Final Project - Linkedin

Introduction to Data Analytics 2021

Presented by Racheli Hayat, Einav Diar, Adar Achwal and Sapir Hastar

Group #3

Data source: https://www.kaggle.com/killbot/linkedin-profiles-and-jobs-data

Our GitHub: https://github.com/einavdiar/Linkedin

We've chosen to analyze information about Linkedin, an online social network designed to create professional and business connections between its users.

During the project, we analyzed the network data in order to find the factors that help users reach efficient use of the network.

As students and future engineers, over the next few years we will be looking for a job, therefore, it's important for us to learn about the best way to utalize this platform.

In [1]:
```
import pandas as pd
import numpy as np
import datetime
import matplotlib.pyplot as plt
import matplotlib.colors as mcolors
import seaborn as sns
```

In [2]:
```
data = pd.read_csv('https://raw.githubusercontent.com/einavdiar/Linkedin/main/Linkedin.csv')
```

Wrangling data:

1. Handling missing values:

In [3]:
```
data=data.dropna(subset =['genderEstimate'])
data['hasPicture'].fillna('no picture', inplace = True)
data['companyHasLogo'].fillna('no logo', inplace = True)
data=data.dropna(subset = ['companyName'])
```

1) We removed missing data rows from "companyName" and "genderEstimate".

2) From missing values under "hasPicture" and "companyHasLogo" we filled "no picture / logo".

In [4]:
```
missing=data[['genderEstimate','hasPicture','companyHasLogo','companyName']].isnull().sum()
pd.DataFrame(missing)
```

Out[4]:

	0
genderEstimate	0
hasPicture	0
companyHasLogo	0
companyName	0

2. Fix columns:

In [5]:
```
data[['genderEstimate','hasPicture','companyHasLogo','companyName','followersCount','ageEstimate']].info()
```

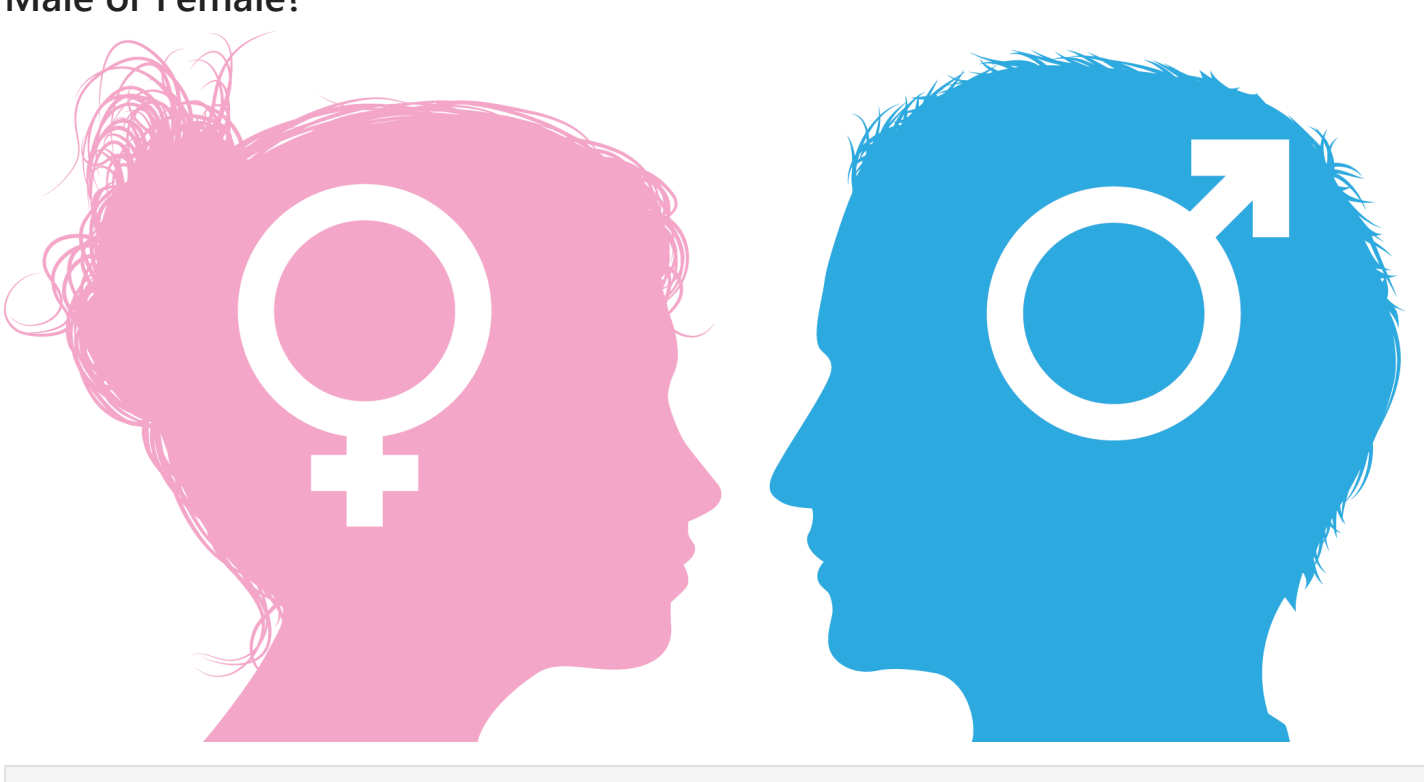
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 35565 entries, 0 to 39536
Data columns (total 6 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   genderEstimate  35565 non-null  object
 1   hasPicture      35565 non-null  object
 2   companyHasLogo  35565 non-null  object
 3   companyName     35565 non-null  object
 4   followersCount  35565 non-null  int64
 5   ageEstimate     35565 non-null  int64
dtypes: int64(2), object(4)
memory usage: 1.9+ MB
```

All our Dtypes were correct.

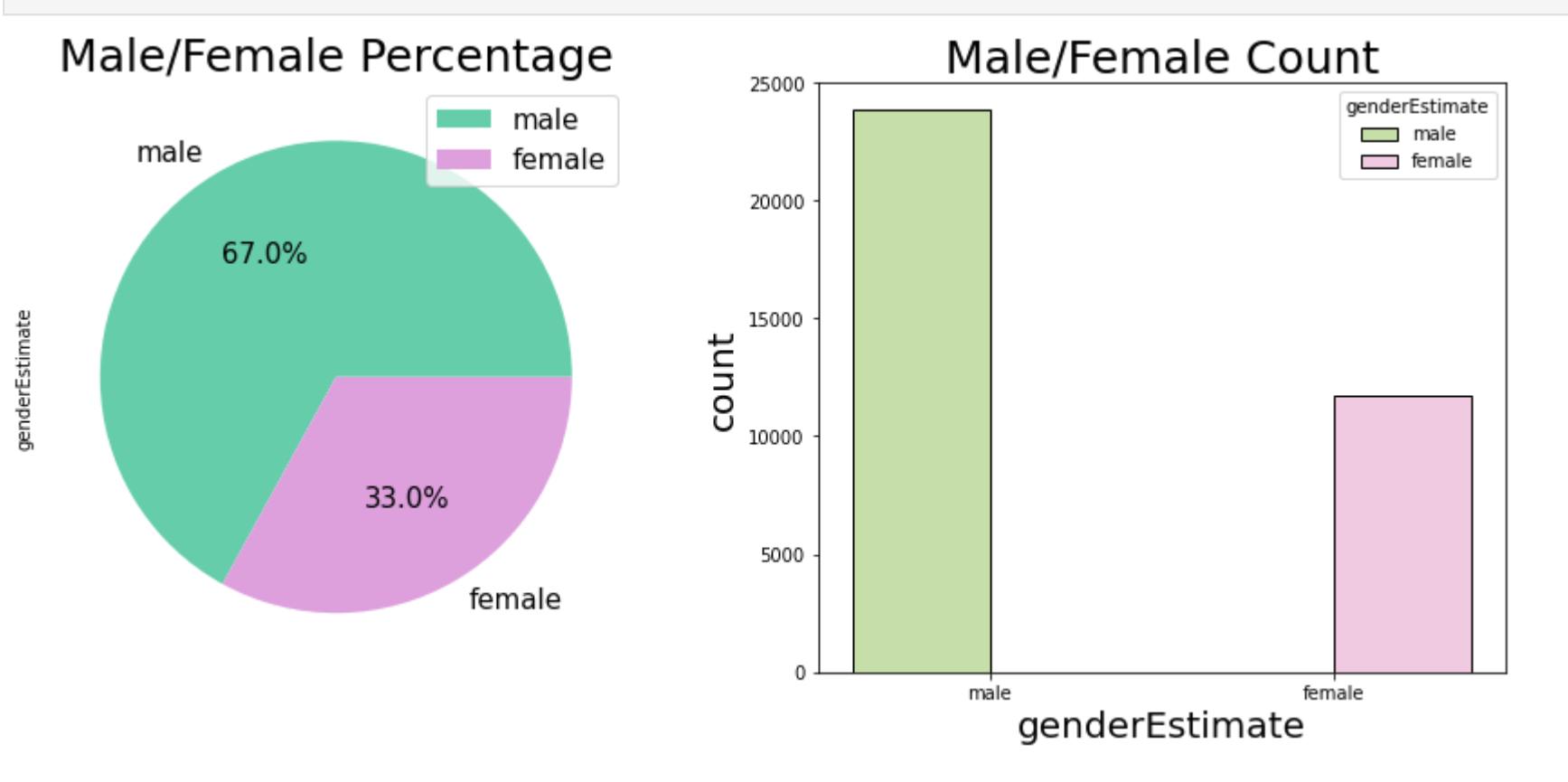
What do you think?

Who is more likely to use linkedin?

Male or Female?



In [6]:
```
plt.figure(figsize=(15, 6))
plt.subplot(1,2,1)
plt.title("Male/Female Percentage",fontsize=25)
plotpie=data['genderEstimate'].value_counts().plot.pie(autopct='%1.1f%%',colors = ['mediumaquamarine', 'plum'],
plt.legend(fontsize=15)
plt.subplot(1,2,2)
plt.title("Male/Female Count",fontsize=25)
plt.xlabel("Gender Estimate",fontsize=20)
plt.ylabel("Count",fontsize=20)
sns.countplot( x="genderEstimate",data=data , edgecolor = 'black', palette = 'PiYG_r', hue='genderEstimate')
plt.show()
```

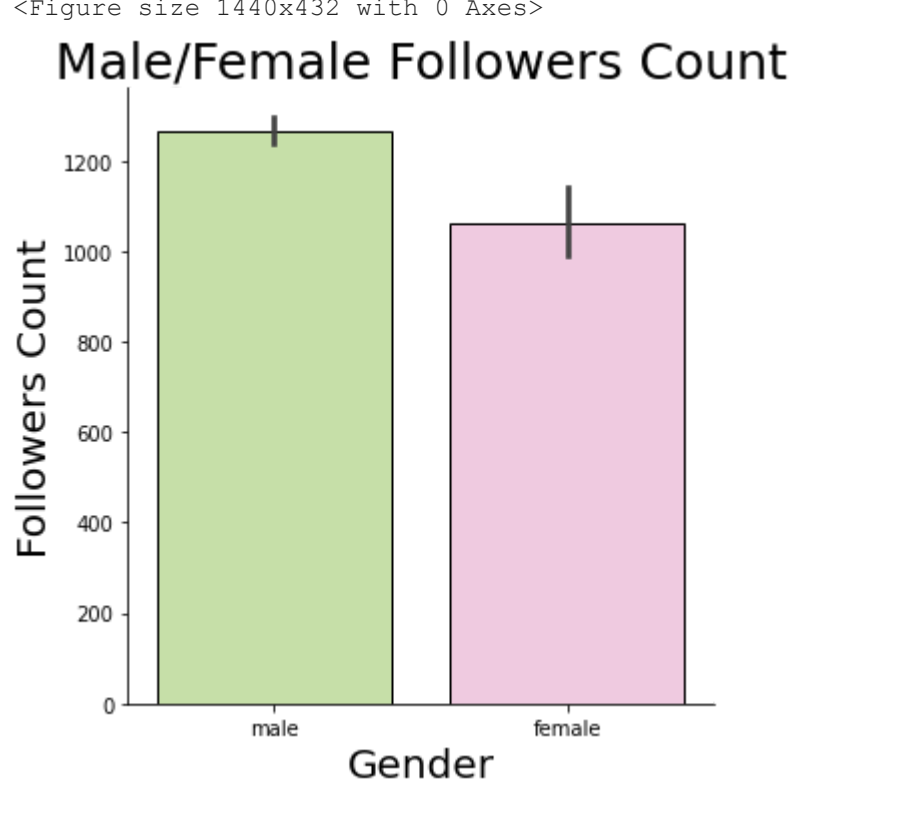


On these charts we can see that there are more male users than females

We would like to examine if there's a connection between Gender and Followers Count

In [7]:
```
plt.figure(figsize=(20, 6))
type_df = data[["genderEstimate", "followersCount"]]
sns.catplot(data=type_df, kind="bar", x="genderEstimate", y = "followersCount",height=5,aspect=1,edgecolor = 'b
plt.title("Male/Female Followers Count",fontsize=25)
plt.xlabel("Gender",fontsize=20)
plt.ylabel("Followers Count",fontsize=20)
```

Out[7]:
```
Text(-2.575000000000003, 0.5, 'Followers Count')
<Figure size 1440x432 with 0 Axes>
```



Although the number of females is significantly lower than the number of males,

Their average followers are close to the average followers of males.

Despite their low number, we can see that they have a high exposure and number of followers (almost the same as males).

Therefore, it can be assumed that the LinkedIn network is recommended for females.

We would like to examine the connection between Logo, Picture and Followers Count

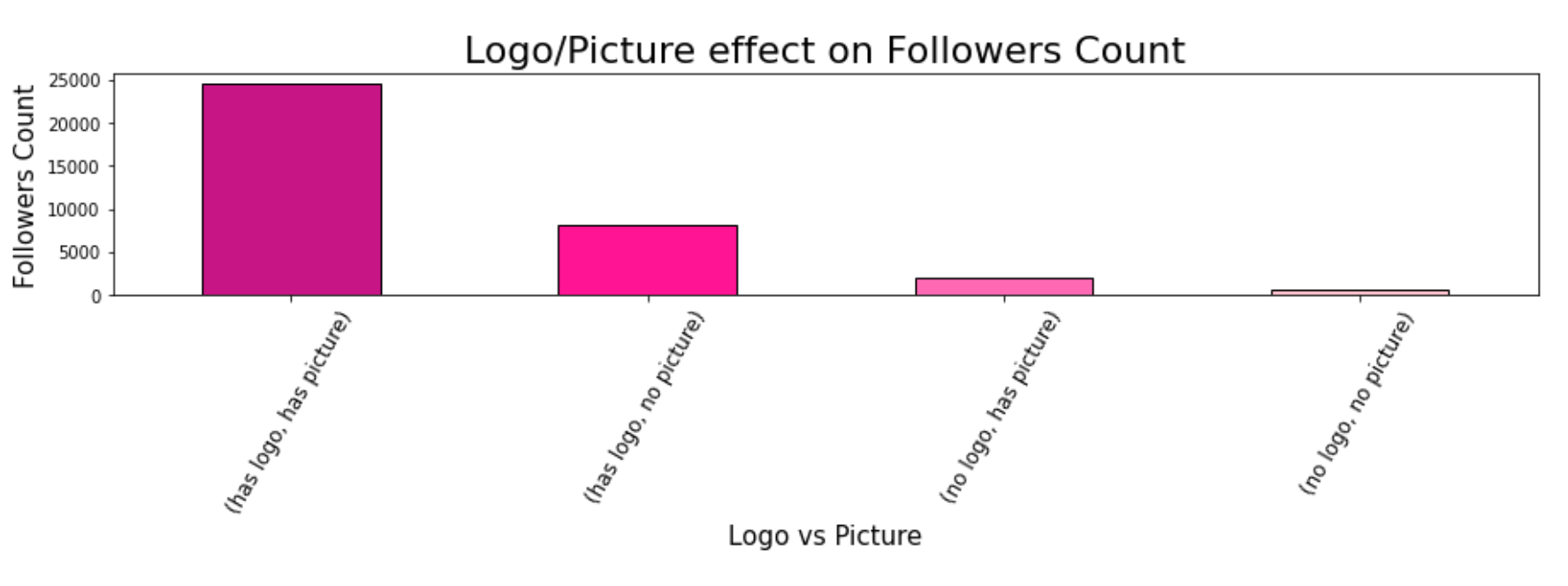
In [8]:
```
plt.figure(figsize=(10, 5))
data.loc[data['hasPicture'].str.contains('jpg'), 'hasPicture'] = 'has picture'
data.loc[data['hasPicture'].str.contains('A'), 'hasPicture'] = 'has picture'
data.loc[data['companyHasLogo'].str.contains('png'), 'companyHasLogo'] = 'has logo'
data.loc[data['companyHasLogo'].str.contains('jpg'), 'companyHasLogo'] = 'has logo'
data.loc[data['companyHasLogo'].str.contains('e'), 'companyHasLogo'] = 'has logo'
data.loc[data['companyHasLogo'].str.contains('A'), 'companyHasLogo'] = 'has logo'
```

```
<Figure size 720x360 with 0 Axes>
```

To analyze the data, we replaced values under these columns

In [9]:
```
plt.figure(figsize=(15, 2.4))
data.groupby(['companyHasLogo','hasPicture'])['followersCount'].count().plot.bar(edgecolor = 'black',color=['me
plt.xticks(rotation=60,fontsize=12)
plt.title("Logo/Picture effect on Followers Count",fontsize=22)
plt.xlabel("Logo vs Picture",fontsize=15)
plt.ylabel("Followers Count",fontsize=15)
```

Out[9]:
```
Text(0, 0.5, 'Followers Count')
```

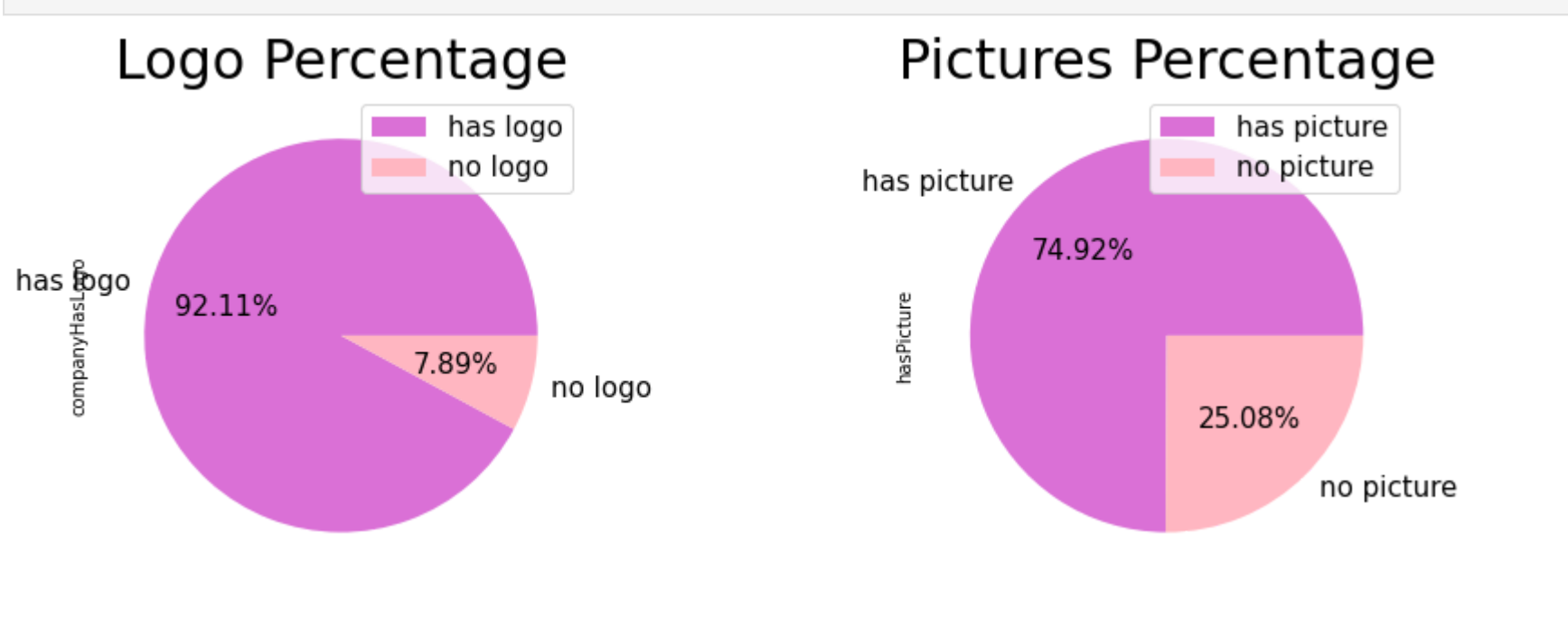


The graph clearly shows that users should upload both logo and image.

A logo has a higher impact on the number of followers than an image, and it shows that an image without a logo is less effective.

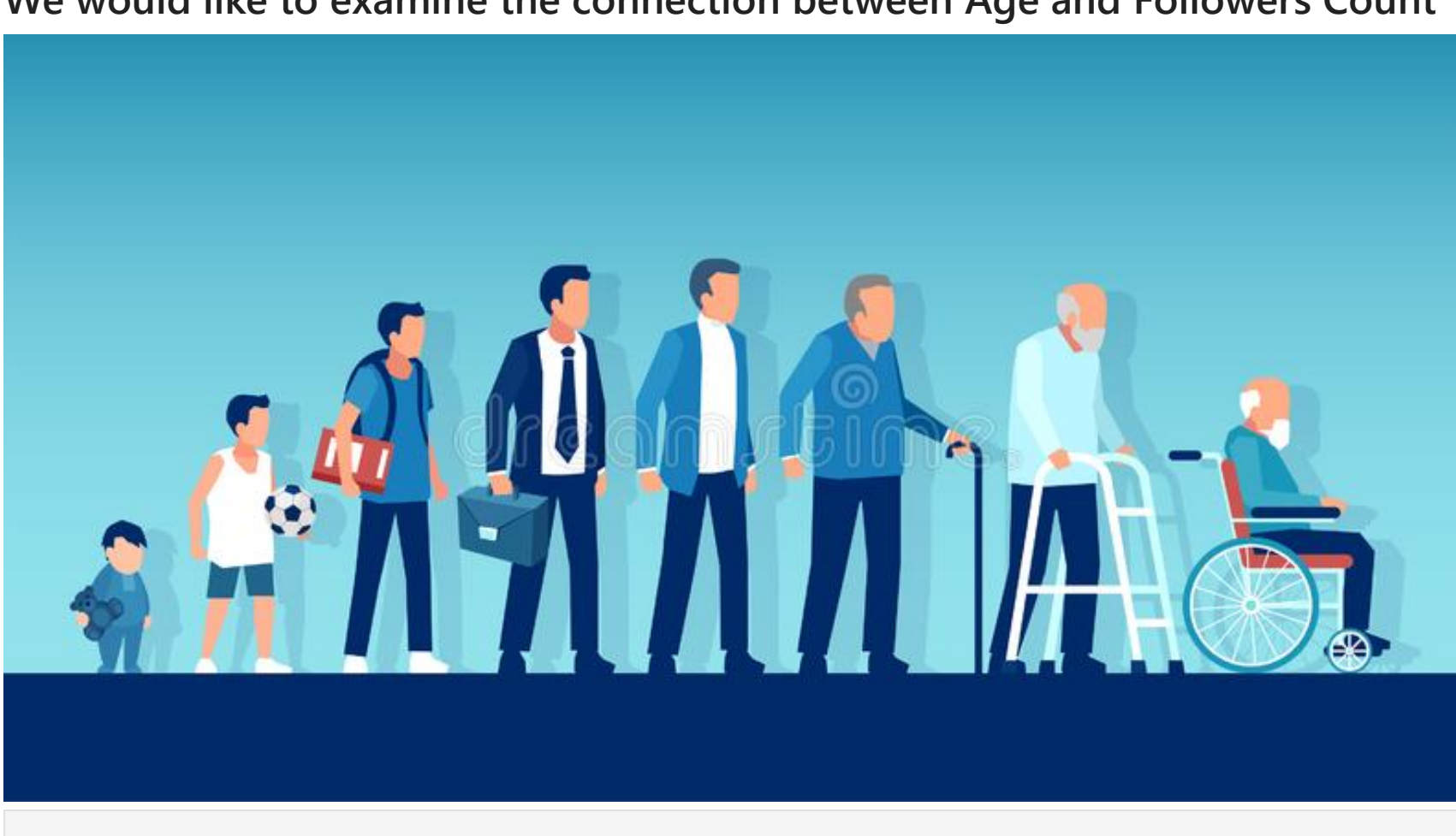
As you can see, users without logo and image have a significantly lower amount of followers.

In [10]:
```
plt.figure(figsize=(15, 5))
plt.subplot(1,2,1)
plt.title("Logo Percentage",fontsize=30)
plotpie=data['companyHasLogo'].value_counts().plot.pie(autopct='%1.2f%%',colors = ['orchid', 'lightpink'],fonts
plt.legend(fontsize=15)
plt.subplot(1,2,2)
plt.title("Pictures Percentage",fontsize=30)
plotpie=data['hasPicture'].value_counts().plot.pie(autopct='%1.2f%%',colors = ['orchid', 'lightpink'],fontsize=
plt.legend(fontsize=15)
plt.show()
```



As you can see, most of the LinkedIn users have logo and picture.

We would like to examine the connection between Age and Followers Count



In [11]:
```
age = data['ageEstimate']
plt.figure(figsize=(10, 5))
plt.hist(age, bins = range(0, 100, 10) , edgecolor = 'black', color = "tab:purple")
plt.xticks(range(0, 100, 10))
plt.title("Followes Count by Age",fontsize=25)
plt.xlabel('Age Estimate',fontsize=20)
plt.ylabel('Followers Count',fontsize=20)
```

Out[11]:
```
Text(0, 0.5, 'Followers Count')
```

Base on the above graph, users between the ages of 30 to 50 have the highest number of followers.

We can assume that the high number of followers for this age group is attributed to their experience and seniority.

In [12]:
```
maxage=data.groupby('followersCount')[['ageEstimate']].max()
maxage.tail()
```

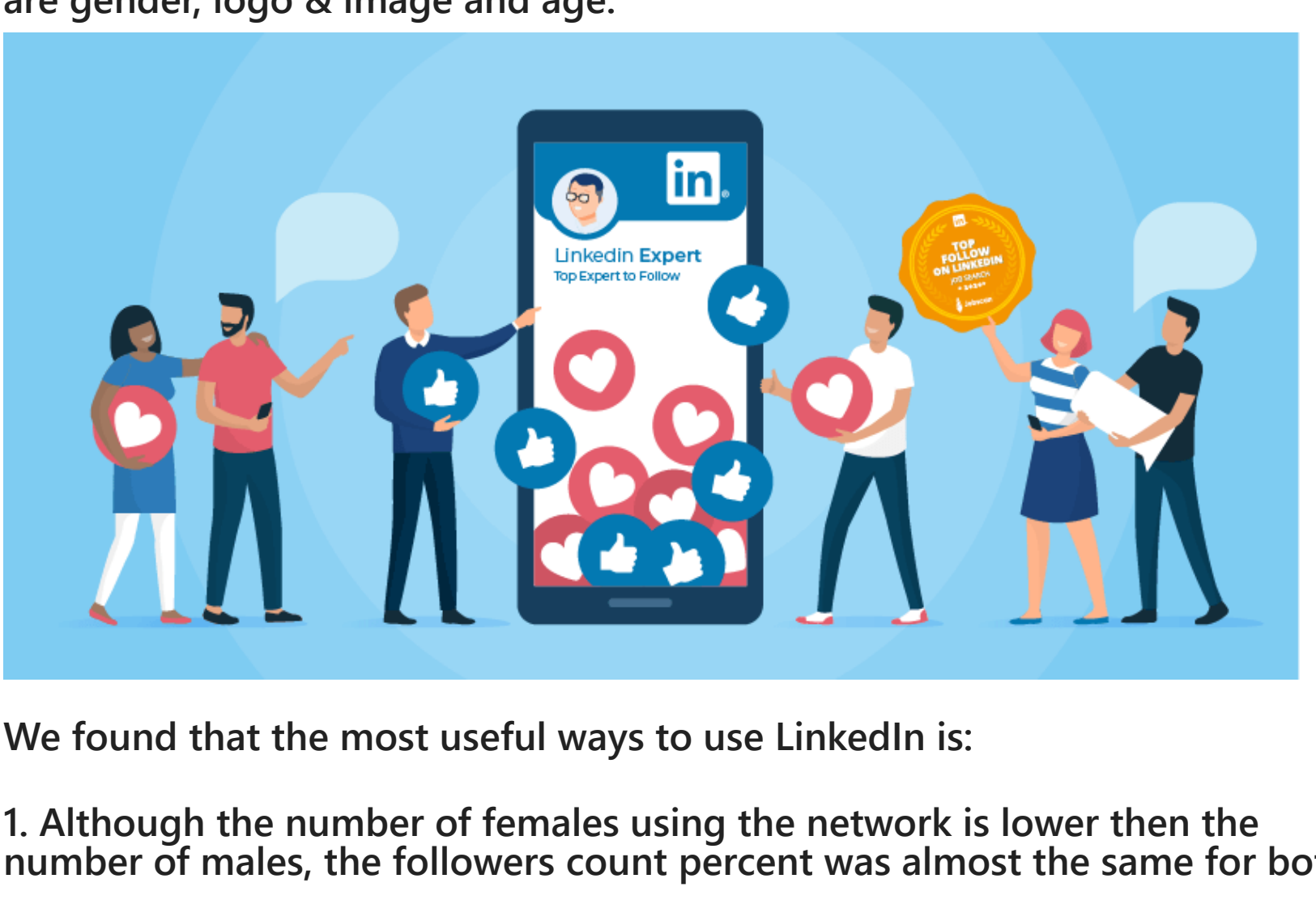
Out[12]:

followersCount	ageEstimate
27067	28
29883	53
30156	41
30242	52
161922	50

As you can see, the LinkedIn users with the highest number of followers are in the 30-50 age group.

In conclusion, in our research we wanted to examine the dependency between the following variables : gender, logo & image, age and followers count.

Our dependent variable is the followers count, and our independent variables are gender, logo & image and age.



We found that the most useful ways to use LinkedIn is:

1. Although the number of females using the network is lower then the number of males, the followers count percent was almost the same for both.

2. Using image is importand for user exposure. However, including a logo has a greater impact.

3. The users with the highest number of followers are in the age group of 30-50 .

In [13]:
```
maxage=data.groupby('followersCount')[['genderEstimate','hasPicture','companyHasLogo','ageEstimate']].max()
maxage.tail()
```

Out[13]:

followersCount	genderEstimate	hasPicture	companyHasLogo	ageEstimate
27067	male	no picture	has logo	28
29883	male	has picture	has logo	53
30156	female	has picture	no logo	41
30242	male	has picture	has logo	52
161922	female	has picture	no logo	50

As you can see, the findings from the table suitable to our expectations.