

Vamos a descargar la base de datos

```
INEGI <- read.csv(url("https://raw.githubusercontent.com/mauriciogtec/PropedeuticoDataScience2017/master/INEGI"))
```

##	Estado	Poblacion	PIBpc	Secundarias
## 1	Aguascalientes	1184996	84.70	348
## 2	Baja California	3155070	83.07	595
## 3	Baja California Sur	637026	94.64	156
## 4	Campeche	822441	395.55	318
## 5	Coahuila de Zaragoza	2748391	106.05	553
## 6	Colima	650555	76.49	169
## 7	Chiapas	4796580	34.44	1979
## 8	Chihuahua	3406465	85.10	772
## 9	Distrito Federal	8851080	172.88	1406
## 10	Durango	1632934	67.61	928
## 11	Guanajuato	5486372	65.67	1691
## 12	Guerrero	3388768	41.28	1755
## 13	Hidalgo	2665018	53.06	1192
## 14	Jalisco	7350682	81.43	1917
## 15	México	15175862	54.41	3622
## 16	Michoacán de Ocampo	4351037	52.80	1596
## 17	Morelos	1777227	58.21	472
## 18	Nayarit	1084979	55.16	561
## 19	Nuevo León	4653458	151.81	965
## 20	Oaxaca	3801962	36.25	2212
## 21	Puebla	5779829	53.81	2167
## 22	Querétaro	1827937	95.07	492
## 23	Quintana Roo	1325578	103.91	380
## 24	San Luis Potosí	2585518	63.29	1637
## 25	Sinaloa	2767761	66.45	893
## 26	Sonora	2662480	84.46	684
## 27	Tabasco	2238603	107.34	742
## 28	Tamaulipas	3268554	93.88	744
## 29	Tlaxcala	1169936	41.15	355
## 30	Veracruz de Ignacio de la Llave	7643194	52.71	3201
## 31	Yucatán	1955577	63.79	596
## 32	Zacatecas	1490668	48.17	1152
##	IndiceAprovechamientoSecundaria	PorcentajeAnalfabetas		
## 1	85.3	3.26		
## 2	86.0	2.57		
## 3	87.9	3.21		
## 4	78.5	8.31		
## 5	75.9	2.63		
## 6	81.8	5.13		
## 7	89.9	17.80		
## 8	80.1	3.66		
## 9	85.9	2.09		
## 10	80.6	3.82		
## 11	89.2	8.18		
## 12	86.7	16.68		
## 13	90.8	10.23		
## 14	91.8	4.36		
## 15	83.5	4.38		
## 16	76.3	10.18		

## 17	84.1	6.42
## 18	89.9	6.31
## 19	82.8	2.20
## 20	88.8	16.27
## 21	87.2	10.38
## 22	79.1	6.31
## 23	85.2	4.77
## 24	85.1	7.91
## 25	89.7	4.97
## 26	87.0	3.04
## 27	82.1	7.06
## 28	80.7	3.61
## 29	80.4	5.19
## 30	82.7	11.44
## 31	79.0	9.23
## 32	85.1	5.55

##	DefuncionesGenerales	Nacimientos	Divorcios	Matrimonios
## 1	5267	26933	1417	6210
## 2	14756	62871	3294	17535
## 3	2739	12864	744	2856
## 4	3964	18343	1138	5267
## 5	15200	59966	3668	15384
## 6	3717	13422	658	3388
## 7	22411	144423	2120	24054
## 8	22187	69735	6203	18728
## 9	55995	153631	11105	35536
## 10	8884	40269	1613	9674
## 11	27454	122412	4806	31310
## 12	18137	98285	1683	22595
## 13	13246	59924	1916	10143
## 14	40555	161217	4283	39127
## 15	72001	326412	12890	72465
## 16	24310	104885	3586	26833
## 17	10317	37446	1391	7874
## 18	5724	25731	1080	6112
## 19	23965	94440	7537	26942
## 20	21525	95505	782	20922
## 21	31843	147296	2892	21027
## 22	8395	41567	1623	9253
## 23	4659	28736	1027	9180
## 24	13361	55847	1769	13452
## 25	14344	57543	3761	17088
## 26	15001	53768	3018	14505
## 27	10834	48806	1815	11097
## 28	17856	63263	2355	18248
## 29	5659	28203	452	5750
## 30	47585	164174	4605	41356
## 31	10954	36427	2476	11960
## 32	8414	35625	1802	9563

##	PorcentajePartosHospitales	PorcentajeAguaPotable	PorcentajeAguaEntubada
## 1	97.1	98.0	98.9
## 2	65.7	93.3	95.9
## 3	95.2	86.7	92.4
## 4	87.0	89.5	90.3

## 5	90.3	97.9	98.2
## 6	98.5	97.9	98.5
## 7	33.2	74.5	78.1
## 8	78.0	93.9	95.2
## 9	94.8	97.8	97.8
## 10	81.3	93.0	94.7
## 11	85.5	93.5	94.7
## 12	60.7	70.6	71.3
## 13	78.4	88.9	91.2
## 14	88.5	93.0	96.0
## 15	91.1	92.4	94.4
## 16	85.6	90.7	92.1
## 17	86.9	91.6	91.8
## 18	82.0	93.1	93.0
## 19	96.4	95.5	96.2
## 20	59.7	76.7	77.2
## 21	80.0	85.3	88.1
## 22	94.2	93.1	95.0
## 23	89.9	92.8	92.2
## 24	86.9	84.9	86.4
## 25	94.1	94.4	94.9
## 26	95.4	95.3	96.5
## 27	80.4	76.9	82.2
## 28	96.5	96.4	95.5
## 29	93.6	98.2	98.2
## 30	75.3	76.8	81.1
## 31	89.9	96.0	97.0
## 32	91.4	94.1	94.4
##	PorcentajeElectricidad	PorcentajeParedesSolidas	PorcentajePisoTierra
## 1	99.2	92.3	1.7
## 2	98.5	77.0	3.3
## 3	96.7	90.3	5.8
## 4	96.8	80.7	4.7
## 5	99.1	84.8	1.6
## 6	99.0	94.7	4.5
## 7	95.9	67.4	14.7
## 8	96.3	77.2	3.2
## 9	99.5	97.9	1.0
## 10	96.1	66.7	6.3
## 11	98.2	93.2	4.1
## 12	95.3	63.0	18.4
## 13	96.9	91.3	7.1
## 14	99.0	91.9	3.0
## 15	98.9	93.9	3.8
## 16	98.0	80.3	10.3
## 17	98.8	90.6	7.2
## 18	96.9	90.0	4.0
## 19	98.3	94.0	2.0
## 20	94.3	66.4	18.7
## 21	97.7	87.3	9.5
## 22	97.7	96.6	3.7
## 23	96.2	87.2	3.7
## 24	95.6	80.9	8.7
## 25	98.4	94.7	6.1

## 26	97.9	88.2	5.3
## 27	98.4	87.5	6.4
## 28	97.0	85.5	3.3
## 29	98.5	90.3	3.9
## 30	96.6	81.5	11.7
## 31	97.4	93.2	2.8
## 32	98.3	63.4	3.4

Las variables que necesitamos hacer per capita para poder hacer un analisis son Secundarias, Defunciones, Nacimientos, Divorcios, Matrimonios

```
for (col in c("Secundarias","DefuncionesGenerales","Nacimientos","Divorcios", "Matrimonios"))
```

```
INEGI[,col] <- INEGI[,col] / INEGI[, "Poblacion"]
```

```
INEGI
```

##	Estado	Poblacion	PIBpc	Secundarias
## 1	Aguascalientes	1184996	84.70	0.0002936719
## 2	Baja California	3155070	83.07	0.0001885854
## 3	Baja California Sur	637026	94.64	0.0002448880
## 4	Campeche	822441	395.55	0.0003866539
## 5	Coahuila de Zaragoza	2748391	106.05	0.0002012086
## 6	Colima	650555	76.49	0.0002597782
## 7	Chiapas	4796580	34.44	0.0004125856
## 8	Chihuahua	3406465	85.10	0.0002266279
## 9	Distrito Federal	8851080	172.88	0.0001588507
## 10	Durango	1632934	67.61	0.0005683022
## 11	Guanajuato	5486372	65.67	0.0003082183
## 12	Guerrero	3388768	41.28	0.0005178873
## 13	Hidalgo	2665018	53.06	0.0004472765
## 14	Jalisco	7350682	81.43	0.0002607921
## 15	México	15175862	54.41	0.0002386685
## 16	Michoacán de Ocampo	4351037	52.80	0.0003668091
## 17	Morelos	1777227	58.21	0.0002655823
## 18	Nayarit	1084979	55.16	0.0005170607
## 19	Nuevo León	4653458	151.81	0.0002073727
## 20	Oaxaca	3801962	36.25	0.0005818049
## 21	Puebla	5779829	53.81	0.0003749246
## 22	Querétaro	1827937	95.07	0.0002691559
## 23	Quintana Roo	1325578	103.91	0.0002866674
## 24	San Luis Potosí	2585518	63.29	0.0006331420
## 25	Sinaloa	2767761	66.45	0.0003226435
## 26	Sonora	2662480	84.46	0.0002569033
## 27	Tabasco	2238603	107.34	0.0003314567
## 28	Tamaulipas	3268554	93.88	0.0002276236
## 29	Tlaxcala	1169936	41.15	0.0003034354
## 30	Veracruz de Ignacio de la Llave	7643194	52.71	0.0004188040
## 31	Yucatán	1955577	63.79	0.0003047694
## 32	Zacatecas	1490668	48.17	0.0007728079
##	IndiceAprovechamientoSecundaria	PorcentajeAnalfabetas		
## 1	85.3	3.26		
## 2	86.0	2.57		
## 3	87.9	3.21		
## 4	78.5	8.31		
## 5	75.9	2.63		

## 6	81.8	5.13
## 7	89.9	17.80
## 8	80.1	3.66
## 9	85.9	2.09
## 10	80.6	3.82
## 11	89.2	8.18
## 12	86.7	16.68
## 13	90.8	10.23
## 14	91.8	4.36
## 15	83.5	4.38
## 16	76.3	10.18
## 17	84.1	6.42
## 18	89.9	6.31
## 19	82.8	2.20
## 20	88.8	16.27
## 21	87.2	10.38
## 22	79.1	6.31
## 23	85.2	4.77
## 24	85.1	7.91
## 25	89.7	4.97
## 26	87.0	3.04
## 27	82.1	7.06
## 28	80.7	3.61
## 29	80.4	5.19
## 30	82.7	11.44
## 31	79.0	9.23
## 32	85.1	5.55

##	Defunciones	Generales	Nacimientos	Divorcios	Matrimonios
## 1	0.004444741	0.02272835	0.0011957846	0.005240524	
## 2	0.004676917	0.01992697	0.0010440339	0.005557721	
## 3	0.004299668	0.02019384	0.0011679272	0.004483333	
## 4	0.004819799	0.02230312	0.0013836859	0.006404107	
## 5	0.005530509	0.02181858	0.0013345990	0.005597457	
## 6	0.005713583	0.02063161	0.0010114441	0.005207861	
## 7	0.004672287	0.03010958	0.0004419816	0.005014823	
## 8	0.006513204	0.02047137	0.0018209493	0.005497781	
## 9	0.006326347	0.01735732	0.0012546492	0.004014877	
## 10	0.005440514	0.02466052	0.0009877925	0.005924306	
## 11	0.005004035	0.02231201	0.0008759887	0.005706868	
## 12	0.005352093	0.02900317	0.0004966407	0.006667615	
## 13	0.004970323	0.02248540	0.0007189445	0.003805978	
## 14	0.005517175	0.02193225	0.0005826670	0.005322907	
## 15	0.004744442	0.02150863	0.0008493751	0.004775017	
## 16	0.005587174	0.02410575	0.0008241713	0.006167036	
## 17	0.005805111	0.02106990	0.0007826800	0.004430498	
## 18	0.005275678	0.02371567	0.0009954110	0.005633289	
## 19	0.005149934	0.02029459	0.0016196557	0.005789673	
## 20	0.005661551	0.02511992	0.0002056833	0.005502948	
## 21	0.005509333	0.02548449	0.0005003608	0.003637997	
## 22	0.004592609	0.02273984	0.0008878862	0.005061991	
## 23	0.003514693	0.02167809	0.0007747564	0.006925281	
## 24	0.005167630	0.02159993	0.0006841956	0.005202826	
## 25	0.005182528	0.02079045	0.0013588601	0.006173943	
## 26	0.005634221	0.02019471	0.0011335296	0.005447928	

## 27	0.004839625	0.02180199	0.0008107735	0.004957109
## 28	0.005462966	0.01935504	0.0007205021	0.005582897
## 29	0.004837017	0.02410645	0.0003863459	0.004914799
## 30	0.006225800	0.02147976	0.0006024968	0.005410827
## 31	0.005601416	0.01862724	0.0012661225	0.006115842
## 32	0.005644449	0.02389868	0.0012088540	0.006415245
##	PorcentajePartosHospitales	PorcentajeAguaPotable	PorcentajeAguaEntubada	
## 1	97.1	98.0	98.9	
## 2	65.7	93.3	95.9	
## 3	95.2	86.7	92.4	
## 4	87.0	89.5	90.3	
## 5	90.3	97.9	98.2	
## 6	98.5	97.9	98.5	
## 7	33.2	74.5	78.1	
## 8	78.0	93.9	95.2	
## 9	94.8	97.8	97.8	
## 10	81.3	93.0	94.7	
## 11	85.5	93.5	94.7	
## 12	60.7	70.6	71.3	
## 13	78.4	88.9	91.2	
## 14	88.5	93.0	96.0	
## 15	91.1	92.4	94.4	
## 16	85.6	90.7	92.1	
## 17	86.9	91.6	91.8	
## 18	82.0	93.1	93.0	
## 19	96.4	95.5	96.2	
## 20	59.7	76.7	77.2	
## 21	80.0	85.3	88.1	
## 22	94.2	93.1	95.0	
## 23	89.9	92.8	92.2	
## 24	86.9	84.9	86.4	
## 25	94.1	94.4	94.9	
## 26	95.4	95.3	96.5	
## 27	80.4	76.9	82.2	
## 28	96.5	96.4	95.5	
## 29	93.6	98.2	98.2	
## 30	75.3	76.8	81.1	
## 31	89.9	96.0	97.0	
## 32	91.4	94.1	94.4	
##	PorcentajeElectricidad	PorcentajeParedesSolidas	PorcentajePisoTierra	
## 1	99.2	92.3	1.7	
## 2	98.5	77.0	3.3	
## 3	96.7	90.3	5.8	
## 4	96.8	80.7	4.7	
## 5	99.1	84.8	1.6	
## 6	99.0	94.7	4.5	
## 7	95.9	67.4	14.7	
## 8	96.3	77.2	3.2	
## 9	99.5	97.9	1.0	
## 10	96.1	66.7	6.3	
## 11	98.2	93.2	4.1	
## 12	95.3	63.0	18.4	
## 13	96.9	91.3	7.1	
## 14	99.0	91.9	3.0	

## 15	98.9	93.9	3.8
## 16	98.0	80.3	10.3
## 17	98.8	90.6	7.2
## 18	96.9	90.0	4.0
## 19	98.3	94.0	2.0
## 20	94.3	66.4	18.7
## 21	97.7	87.3	9.5
## 22	97.7	96.6	3.7
## 23	96.2	87.2	3.7
## 24	95.6	80.9	8.7
## 25	98.4	94.7	6.1
## 26	97.9	88.2	5.3
## 27	98.4	87.5	6.4
## 28	97.0	85.5	3.3
## 29	98.5	90.3	3.9
## 30	96.6	81.5	11.7
## 31	97.4	93.2	2.8
## 32	98.3	63.4	3.4

Es importante siempre limpiar bien los datos.

Vamos a guardar en una matriz de datos x las variables numericas que queremos analizar (todas menos Estado y Poblacion), y vamos a guardar Estado como row.names.

```
X <- INEGI[, -(1:2)] #le quita las primeras dos columnas
row.names(X) <- INEGI$Estado
head(X)
```

##	PIBpc	Secundarias	IndiceAprovechamientoSecundaria
## Aguascalientes	84.70	0.0002936719	85.3
## Baja California	83.07	0.0001885854	86.0
## Baja California Sur	94.64	0.0002448880	87.9
## Campeche	395.55	0.0003866539	78.5
## Coahuila de Zaragoza	106.05	0.0002012086	75.9
## Colima	76.49	0.0002597782	81.8

##	PorcentajeAnalfabetas	DefuncionesGenerales
## Aguascalientes	3.26	0.004444741
## Baja California	2.57	0.004676917
## Baja California Sur	3.21	0.004299668
## Campeche	8.31	0.004819799
## Coahuila de Zaragoza	2.63	0.005530509
## Colima	5.13	0.005713583

##	Nacimientos	Divorcios	Matrimonios
## Aguascalientes	0.02272835	0.001195785	0.005240524
## Baja California	0.01992697	0.001044034	0.005557721
## Baja California Sur	0.02019384	0.001167927	0.004483333
## Campeche	0.02230312	0.001383686	0.006404107
## Coahuila de Zaragoza	0.02181858	0.001334599	0.005597457
## Colima	0.02063161	0.001011444	0.005207861

##	PorcentajePartosHospitales	PorcentajeAguaPotable
## Aguascalientes	97.1	98.0
## Baja California	65.7	93.3
## Baja California Sur	95.2	86.7
## Campeche	87.0	89.5
## Coahuila de Zaragoza	90.3	97.9
## Colima	98.5	97.9

```
##                               PorcentajeAguaEntubada PorcentajeElectricidad
## Aguascalientes                98.9                99.2
## Baja California                95.9                98.5
## Baja California Sur            92.4                96.7
## Campeche                      90.3                96.8
## Coahuila de Zaragoza           98.2                99.1
## Colima                        98.5                99.0
##                               PorcentajeParedesSolidas PorcentajePisoTierra
## Aguascalientes                92.3                1.7
## Baja California                77.0                3.3
## Baja California Sur            90.3                5.8
## Campeche                      80.7                4.7
## Coahuila de Zaragoza           84.8                1.6
## Colima                        94.7                4.5
```

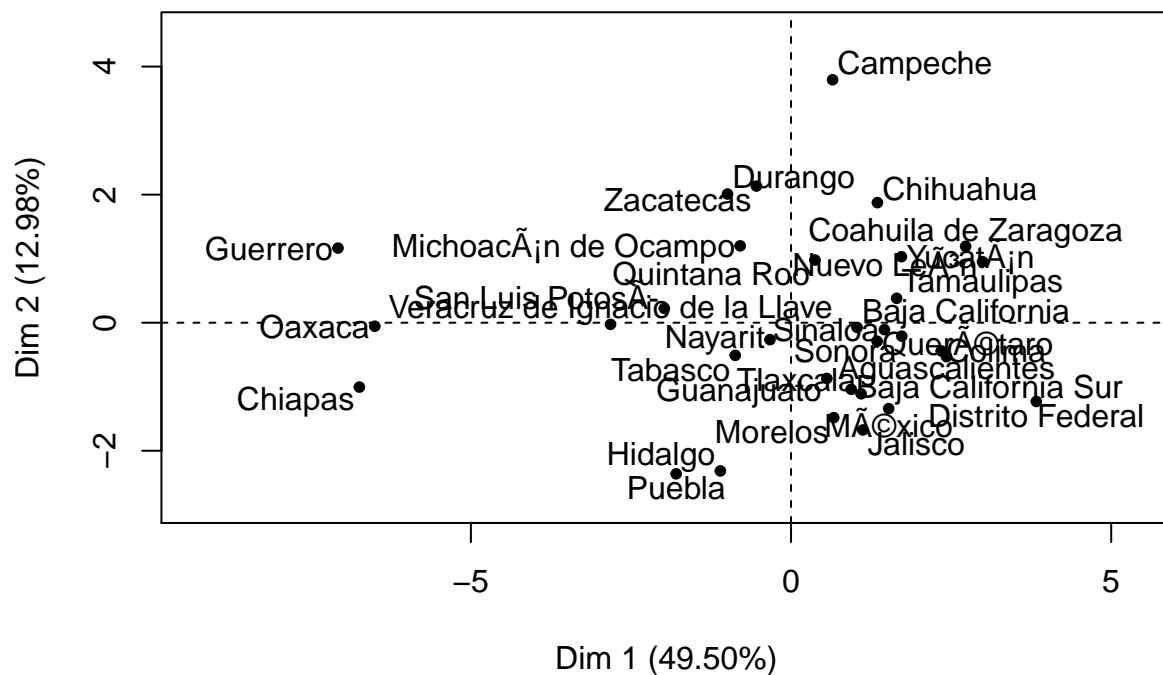
```
#install.packages("FactoMineR")
```

```
library(FactoMineR)
```

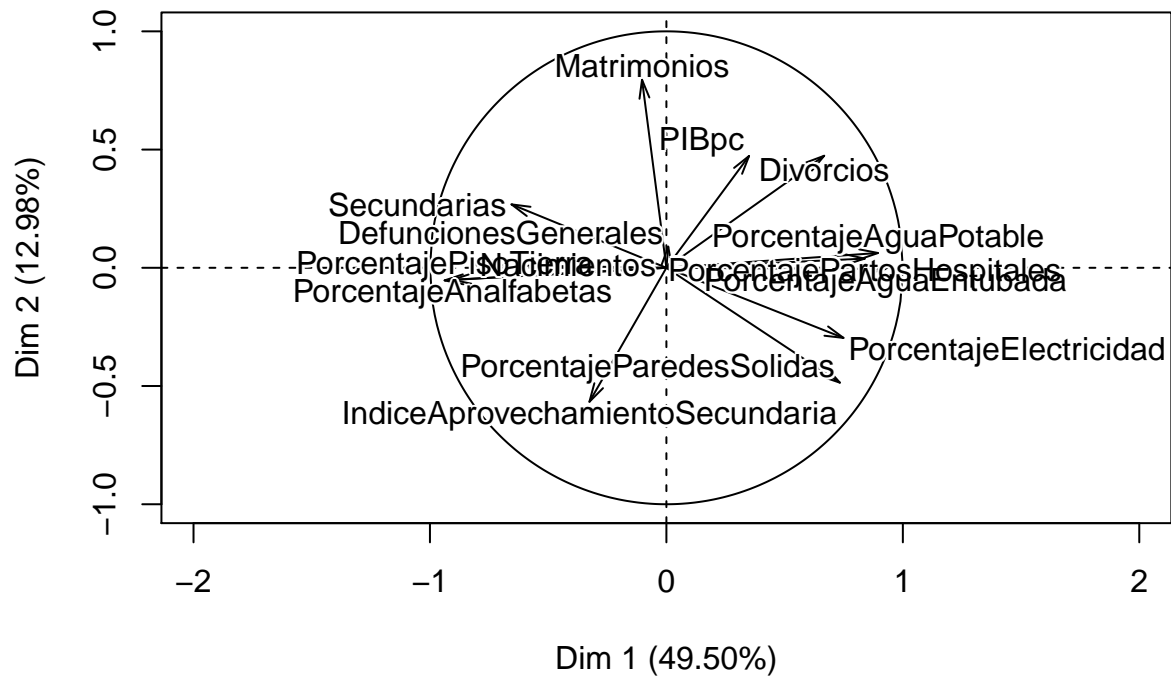
```
## Warning: package 'FactoMineR' was built under R version 3.4.1
```

```
model <- PCA(X)
```

Individuals factor map (PCA)



Variables factor map (PCA)



Hay 49 + 12 representacion en este diagrama