In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import string
import re
import nltk
from nltk.util import pr
from nltk.corpus import stopwords
import warnings
warnings.filterwarnings('ignore')
stemmer = nltk.SnowballStemmer("english")
nltk.download('stopwords')
stopword=set(stopwords.words('english'))
```

```
[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 [6]:

```
data = pd.read_excel("war_tweets.xls")
```

In [8]:

```
data.head()
```

Out[8]:

	id	conversation_id	created_at	date	time	timezone	
0	1504325620976819968	1504082706598139904	2022-03-17 05:15:51 UTC	2022-03-17	05:15:51	0	
1	1504325620179909888	1504323038044509952	2022-03-17 05:15:51 UTC	2022-03-17	05:15:51	0	1420232
2	1504325618829250048	1504325618829250048	2022-03-17 05:15:51 UTC	2022-03-17	05:15:51	0	138773
3	1504325616589489920	1504325616589489920	2022-03-17 05:15:50 UTC	2022-03-17	05:15:50	0	
4	1504325616320989952	1504324574766320128	2022-03-17 05:15:50 UTC	2022-03-17	05:15:50	0	

5 rows × 36 columns

In [9]:

```
data.tail()
```

Out[9]:

	id	conversation_id	created_at	date	time	timezone	
10009	1504308144968760064	1503515544871439872	2022-03-17 04:06:25 UTC	2022-03-17	04:06:25	0	148
10010	1504308143953779968	1504308143953779968	2022-03-17 04:06:24 UTC	2022-03-17	04:06:24	0	150
10011	1504308143399920128	1486861730202459904	2022-03-17 04:06:24 UTC	2022-03-17	04:06:24	0	147
10012	1504308142120869888	1504288918430269952	2022-03-17 04:06:24 UTC	2022-03-17	04:06:24	0	123
10013	1504308140199790080	1504110924730619904	2022-03-17 04:06:23 UTC	2022-03-17	04:06:23	0	146

5 rows × 36 columns

In [10]:

```
data.shape
```

Out[10]:

```
(10014, 36)
```

In [11]:

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10014 entries, 0 to 10013
Data columns (total 36 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   id               10014 non-null  int64
 1   conversation_id  10014 non-null  int64
 2   created_at       10014 non-null  object
 3   date             10014 non-null  datetime64[ns]
 4   time             10014 non-null  object
 5   timezone         10014 non-null  int64
 6   user_id          10014 non-null  int64
 7   username         10014 non-null  object
 8   name             10014 non-null  object
 9   place            1 non-null      object
 10  tweet            10014 non-null  object
 11  language         10014 non-null  object
 12  mentions         10014 non-null  object
 13  urls             10014 non-null  object
 14  photos           10014 non-null  object
 15  replies_count    10014 non-null  int64
 16  retweets_count   10014 non-null  int64
 17  likes_count      10014 non-null  int64
 18  hashtags         10014 non-null  object
 19  cashtags         10014 non-null  object
 20  link             10014 non-null  object
 21  retweet          10014 non-null  bool
 22  quote_url        876 non-null    object
 23  video            10014 non-null  int64
 24  thumbnail        936 non-null    object
 25  near             0 non-null      float64
 26  geo              0 non-null      float64
 27  source           0 non-null      float64
 28  user_rt_id       0 non-null      float64
 29  user_rt          0 non-null      float64
 30  retweet_id       0 non-null      float64
 31  reply_to         10014 non-null  object
 32  retweet_date     0 non-null      float64
 33  translate        0 non-null      float64
 34  trans_src        0 non-null      float64
 35  trans_dest       0 non-null      float64
dtypes: bool(1), datetime64[ns](1), float64(10), int64(8), object(16)
memory usage: 2.7+ MB
```

In [12]:

```
data.describe()
```

Out[12]:

	id	conversation_id	timezone	user_id	replies_count	retweets_count	
count	1.001400e+04	1.001400e+04	10014.0	1.001400e+04	10014.000000	10014.000000	1
mean	1.504317e+18	1.502877e+18	0.0	6.984499e+17	0.313661	0.552227	
std	5.075717e+12	2.728863e+16	0.0	6.443610e+17	2.549457	10.848945	
min	1.504308e+18	4.371802e+17	0.0	7.421430e+05	0.000000	0.000000	
25%	1.504312e+18	1.504181e+18	0.0	4.921743e+08	0.000000	0.000000	
50%	1.504317e+18	1.504309e+18	0.0	8.388104e+17	0.000000	0.000000	
75%	1.504321e+18	1.504316e+18	0.0	1.354872e+18	0.000000	0.000000	
max	1.504326e+18	1.504326e+18	0.0	1.504322e+18	142.000000	666.000000	

In [13]:

```
data.isnull().sum()
```

Out[13]:

```
id                    0
conversation_id       0
created_at            0
date                  0
time                  0
timezone              0
user_id               0
username              0
name                  0
place             10013
tweet                 0
language              0
mentions              0
urls                  0
photos                0
replies_count         0
retweets_count        0
likes_count           0
hashtags              0
cashtags              0
link                  0
retweet               0
quote_url          9138
video                 0
thumbnail          9078
near              10014
geo               10014
source            10014
user_rt_id        10014
user_rt           10014
retweet_id        10014
reply_to              0
retweet_date      10014
translate         10014
trans_src         10014
trans_dest        10014
dtype: int64
```

In [14]:

```
data.columns
```

Out[14]:

```
Index(['id', 'conversation_id', 'created_at', 'date', 'time', 'timezone',
       'user_id', 'username', 'name', 'place', 'tweet', 'language', 'menti
ons',
       'urls', 'photos', 'replies_count', 'retweets_count', 'likes_count',
       'hashtags', 'cashtags', 'link', 'retweet', 'quote_url', 'video',
       'thumbnail', 'near', 'geo', 'source', 'user_rt_id', 'user_rt',
       'retweet_id', 'reply_to', 'retweet_date', 'translate', 'trans_src',
       'trans_dest'],
      dtype='object')
```

In [15]:

```
data[["tweet"]].head()
```

Out[15]:

	tweet
0	@PeterSchiff @PadaPrabu @SteveKrohn1 If it wer...
1	@meatballsubzero Are you pro russia or pro Ukr...
2	@SUBWAY Please stop doing business in Russia....
3	Is Russia prepared for an economic crisis? Dev...
4	@BW Putin is Fake News ðŸ“° The Ruble is trash...

In [16]:

```
data["language"].value_counts()
```

Out[16]:

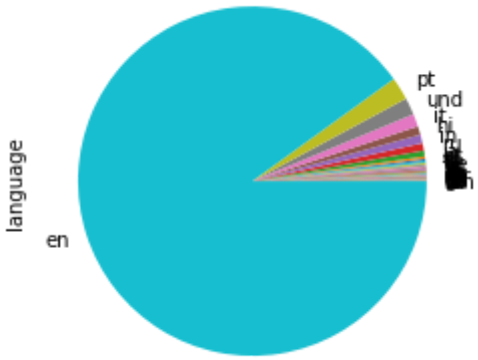
```
en     9018
pt      211
und     158
it      118
hi       80
in       79
ru       69
ja       54
es       22
pl       19
tl       18
nl       15
de       14
ar       13
fr       13
zh       11
th       10
ca        9
ta        8
ro        6
et        6
or        5
fi        5
bn        5
mr        5
ne        5
uk        4
kn        4
ml        4
cs        4
te        3
no        3
el        3
gu        3
ur        3
tr        2
iw        2
sl        1
fa        1
am        1
Name: language, dtype: int64
```

In [23]:

```
data.language.value_counts().sort_values().plot(kind = 'pie')
```

Out[23]:

```
<matplotlib.axes._subplots.AxesSubplot at 0xa33d4921c0>
```



In [24]:

```
data["tweet"][0]
```

Out[24]:

```
'@PeterSchiff @PadaPrabu @SteveKrohn1 If it were you you would have shit y
our pants and changed the name of your country to Russia.'
```

In [25]:

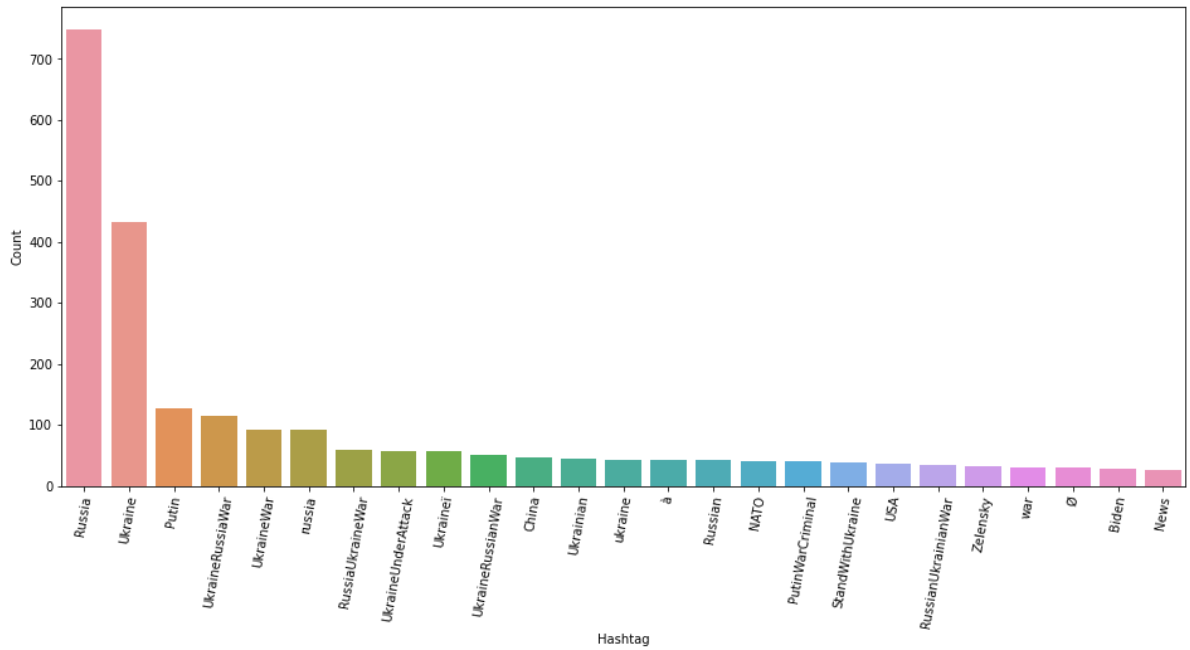
```
def hashtag_extract(text_list):
    hashtags = []
    # Loop over the words in the tweet
    for text in text_list:
        ht = re.findall(r"#(\w+)", text)
        hashtags.append(ht)

    return hashtags

def generate_hashtag_freqdist(hashtags):
    a = nltk.FreqDist(hashtags)
    d = pd.DataFrame({'Hashtag': list(a.keys()),
                      'Count': list(a.values())})
    # selecting top 15 most frequent hashtags
    d = d.nlargest(columns="Count", n = 25)
    plt.figure(figsize=(16,7))
    ax = sns.barplot(data=d, x= "Hashtag", y = "Count")
    plt.xticks(rotation=80)
    ax.set(ylabel = 'Count')
    plt.show()
```

In [27]:

```
hashtags = hashtag_extract(data["tweet"])
hashtags = sum(hashtags, [])
```

In [28]:

```
generate_hashtag_freqdist(hashtags)
```



In [29]:

```
data['total_length_characters'] = data['tweet'].str.len()
print(data['total_length_characters'])
total_length_characters = data['total_length_characters'].sum()
print(total_length_characters)
count = 0
for y in data["tweet"]:
    count = count + 1
print(count)
average_length = total_length_characters / count
print (average_length)
```

```
0        130
1        162
2        167
3        220
4         81
        ...
10009    255
10010     84
10011    176
10012    249
10013    216
Name: total_length_characters, Length: 10014, dtype: int64
1809200
10014
180.66706610744956
```

In [30]:

```
data['total_count_words'] = data['tweet'].str.split().str.len()
print(data['total_count_words'])
total_words = data['total_count_words'].sum()
print(total_words)
count = 0
for y in data["tweet"]:
    count = count + 1
print(count)
average_words = total_words / count
print (average_words)
```

```
0        22
1        28
2        26
3        32
4        15
         ..
10009    44
10010    11
10011    32
10012    39
10013    32
Name: total_count_words, Length: 10014, dtype: int64
271703
10014
27.13231475933693
```

In [31]:

```
def clean(text):
    text = str(text).lower()
    text = re.sub('\[.*?\]', '', text)
    text = re.sub('https?://\S+|www\.\S+', '', text)
    text = re.sub('<.*?>+', '', text)
    text = re.sub('[%s]' % re.escape(string.punctuation), '', text)
    text = re.sub('\n', '', text)
    text = re.sub('\w*\d\w*', '', text)
    text = [word for word in text.split(' ') if word not in stopword]
    text=" ".join(text)
    text = [stemmer.stem(word) for word in text.split(' ')]
    text=" ".join(text)
    return text
data["tweet"] = data["tweet"].apply(clean)
```

In [32]:

```
data['total_length_characters'] = data['tweet'].str.len()
print(data['total_length_characters'])
total_length_characters = data['total_length_characters'].sum()
print(total_length_characters)
count = 0
for y in data["tweet"]:
    count = count + 1
print(count)
average_length = total_length_characters / count
print (average_length)
```

```
0         64
1         98
2        121
3        134
4         63
        ...
10009    126
10010     74
10011    115
10012    130
10013    137
Name: total_length_characters, Length: 10014, dtype: int64
1151855
10014
115.02446574795286
```

In [33]:

```
data['total_count_words'] = data['tweet'].str.split().str.len()
print(data['total_count_words'])
total_words = data['total_count_words'].sum()
print(total_words)
count = 0
for y in data["tweet"]:
    count = count + 1
print(count)
average_words = total_words / count
print (average_words)
```

```
0         9
1        16
2        19
3        19
4        11
         ..
10009    20
10010    10
10011    19
10012    20
10013    18
Name: total_count_words, Length: 10014, dtype: int64
163755
10014
16.35260635110845
```

In [34]:

```
from textblob import TextBlob
```

In [35]:

```
def analyze_sentiment(tweet):
    analysis = TextBlob(clean(tweet))
    if analysis.sentiment.polarity > 0:
        return 1
    elif analysis.sentiment.polarity == 0:
        return 0
    else:
        return -1
```

In [36]:

```
data['Sentiment'] = data['tweet'].apply(lambda x:analyze_sentiment(x))
data['Source'] = 'random_user'
data['Length'] = data['tweet'].apply(len)
data['Word_counts'] = data['tweet'].apply(lambda x:len(str(x).split()))
```

In [37]:

```
data1=data[['tweet','retweets_count', 'Sentiment', 'Source',
            'Length','Word_counts']]
data1.head()
```

Out[37]:

	tweet	retweets_count	Sentiment	Source	Length	Word_counts
0	peterschiff padaprabu would shit pant chang n...	0	-1	random_user	64	9
1	meatballsubzero pro russia pro ukrain cannot ...	0	0	random_user	98	16
2	subway pleas stop busi russia everi dollar sp...	0	1	random_user	121	19
3	russia prepar econom crisi develop expert nata...	0	0	random_user	134	19
4	bw putin fake news ðÿ“° rubl trash ðÿ— russia...	0	-1	random_user	63	11

In [39]:

```
data1['Clean tweet'] = data1['tweet'].apply(lambda x:clean(x))
```

In [40]:

```
data1[["Clean tweet","Sentiment"]].iloc[100]
```

Out[40]:

```
Clean tweet    ewarren war russia putin peopl wef go peopl la...
Sentiment                                                      0
Name: 100, dtype: object
```

In [41]:

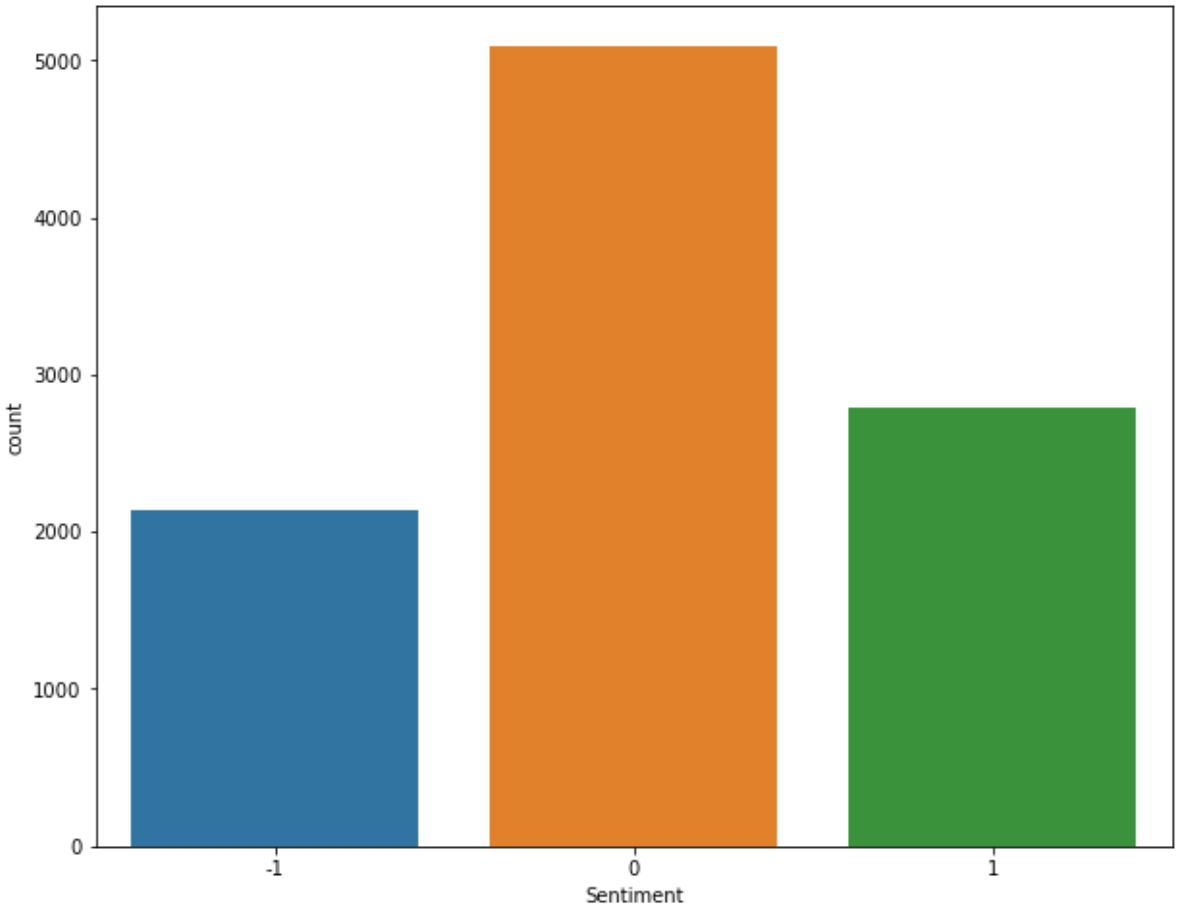
```
sentiment = data1['Sentiment'].value_counts()
sentiment
```

Out[41]:

```
 0    5094
 1    2788
-1    2132
Name: Sentiment, dtype: int64
```

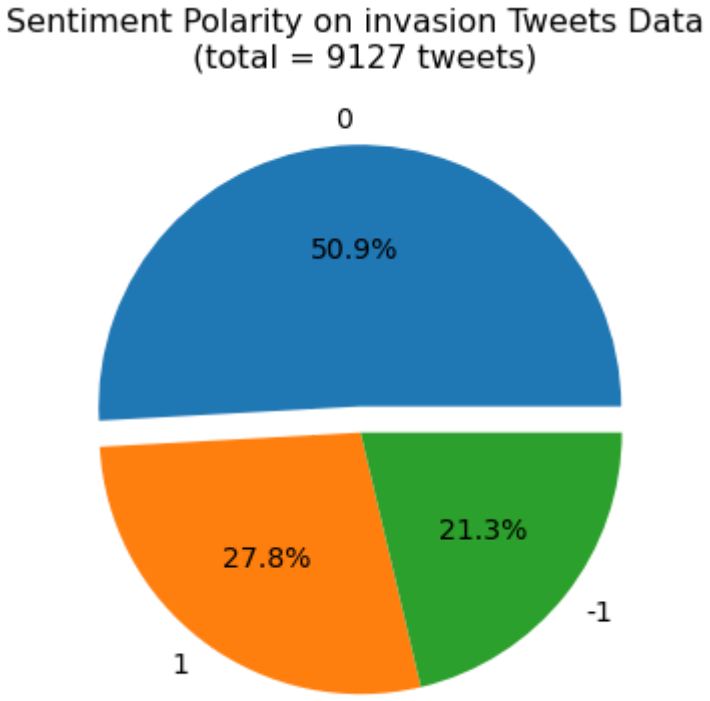
In [42]:

```
plt.figure(figsize = (10,8))
sns.countplot(data = data1, x = 'Sentiment')
plt.show()
```



In [43]:

```
fig, ax = plt.subplots(figsize = (6, 6))
sizes = [count for count in data1['Sentiment'].value_counts()]
labels = list(data['Sentiment'].value_counts().index)
explode = (0.1, 0, 0)
ax.pie(x = sizes, labels = labels, autopct = '%1.1f%%', explode = explode, textprops={'
ax.set_title('Sentiment Polarity on invasion Tweets Data \n (total = 9127 tweets)', font
plt.show()
```



In [46]:

```
neutral = data1[data1['Sentiment'] == 0]
positive = data1[data1['Sentiment'] == 1]
negative = data1[data1['Sentiment'] == -1]
```

In [47]:

```
negative.iloc[1]
```

Out[47]:

```
tweet             bw putin fake news ðÿ“° rubl trash ðÿ—  russia...
retweets_count                                                   0
Sentiment                                                       -1
Source                                                  random_user
Length                                                         63
Word_counts                                                    11
Clean tweet       bw putin fake news ðÿ“° rubl trash ðÿ—  russia...
Name: 4, dtype: object
```

In [48]:

```
#neutral_text
print("Neutral tweet example  :",neutral['tweet'].values[15])
# Positive tweet
print("Positive Tweet example :",positive['tweet'].values[37])
#negative_text
print("Negative Tweet example :",negative['tweet'].values[1])
```

```
Neutral tweet example  : us allow russia troop cuba mexico attack said cou
ntri
Positive Tweet example : new post media israeliani russia aperta idea di n
egoziati gerusalemm â€“
Negative Tweet example : bw putin fake news ðÿ“° rubl trash ðÿ—  russia hi
stori ðÿ'‹ðÿ½
```

In [53]:

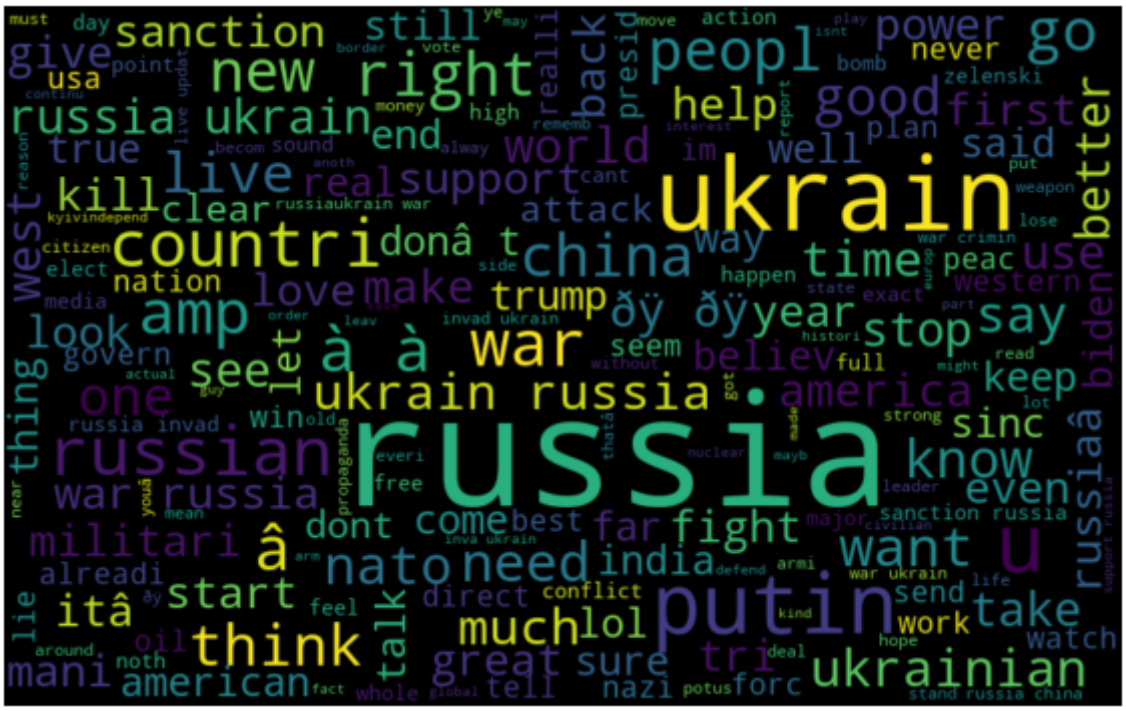
```
from wordcloud import WordCloud
```

In [54]:

```
txt = ' '.join(text for text in data1['Clean tweet'])
wordcloud = WordCloud(
            background_color = 'white',
            max_font_size = 100,
            max_words = 100,
            width = 800,
            height = 500
            ).generate(txt)
plt.imshow(wordcloud,interpolation = 'bilinear')
plt.axis('off')
plt.show()
```

In [55]:

```
positive_words =' '.join([text for text in data1['Clean tweet'][data1['Sentiment'] == 1]
wordcloud = WordCloud(width=800, height=500, random_state=21, max_font_size=110).generat
plt.figure(figsize=(10, 7))
plt.imshow(wordcloud, interpolation="bilinear")
plt.axis('off')
plt.show()
```



In [56]:

```
negative_words =' '.join([text for text in data1['Clean tweet'][data1['Sentiment'] == -1
wordcloud = WordCloud(width=800, height=500, random_state=21, max_font_size=110).generat
plt.figure(figsize=(10, 7))
plt.imshow(wordcloud, interpolation="bilinear")
plt.axis('off')
plt.show()
```

In [57]:

```
neutral_words =' '.join([text for text in data1['Clean tweet'][data1['Sentiment'] == 0]]
wordcloud = WordCloud(width=800, height=500, random_state=21, max_font_size=110).generat
plt.figure(figsize=(10, 7))
plt.imshow(wordcloud, interpolation="bilinear")
plt.axis('off')
plt.show()
```