TWITTER HASHTAG ANALYSIS FOR "@DeutscheBörse"

In [3]:
```
import tweepy, codecs
```

In [4]:
```
consumer_key = "cQcOkP6TZjTozZ53"
consumer_secret = "Ro6p8Kb4Ljj9kcI3vdeXlqetaWCZ1O"
access_token ="3224795051-L4U1AiU8QjpcPYVH"
access_token_secret ="FYcR91YXxmUWnCokylrtL"

auth = tweepy.OAuthHandler(consumer_key,consumer_secret)

auth.set_access_token(access_token, access_token_secret)
api = tweepy.API(auth)
```

In [5]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [20]:
```
tweetler = api.search(q = "@DeutscheBörse", lang = "en", count = 20000)
```

In [2]:
```
def hashtag_df(tweetler):
    import pandas as pd
    id_list = [tweet.id for tweet in tweetler]
    df = pd.DataFrame(id_list, columns= ["id"])


    df["text"] = [tweet.text for tweet in tweetler]
    df["created_at"] = [tweet.created_at for tweet in tweetler]
    df["retweeted"] = [tweet.retweeted for tweet in tweetler]
    df["text"] = [tweet. for tweet in tweetler]
    df["source"] = [tweet.source for tweet in tweetler]
```

```
    df["retweet_count"] = [tweet.retweet_count for tweet in tweetler]
    df["user_screen_name"] = [tweet.author.screen_name for tweet in twe
etler]
    df["user_followers_counts"] = [tweet.author.followers_count for twe
et in tweetler]
    df["user_location"] = [tweet.author.location for tweet in tweetler]
    df["Hashtags"] = [tweet.entities.get("hashtags") for tweet in tweet
ler]

    return df
```

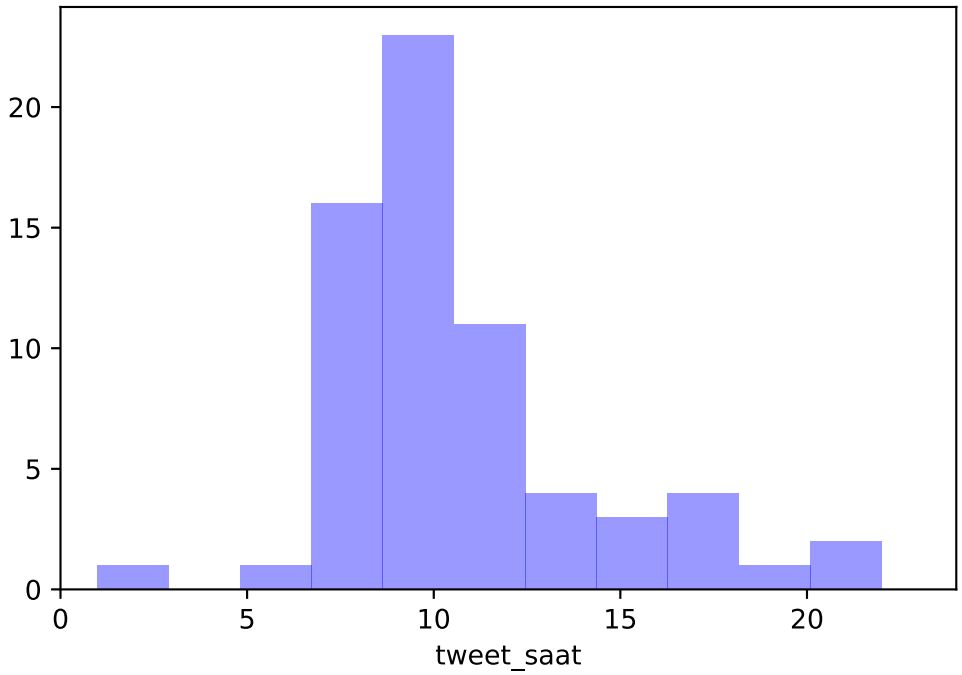
In [21]:
```
dbg = hashtag_df(tweetler)
```

In [49]:
```
dbg["tweet_saat"] = dbg["created_at"].apply(lambda x: x.strftime("%H"))
```

which hours "@DeutscheBörse" hastag is used in tweets

In [53]:
```
sns.distplot(dbg.tweet_saat,kde = False,color = "blue") #which hours "@
DeutscheBörse" hastag is used in tweets
plt.xlim(00,24)
```

Out[53]:
```
(0, 24)
```

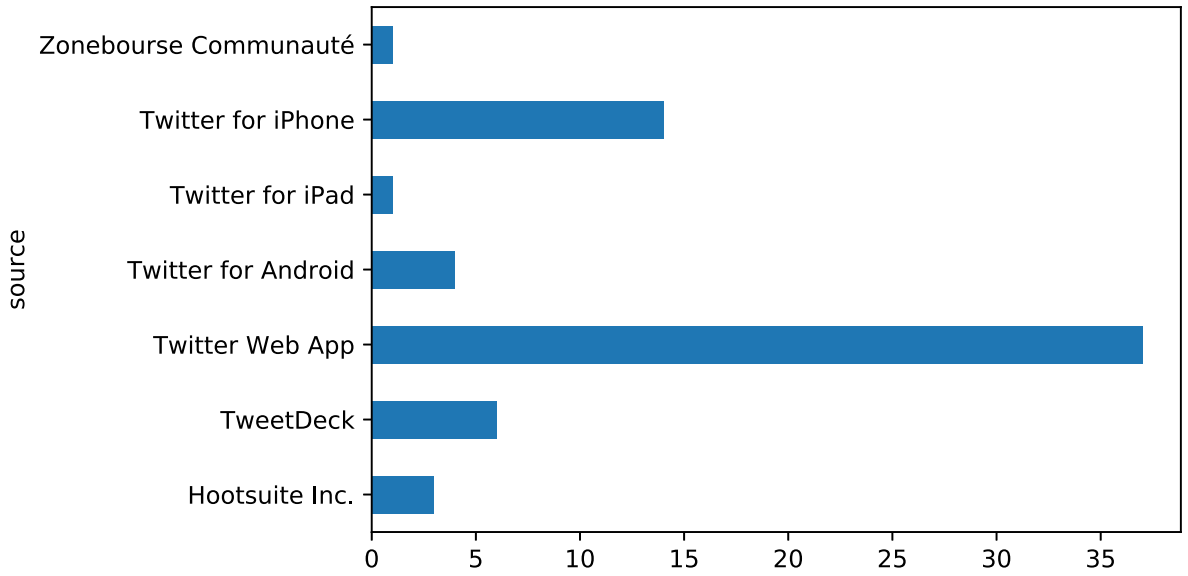


In [55]:
```
kaynak_freq = dbg.groupby("source").count()["id"]
```

People are using Twitter Web Application while sending tweets about "@DeutscheBörse" hastag.

In [56]:
```
kaynak_freq.plot.barh()
```

Out[56]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2304213bb38>
```



In [23]:
```
aa = dbg.copy()
```

In [24]:
```
#upper-lower case change
aa["text"] = aa["text"].apply(lambda x: " ".join(x.lower() for x in x.s
plit()))
```

In [25]:
```
# poinst sign
aa["text"] = aa["text"].str.replace('[^\w\s]','')
```

In [26]:
```
#numbers
aa["text"] = aa["text"].str.replace('\d','')
```

In [27]:
```
#stopwords
import nltk
from nltk.corpus import stopwords
sw = stopwords.words("english")
aa["text"] = aa["text"].apply(lambda x: " ".join(x for x in x.split() i
f x not in sw ))
```

In [28]:
```
##lemmi
from textblob import Word
aa["text"] = aa["text"].apply(lambda x : " ".join([Word(word).lemmatize
() for word in x.split()]))
```

In [29]:
```
aa["text"] = aa["text"].str.replace("rt",'')
```

In [30]:
```
aa["text"] # Here I cleaned text.
```

Out[30]:
```
0      madana_hq would like thank deutscheboerse ven...
1                    madana_hq deutscheboerse congrats
2     mojmir_hlinka year constant accusation journal...
3     ok markus braun ceo wirecard stepped least new...
4     company ceo resigned today suspended senior ex...
                            ...
61    deutscheboerse go bitcoin brendaneich nntaleb ...
62    deutscheboerse go bitcoin brendaneich nntaleb ...
63    happy bihday subsidiary clearstream clearstrea...
64     madana_hq would like thank deutscheboerse ven...
65     madana_hq would like thank deutscheboerse ven...
Name: text, Length: 66, dtype: object
```

In [31]:
```
freq_df = aa["text"].apply(lambda x: pd.value_counts(x.split(" "))).sum
(axis=0).reset_index() # frequency of words
```

In [57]:
```
freq_df.columns = ["words","frequency"]
```

In [58]:
```
freq_df.groupby("words").count()["frequency"].sort_values(ascending = F
alse)
```

Out[58]:
```
words
yet             1
f_jan           1
event           1
evidence        1
exalted         1
                ..
```

```
network          1
new              1
news             1
nikkeimarket     1
                 1
Name: frequency, Length: 305, dtype: int64
```

In [59]:
```
freq_df[freq_df.frequency > freq_df.frequency.mean() + freq_df.frequenc
y.std()] ##Reduction according to  std.
```

Out[59]:

	words	frequency
0	madana_hq	9.0
1	online	8.0
2	organizing	8.0
3	atypical	8.0
4	matching	8.0
5	event	8.0
6	venture	8.0
7	deutscheboerse	46.0
8	like	9.0
9	vcs	8.0
10	would	8.0
11	network	8.0
12	thank	8.0
13		23.0
25	ceo	9.0
30	wirecard	7.0
33	new	8.0

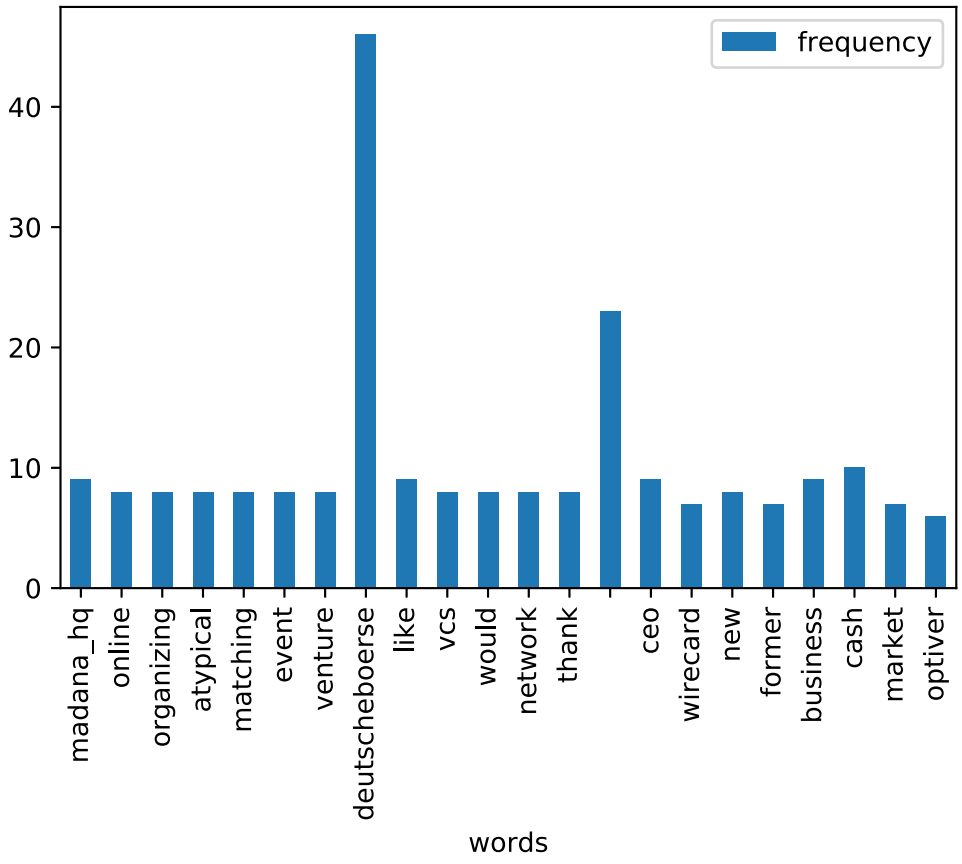
	words	frequency
35	former	7.0
151	business	9.0
237	cash	10.0
239	market	7.0
241	optiver	6.0

In [63]:
```
freqler = freq_df[freq_df.frequency > freq_df.frequency.mean() + freq_df.frequency.std()]
```

Here we can see the visualization of words and which words are most used from people who use "@DeutscheBörse" hashtag

In [64]:
```
freqler.plot.bar(x = "words", y ="frequency")
```

Out[64]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2304208e320>
```



Word cloud for collected words about deutsch borse.

In [37]:
```
import numpy as np
import pandas as pd
from os import path
from PIL import Image
from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator
import matplotlib.pyplot as plt
```

In [38]:
```
text = " ".join(i for i in aa.text)
```

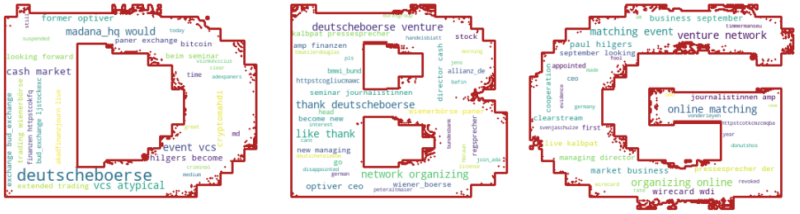
In [39]:
```
wordcloud = WordCloud(background_color = "white").generate(text)
plt.imshow(wordcloud , interpolation= "bilinear")
plt.axis("off")
plt.tight_layout(pad = 0)
plt.show()
```

In [84]:
```
mrkt = np.array(Image.open("Adsız.jpg"))
%config InlineBackend.figure_format = "retina"
```

In [87]:
```
%config InlineBackend.figure_format = "retina"
wc = WordCloud(background_color= "white",
                              max_words=100,
                              mask=mrkt,
                              contour_width=3,
                              contour_color="firebrick")

wc.generate(text)
plt.figure(figsize=(10,10))
```

```
plt.imshow(wc, interpolation = "bilinear")
plt.axis("off")
plt.tight_layout(pad = 0)
plt.show()
```



Sentiment Analysis.

In [93]:
```
from textblob import TextBlob
import pandas as pd
aa1 = aa.copy()
```

In [94]:
```
def getSubjectivity(text):

    return TextBlob(text).sentiment.subjectivity
```

In [95]:
```
def getPolarity(text):

    return  TextBlob(text).sentiment.polarity
```

In [96]:
```
aa1['Subjectivity'] = aa1['text'].apply(getSubjectivity)
```

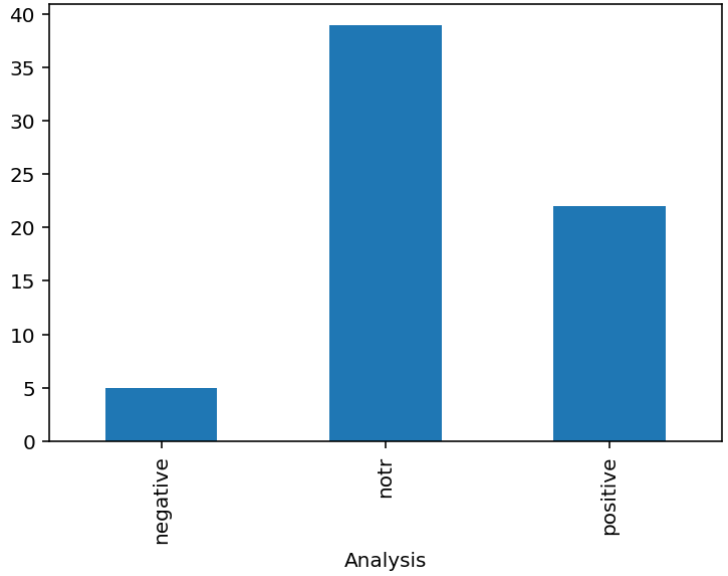
```
aa1['Polarity'] = aa1['text'].apply(getPolarity)
```

In [97]:
```
def getscore(score):
    if score <0:
        return "negative"
    elif score == 0:
        return "notr"
    else:
        return "positive"
```

In [99]:
```
aa1['Analysis'] = aa1['Polarity'].apply(getscore)
```

In [101]:
```
duygu_freq = aa1.groupby("Analysis").count()["id"]
duygu_freq.plot.bar()
```

Out[101]: <matplotlib.axes._subplots.AxesSubplot at 0x230430c9668>



NEGATIVE TWEETS

In [103]:
```
print('Printing negative:\n')
j=1
sortedDF = aa1.sort_values(by=['Polarity'],ascending=False) #Sort the t
weets
for i in range(0, sortedDF.shape[0] ):
  if( sortedDF['Analysis'][i] == 'negative'):
    print(str(j) + ') '+sortedDF["text"][i])
    print()
    j=j+1
```

```
Printing negative:

1)  jc donutshos im disappointed germany made fool german medium handel
sblatt reflect

2) deezee cryptomahdi deutscheboerse agreed take long license revoked

3) donutshos im disappointed germany made fool german medium handelsbla
tt sho httpstcotmszfndlz

4) germantrader deutscheboerse well also criminal bafin didnt investiga
te request third pay audit httpstcovvazkhoy

5) come conclusion today criminal let stock trade morning opinion https
tcoybbwljgep
```

POSITIVE TWEETS

In [104]:
```
print('Printing positive tweets:\n')
j=1
sortedDF = aa1.sort_values(by=['Polarity']) #Sort the tweets
for i in range(0, sortedDF.shape[0] ):
  if( sortedDF['Analysis'][i] == 'positive'):
    print(str(j) + ') '+ sortedDF['text'][i])
```

```
    print()
    j= j+1
```

```
Printing positive tweets:

1) ok markus braun ceo wirecard stepped least new ceo former prosecutor
previous httpstcotjwbyvlnlp

2) sound like wirecard wdi management blaming pointing others rather ad
mitting blatan httpstcomrmksctso

3) cryptomahdi deutscheboerse time post none good

4)  akadfinanzjourn live kalbpat pressesprecher der deutscheboerse beim
seminar journalistinnen amp finanzen httpstcokfq

5)  akadfinanzjourn live kalbpat pressesprecher der deutscheboerse beim
seminar journalistinnen amp finanzen httpstcokfq

6)  akadfinanzjourn live kalbpat pressesprecher der deutscheboerse beim
seminar journalistinnen amp finanzen httpstcokfq

7) live kalbpat pressesprecher der deutscheboerse beim seminar journali
stinnen amp finanzen httpstcokfqdvwiz

8) great news btcetc bitcoin exchange traded crypto ticker btce listed
deutscheboerse morning first httpstcoccdtxbkap

9)  deutscheboerse eurexgroup clear first interest rate swap transactio
n japan httpstcoaextjeqxt httpstcoiryqfetuik

10) eurexgroup clear first interest rate swap transaction japan httpstc
oaextjeqxt httpstcoiryqfetuik

11)  lambopnl former optiver ceo new head cash business deutscheboerse
httpstcogliucmawc

12)  lambopnl former optiver ceo new head cash business deutscheboerse
httpstcogliucmawc
```

```
13)  clearstream fund ajbellgroup appointed clearstream primary custodi

an fund processing activity excited

14) former optiver ceo new head cash business deutscheboerse httpstcogl
iucmawc

15)  deutscheboerse paul hilgers become new managing director cash mark
et business september looking forward

16)  deutscheboerse paul hilgers become new managing director cash mark
et business september looking forward

17)  deutscheboerse paul hilgers become new managing director cash mark
et business september looking forward

18) paul hilgers become new managing director cash market business sept
ember looking forward httpstcoicdxpteuma

19) congratulation happy th bihday eex httpstcotejtwmzjj

20) crifc_de deutscheboerse great news

21) time kickoff adafellowship programme excited welcome talented ambit
ious colleague httpstcodkuwttps

22) happy bihday subsidiary clearstream clearstream httpstcoyjcbumbzk
```

In [5]:
```
! jupyter nbconvert --to html dbg.ipynb.
```

```
[NbConvertApp] Converting notebook dbg.ipynb. to html
[NbConvertApp] Writing 803783 bytes to dbg.ipynb.html
```

In [ ]:
```
```