**The dataset for Women Track Record**

## country sp100 sp200 sp400 sp800 sp1500 sp3000 marathon ## 1 ARG 11.57 22.94 52.50 2.05 4.25 9.19 150.3 ## 2 AUS 11.12 22.23 48.63 1.98 4.02 8.63 143.5 ## 3 AUT 11.15 22.70 50.62 1.94 4.05 8.78 154.3 ## 4 BEL 11.14 22.48 51.45 1.97 4.08 8.82 143.1 ## 5 BER 11.46 23.05 53.30 2.07 4.29 9.81 174.2 ## 6 BRA 11.17 22.60 50.62 1.97 4.17 9.04 147.4 ## 7 CAN 10.98 22.62 49.91 1.97 4.00 8.54 148.4 ## 8 CHI 11.65 23.84 53.68 2.00 4.22 9.26 152.2 ## 9 CHN 10.79 22.01 49.81 1.93 3.84 8.10 139.4 ## 10 COL 11.31 22.92 49.64 2.04 4.34 9.37 155.2 ## 11 COK 12.52 25.91 61.65 2.28 4.82 11.10 212.3 ## 12 CRC 11.72 23.92 52.57 2.10 4.52 9.84 164.3 ## 13 CZE 11.09 21.97 47.99 1.89 4.03 8.87 145.2 ## 14 DEN 11.42 23.36 52.92 2.02 4.12 8.71 149.3 ## 15 DOM 11.63 23.91 53.02 2.09 4.54 9.89 166.5 ## 16 FIN 11.13 22.39 50.14 2.01 4.10 8.69 148.0 ## 17 FRA 10.73 21.99 48.25 1.94 4.03 8.64 148.3 ## 18 GER 10.81 21.71 47.60 1.92 3.96 8.51 141.4 ## 19 GBR 11.10 22.10 49.43 1.94 3.97 8.37 135.2 ## 20 GRE 10.83 22.67 50.56 2.00 4.09 8.96 153.4 ## 21 GUA 11.92 24.50 55.64 2.15 4.48 9.71 171.3 ## 22 HUN 11.41 23.06 51.50 1.99 4.02 8.55 148.5 ## 23 INA 11.56 23.86 55.08 2.10 4.36 9.50 154.3 ## 24 IND 11.38 22.82 51.05 2.00 4.10 9.11 158.1 ## 25 IRL 11.43 23.02 51.07 2.01 3.98 8.36 142.2 ## 26 ISR 11.45 23.15 52.06 2.07 4.24 9.33 156.4 ## 27 ITA 11.14 22.60 51.31 1.96 3.98 8.59 143.5 ## 28 JPN 11.36 23.33 51.93 2.01 4.16 8.74 139.4 ## 29 KEN 11.62 23.37 51.56 1.97 3.96 8.39 138.5 ## 30 KOR, S 11.49 23.80 53.67 2.09 4.24 9.01 146.1 ## 31 KOR, N 11.80 25.10 56.23 1.97 4.25 8.96 145.3 ## 32 LUX 11.76 23.96 56.07 2.07 4.35 9.21 149.2 ## 33 MAS 11.50 23.37 52.56 2.12 4.39 9.31 169.3 ## 34 MRI 11.72 23.83 54.62 2.06 4.33 9.24 167.1 ## 35 MEX 11.09 23.13 48.89 2.02 4.19 8.89 144.1 ## 36 MYA 11.66 23.69 52.96 2.03 4.20 9.08 158.4 ## 37 NED 11.08 22.81 51.35 1.93 4.06 8.57 143.4 ## 38 NZL 11.32 23.13 51.60 1.97 4.10 8.76 146.5 ## 39 NOR 11.41 23.31 52.45 2.03 4.01 8.53 141.1 ## 40 PNG 11.96 24.68 55.18 2.24 4.62 10.21 221.1 ## 41 PHI 11.28 23.35 54.75 2.12 4.41 9.81 165.5 ## 42 POL 10.93 22.13 49.28 1.95 3.99 8.53 144.2 ## 43 POR 11.30 22.88 51.92 1.98 3.96 8.50 143.3 ## 44 ROM 11.30 22.35 49.88 1.92 3.90 8.36 142.5 ## 45 RUS 10.77 21.87 49.11 1.91 3.87 8.38 141.3 ## 46 SAM 12.38 25.45 56.32 2.29 5.42 13.12 191.6 ## 47 SIN 12.13 24.54 55.08 2.12 4.52 9.94 154.4 ## 48 ESP 11.06 22.38 49.67 1.96 4.01 8.48 146.5 ## 49 SWE 11.16 22.82 51.69 1.99 4.09 8.81 150.4 ## 50 SUI 11.34 22.88 51.32 1.98 3.97 8.60 145.5 ## 51 TPE 11.22 22.56 52.74 2.08 4.38 9.63 159.5 ## 52 THA 11.33 23.30 52.60 2.06 4.38 10.07 162.4 ## 53 TUR 11.25 22.71 53.15 2.01 3.92 8.53 151.4 ## 54 USA 10.49 21.34 48.83 1.94 3.95 8.43 141.2

**Here I am to do the factor Analysis and to say about the factors included in it and also the Outliers.**

Here, the outliers are:

## COK KOR, N PNG SAM

## 2.833 3.738 4.358 5.002

We have here computed the outliers by the Mahalanobis Distance.

**The details of Principal Components are:**

## Importance of components: Comp.1 Comp.2 Comp.3 Comp.4 Comp.5 Comp.6

## Standard deviation 2.4099 0.79290 0.5285 0.35292 0.3016 0.233493

## Proportion of Variance 0.8297 0.08981 0.0399 0.01779 0.0130 0.007788

## Cumulative Proportion 0.8297 0.91947 0.9594 0.97717 0.9902 0.997957

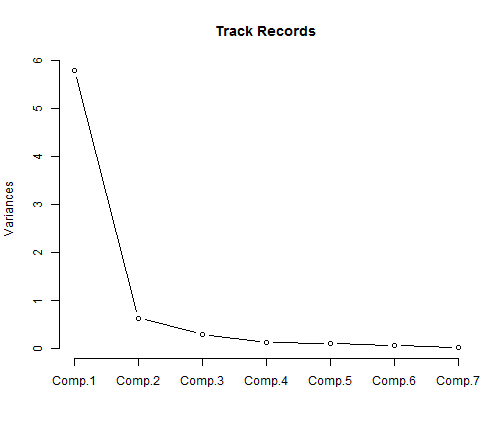
Comp.7

## Standard deviation 0.119592

## Proportion of Variance 0.002043

## Cumulative Proportion 1.000000

**The scree plot describing the components are here:**



**If we consider 2 factors we can see that the patterns are described.**

## ## Loadings: Factor1 Factor2

## sp100 0.461 0.833

## sp200 0.455 0.877

## sp400 0.401 0.829

## sp800 0.732 0.566

## sp1500 0.882 0.454

## sp3000 0.918 0.361

## marathon 0.693 0.42

## SS loadings 3.216 2.987

## Proportion Var 0.459 0.427

## Cumulative Var 0.459 0.886

## Test of the hypothesis that **2 factors are sufficient.**

## The chi square statistic is 31.43 on 8 degrees of freedom.

## The p-value is 0.000118

**From the coefficients of factors, we can see that factor 1 represents the values of long tracks (more than 800m),whereas factor 2 represents that of short ones (less than 400m).**