import pandas as pd import numpy as np import matplotlib.pyplot as plt import matplotlib.cm as cm import seaborn as sns import plotly.graph_objects as go from plotly.subplots import make subplots import plotly.express as px import plotly.offline data1 = pd.read csv(r"C:\Users\SAMEERM. CHANNE\Downloads\datascience fbt notes\projects\AI index db.csv") data1 Country Talent Infrastructure Operating Environment \ United States of America 100.00 94.02 64.56 100.00 1 China 16.51 91.57 United Kingdom 71.43 39.65 74.65 Canada 77.05 3 31.28 93.94 Israel 35.76 67.58 4 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 14.11 Kenya 0.75 29.84 0.00 60 Nigeria 2.74 50.10 Pakistan 8.00 2.43 61 12.48 Research Development Government Strategy Commercial Total score \ 100.00 100.00 100.00 77.39 100.00 1 71.42 79.97 94.87 44.02 62.92 36.50 25.03 82.82 18.91 40.93 25.78 100.00 14.88 30.67

40.19						
4 32.63 27.96 43.91 27.33 39.89						
57 0.12 0.95 35.57 0.09 6.62						
58 2.08 1.54 68.72 0.31 4.83						
59 0.07 12.15 7.75 0.31 2.30						
60 0.45 2.06 7.75 0.33 1.38						
61 2.17 1.09 13.92 0.27 0.00						
5	Political					
, ,	iberal					
1 7 11	Closed					
· ·	iberal					
	iberal					
5	iberal					
democracy						
	ctoral					
	ctoral					
autocracy 59 Africa Nascent Lower middle Ele	ctoral					
	ctoral					
autocracy 61 Asia-Pacific Nascent Lower middle Ele autocracy	ctoral					
[62 rows x 13 columns]						
<pre>data1.head()</pre>						
Country Talent Infrastructure Opera Environment \	ting					
0 United States of America 100.00 94.02 64.56						
1 China 16.51 100.00						

91.	57							
2		United Kir	ngdom	39.65		71.43		
74. 3	65	Ca	anada	31.28		77.05		
93.	94							
4 82.	44	15	rael	35.76		67.58		
	Research	Developmer	nt Gov	ernment	Strate	av Comm	ercial	Total score
\		•		CTTIMETTE				
0	100.00	100.0)0		77.	39	100.00	100.00
1	71.42	79.9	97		94.	87	44.02	62.92
2	36.50	25.0)3		82.	82	18.91	40.93
3	30.67	25.7	78		100.	00	14.88	40.19
4	32.63	27.9	96		43.	91	27.33	39.89
	_	ion		Clust	er Inc	ome grou	p Pol	itical
reg 0	ime Ameri	cas	Powe	r playe	rs	Hig	h Libe	eral
	ocracy Asia-Paci	fic		r playe		er middl	o (1)	sed
aut	ocracy				•			
2 dem	Eur ocracy	ope Tradit	ional	champio	ns	Hig	h Libe	eral
3	Ameri	cas Tradit	ional	champio	ns	Hig	h Libe	eral
4	ocracy Middle E	ast	Ris	ing sta	rs	Hig	h Libe	eral
dem	ocracy							
dat	al.info()							
		as.core.fra			>			
		62 entries, (total 13						
#	Column		N	lon-Null	Count	Dtype		
0	Country			2 non-n		object		
1 2	Talent Infrast	ructure		52 non-n 52 non-n		float64 float64		
3	Operati	ng Environm	nent 6	2 non-n	ull	float64		
4 5	Researc Develop			2 non-n 2 non-n		float64 float64		
6 7	•	ent Strate		2 non-n 2 non-n		float64 float64		
8	Total s			2 non-n		float64		

```
9
     Region
                             62 non-null
                                              object
     Cluster
                                              object
 10
                             62 non-null
 11
     Income group
                             62 non-null
                                              object
 12
     Political regime
                             62 non-null
                                              object
dtypes: float64(8), object(5)
memory usage: 6.4+ KB
data1.describe()
                    Infrastructure
                                     Operating Environment
           Talent
Research \
        62.000000
                         62,000000
                                                              62,000000
count
                                                  62.000000
        16.803065
mean
                         63.503710
                                                  66.925484
                                                              16.610000
        15.214963
                         20.217525
                                                  20.000424
                                                              17.413996
std
         0.000000
                          0.000000
                                                   0.000000
                                                               0.000000
min
25%
         7.365000
                         55.857500
                                                  58.107500
                                                               3.032500
50%
        13.445000
                         65.230000
                                                  69.505000
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75%
                                                  80.500000
        24.567500
                         75.947500
                                                              25.412500
max
       100,000000
                        100.000000
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                                                             100.000000
       Development
                     Government Strategy
                                                        Total score
                                           Commercial
count
         62.000000
                                62.000000
                                            62.000000
                                                          62.000000
         14.824677
                                57.865645
mean
                                             6.171935
                                                          23.914677
                                            14.029632
         19.419279
                                26.252448
                                                          15.123586
std
min
          0.000000
                                 0.000000
                                             0.000000
                                                           0.000000
25%
          1.202500
                               41.030000
                                             0.697500
                                                          14.805000
50%
          9.005000
                               63.930000
                                             2.585000
                                                          23.220000
75%
         19.980000
                               77.952500
                                             5.307500
                                                          30.487500
                                                         100.000000
        100.000000
                               100.000000
                                           100.000000
max
```

We knows that

There are no missing values in the dataset, with 62 countries (records) presented there to describe their AI potential as of 2023 There are 8 numeric and 4 categorical variables in the dataset All numeric variables have their values in the range from 0 to 100 Total score variable can be considered to be the target variable whereas other variables can describe the various effects on it

```
data1.isna().sum()

Country 0

Talent 0

Infrastructure 0
```

Res Dev Gov Com Tot Reg Clu Inc Pol	rating Enearch elopment ernment S mercial al score ion ster ome group itical re pe: int64	trategy gime	t 0 0 0 0 0 0 0					
dat	a1.isnull							
Res	Country earch \	Talent	Infras ⁻	tructure	Operating	Environ	ment	
0	False	False		False		F	alse	False
1	False	False		False		F	alse	False
2	False	False		False		F	alse	False
3	False	False		False		F	alse	False
4	False	False		False		F	alse	False
57	False	False		False		F	alse	False
58	False	False		False		F	alse	False
59	False	False		False		F	alse	False
60	False	False		False		F	alse	False
61	False	False		False		F	alse	False
\	Developm	ent Gov	ernment	Strategy	Commercia	ıl Tota	l score	Region
0	Fa	lse		False	Fals	se	False	False
1	Fa	lse		False	Fals	se .	False	False
2	Fa	lse		False	Fals	e	False	False
3	Fa	lse		False	Fals	se	False	False
4	Fa	lse		False	Fals	se	False	False

Environment	\	Count	ry Talent	Infrastru	cture (Operating	
0 United St	•	Ameri	ca 100.00		94.02		
64.56		Chir	na 16.51	1	00.00		
91.57	United	Kingdo	om 39.65		71.43		
74.65 3		Canad	da 31.28		77.05		
93.94 4		Israe	el 35.76		67.58		
82.44							
Research	Develo	pment	Government	Strategy	Commer	cial Tot	al score
0 100.00	1	00.00		77.39	100	9.00	100.00
1 71.42		79.97		94.87	44	4.02	62.92
2 36.50		25.03		82.82	18	8.91	40.93
3 30.67		25.78		100.00	14	4.88	40.19
4 32.63		27.96		43.91	2	7.33	39.89
Reg	ion		Clust	er Income	group	Politic	al
regime						Liberal	ac
democracy			Power playe		High		
<pre>1 Asia-Paci autocracy</pre>			Power playe	• •	middle		
2 Eurodemocracy	ope Tr	adition	nal champic	ns	High	Liberal	
<pre>3 Ameri democracy</pre>	cas Tr	adition	nal champio	ns	High	Liberal	
4 Middle Eddemocracy	ast		Rising sta	rs	High	Liberal	
data1.drop d	uplicat	es (keer	o= 'first',	inplace =T	rue)		
data1		·		·			
		Coun	try Talent	Infrastr	ucture	Operatin	g
Environment 0 United S	\ tates o	f Amer	ica 100.00		94.02		
64.56 1		Ch:	ina 16.51		100.00		
91.57 2	11	-l - lZ !	dom 20 65		71 42		
_	unite	d Kingo	dom 39.65		71.43		

3		Canada	31.28		77.05	
93.94						
4 82.44		Israel	35.76		67.58	
 57		Sri Lanka	6.27		34.64	
35.79		JII Lalika	0.27		34.04	
58		Egypt	1.11		38.84	
0.00 59		Kenya	0.75		14.11	
29.84		_				
60 50.10		Nigeria	2.74		0.00	
61		Pakistan	8.00		2.43	
12.48						
Re:	search	Development G	overnment	Strategy	Commercial	Total
0	100.00	100.00		77.39	100.00	
100.00	71.42	79.97		94.87	44.02	
62.92	36.50	25.03		82.82	18.91	
40.93	30.67	25.78		100.00	14.88	
40.19 4 39.89	32.63	27.96		43.91	27.33	
57	0.12	0.95		35.57	0.09	
6.62 58 4.83	2.08	1.54		68.72	0.31	
59	0.07	12.15		7.75	0.31	
2.30	0.45	2.06		7.75	0.33	
1.38 61	2.17	1.09		13.92	0.27	
0.00						
	Regi	on	Cluste	er Income	group	Political
regime 0	Amerio	ras Po	wer player	~S	High L	iberal
democra	асу				-	
1 As:	ia-Paci1	ic Po	wer player	rs Upper	middle	Closed
2	Euro	pe Traditiona	l champior	ıs	High L	iberal

democracy A Mericas Traditional champions High Liberal democracy Middle East Rising stars High Liberal democracy					
4 Middle East democracy		as Traditiona	ıl champion	s High	Liberal
democracy 57 Asia-Pacific democracy 58 Middle East autocracy 59 Africa Nascent Lower middle Electoral democracy 60 Africa Nascent Lower middle Electoral autocracy 61 Asia-Pacific Nascent Lower middle Electoral autocracy 61 Asia-Pacific Nascent Lower middle Electoral autocracy 62 rows x 13 columns] datal['Cluster'] = datal['Cluster'].str.lower() datal Country Talent Infrastructure Operating Environment Ounited States of America 100.00 94.02 64.56 1 China 16.51 100.00 91.57 2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48		st R	Rising star	s High	Liberal
S7 Asia-Pacific democracy 58 Middle East Nascent Lower middle Electoral democracy 59 Africa Nascent Lower middle Electoral autocracy 60 Africa Nascent Lower middle Electoral autocracy 61 Asia-Pacific Nascent Lower middle Electoral autocracy 61 Asia-Pacific Nascent Lower middle Electoral autocracy 62 rows x 13 columns] 63 datal['Cluster'] = datal['Cluster'].str.lower() 64 datal Country Talent Infrastructure Operating Environment \ 6 United States of America 100.00 94.02 64.56 1 China 16.51 100.00 91.57 2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 99.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43	_		-	_	
democracy 58 Middle East autocracy Nascent Lower middle Electoral autocracy 59 Africa autocracy Nascent Lower middle Electoral autocracy 60 Africa autocracy Nascent Lower middle Electoral autocracy 61 Asia-Pacific autocracy Nascent Lower middle Electoral autocracy [62 rows x 13 columns] Country Talent Infrastructure Operating Environment \					
58 Middle East autocracy Nascent Lower middle autocracy Electoral autocracy 60 Africa Africa autocracy Nascent Lower middle Electoral autocracy 61 Asia-Pacific autocracy Nascent Lower middle Electoral autocracy [62 rows x 13 columns] datal['Cluster'] = datal['Cluster'].str.lower() datal Environment \ 0 Ountry Talent Infrastructure Operating Environment \ 0 0 United States of America 100.00 94.02 64.56 China 16.51 100.00 91.57 1.43 2 United Kingdom 39.65 71.43 7.05 93.94 Israel 35.76 67.58 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 Egypt 1.11 38.84 0.00 99 Kenya 0.75 14.11 29.84 Nigeria 2.74 0.00 60 Nigeria 2.74 0.00 50.10 Pakistan 8.00 2.43		ic	Nascen	t Lower middle	Electoral
59 Africa autocracy 60 Africa Africa autocracy 61 Nascent Lower middle Electoral Electoral Electoral Electoral Asia-Pacific autocracy 61 Nascent Lower middle Electoral Elector	58 Middle Ea	st	Nascen	t Lower middle	Electoral
autocracy 61	59 Afri	ca	Nascen	t Lower middle	Electoral
61 Asia Pacific autocracy [62 rows x 13 columns] data1['Cluster'] = data1['Cluster'].str.lower() data1 Country Talent Infrastructure Operating Environment \ 0 United States of America 100.00 94.02 64.56 1 China 16.51 100.00 91.57 2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48	60 Afri	ca	Nascen	t Lower middle	Electoral
[62 rows x 13 columns] data1['Cluster'] = data1['Cluster'].str.lower() data1	61 Asia-Pacif	ic	Nascen	t Lower middle	Electoral
Country Talent Infrastructure Operating Environment \ 0	-	columns]			
Country Talent Infrastructure Operating Environment \ 0	data1['Cluster	'] = data1['Cl	.uster']. <mark>st</mark>	r.lower()	
Environment \ 0 United States of America 100.00 94.02 64.56	data1				
0 United States of America 100.00 94.02 64.56 1 China 16.51 100.00 91.57 2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48		Country	Talent	Infrastructure	Operating
1 China 16.51 100.00 91.57 2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48	0 United Sta		100.00	94.02	
2 United Kingdom 39.65 71.43 74.65 3 Canada 31.28 77.05 93.94 4 Israel 35.76 67.58 82.44 57 Sri Lanka 6.27 34.64 35.79 58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48		China	16.51	100.00	
74.65 3		United Kinadom	39.65	71.43	
93.94 4	74.65	-			
82.44 57		Canada	31.28	//.05	
		Israel	35.76	67.58	
57					
58 Egypt 1.11 38.84 0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43		Sri Lanka	6.27	34.64	
0.00 59 Kenya 0.75 14.11 29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48		Favnt	. 1 11	38 84	
29.84 60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48	0.00				
60 Nigeria 2.74 0.00 50.10 61 Pakistan 8.00 2.43 12.48		Kenya	0.75	14.11	
61 Pakistan 8.00 2.43 12.48	60	Nigeria	2.74	0.00	
12.48		Pakistan	8.00	2.43	
Research Development Government Strategy Commercial Total					
	Research	Development G	Government	Strategy Comme	rcial Total

	100.00	100.00		77.39	10	0.00	
100.00							
1 62.92	71.42	79.97		94.87	4	4.02	
2 40.93	36.50	25.03		82.82	1	8.91	
3	30.67	25.78		100.00	1	4.88	
40.19 4 39.89	32.63	27.96		43.91	2	7.33	
57	0.12	0.95		35.57		0.09	
6.62 58	2.08	1.54		68.72		0.31	
4.83 59	0.07	12.15		7.75		0.31	
2.30	0.45	2.06		7.75		0.33	
1.38							
61 0.00	2.17	1.09		13.92		0.27	
0.00							_
regime	Region		Cluster	Income	group	Politic	al
0	Americas	pow	er players		High	Liberal	
	ia-Pacific	pow	er players	Upper	middle	Closed	
autocr 2	acy Europe	traditional	champions		High	Liberal	
democr	acy				_		
democr	acv	traditional	-		High		
4 M democr		ri	sing stars		High	Liberal	
	ia-Pacific		nascent	Lower	middle	Electoral	
democr 58 M	acy iddle East		nascent	Lower	middle	Electoral	
autocr 59	acy Africa		nascent	Lower	middle	Electoral	
autocr 60			nascent		middle	Electoral	
autocr	асу						
61 As autocr	ia-Pacific acy		nascent	Lower	middle	Electoral	

[62 rows x 13 columns] data1['Operating Environment'].fillna(0, inplace=True) data1 Country Talent Infrastructure Operating Environment \ O United States of America 100.00 94.02 64.56 China 16.51 100.00 91.57 United Kingdom 39.65 71.43 74.65 Canada 31.28 77.05 93.94 Israel 35.76 67.58 82.44 . . . 57 Sri Lanka 34.64 6.27 35.79 58 Egypt 1.1138.84 0.00 59 Kenya 0.75 14.11 29.84 0.00 60 Nigeria 2.74 50.10 Pakistan 8.00 2.43 61 12.48 Research Development Government Strategy Commercial Total score \ 100.00 100.00 100.00 77.39 100.00 1 71.42 79.97 94.87 44.02 62.92 36.50 25.03 82.82 18.91 40.93 30.67 25.78 100.00 14.88 40.19 32.63 27.96 43.91 27.33 39.89

35.57

68.72

0.09

0.31

57

6.62 58

4.83

0.12

2.08

0.95

1.54

2.30 60 0.45 2.06 7.75 0.33 1.38 61 2.17 1.09 13.92 0.27 0.00 Region Cluster Income group Political regime 0 Americas power players High Liberal democracy 1 Asia-Pacific power players Upper middle Closed autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 5 Asia-Pacific nascent Lower middle Electoral democracy 5 Middle East nascent Lower middle Electoral autocracy 5 Middle East nascent Lower middle Electoral autocracy 6 Africa nascent Lower middle Electoral autocracy 7 Asia-Pacific nascent Lower middle Electoral autocracy 8 Africa nascent Lower middle Electoral autocracy 9 Africa nascent Lower middle Electoral autocracy 1 Asia-Pacific nascent Lower middle Electoral autocracy 2 Africa nascent Lower middle Electoral autocracy 3 Africa nascent Lower middle Electoral autocracy 4 Asia-Pacific nascent Lower middle Electoral autocracy 5 Africa nascent Lower middle Electoral autocracy 6 Africa nascent Lower middle Electoral autocracy 6 Africa nascent Lower middle Electoral autocracy 6	59	0.07	12.15		7.75		0.31
Region Cluster Income group Political regime O Americas power players High Liberal democracy 1 Asia-Pacific power players Upper middle Closed autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 5 Asia-Pacific nascent Lower middle Electoral democracy 5 Middle East nascent Lower middle Electoral autocracy 5 Middle East nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] 63 mascent Lower middle Electoral autocracy 64 This mascent Lower middle Electoral autocracy 65 Asia-Pacific nascent Lower middle Electoral autocracy 66 Africa nascent Lower middle Electoral autocracy 67 Asia-Pacific nascent Lower middle Electoral autocracy 68 Africa nascent Lower middle Electoral autocracy 69 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] 63 columns in the properties of the	60	0.45	2.06		7.75		0.33
Region Cluster Income group Political regime O Americas power players High Liberal democracy 1 Asia-Pacific power players Upper middle Closed autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 5 Asia-Pacific nascent Lower middle Electoral democracy 5 Middle East nascent Lower middle Electoral autocracy 5 Africa nascent Lower middle Electoral autocracy 6 Africa nascent Lower middle Electoral autocracy 7 Asia-Pacific nascent Lower middle Electoral autocracy 8 Africa nascent Lower middle Electoral autocracy 9 Africa nascent Lower middle Electoral autocracy 1 Asia-Pacific nascent Lower middle Electoral autocracy 1 Africa nascent Lower middle Electoral autocracy 1 Africa nascent Lower middle Electoral autocracy 2 Africa nascent Lower middle Electoral autocracy 3 Africa nascent Lower middle Electoral autocracy 4 Africa nascent Lower middle Electoral autocracy 5 Africa nascent Lower middle Electoral autocracy 6 Africa nascent Lower middle Electoral au		2.17	1.09		13.92		0.27
regime 0 Americas power players High Liberal democracy 1 Asia-Pacific power players Upper middle Closed autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy	0.00						
O Americas power players High Liberal democracy 1 Asia-Pacific power players Upper middle Closed autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 5 57 Asia-Pacific nascent Lower middle Electoral democracy 58 Middle East nascent Lower middle Electoral autocracy 59 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', ' Distribution of Research ', ' Distribution of Operating Environment ', ' Distribution of Government Strategy ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Sovernment Strategy ', ' Distribution of Sovernment Strategy', 'Distribution of Sovernment Strategy', ' 'Distribution of Sovernment Strategy', 'Distribution of Sovernment Strategy', 'Distribution of Sovernment Strategy', ' ' ' Source Players Upper Middle Electoral Autoracy Sovernment Strategy ' ' Source Players Middle Electoral Autoracy Sovernment Strategy ' ' Source Players Middle Electoral Autoracy Sovernment Strategy ' Source Players Middle Electoral Autoracy Sovernment Strategy ' Source Players Middle Electoral Autoracy Sovernment Strategy	rogimo	Region		Cluster	Income	group	Political
1 Asia-Pacific autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 5 Asia-Pacific nascent Lower middle Electoral democracy 58 Middle East nascent Lower middle Electoral autocracy 59 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', ' Distribution of Research ', ' Distribution of Government Strategy ', ' Distribution of Government Strategy ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of 'Distribution of Commercial', 'Distribution of 'Distribution of Commercial', 'Distribution of Commercial', 'Distribution of 'Distribution of Commercial', 'Distribution of Commercial	0		powe	er players		High	Liberal
autocracy 2 Europe traditional champions High Liberal democracy 3 Americas traditional champions High Liberal democracy 4 Middle East rising stars High Liberal democracy 57 Asia-Pacific nascent Lower middle Electoral democracy 58 Middle East nascent Lower middle Electoral autocracy 59 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', ' Distribution of Operating Environment ', ' Distribution of Research ', ' Distribution of Government Strategy ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of 'Distribution of Commercial', 'Distribution of Commercial', 'Distribution of 'Distribution of Commercial', 'Distribution of Commercial		•	DOW	er plavers	Upper	middle	Closed
democracy 3	autocra	су	•		орро.		
<pre>democracy 4 Middle East</pre>	democra		traditional	champions		High	Liberat
4 Middle East rising stars High Liberal democracy			traditional	champions		High	Liberal
	4 Mi	ddle East	ris	sing stars		High	Liberal
57 Asia-Pacific nascent Lower middle Electoral democracy 58 Middle East nascent Lower middle Electoral autocracy 59 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', ' Distribution of Operating Environment ', ' Distribution of Operating Environment ', ' Distribution of Government Strategy ', ' Distribution of Government Strategy ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Infrastribution of Government Strategy ', ' Distribution of Strategy ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Infrastribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Commercial ', ' Distribution of Commercial '		cy 					
democracy 58 Middle East nascent Lower middle Electoral autocracy 59 Africa nascent Lower middle Electoral autocracy 60 Africa nascent Lower middle Electoral autocracy 61 Asia-Pacific nascent Lower middle Electoral autocracy 62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', ' Distribution of Infrastructure ', ' Distribution of Operating Environment ', ' Distribution of Development ', ' Distribution of Government Strategy ', ' Distribution of Commercial		a Pacific		naccent	Lower	middla	Flectoral
autocracy 59	democra	су					
Africa nascent Lower middle Electoral autocracy Asia-Pacific nascent Lower middle nascent				nascent	Lower	middle	Electoral
<pre>60 Africa</pre>	59	Africa		nascent	Lower	middle	Electoral
61 Asia-Pacific nascent Lower middle Electoral autocracy [62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=(' Distribution of Talent ', of Infrastructure', of Operating Environment', of Research', of Development', of Government Strategy', of Commercial', ' Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution				nascent	Lower	middle	Electoral
<pre>autocracy [62 rows x 13 columns] fig = make_subplots(rows=2, cols=4, subplot_titles=('Distribution</pre>				nascent	Lower	middle	Electoral
<pre>fig = make_subplots(rows=2, cols=4, subplot_titles=('Distribution</pre>							
of Talent', of Infrastructure', of Operating Environment', of Research', of Development', of Government Strategy', of Commercial', ' Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution	[62 row	s x 13 col	umns]				
of Infrastructure', of Operating Environment', of Research', of Development', of Government Strategy', of Commercial', ' Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution 'Distribution			ts(rows=2, co	ols= <mark>4</mark> , subp	lot_tit	-	
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<pre>'Distribution of Research',</pre>	of Oper	ating Envi	ronment	,		' <	Distribution
of Development', of Government Strategy', of Commercial', ' Distribution 'Distribution 'Distribution 'Distribution		_	ŕ	•		' <	Distribution
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' Distribution						١,	Distribution
	of Comm	ercial	,			1,	Distribution
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we knows that

Infrastructure and Operating Environment are skewened to the right a little Other numeric variables are significantly left-skewed The values of Talent, Research, Development, Commercial and Total score have clear outliers to the right side of the distribution (it is related to two countries in Power players cluster)

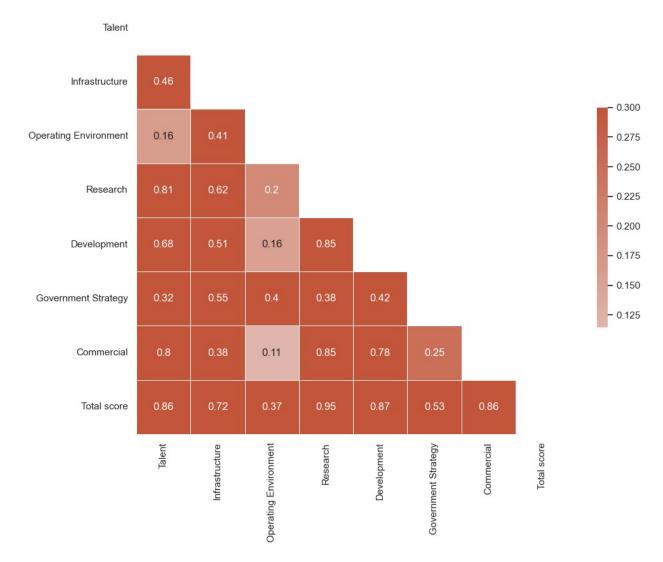
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corr = d.corr()

mask = np.triu(np.ones_like(corr, dtype=bool))

f, ax = plt.subplots(figsize=(11, 9))

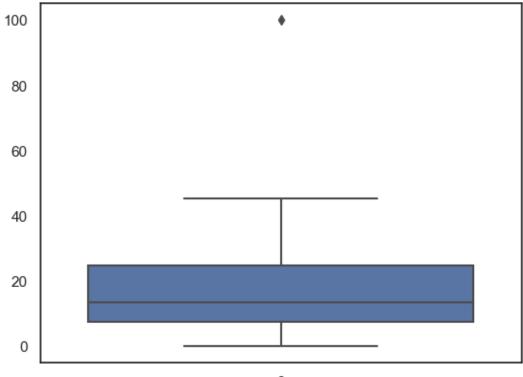
cmap = sns.diverging_palette(230, 20, as_cmap=True)
sns.heatmap(corr, mask=mask, cmap=cmap, vmax=.3, center=0, annot=True, square=True, linewidths=.5, cbar_kws={"shrink": .5})

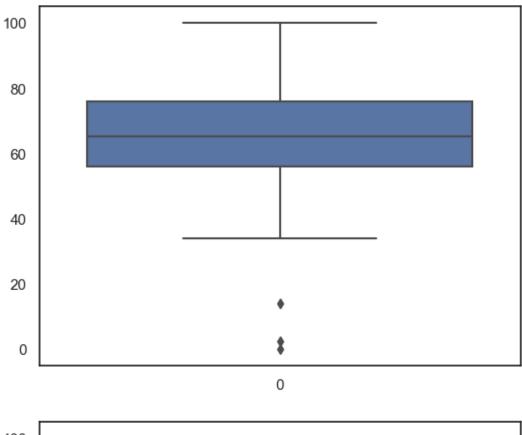
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The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.
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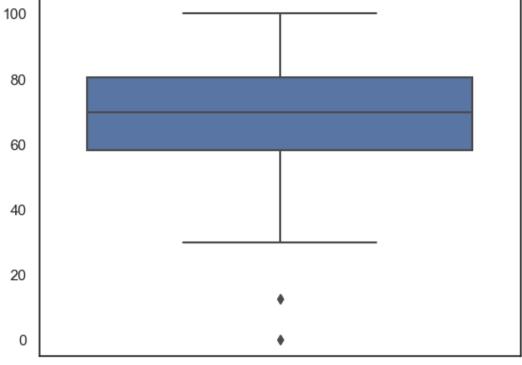


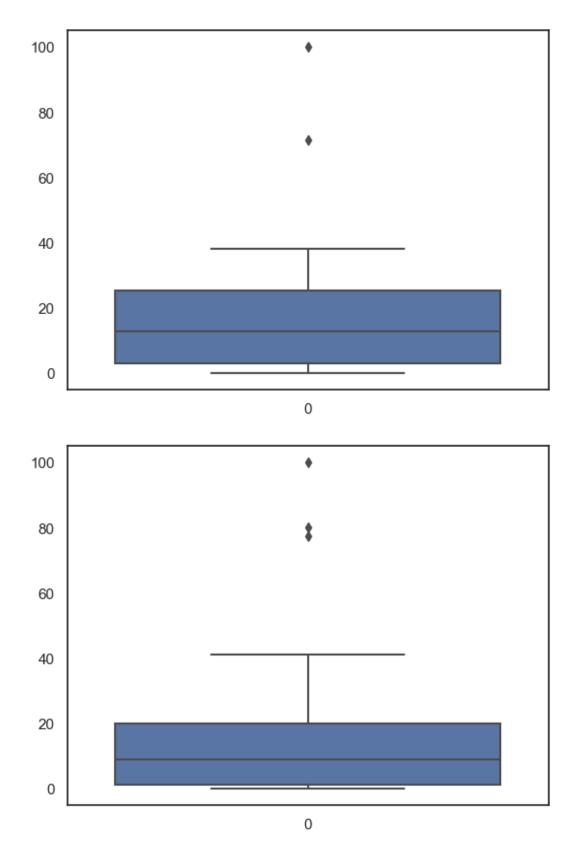
We knows that

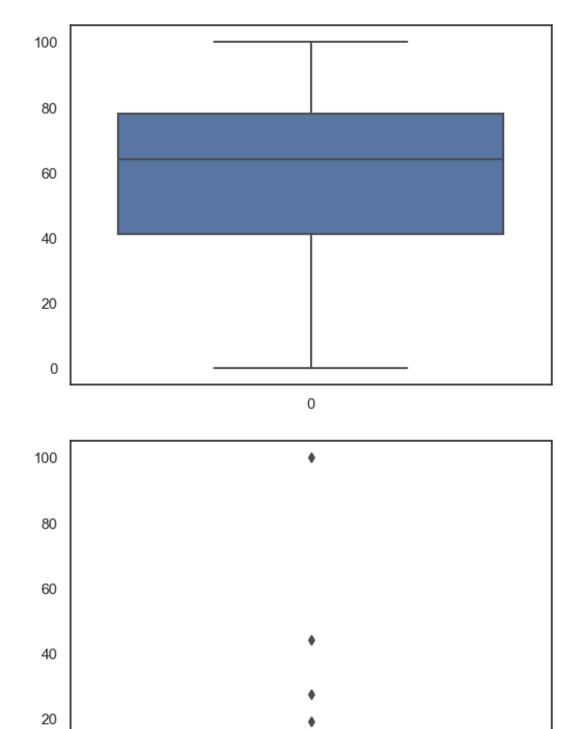
Total score is highly correlated with Research (0.95), Development (0.87), Talent (0.86), and Commercial (0.86) variables Total score displays mediuum correlations with Government Strategy and Operating Environment variables (that is, the contribution of such variables to the Total score is less then the highly correlated variables)

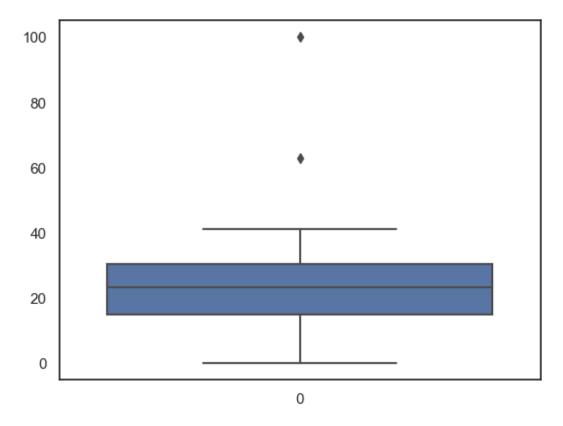












We find that

the biggest group of the countries in the dataset are European countries with High income level, fitting into Waking Up cluster countries with High income level, fitting into Waking Up cluster, are the most numerous group in Aasia-Pacific and Middle East regions, too the most 'crowdy' group in Americas is Waking Up, with Upper middle income level Traditional champions and Raising star countries are all with High level of incomes One of the Power players (USA) is with the High level of incomes, and another Power player (China) in Uppper middle income group the biggest groups in Europe and Asia-Pacific regions represent the countries with High income and either Liberal or Electoral democracy the biggest group of countries in Americas contains the countries with High income level and Liberal democracy as a political regime the biggest group of countries in Middle East contains the countries with High income level and Closed autocraty as a political regime

Conclusion: In the chapters below, we are going look deeper at the business-level and public administration insights drawn from the data in AI dataset.

First of all, we are going to look at the relations between Total score and other variables in the dataset (see Total Score Insights chapter). Then we are going to outline the holistic insights on

Al Implementation Al Research and Development Al Governance and Commercial contexts In the series of the final chapters at the end of the notebook, we are going to perform bivariative and multivariate analysis for the rest of the numeric features in the dataset (besides Total score).