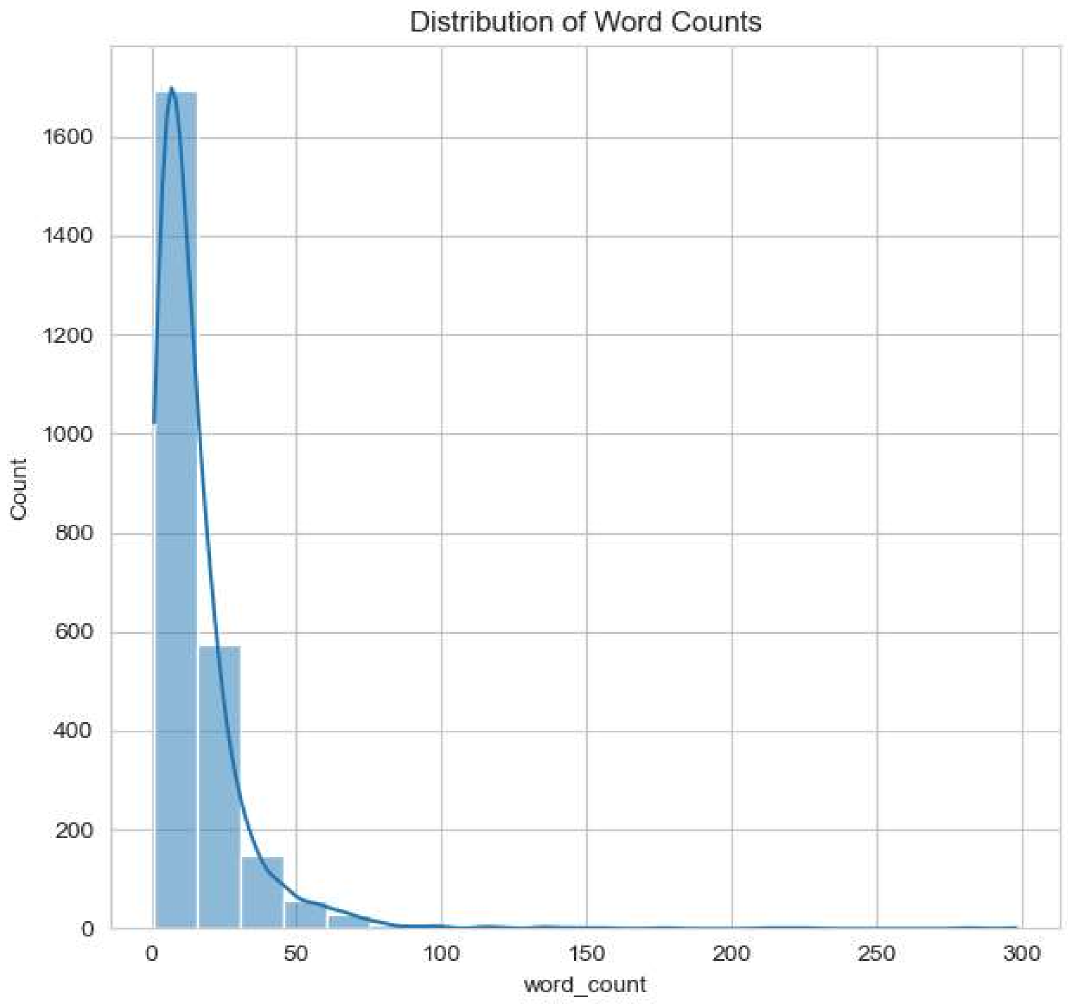
In [15]:
```
# Set the aesthetic style of the plots
sns.set_style("whitegrid")

# Plot distribution of post lengths
plt.figure(figsize=(12, 6))
plt.subplot(1, 2, 1)  # 1 row, 2 columns, 1st subplot
sns.histplot(df['comment_length'], kde=True, bins=20)
plt.title('Distribution of Comment Lengths')

```

Out[15]:
```
Text(0.5, 1.0, 'Distribution of Comment Lengths')
```



In [16]:

```
# Plot distribution of word counts
plt.figure(figsize=(12, 6))
plt.subplot(1, 2, 2)  # 1 row, 2 columns, 2nd subplot
sns.histplot(df['word_count'], kde=True, bins=20)
plt.title('Distribution of Word Counts')

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



Task 5 - Let's analyze and visualize the most trending comments

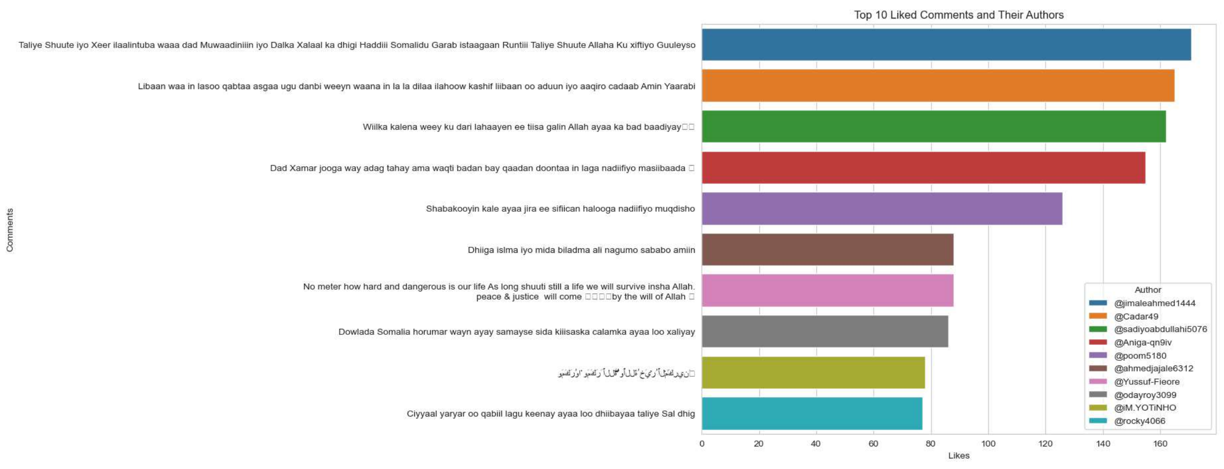
the most trending comments Sort by Likes and Get Top 5

In [17]:
```python
df.sort_values(by='like_count', ascending=False)[0:5]
```

Out[17]:

	author	date	Comment	like_count	reply_count	comment_length	word_count
999	@jimaleahmed1444	2024-04-09T22:18:00Z	Taliye Shuute iyo Xeer ilaalintuba waaa dad Mu...	171	15	164	24
1192	@Cadar49	2024-04-09T18:10:22Z	Libaan waa in lasoo qabtaa asgaa ugu danbi wee...	165	27	132	24
1249	@sadiyoabdullahi5076	2024-04-09T17:44:23Z	Wiilka kalena weey ku dari lahaayen ee tiisa g...	162	10	79	14
1371	@Aniga-qn9iv	2024-04-09T16:08:41Z	Dad Xamar jooga way adag tahay ama waqti badan...	155	27	96	17
1284	@poom5180	2024-04-09T17:26:29Z	Shabakooyin kale ayaa jira ee sifiican halooga...	126	4	65	9

In [18]:
```python
# Extracting the information for visualization
top_liked_comments_users = df[['author', 'Comment', 'like_count']].sort_values(by='like_

# Visualization
plt.figure(figsize=(10, 8))
sns.barplot(x='like_count', y='Comment', hue='author', dodge=False, data=top_liked_comme
plt.title('Top 10 Liked Comments and Their Authors')
plt.xlabel('Likes')
plt.ylabel('Comments')
plt.legend(title='Author', loc='lower right')
plt.show()
```



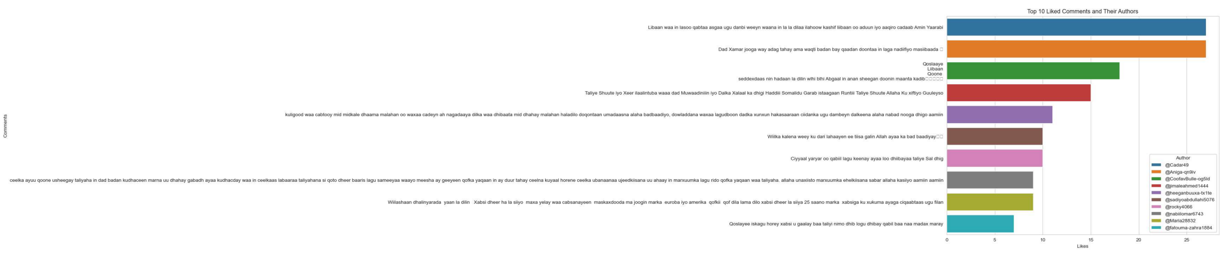
the most trending comments Sort by replies and Get Top 5

In [19]:
```python
df.sort_values(by='reply_count', ascending=False)[0:5]
```

Out[19]:

	author	date	Comment	like_count	reply_count	comment_length	word_cc
1192	@Cadar49	2024-04-09T18:10:22Z	Libaan waa in lasoo qabtaa asgaa ugu danbi wee...	165	27	132	
1371	@Aniga-qn9iv	2024-04-09T16:08:41Z	Dad Xamar jooga way adag tahay ama waqti badan...	155	27	96	
1144	@CoofavBulle-og5ld	2024-04-09T18:48:58Z	Qoslaaye\nLiibaan\nQoone \nseddexdaas nin hada...	16	18	112	
999	@jimaleahmed1444	2024-04-09T22:18:00Z	Taliye Shuute iyo Xeer ilaalintuba waaa dad Mu...	171	15	164	
1354	@heeganbuuxa-tx1te	2024-04-09T16:33:14Z	kuligood waa cabtooy mid midkale dhaama malaha...	75	11	274	

In [20]:
```python
# Extracting the information for visualization
top_replied_comments_users = df[['author', 'Comment', 'reply_count']].sort_values(by='re

# Visualization
plt.figure(figsize=(10, 8))
sns.barplot(x='reply_count', y='Comment', hue='author', dodge=False, data=top_replied_co
plt.title('Top 10 Liked Comments and Their Authors')
plt.xlabel('Likes')
plt.ylabel('Comments')
plt.legend(title='Author', loc='lower right')
plt.show()
```



Task 6 - Let's analyze and visualize the top 5 users by number of comments

Unique Authors

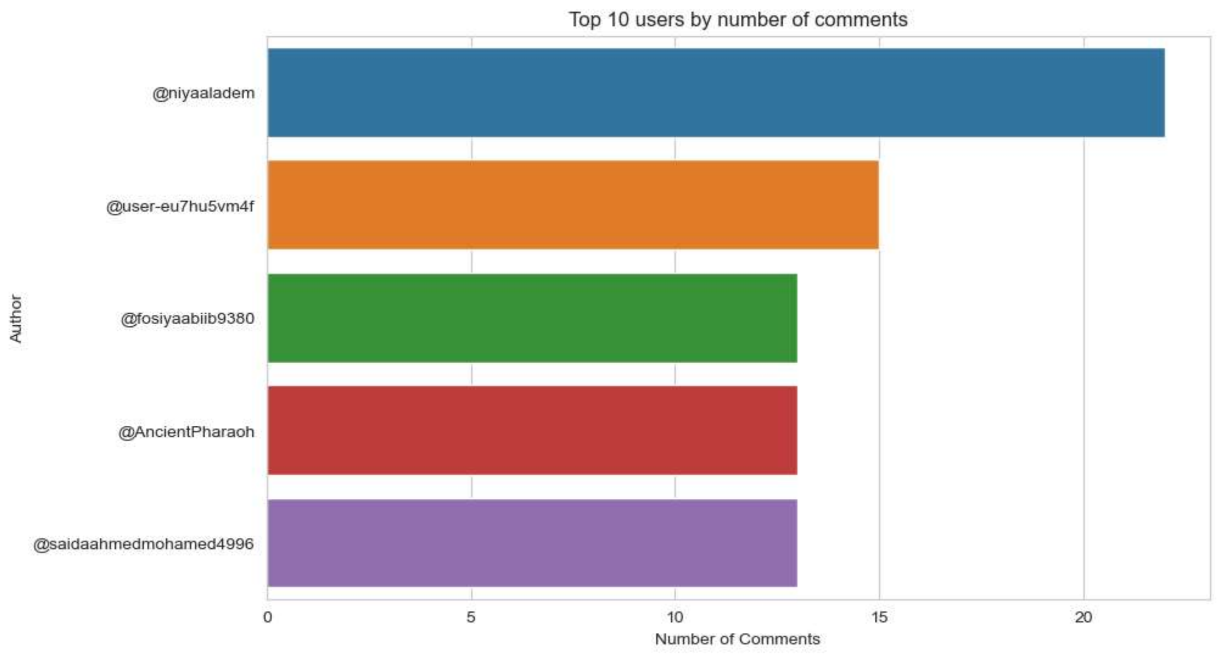
In [21]:
```python
unique_authors = df['author'].nunique()
unique_authors
```

Out[21]:
```
1705
```

In [22]:
```python
# Author analysis
top_contributors = df['author'].value_counts().head(5)
top_contributors
```

Out[22]:
```
@niyaaladem                22
@user-eu7hu5vm4f           15
@fosiyaabiib9380           13
@AncientPharaoh            13
@saidaahmedmohamed4996     13
Name: author, dtype: int64
```

In [23]:
```python
# Top Contributors
plt.figure(figsize=(10, 6))
sns.barplot(x=top_contributors.values, y=top_contributors.index)
plt.title('Top 10 users by number of comments')
plt.xlabel('Number of Comments')
plt.ylabel('Author')
plt.show()
```

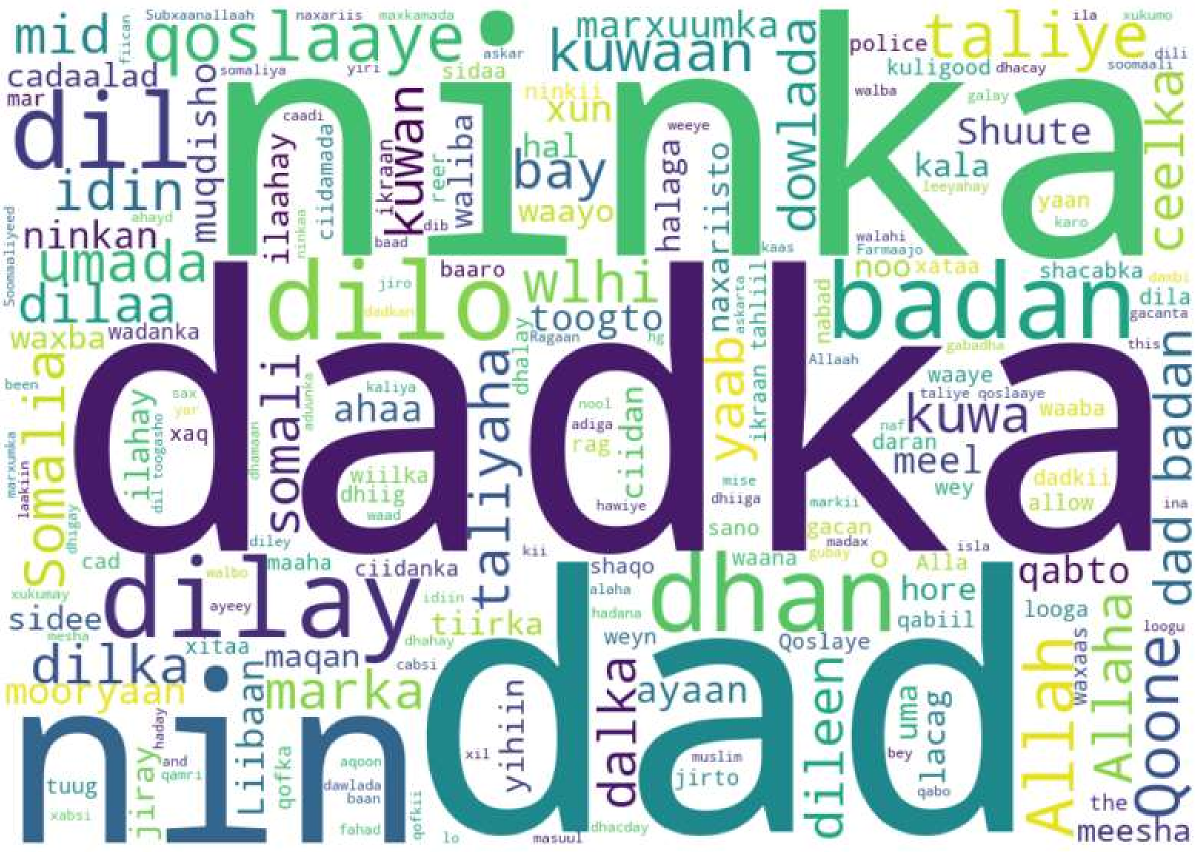


Task 7 - Let's visualize the prevalent words in the comments using WordCloud

In [24]:
```python

# defining my own list completely
my_stopwords = {'ku', 'iyo', 'uu', 'ha', 'ma', 'laga', 'ugu', 'waa', 'in', 'ee', 'aa', '
                'inay', 'la', 'ah', 'ka', 'ayaa', 'iska', 'wax', 'oo', 'soo', 'ayuu', 'b
                'wa', 'i', 'buu', 'inu', 'loo', 'waxaa', 'waxaan', 'ah', 'lama', 'maxay'
               'a', 'lagu', 'maxaa', 'inuu', 'wada', 'wuxuu', 'hala', 'e', 'waxan', 'sid
                'ah', 'wuu', 'ama', 'sii', 'hadii', 'ay' 'aya', 'siduu', 'yaa', 'ayu', '
               'ba', 'aha', 'iga', 'baa', 'ay', 'muxuu', 'maa', 'is', 'ayay', 'so', 'lah
               'haa', 'he', 'ilaa', 'hada', 'mida', 'may', 'waxa', 'waan', 'hadaad', 'wa
               'inaad', 'og', 'sow', 'inta', 'haku', 'lahaa', 'inay', 'alx', 'kugu', 'yal
               'miya', 'ayey', 'maxa', 'haduu', 'leh', 'ayan', 'hadi', 'iney', 'isku', '
                'muu', 'kama', 'aamiin', 'Asc', 'asaga', 'no', 'aniga', 'ahayn', 'lahayn
               'kulaha', 'xamar', 'kan', 'ilahow', 'ey', 'asaga' 'wll', 'to' }


```

In [25]:

```python
# Word cloud for comments
text = ' '.join(comment for comment in df.Comment)
stopwords = set(my_stopwords)
wordcloud = WordCloud(stopwords=stopwords, background_color="white", width=1000, height=
            min_font_size = 10).generate(text)

plt.figure(figsize=(10, 8), facecolor = None)
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.show()
```



Task 8 - Let’s visualize in what STATE/COUNTRY were the top posts posted that mention your TOPIC

unfortunately YouTube's Data API restricts access to directly access to the location data of its users due to their privacy and policy reasons.

Task 9 - Let’s visualize on what day(s) of the month was your TOPIC talked about the most on the selected social media platform

checking my data types to see if date column is datetime

In [26]:
```
df.dtypes
```

Out[26]:
```
author             object
date               object
Comment            object
like_count          int64
reply_count         int64
comment_length      int64
word_count          int64
dtype: object
```

In [27]:
```
# Convert the 'date' column to datetime
df['date'] = pd.to_datetime(df['date'])

```

In [28]:
```
# Verify the conversion by checking the data type again
print(df['date'].dtype)
```

```
datetime64[ns, UTC]
```

In [29]:
```
df.dtypes
```

Out[29]:
```
author                          object
date               datetime64[ns, UTC]
Comment                         object
like_count                       int64
reply_count                      int64
comment_length                   int64
word_count                       int64
dtype: object
```

Extracting Day of the Month

In [30]:
```
df['day_of_month'] = df['date'].dt.day
```

Aggregate Data by Day of the Month

Now, count how many comments were made on each day of the month. This involves grouping the 'data by the day_of_month' and counting the number of comments.

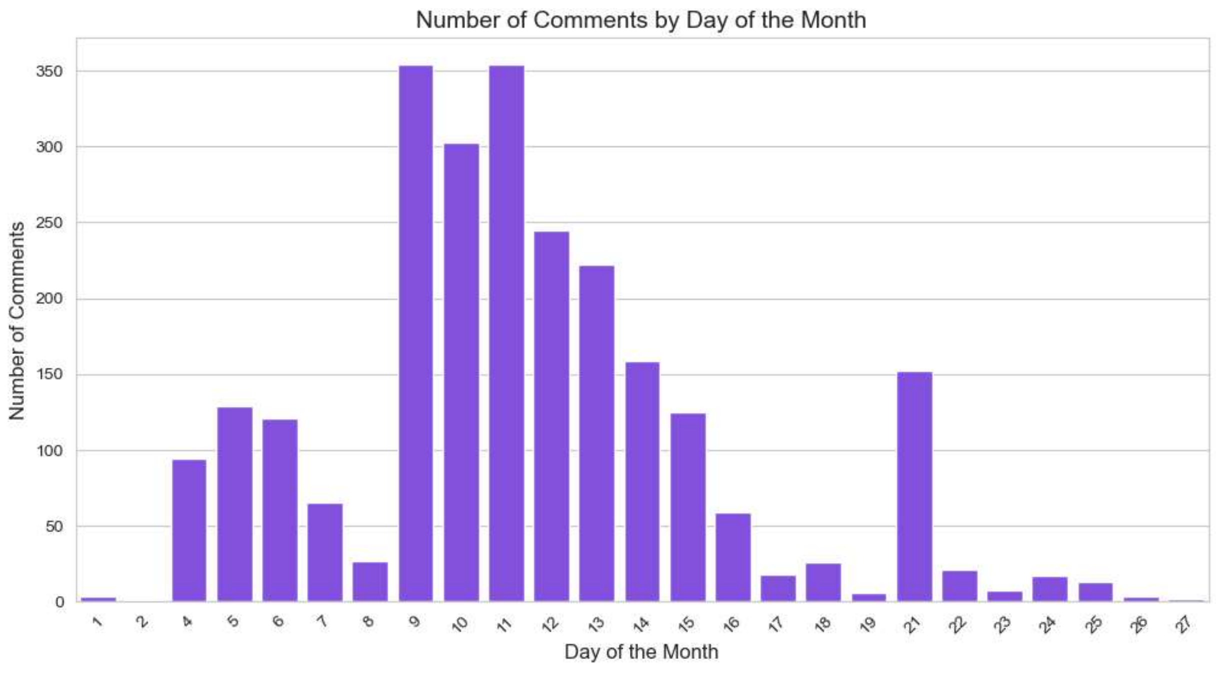
In [31]:
```python
comments_by_day = df.groupby('day_of_month')['Comment'].count()
comments_by_day
```

Out[31]:
```
day_of_month
1       3
2       1
4      94
5     129
6     121
7      65
8      27
9     354
10    303
11    354
12    245
13    222
14    159
15    125
16     59
17     18
18     26
19      6
21    152
22     21
23      7
24     17
25     13
26      3
27      2
Name: Comment, dtype: int64
```

Visualize the Data

Finally, use a bar chart to visualize the number of comments per day of the month.

In [32]:
```python
plt.figure(figsize=(12, 6))
sns.barplot(x=comments_by_day.index, y=comments_by_day.values, color='#7D3CF8')  # Electr
plt.title('Number of Comments by Day of the Month', fontsize=14)
plt.xlabel('Day of the Month', fontsize=12)
plt.ylabel('Number of Comments', fontsize=12)
plt.xticks(rotation=45) # Helps with readability if there are many days
plt.show()


```



Task 10: Let’s collect 3,000 statements across Somali public pages on Social Media Outlet and annotate them into three sentiment labels:- Positive-wanaag, Negative-xumaan or Neutral-dhexdhexaad

In [33]:
```
Sentiments = pd.read_csv('Sentiment_data.csv')
Sentiments.head()
```

Out[33]:

	Statements	Label
0	naxariis	1
1	jaceyl	1
2	amaan	1
3	jiidasho	1
4	raali galin	1

In [34]:
```
Sentiments.isna().sum()
```

Out[34]:
```
Statements    66
Label          0
dtype: int64
```

In [35]:
```
Sentiments = Sentiments.dropna()
```

In [36]:
```
Sentiments.isna().sum()
```

Out[36]:
```
Statements    0
Label         0
dtype: int64
```

In [37]:
```
Sentiments.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 3313 entries, 0 to 3378
Data columns (total 2 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Statements  3313 non-null   object
 1   Label       3313 non-null   int64 
dtypes: int64(1), object(1)
memory usage: 77.6+ KB
```

In [38]:
```
def remove_punctuation(text):
    return "".join([t for t in text if t not in string.punctuation])

```

In [39]:
```
def words_with_more_than_three_chars(text):
    return " ".join([t for t in text.split() if len(t)>3])

```

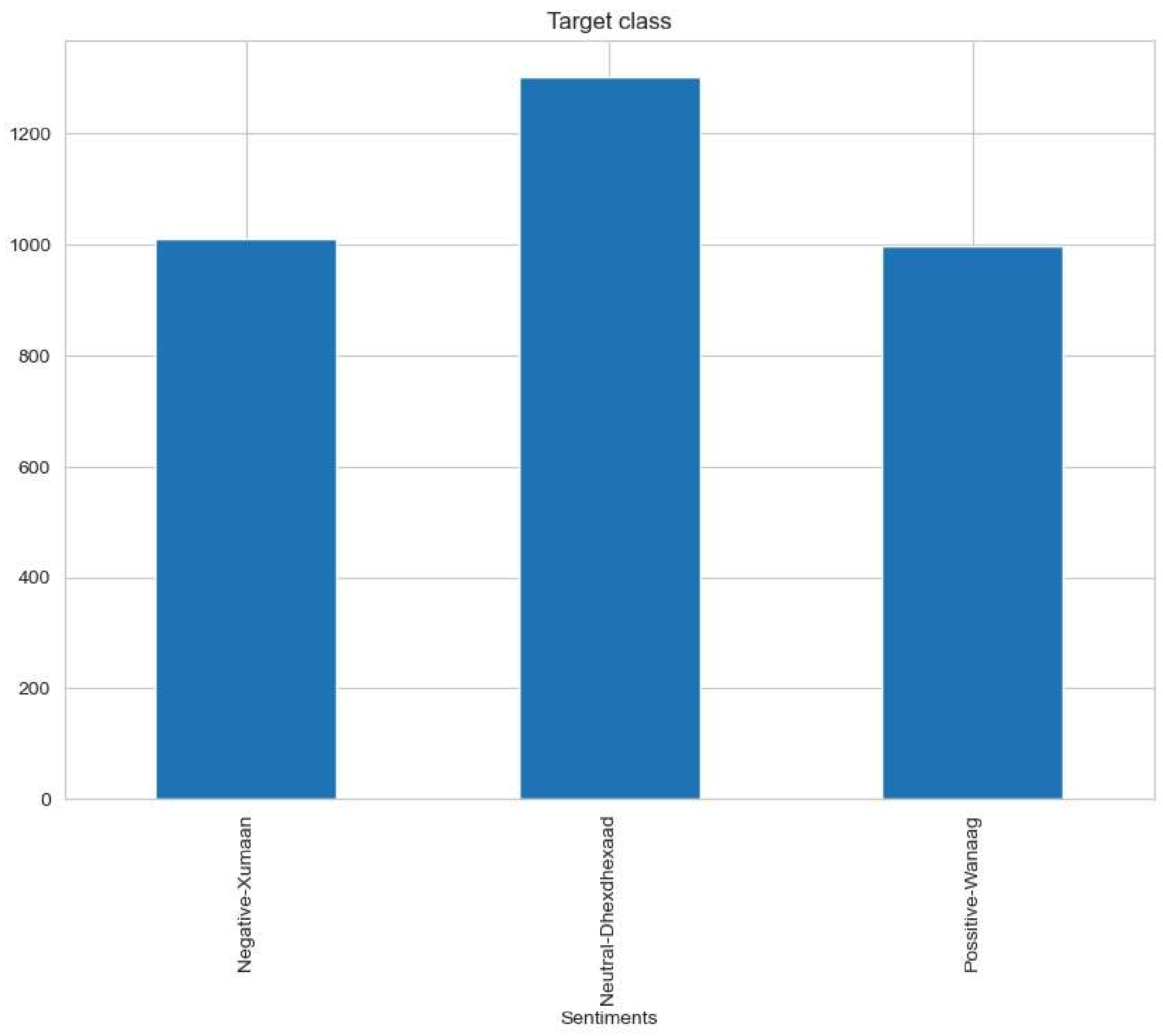
In [40]:
```
import string

def remove_punctuation(x):
    # Check if x is a string instance
    if isinstance(x, str):
        # If x is a string, remove punctuation
        return x.translate(str.maketrans('', '', string.punctuation))
    else:
        # If x is not a string (e.g., NaN or a number), return it unchanged
        return x
```

In [41]:
```
# Assuming Sentiments is your DataFrame and 'Statement' is a column in it
Sentiments['Statements'] = Sentiments['Statements'].apply(lambda x: remove_punctuation(x

# Display the first 10 rows of the DataFrame
Sentiments.head(10)

```
Out[41]:

	Statements	Label
0	naxariis	1
1	jaceyl	1
2	amaan	1
3	jiidasho	1
4	raali galin	1
5	hambalyo	1
6	faraxad	1
7	qurux	1
8	quruxsan	1
9	jecel yahay	1

In [42]:
```
# Convert non-string values to strings
Sentiments['Statements'] = Sentiments['Statements'].astype(str)
```
In [43]:
```
Sentiments['Statements']=Sentiments['Statements'].apply(lambda x:remove_punctuation(x))
Sentiments['Statements']=Sentiments['Statements'].apply(lambda x:words_with_more_than_thr
Sentiments['Statements']=Sentiments['Statements'].apply(lambda x: ' '.join([word for word
```
In [44]:
```
Sentiments['Sentiments'] = Sentiments['Label'].map({1:'Possitive-Wanaag',2:'Neutral-Dhexd
Sentiments.tail()
```
Out[44]:

	Statements	Label	Sentiments
3374	dhiladii dhashay	3	Negative-Xumaan
3375	intaas lagugu badnasaa loodaawado dagaal kiina...	3	Negative-Xumaan
3376	Dhocil masersan xnuun	3	Negative-Xumaan
3377	Fartuuun tuugo kasoo sameey part2 wlhi qoslaay...	3	Negative-Xumaan
3378	Fartuuntuu sheegaayo maba fahmine dhib badnaa ...	3	Negative-Xumaan

In [45]:
```
Sentiments.groupby('Sentiments')['Sentiments'].count().plot(kind='bar',title='Target cla

```
Out[45]:
```
<Axes: title={'center': 'Target class'}, xlabel='Sentiments'>
```


In [46]:
```
# Convert stop_words_to_lower to a set for faster membership testing
stop_words_set = set(my_stopwords)

# Define a function to clean and process each comment
def process_comment(comment):
    review = re.sub('[^a-zA-Z]', ' ', str(comment))
    review = review.lower().split()
    review = [word for word in review if word not in stop_words_set]
    return ' '.join(review)
```

In [47]:
```
# Apply the function to each comment in the DataFrame
Sentiments['ProcessedStatement'] = Sentiments['Statements'].apply(process_comment)

Sentiments.head()
```
Out[47]:

	Statements	Label	Sentiments	ProcessedStatement
0	naxariis	1	Possitive-Wanaag	naxariis
1	jaceyl	1	Possitive-Wanaag	jaceyl
2	amaan	1	Possitive-Wanaag	amaan
3	jiidasho	1	Possitive-Wanaag	jiidasho
4	raali galin	1	Possitive-Wanaag	raali galin

In [48]:
```python
# Task 11 - Let’s train a sentiment analysis model using machine learning

X = Sentiments['ProcessedStatement']  # The column containing text data
y =  Sentiments['Sentiments']  # The column containing sentiment labels
```

In [49]:
```python
# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42
```

In [50]:
```python

# Define a machine learning pipeline
pipeline = Pipeline([
    ('tfidf', TfidfVectorizer(lowercase=True)),
    ('classifier', LogisticRegression(random_state=42)),
])
```

In [51]:
```python
# Train the model with the corrected data
pipeline.fit(X_train, y_train)
```

Out[51]:
```
▸      Pipeline
  ▸ TfidfVectorizer
▸ LogisticRegression
```

In [52]:
```python
# Accuracy Testing on the Model

from sklearn.metrics import accuracy_score
y_pred = pipeline.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy * 100:.2f}%")

```

```
Accuracy: 82.20%
```

In [54]:
```python
# Convert stop_words_to_lower to a set for faster membership testing
stop_words_set = set(my_stopwords)

# Define a function to clean and process each comment
def process_comment(comment):
    review = re.sub('[^a-zA-Z]', ' ', str(comment))
    review = review.lower().split()
    review = [word for word in review if word not in stop_words_set]
    return ' '.join(review)

# Apply the function to each comment in the DataFrame
df['ProcessedComment'] = df['Comment'].apply(process_comment)

```

In [55]:
```python
# Task 12 - Let’s now apply the trained model on the selected topic textual contents in 
# Now, you can predict with confidence that the pipeline is fitted
predicted_sentiments = pipeline.predict(df['ProcessedComment'])
df['Predicted Sentiment'] = predicted_sentiments

# Displaying the original comments with their predicted sentiments
print(df[['ProcessedComment', 'Predicted Sentiment']].head())
```

```
                                    ProcessedComment Predicted Sentiment
0  cadaab rabi bilaash uma san mujrimiin rabiyaw ...     Negative-Xumaan
1                      beenaale gacan dhiigle tuug dilo     Negative-Xumaan
2  all shaba le haye polis dada cun qamriga qaram...     Negative-Xumaan
3  hadu yaqaano ii abtiriyo kulahaa kk hoyadaaba ...     Negative-Xumaan
4  sarkaal bistoolda dibtay ina asagana talabo la...    Possitive-Wanaag
```

In [56]:

```python
## Applying  the trained model to predict sentiments of the selected topic textual conte
# Applying the trained model to predict sentiments of the selected topic textual content
predicted_sentiments = pipeline.predict(df['ProcessedComment'])

# Add the predictions to the original dataframe for review
df['Predicted Sentiment'] = predicted_sentiments

# Displaying the original comments with their predicted sentiments
print(df[['ProcessedComment', 'ProcessedComment']].head())

```

```
                                    ProcessedComment  \
0  cadaab rabi bilaash uma san mujrimiin rabiyaw ...   
1                    beenaale gacan dhiigle tuug dilo   
2  all shaba le haye polis dada cun qamriga qaram...   
3  hadu yaqaano ii abtiriyo kulahaa kk hoyadaaba ...   
4  sarkaal bistoolda dibtay ina asagana talabo la...   

                                    ProcessedComment  
0  cadaab rabi bilaash uma san mujrimiin rabiyaw ...  
1                    beenaale gacan dhiigle tuug dilo  
2  all shaba le haye polis dada cun qamriga qaram...  
3  hadu yaqaano ii abtiriyo kulahaa kk hoyadaaba ...  
4  sarkaal bistoolda dibtay ina asagana talabo la...  
```

In [57]:

```python
df.head()
```

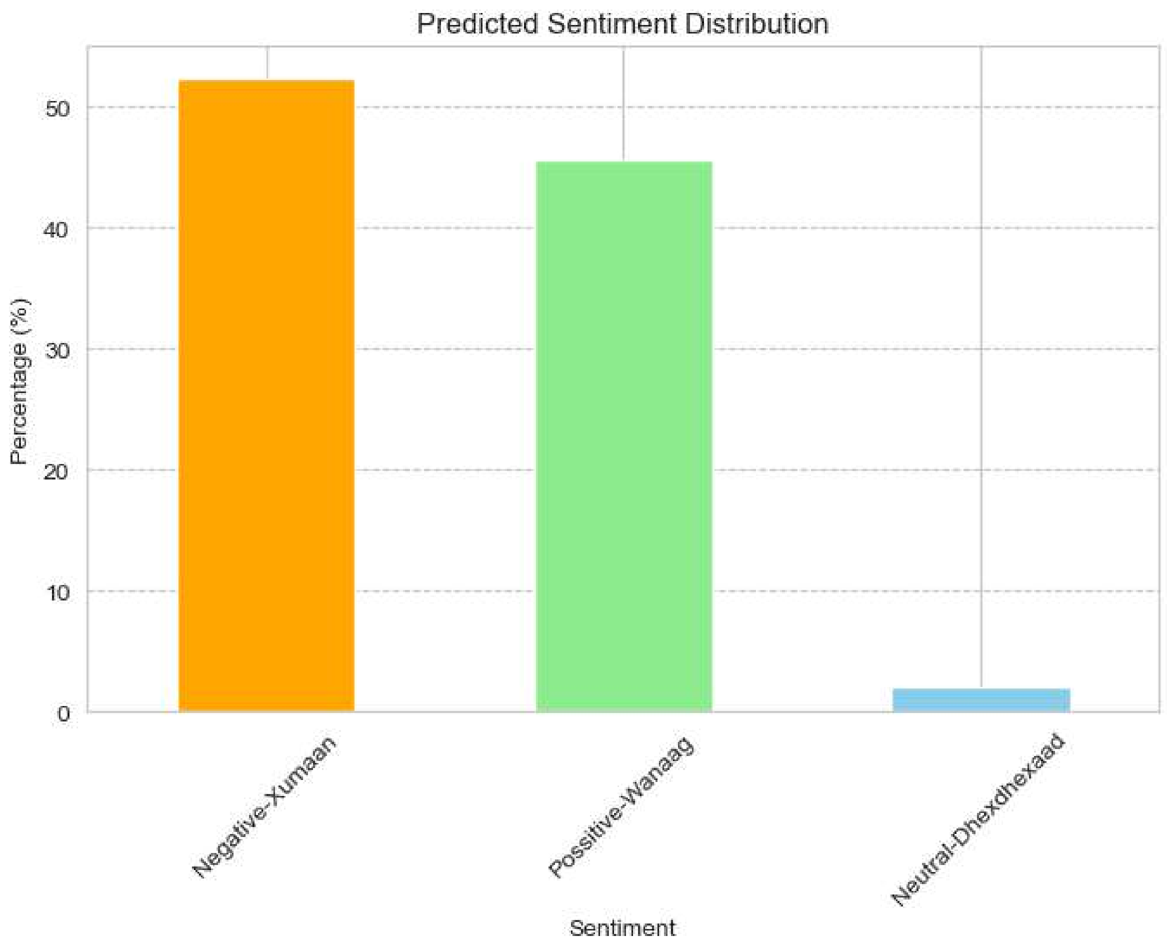
Out[57]:

	author	date	Comment	like_count	reply_count	comment_length	word_count	da
0	@maryamadirie8722	2024-04-19 09:43:45+00:00	Cadaab ka rabi bilaash uma san mujrimiin Rabiy...	0	0	61	10	
1	@hagiohaji7937	2024-04-19 03:35:24+00:00	Beenaale gacan ku dhiigle tuug, hala dilo.	0	0	42	7	
2	@fadumawarsamemumin4232	2024-04-18 12:17:27+00:00	All Shaba a le lagu Haye Polis dada cun ah Qam...	0	0	96	18	
3	@user-we3ty2ct8f	2024-04-17 22:02:09+00:00	Hadu I yaqaano ha ii abtiriyo kulahaa kk ma ho...	0	0	125	22	
4	@abdiali4991	2024-04-17 08:07:17+00:00	Sarkaal kan bistoolda loo dibtay waa ina asaga...	0	0	117	19	

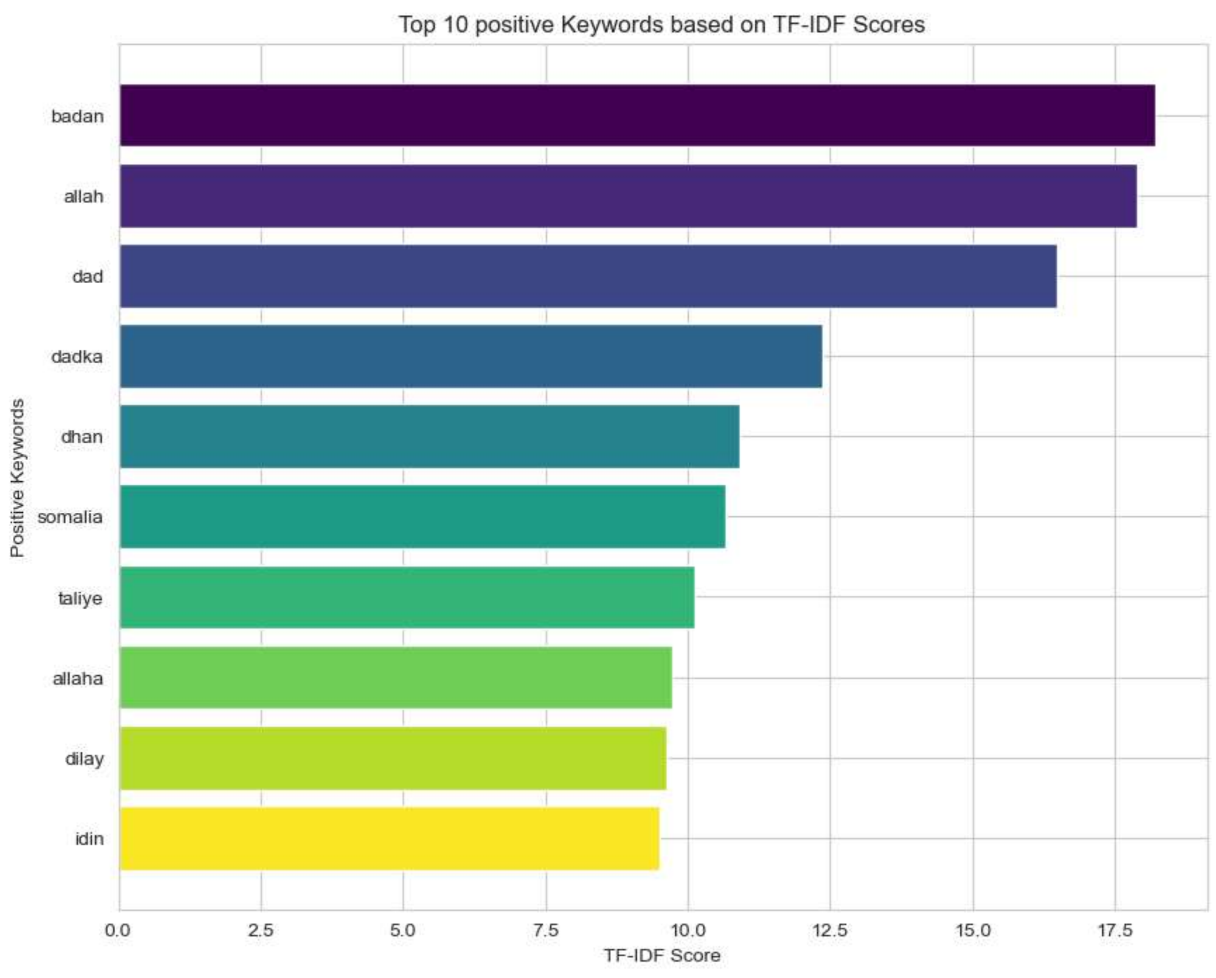
In [58]:
```
# Task 13 - Let’s visualize the sentiment percentages (positive, negative, neutral) for t

## before the visualization let's calculating sentiment distribution in the predicted sen

# Calculating sentiment distribution in the predicted sentiments
predicted_sentiments_distribution = df['Predicted Sentiment'].value_counts(normalize=Tru
predicted_sentiments_distribution

```

Out[58]:
```
Negative-Xumaan        52.335709
Possitive-Wanaag       45.645289
Neutral-Dhexdhexaad     2.019002
Name: Predicted Sentiment, dtype: float64
```

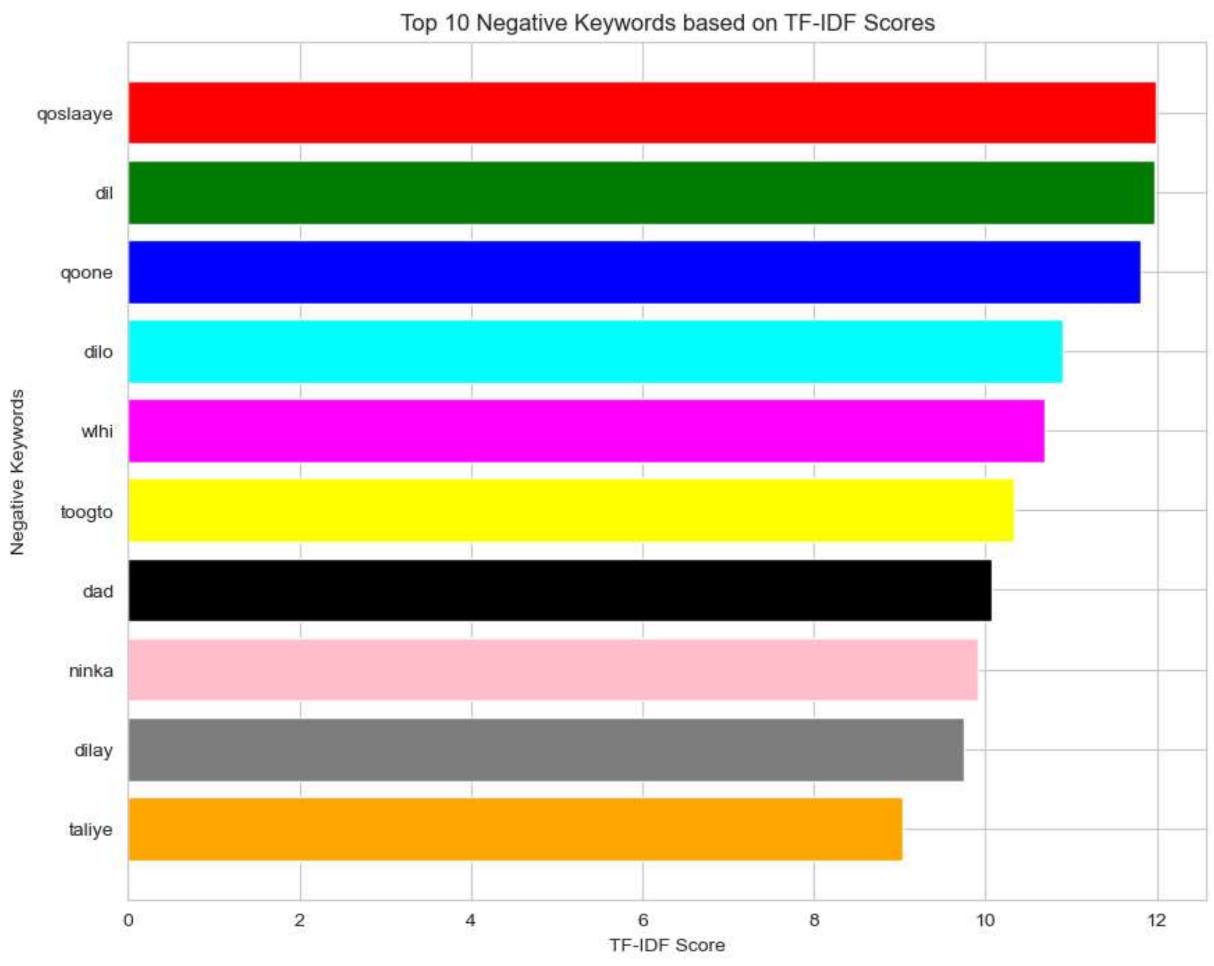
In [59]:
```
## Visualizing the Predicted sentiment

plt.figure(figsize=(8, 5))
predicted_sentiments_distribution.plot(kind='bar', color=['orange', 'lightgreen', 'skybl
plt.title('Predicted Sentiment Distribution')
plt.xlabel('Sentiment')
plt.ylabel('Percentage (%)')
plt.xticks(rotation=45)
plt.grid(axis='y', linestyle='--')
plt.show()

```



In [60]:
```
# Task 14 - Let’s visualize the top positive keywords associated with the selected topic

from sklearn.feature_extraction.text import TfidfVectorizer
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

# Filter the dataset for comments predicted as positive
positive_comments = df[df['Predicted Sentiment'] == 'Possitive-Wanaag']['ProcessedCommen

# Apply TF-IDF vectorization
tfidf_vectorizer = TfidfVectorizer(stop_words='english')  # Adjust or remove stop_words 
tfidf_matrix = tfidf_vectorizer.fit_transform(positive_comments)

# Get feature names and tfidf scores
feature_names = tfidf_vectorizer.get_feature_names_out()
scores = np.asarray(tfidf_matrix.sum(axis=0)).ravel()
tfidf_scores = dict(zip(feature_names, scores))

# Sort the scores in descending order
sorted_tfidf_scores = sorted(tfidf_scores.items(), key=lambda x: x[1], reverse=True)

# Convert to DataFrame for easy handling and visualization
df_tfidf_scores = pd.DataFrame(sorted_tfidf_scores, columns=['Term', 'Score']).head(10)

# Visualization using a colormap
plt.figure(figsize=(10, 8))
colors = plt.cm.viridis(np.linspace(0, 1, len(df_tfidf_scores)))
plt.barh(df_tfidf_scores['Term'], df_tfidf_scores['Score'], color=colors)
plt.xlabel('TF-IDF Score')
plt.ylabel('Positive Keywords')
plt.title('Top 10 positive Keywords based on TF-IDF Scores')
plt.gca().invert_yaxis()
plt.show()


```



In [61]:
```
# Task 15 - Let’s visualize the top negative keywords associated with the selected topic

from sklearn.feature_extraction.text import TfidfVectorizer
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

# Filter the dataset for comments predicted as positive
positive_comments = df[df['Predicted Sentiment'] == 'Negative-Xumaan']['ProcessedComment

# Apply TF-IDF vectorization
tfidf_vectorizer = TfidfVectorizer(stop_words='english')  # Adjust or remove stop_words 
tfidf_matrix = tfidf_vectorizer.fit_transform(positive_comments)

# Get feature names and tfidf scores
feature_names = tfidf_vectorizer.get_feature_names_out()
scores = np.asarray(tfidf_matrix.sum(axis=0)).ravel()
tfidf_scores = dict(zip(feature_names, scores))

# Sort the scores in descending order
sorted_tfidf_scores = sorted(tfidf_scores.items(), key=lambda x: x[1], reverse=True)

# Convert to DataFrame for easy handling and visualization
df_tfidf_scores = pd.DataFrame(sorted_tfidf_scores, columns=['Term', 'Score']).head(10)

# Visualization with custom colors
plt.figure(figsize=(10, 8))
custom_colors = ['red', 'green', 'blue', 'cyan', 'magenta', 'yellow', 'black', 'pink', '
plt.barh(df_tfidf_scores['Term'], df_tfidf_scores['Score'], color=custom_colors)
plt.xlabel('TF-IDF Score')
plt.ylabel('Negative Keywords')
plt.title('Top 10 Negative Keywords based on TF-IDF Scores')
plt.gca().invert_yaxis()
plt.show()

```



In [ ]:
```

```