In [1]:
```
# Group: 9
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# Course: CIS 3120-ETRA
# Date: 11/22/2021

# Importing the required libraries
import numpy as np
import pandas as pd
import seaborn as sns

# Reading the provided csv file
data = pd.read_csv('WHRData.csv')
```

In [20]:
```
# Listing the required year and assigning into new dataframe

Year = [2017, 2018, 2019, 2020]
newData = data[data.year.isin(Year)]

# Characteristics of reduced dataset and the missing values of Generosity.

print("The reduced dataframe has {0} rows and {1} columns".format(newData.shape[0],newData.shape[1]))
print("Are there missing values in the Generosity? {}".format(newData['Generosity'].isnull().any()))
```

```
The reduced dataframe has 528 rows and 10 columns
Are there missing values in the Generosity? True
```

In [27]:
```
# 2.Calculate the average of your assigned variable for all countries across the
#four-year period. Sort the dataset to show first the countries with the highest values.


sortedData = newData.pivot_table('Generosity',index = 'Country name')
sortedData.sort_values('Generosity', ascending= False)
# Resource: https://stackoverflow.com/questions/45194006/how-to-sort-pivot-table-in-pandas
```

Out[27]:

Country name	Generosity
Myanmar	0.542750
Indonesia	0.518333

Country name	Generosity
Haiti	0.401500
Gambia	0.320333
Kenya	0.273750
...	...
Morocco	-0.230750
Georgia	-0.239500
Japan	-0.245250
Botswana	-0.247000
Greece	-0.288750

151 rows × 1 columns

In [23]:
```
# 3.Display a pivot table with the minimum of your assigned variable by year and region

newData.pivot_table('Generosity',index = 'year',columns = 'Region',aggfunc='min')
```

Out[23]:

year	Australia and New Zealand	Central and Eastern Europe	Eastern Asia	Latin America and Caribbean	Middle East and Northern Africa	North America	Southeastern Asia	Southern Asia	Sub-Saharan Africa	Western Europe
2017	0.294	-0.244	-0.206	-0.202	-0.237	0.163	-0.141	-0.121	-0.248	-0.290
2018	0.120	-0.292	-0.261	-0.211	-0.234	0.106	-0.108	-0.094	-0.254	-0.335
2019	0.121	-0.260	-0.255	-0.211	-0.244	0.112	-0.126	-0.108	-0.239	-0.289
2020	0.125	-0.221	-0.259	-0.157	-0.229	0.034	-0.116	-0.009	-0.104	-0.241

In [25]:
```
# 4.Display a pivot table with the mean of your assigned variable by region and year and
# graphically show how the variable has changed over the years, in each region.
```

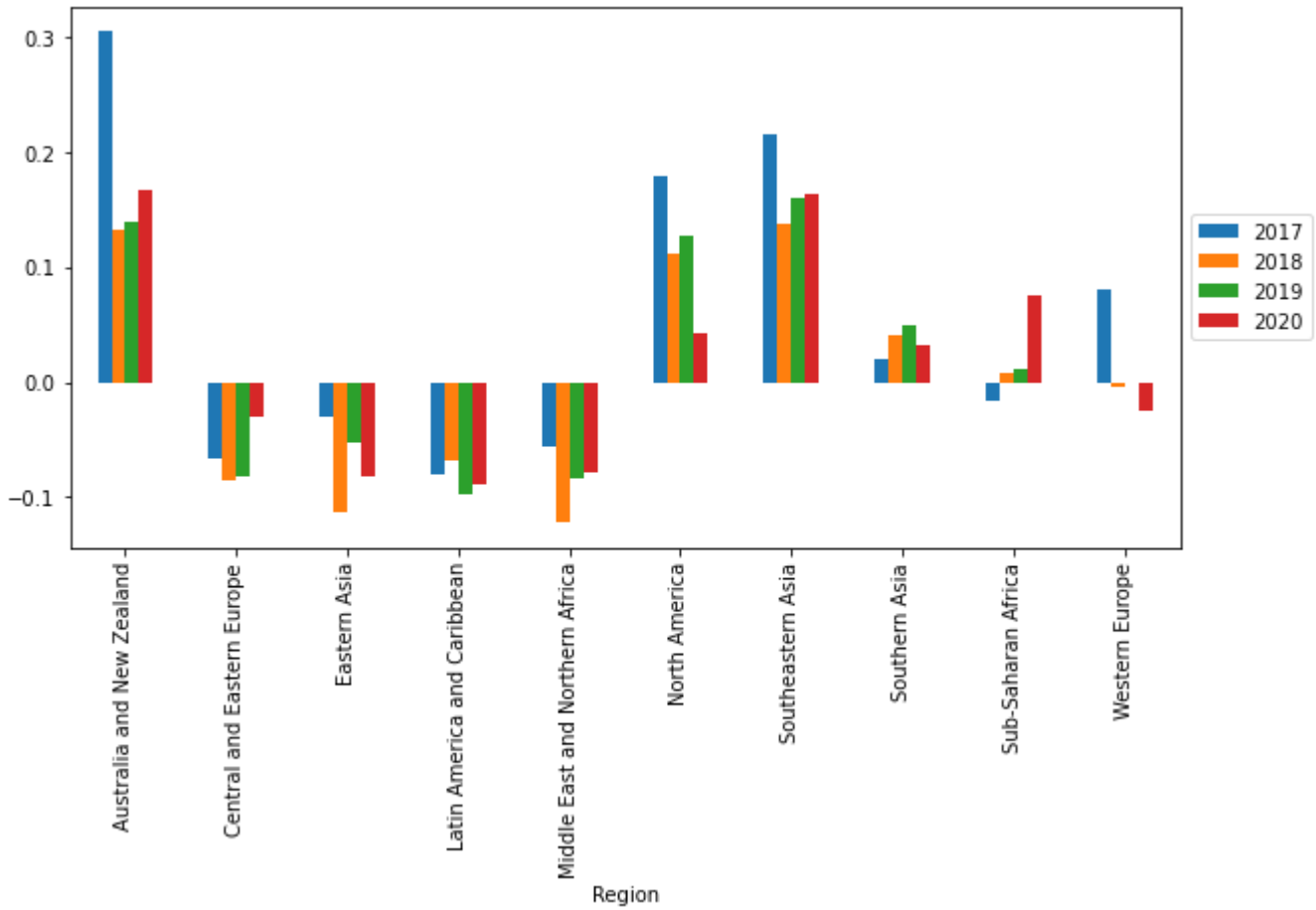
```
chart = newData.pivot_table('Generosity',index = 'Region',columns = 'year')
chart
```

Out[25]:

year	2017	2018	2019	2020
Region				
Australia and New Zealand	0.305500	0.133000	0.139000	0.167500
Central and Eastern Europe	-0.066500	-0.085143	-0.082111	-0.029619
Eastern Asia	-0.029667	-0.113750	-0.053400	-0.081750
Latin America and Caribbean	-0.080381	-0.067353	-0.098389	-0.089500
Middle East and Northern Africa	-0.056882	-0.122167	-0.083923	-0.079300
North America	0.180000	0.111000	0.128000	0.042000
Southeastern Asia	0.215143	0.137400	0.160000	0.164000
Southern Asia	0.020333	0.040833	0.049167	0.033000
Sub-Saharan Africa	-0.015857	0.008086	0.010629	0.075857
Western Europe	0.080905	-0.004000	-0.001000	-0.024167

In [26]:
```
chart.plot(kind='bar', figsize=(10,5)).legend(loc='center left', bbox_to_anchor = (1,0.5))
```

Out[26]:
```
<matplotlib.legend.Legend at 0x2181803c8b0>
```



Analyzing the result of the tables:

In the given happiness dataset, Our team was given to analyze the 'Generosity'. The top countries who donated money are from South-East Asia and follwing them South African countires Kenya, Haiti and Gambia also are the top 5 generous country to donate money in charity. This also shows that these countries belongs to least developed or developing country and they still fall under the top 5 country in "Generosity'category. The developed countries like Japan and Greece falls under the least 'Generosity' country which is very shocking.

As from the bar grapg, we can observe by the region and year there is a huge change in year 2017 and 2018 in almost all the regions. Also if you notice in 2020 during the pandemic, North America, Western Europe and Eastern Asia has a decline which also indicates that these regions instead of donating and helping the world to be in a better place. It is a shame also that the world's leading countries belongs to these three regions.