PREDMET: Analiza i vizualizacija podataka

Analiza faktora koji utiču na zadovoljstvo životom u jednoj zemlji

###The World Happiness Report-je svetski izveštaj koji rangira 156 zemalja po tome koliko njihovi gradjani smatraju sebe srećnim. Ta lista se sastavlja tako što uzorci stanovnika iz svake zemalje ocenama od 0 do 10 odgovoraju na pitanja o kvalitetu svog života. Kao potencijalni faktori koji tome doprinose uzimaju se u obzir vrednost GDP po stanovniku, očekivano trajanje života, velikodušnost (ispitanici odgovaruju na pitanje da li doniraju novac u dobrotvorne svrhe), društvena podrška (da li imaju podršku od strane porodice ili prijatelja), osećaj slobode i prisustvo korupcije u zemlji (percepcija ispitanika o postojanju korupcije).

#Istraživanje obuhvata godišnji uzorak od 1.000 ljudi, a ukoliko je neka zemlja imala istraživanja svake godine, tada je veličina uzorka 3.000 ljudi.

#Podaci se odnose na izveštaj iz 2020. godine.

Baza je dostupna na https://www.kaggle.com/mathurinache/world-happiness-report?select=2020.csv

```
#Potrebni paketi
library(dplyr)
library(tidyr)
library(ggplot2)
```

Učitavanje baze

```
WHR_data<-read.csv("Data/WorldHappinessReport2020.csv", stringsAsFactors = FALSE)

glimpse(WHR_data20)
```

```
> glimpse(WHR_data)
Rows: 153
Columns: 20
$ Country.name                            <chr> "Finland", "Denmark", "Switzerland", "Iceland",
"Norway", "Netherlands", "Sweden",...
$ Regional.indicator                      <chr> "Western Europe", "Western Europe", "Western Eur
ope", "Western Europe", "Western E...
$ Ladder.score                            <dbl> 7.8087, 7.6456, 7.5599, 7.5045, 7.4880, 7.4489,
7.3535, 7.2996, 7.2942, 7.2375, 7....
$ Standard.error.of.ladder.score          <dbl> 0.03115630, 0.03349229, 0.03501417, 0.05961586,
0.03483738, 0.02779175, 0.03623420...
$ upperwhisker                            <dbl> 7.869766, 7.711245, 7.628528, 7.621347, 7.556281
, 7.503372, 7.424519, 7.376953, 7....
$ lowerwhisker                            <dbl> 7.747634, 7.579955, 7.491272, 7.387653, 7.419719
, 7.394428, 7.282481, 7.222248, 7....
$ Logged.GDP.per.capita                   <dbl> 10.639267, 10.774001, 10.979933, 10.772559, 11.0
87804, 10.812712, 10.758794, 10.50...
$ Social.support                          <dbl> 0.9543297, 0.9559908, 0.9428466, 0.9746696, 0.95
24866, 0.9391388, 0.9263112, 0.949...
$ Healthy.life.expectancy                 <dbl> 71.90083, 72.40250, 74.10245, 73.00000, 73.20078
, 72.30092, 72.60077, 73.20263, 73...
$ Freedom.to.make.life.choices            <dbl> 0.9491722, 0.9514443, 0.9213367, 0.9488919, 0.95
57503, 0.9085478, 0.9391442, 0.936...
$ Generosity                              <dbl> 0.059482019, 0.066201776, 0.105911039, 0.2469442
19, 0.134532630, 0.207612440, 0.1...
$ Perceptions.of.corruption               <dbl> 0.1954446, 0.1684895, 0.3037284, 0.7117097, 0.26
32182, 0.3647171, 0.2508802, 0.221...
$ Ladder.score.in.Dystopia                <dbl> 1.972317, 1.972317, 1.972317, 1.972317, 1.972317
, 1.972317, 1.972317, 1.972317, 1....
$ Explained.by..Log.GDP.per.capita        <dbl> 1.2851895, 1.3269485, 1.3907742, 1.3265016, 1.42
42073, 1.3389463, 1.3222352, 1.242...
$ Explained.by..Social.support            <dbl> 1.499526, 1.503449, 1.472403, 1.547567, 1.495173
, 1.463646, 1.433348, 1.487218, 1....
```

```
$ Explained.by..Healthy.life.expectancy      <dbl> 0.9612714, 0.9793326, 1.0405332, 1.0008434, 1.00
80719, 0.9756753, 0.9864705, 1.008...
$ Explained.by..Freedom.to.make.life.choices <dbl> 0.6623167, 0.6650399, 0.6289545, 0.6619807, 0.67
02009, 0.6136265, 0.6502977, 0.646...
$ Explained.by..Generosity                   <dbl> 0.15967044, 0.24279340, 0.26905575, 0.36233023,
0.28798509, 0.33631757, 0.27282789...
$ Explained.by..Perceptions.of.corruption    <dbl> 0.477857262, 0.495260328, 0.407945901, 0.1445407
72, 0.434100568, 0.368569762, 0.44...
$ Dystopia...residual                        <dbl> 2.7628350, 2.4327407, 2.3502674, 2.4606881, 2.16
82663, 2.3521171, 2.2462993, 2.128...
```

Baze sadrzi podatke za 153 zemlje

#Priprema podataka za analizu

Provera nedostajućih vrednosti

```
sum(is.na(WHR_data))
```

```
> sum(is.na(WHR_data))
[1] 0
```

Nema NA

Odabir varijabli koje cemo uključiti u istraživanje i preimenovanje kolona radi lakšeg snalaženja

```
WHR_data20 <- WHR_data %>%

         select(Country.name,Regional.indicator,Ladder.score,Logged.GDP.per.capita,Social.support,
                      Healthy.life.expectancy,Generosity,Perceptions.of.corruption) %>%
        rename(Country=Country.name,Happ_Score=Ladder.score,GDP_perCapita=Logged.GDP.per.capita,
                      Life_exp=Healthy.life.expectancy,Corruption=Perceptions.of.corruption)

glimpse(WHR_data20)
```

Sada baza izgleda ovako

```
>  glimpse(WHR_data20)
 Rows: 153
 Columns: 8
 $ Country            <chr> "Finland", "Denmark", "Switzerland", "Iceland", "Norway", "Netherlands",
 $ Regional.indicator <chr> "Western Europe", "Western Europe", "Western Europe", "Western Europe",
 $ Happ_Score         <dbl> 7.8087, 7.6456, 7.5599, 7.5045, 7.4880, 7.4489, 7.3535, 7.2996, 7.2942,
 $ GDP_perCapita      <dbl> 10.639267, 10.774001, 10.979933, 10.772559, 11.087804, 10.812712, 10.758
 $ Social.support     <dbl> 0.9543297, 0.9559908, 0.9428466, 0.9746696, 0.9524866, 0.9391388, 0.9263
 $ Life_exp           <dbl> 71.90083, 72.40250, 74.10245, 73.00000, 73.20078, 72.30092, 72.60077, 73
 $ Generosity         <dbl> 0.059482019, 0.066201776, 0.105911039, 0.246944219, 0.134532630, 0.20761
 $ Corruption         <dbl> 0.1954446, 0.1684895, 0.3037284, 0.7117097, 0.2632182, 0.3647171, 0.2508
```

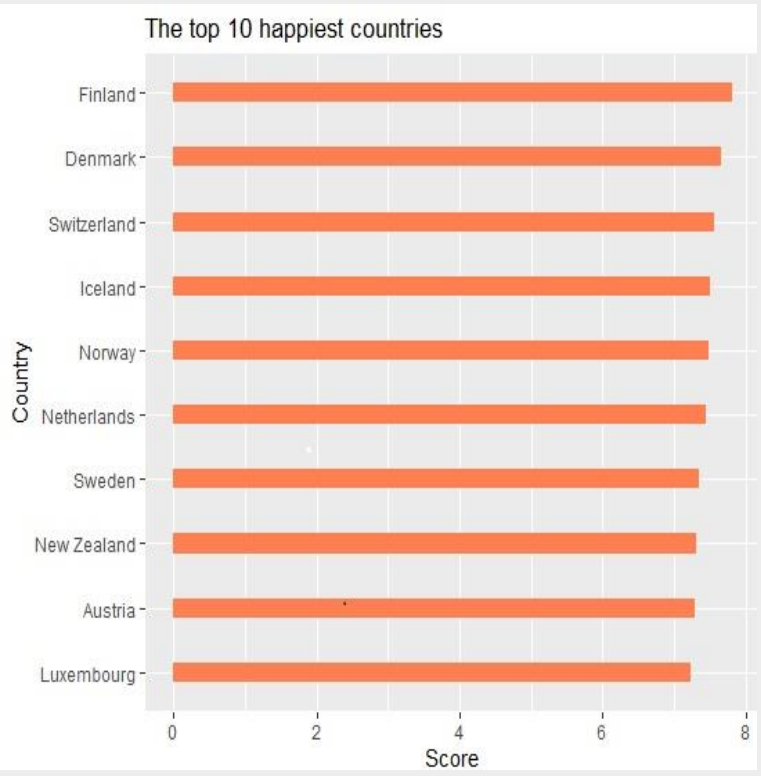
###Eksplorativna analiza

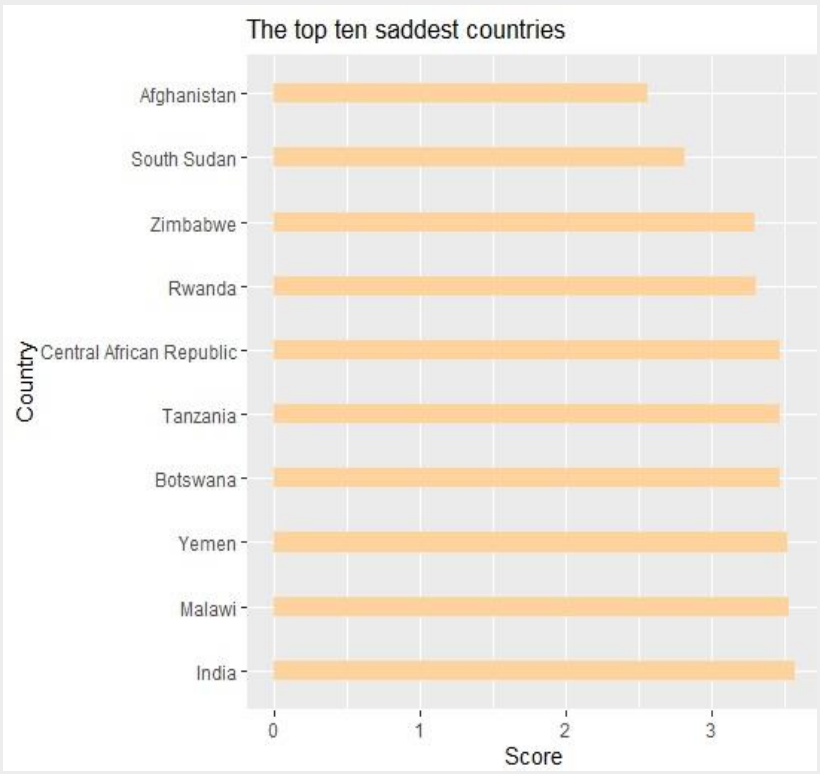
Deset 'najsrećnijih' zemalja

```
Top_10<- WHR_data20 %>% select (Country,Happ_Score) %>%
                    arrange(desc(Happ_Score)) %>%
                     head(n=10)
 Top_10


  ggplot(Top_10, aes(x = reorder(Country, Happ_Score), y = Happ_Score)) +
               geom_bar(stat = "identity",fill="Coral",width =0.3) + coord_flip()+
               labs(x = "Country", y = "Score", title = "The top 10 happiest countries")
```

Deset 'najnesrećnijih' zemalja

```
Top_10 <- WHR_data20 %>% select (Country,Happ_Score) %>%
                         arrange(Happ_Score) %>%
                          head(n=10)

ggplot(Top_10, aes(x = reorder(Country, -Happ_Score), y = Happ_Score)) +
          geom_bar(stat = "identity",fill="burlywood1",width =0.3) + coord_flip()+
              labs(x = "Country", y = "Score", title = "The top ten saddest countries")
```





Kako je Srbija rangirana i kako su gradjani Srbije ocenili kvalitet života u zemlji?

```
WHR_data20[WHR_data20$Country == "Serbia",c(1,3) ]
```

```
> WHR_data20[WHR_data20$Country == "Serbia",c(1,3) ]
   Country Happ_Score
64  Serbia     5.7782
```

#Od 153 zemlje, Srbija se nalazi na 64. mestu. Na skali sreće od 1 do 10, Srbija je imala ocenu 5,78.

Srbija u odnosu na zemlje u okruženju

```
WHR_data20[WHR_data20$Country %in%
            c('Serbia','Hungary','Romania','Bulgaria','Albania','Montenegro',
                'Bosnia and Herzegovina','Croatia','Slovenia'), c(1,3)]
```

```
> WHR_data20[WHR_data20$Country %in%
+             c('Serbia','Hungary','Romania','Bulgaria','Albania','Montenegro',
+                 'Bosnia and Herzegovina','Croatia','Slovenia'), c(1,3)]
                   Country Happ_Score
33                Slovenia     6.3634
47                 Romania     6.1237
53                 Hungary     6.0004
64                  Serbia     5.7782
69  Bosnia and Herzegovina     5.6741
72              Montenegro     5.5461
79                 Croatia     5.5047
96                Bulgaria     5.1015
105                Albania     4.8827
```

U odnosu na zemlje regiona, Srbija je 'srećnija' od BiH (69), Crne Gore (72), Hrvatske (79), Bugarske (96) i Albanije (105), a ispred nje se nalaze Slovenija (33. mesto), Rumunija (47), Madjarska (53).

Ocekivani životni vek u Srbiji

```
    WHR_data20[WHR_data20$Country == "Serbia",c(1,6) ]
```

```
> WHR_data20[WHR_data20$Country == "Serbia",c(1,6) ]
   Country Life_exp
64  Serbia 68.21021


>
```

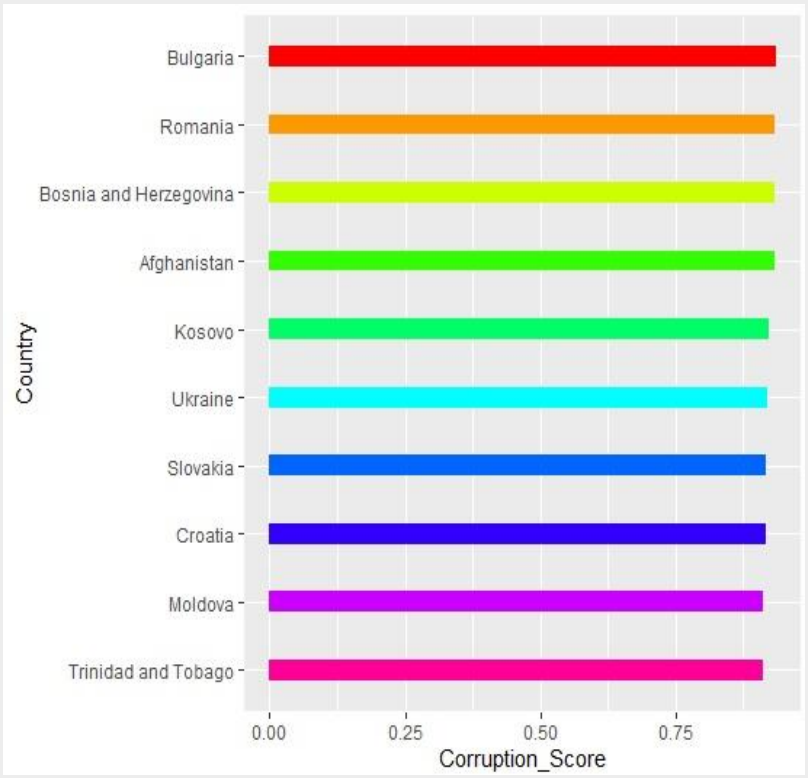
Najkorumiranije zemlje na osnovu ocene njihovih gradjana

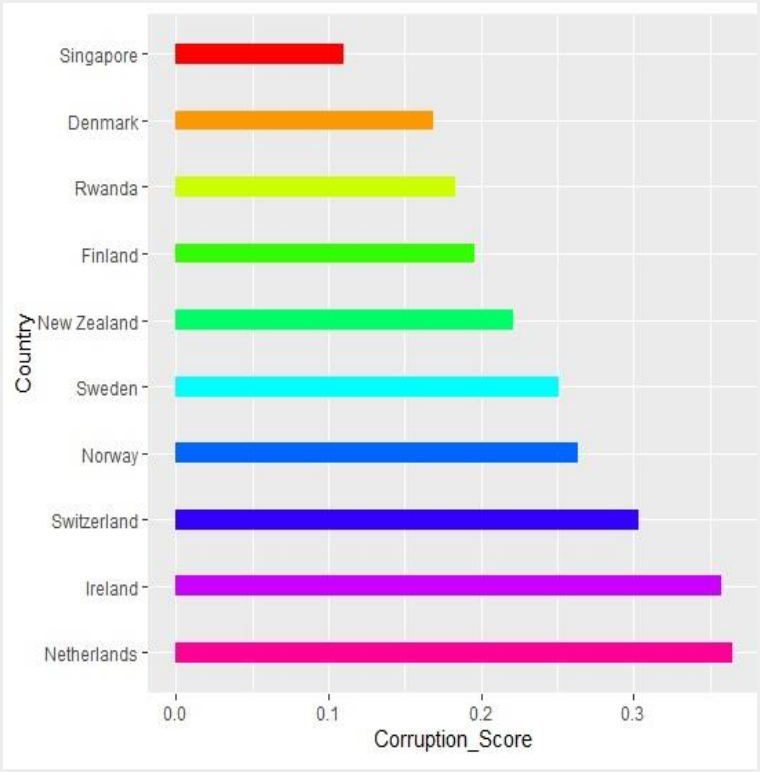
```
Top_10<- WHR_data20 %>%
              select (Country,Corruption ) %>%
                 arrange(desc(Corruption )) %>%
                    head(n=10)

 ggplot(Top_10, aes(x = reorder(Country, Corruption), y = Corruption)) +
        geom_bar(stat = "identity",fill=rainbow(n=length(Top_10$Country)),width =0.3) +
coord_flip()+
        labs(x = "Country", y = "Corruption_Score")
```

Najmanje korumiranije zemlje na osnovu ocene njihovih gradjana

```
Top_10 <- WHR_data20 %>%
           select (Country,Corruption ) %>%
            arrange(Corruption ) %>%
            head(n=10)

ggplot(Top_10, aes(x =reorder(Country, -Corruption), y=Corruption)) +
        geom_bar(stat = "identity",fill=rainbow(n=length(Top_10$Country)),width =0.3) +
coord_flip()+
        labs(x = "Country", y = "Corruption_Score")
```

Graficki prikaz ‘Najkorumiranije zemlje ‘ I ‘Najmanje korumiranije zemlje’





Istraživačka pitanja

Da li postoji statistički značajna veza izmedju sreće i

-vrednosti GDP-a po glavi stanovnika (GDP per capita),

-podrske porodice i prijatelja (Social.support),

-očekivanog trajanja zivota (life expectancy) ,

-velikodušnosti (Generosity) i

-prisustva korupcije u društvu (Corruption).

Odgovore na ova pitanja cemo dobiti primenom korelacije, a primenom metoda linerne regresije utvrdicemo koliko su ove varijable pogodne za predvinjanje zadovoljstva kvalitetom zivota (ocene sreće).

#Pre sprovodjenja ovih tehnika, potrebno je utvrditi da li varijable podležu normalnoj distribuciji ili ne, ukoliko je to slucaj koristimo Pearsonov koeficijent korelacije (normalna raspodela) , u suprotnom Spirmanov koef.

#Pomocu Shapiro–Wilk testa utvrdjujemo da li varijabe podeležu normalnoj distribuciji ili ne

H_0..podleze normalnoj distribuciji, ukoliko je p>0.01, prihvatamo H_0, u sprotnom odbacujemo u korist H1

H_1..ne podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$Happ_Score)
```

```
> shapiro.test(WHR_data20$Happ_Score)

        Shapiro-Wilk normality test

data:  WHR_data20$Happ_Score
W = 0.98899, p-value = 0.2742
```

podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$GDP)
```

```
> shapiro.test(WHR_data20$GDP)

        Shapiro-Wilk normality test

data:  WHR_data20$GDP
W = 0.9624, p-value = 0.000352
```

#ne podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$Social.support)
> shapiro.test(WHR_data20$Social.support)

        Shapiro-Wilk normality test

data:  WHR_data20$Social.support
W = 0.90486, p-value = 1.958e-08
```

#ne podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$Life_exp)
> shapiro.test(WHR_data20$Life_exp)

        Shapiro-Wilk normality test

data:  WHR_data20$Life_exp
W = 0.95457, p-value = 6.744e-05
```

#ne podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$Generosity)
> shapiro.test(WHR_data20$Generosity)

        Shapiro-Wilk normality test

data:  WHR_data20$Generosity
W = 0.95663, p-value = 0.0001029
```

#ne podleze normalnoj distribuciji

```
shapiro.test(WHR_data20$Corruption)
```

```
> shapiro.test(WHR_data20$Corruption)

        Shapiro-Wilk normality test

data:  WHR_data20$Corruption
W = 0.82274, p-value = 2.478e-12
```

#ne podleze normalnoj distribuciji

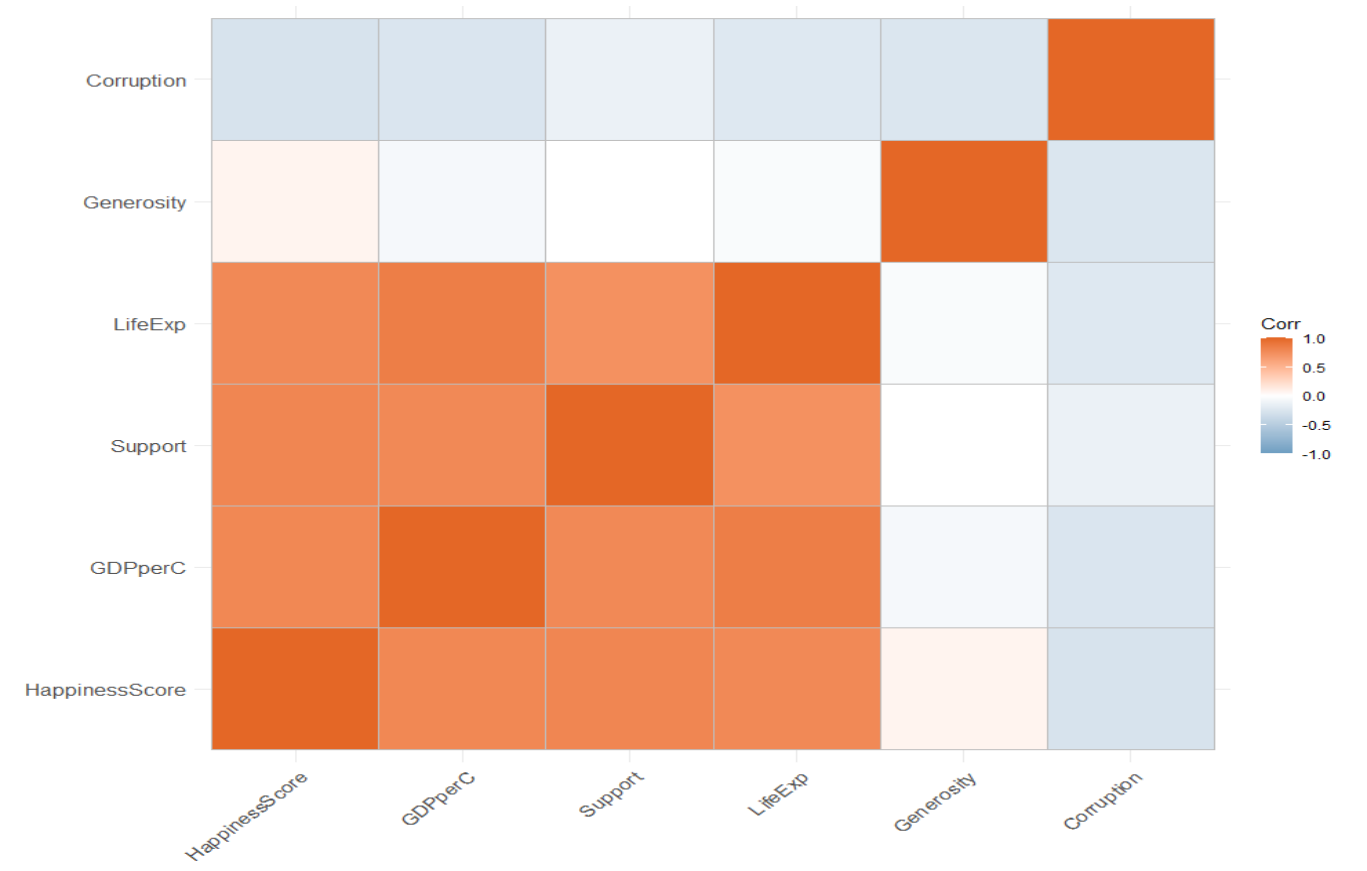
Samo jedna varijabla podleze normalnoj distribuciji (ocena srece), a sve ostale odstupaju od normalne raspodele, koristimo Spirmanov koef. korelacije.

Korelacija

```
library("Hmisc")

WHR_corr <- data.frame(WHR_data20$Happ_Score,WHR_data20$GDP_perCapita,
                       WHR_data20$Social.support,WHR_data20$Life_exp,
                                 WHR_data20$Generosity,WHR_data20$Corruption)

rcorr(as.matrix(WHR_corr), type = c("spearman"))



            WHR_data20.Happ_Score WHR_data20.GDP_perCapita WHR_data20.Social.support WHR_data20.Lif
e_exp
WHR_data20.Happ_Score                    1.00                    0.79                         0.80
0.78
WHR_data20.GDP_perCapita                 0.79                    1.00                         0.78
0.85
WHR_data20.Social.support                0.80                    0.78                         1.00
0.73
WHR_data20.Life_exp                      0.78                    0.85                         0.73
1.00
WHR_data20.Generosity                    0.07                   -0.07                         0.00
-0.04
WHR_data20.Corruption                   -0.28                   -0.26                        -0.14
-0.23
                         WHR_data20.Generosity WHR_data20.Corruption
WHR_data20.Happ_Score                     0.07                 -0.28
WHR_data20.GDP_perCapita                 -0.07                 -0.26
WHR_data20.Social.support                 0.00                 -0.14
WHR_data20.Life_exp                      -0.04                 -0.23
WHR_data20.Generosity                     1.00                 -0.25
WHR_data20.Corruption                    -0.25                  1.00

n= 153



P
                         WHR_data20.Happ_Score WHR_data20.GDP_perCapita WHR_data20.Social.support
WHR_data20.Life_exp
WHR_data20.Happ_Score                          0.0000                   0.0000
0.0000
WHR_data20.GDP_perCapita 0.0000                                         0.0000
0.0000
WHR_data20.Social.support 0.0000               0.0000
0.0000
WHR_data20.Life_exp      0.0000                0.0000                   0.0000
WHR_data20.Generosity    0.3600                0.3804                   0.9617
0.6244
WHR_data20.Corruption    0.0005                0.0014                   0.0781
0.0051
                         WHR_data20.Generosity WHR_data20.Corruption
WHR_data20.Happ_Score    0.3600                0.0005
WHR_data20.GDP_perCapita 0.3804                0.0014
WHR_data20.Social.support 0.9617               0.0781
WHR_data20.Life_exp      0.6244                0.0051
WHR_data20.Generosity                          0.0022
WHR_data20.Corruption    0.0022
```

Vizualizacija korelacije

```
names (WHR_corr)=c('HappinessScore','GDPperC','Support','LifeExp','Generosity','Corruption')

WHR_corrplot <-cor(WHR_corr, method = "spearman")

library(ggcorrplot)

ggcorrplot(WHR_corrplot, method = "square",colors = c("#6D9EC1", "white", "#E46726"))
```



#REZULTATI ANALIZE

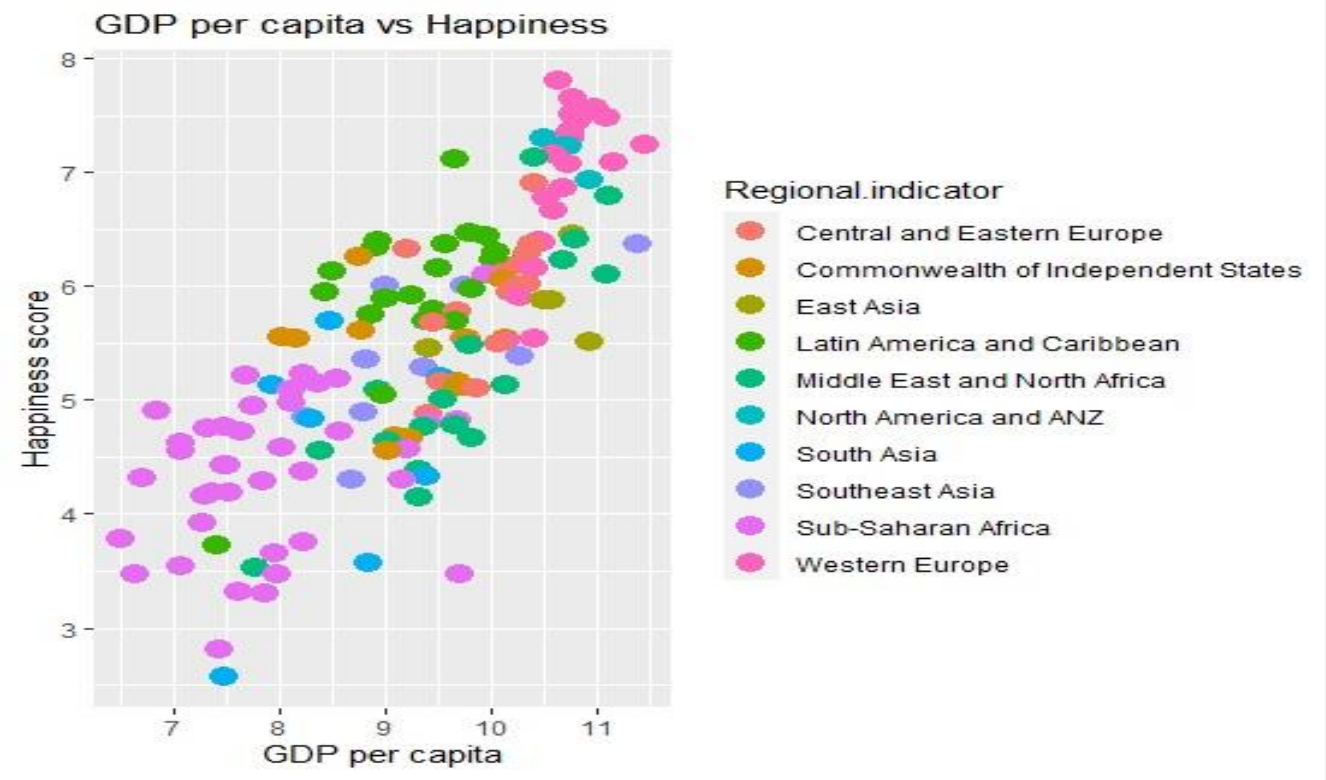
1) Da li postoji statistički značajna veza izmedju vrednosti GDP per capita i sreće (kvaliteta života)?

p (p=0) vrednost je manja od 0.01, veza je statistički značajna;

Koef.korelacije je 0.79 (r=0.79), što znači da postoji pozitivna i jaka veza izmedju ove dve varijable, odnosno sa rastom GDP per capita, raste i zadovoljstvo zivotom tj. ocena sreće i obrnuto.

Grafički prikaz

```
qplot(data=WHR_data20, x=GDP_perCapita,y=Happ_Score,colour=Regional.indicator,size=I(4))+
      labs(title ='GDP per capita vs Happiness', x='GDP per capita', y='Happiness score')
```



#Na grafiku možemo uočiti da zemlje Zapadne Evrope imaju najveće vrednosti za GDP i nalaze se medju najsrećnijima.
*Napomena: Zemlje Zapadne Evrope (*WEOG-Western European and Other States Group-prema klasifikaciji UN, u ovu grupu zemalja ubraju se i zemlje Severne Evrope kao i odredjene zemlje Okeanije(Australija i Nz) i Zapadne Azije (Turska i Izrael)).

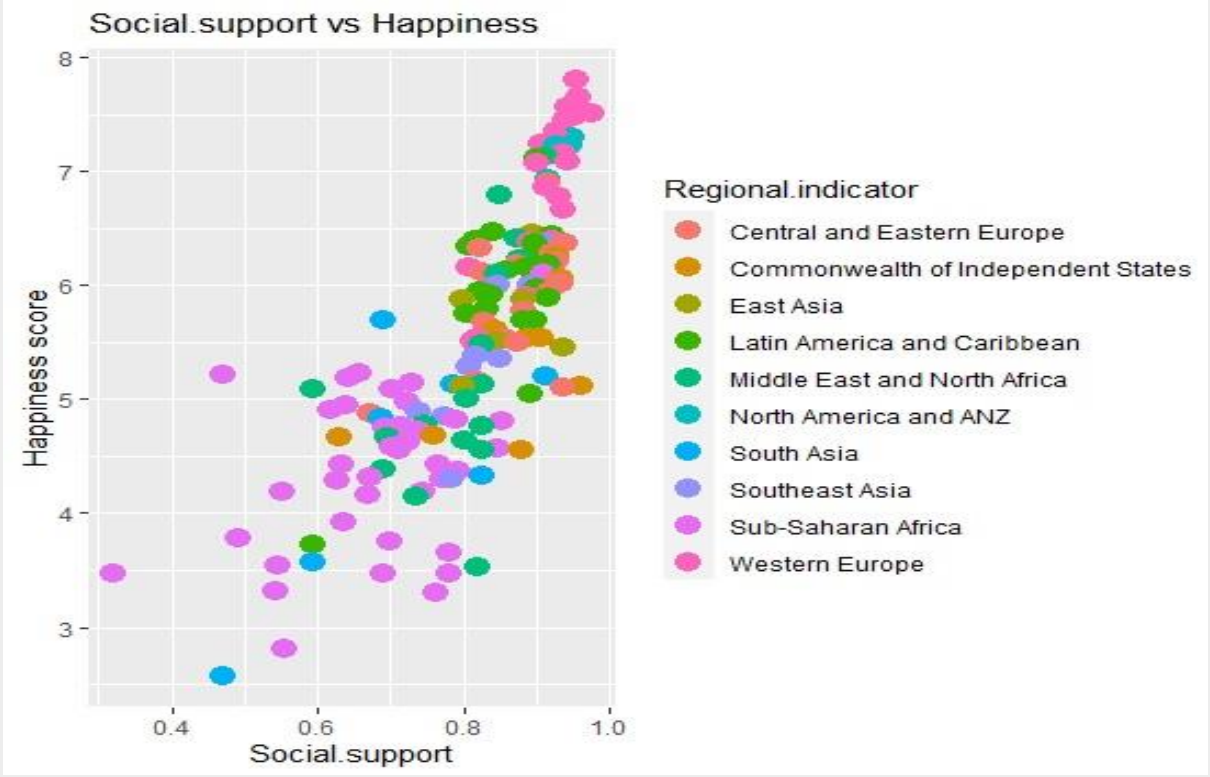
2) Da li postoji statisticki znacajna veza izmedju postojanja društvene podrške i sreće?

p (p=0) vrednost je manja od 0.01, veza je statistički značajna;

Koef.korelacije je 0.80 (r=0.80), što znači da postoji pozitivna i jaka veza izmedju ove dve varijable, odnosno sa rastom društvene podrske, raste i zadovoljstvo zivotom tj. ocena sreće i obrnuto.

Grafički prikaz

```
qplot(data=WHR_data20, x=Social.support,y=Happ_Score,colour=Regional.indicator,size=I(4))+
  labs(title ='Social.support vs Happiness', x='Social.support', y='Happiness score')
```



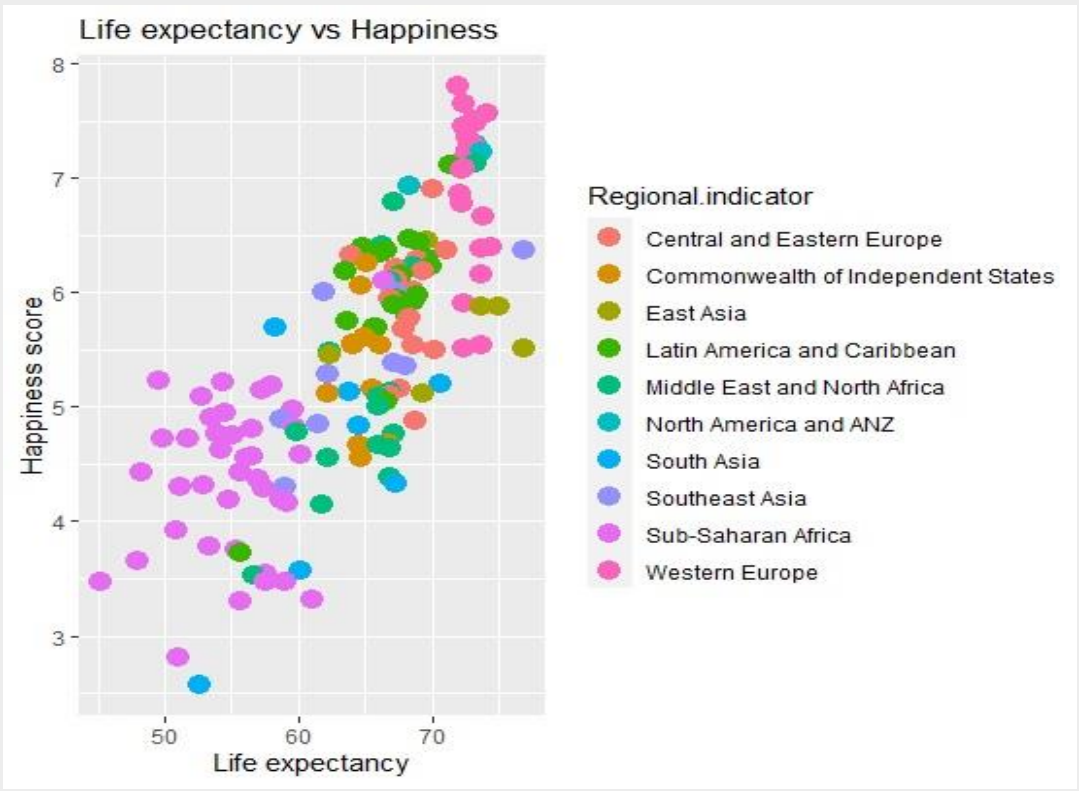
3) Da li postoji statistički značajna veza izmedju dužine očekivanog životnog veka i sreće?

p (p=0) vrednost je manja od 0.01, veza je statistički značajna;

Koef.korelacije je 0.78 (r=0.78), što znači da postoji pozitivna i jaka veza izmedju ove dve varijable, odnosno sa rastom drustvene podrske, raste i zadovoljstvo zivotom tj. ocena sreće i obrnuto.

Grafički prikaz

```
qplot(data=WHR_data20, x=Life_exp,y=Happ_Score,colour=Regional.indicator,size=I(4))+
  labs(title ='Life expectancy vs Happiness', x='Life expectancy', y='Happiness score')
```



#4) Da li postoji statistički značajna veza izmedju velikodušnosti i sreće?

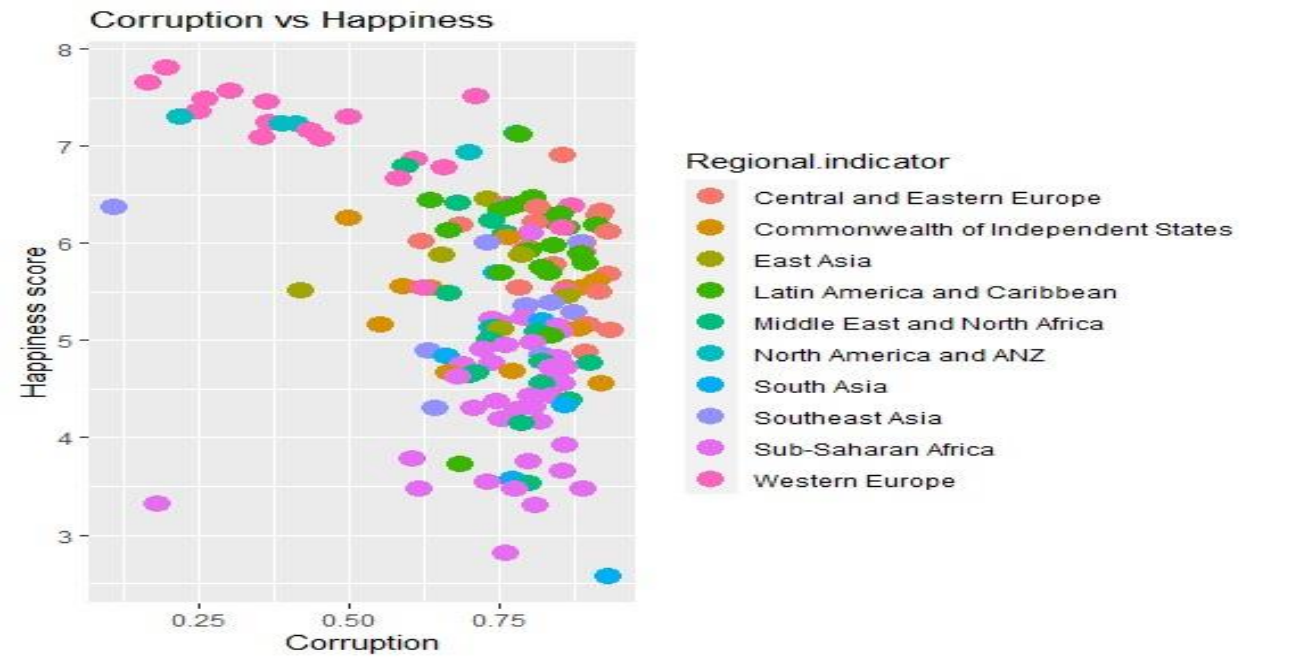
Postoji pozitivna i slaba veza izmedju ove dve varijable (r=0.07), p=0.36, p> 0,01, odatle sledi da ova veza statistički nije značajna!

5) Da li postoji statistički značajna veza izmedju sreće i prisustva korupcije u društvu (prema percepciji gradjana)?

p (p=0) vrednost je manja od 0.01, veza je statistički značajna;

Koef.korelacije je -0.28 (r=-0.28), što znači da postoji negativna i slaba veza izmedju ove dve varijable, odnosno ako nivo korupcije raste, nivo sreće se smanjuje i obrnuto.

```
qplot(data=WHR_data20, x=Corruption,y=Happ_Score,colour=Regional.indicator,size=I(4))+
  labs(title ='Corruption vs Happiness', x='Corruption', y='Happiness score')
```



Utvrdjeno je da postoji pozitivna korelacija između varijable nivoa sreće i varijabli GDP-a po stanovniku, postojanja društvene podrške, dužine očekivanog životnog veka i negativna korelacija između varijable nivoa sreće i postojanja korupcije u društvu, dok veza izmedju izmedju velikodušnosti i sreće nije statistički značajna.

Najjača je korelacija sa postojanjem društvene podrške (r=0,80), zatim sa GDP per capita (r=0,79) i dužine očekivanog životnog veka (r=0,78).

#Regresioni modeli:

Prvi model –(sve varijable izmedju kojih postoji statistički značajna korelacija)

```
Model_1 <- lm(WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita + WHR_data20$Social.support +
                WHR_data20$Life_exp+WHR_data20$Corruption)
summary(Model_1)
```

```
> summary(Model_1)

Call:
lm(formula = WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita +
    WHR_data20$Social.support + WHR_data20$Life_exp + WHR_data20$Corruption)

Residuals:
     Min       1Q   Median       3Q      Max
-1.70267 -0.38014  0.06589  0.37730  1.64494

Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)               -0.79994    0.59207  -1.351 0.178729
WHR_data20$GDP_perCapita   0.19055    0.08498   2.242 0.026428 *
WHR_data20$Social.support  3.49545    0.66525   5.254 5.09e-07 ***
WHR_data20$Life_exp        0.03909    0.01357   2.880 0.004561 **
WHR_data20$Corruption     -1.15109    0.29917  -3.848 0.000177 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.5981 on 148 degrees of freedom
Multiple R-squared:  0.7185,   Adjusted R-squared:  0.7109
F-statistic: 94.43 on 4 and 148 DF,  p-value: < 2.2e-16
```

Prvi model je prilično dobar, objašnjava 72 % varjabiliteta zadovoljstva kvalitom života (uk. ocene sreće)

r^2= 0.72, p < 0.01

Drugi model (varijable izmedju kojih je najjača korelacija)

```
Model_2 <- lm(WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita + WHR_data20$Social.support +
                WHR_data20$Life_exp)

summary(Model_2)
```

```
> summary(Model_2)

Call:
lm(formula = WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita +
    WHR_data20$Social.support + WHR_data20$Life_exp)

Residuals:
     Min       1Q   Median       3Q      Max
-1.73169 -0.44349 -0.00185  0.49128  1.67715

Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)               -2.29961    0.46586  -4.936 2.11e-06 ***
WHR_data20$GDP_perCapita   0.22882    0.08822   2.594 0.010439 *
WHR_data20$Social.support  3.17379    0.68987   4.601 8.94e-06 ***
WHR_data20$Life_exp        0.04778    0.01399   3.416 0.000819 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.6252 on 149 degrees of freedom
Multiple R-squared:  0.6903,   Adjusted R-squared:  0.6841
F-statistic: 110.7 on 3 and 149 DF,  p-value: < 2.2e-16
```

Drugi model je takodje dobar objašnjava 69 % varjabiliteta zadovoljstva kvalitom života (uk. ocene sreće)
r^2= 0.69, p < 0.01

Treći model

```
Model_3 <- lm(WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita)
summary(Model_3)
```

```
> summary(Model_3)

Call:
lm(formula = WHR_data20$Happ_Score ~ WHR_data20$GDP_perCapita)

Residuals:
     Min       1Q   Median       3Q      Max
-2.29256 -0.52524  0.02843  0.57109  1.38802

Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)               -1.19865    0.44586  -2.688  0.00799 **
WHR_data20$GDP_perCapita   0.71774    0.04757  15.088  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.7047 on 151 degrees of freedom
Multiple R-squared:  0.6012,   Adjusted R-squared:  0.5986
F-statistic: 227.6 on 1 and 151 DF,  p-value: < 2.2e-16
```

Ovaj model je takodje dobar jer objašnjava 60 % varjabiliteta ukupne ocene sreće sa samo jednom varijablom
r^2= 0,60, p < 0.01

```
Model_4 <- lm(WHR_data20$Happ_Score ~ WHR_data20$Social.support)

summary(Model_4)
```

```
> summary(Model_4)

Call:
lm(formula = WHR_data20$Happ_Score ~ WHR_data20$Social.support)

Residuals:
     Min       1Q   Median       3Q      Max
-2.01071 -0.38261 -0.04146  0.46455  2.12511

Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)                -0.1926     0.3925  -0.491    0.624
WHR_data20$Social.support   7.0059     0.4800  14.596   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.7187 on 151 degrees of freedom
Multiple R-squared:  0.5852,   Adjusted R-squared:  0.5825
F-statistic: 213.1 on 1 and 151 DF,  p-value: < 2.2e-16
```

Ovaj model je takodje dobar jer objašnjava 58 % varjabiliteta ukupne ocene sreće sa samo jednom varijablom
r^2= 0,58, p < 0.01
#Prvi model je najbolji jer objašnjava najveći procenat varijabiteta ukupne ocene sreće.