Relationship between internet use and suicide rates: an ecological anlaysis Using World Bank Data

HSS2021

2025-10-10

# Research goal

To investigate the relationship between GDP per capita and a set of eight development indicators across countries, identifying which factors most strongly predict economic performance and exploring their policy implications.

## Methods

# install necessary libraries

#options(repos = c(CRAN = "https://cloud.r-project.org"))  
# Install pacman if you haven't already  
#install.packages("pacman")  
  
# Load pacman  
library(pacman)  
  
# Use pacman to load (and install if necessary) the packages  
p\_load(WDI, summarytools, reshape2,dplyr, tidyr, ggplot2, car, broom, jtools, gtsummary, modelsummary, broom, dplyr, purrr, gt)

## download the data

indicators <- c(  
 "NY.GDP.PCAP.CD", # GDP per capita  
 "SH.STA.SUIC.P5", # Suicide mortality rate (per 100,000 population)  
 "SP.POP.GROW", # Population growth  
 "SP.DYN.LE00.IN", # Life expectancy  
 "SE.ADT.LITR.ZS", # Literacy rate  
 "EG.ELC.ACCS.ZS", # Access to electricity  
 "IT.NET.USER.ZS", # Internet users  
 "SE.SEC.ENRR", # Secondary school enrollment  
 "SL.UEM.TOTL.ZS")  
  
data\_raw <- WDI(country = "all", indicator = indicators, start = 2015, end = 2023, extra = TRUE)

## clean colnames

## change column type

# Descriptive analysis

df %>% select(-year) %>% drop\_na() %>% descr(stats = c("mean", "sd", 'min', 'max'),  
 transpose = TRUE,  
 headings = T)

## Non-numerical variable(s) ignored: iso2c, country

## Descriptive Statistics   
## df   
## N: 236   
##   
## Mean Std.Dev Min Max  
## ------------------- --------- ---------- -------- ----------  
## electricity 86.15 24.99 8.40 100.00  
## gdp 7980.58 11671.87 210.01 80056.13  
## internet 52.03 25.46 2.20 100.00  
## life\_exp 71.57 6.65 51.60 83.60  
## literacy 85.54 17.30 22.31 100.00  
## pop\_growth 1.32 1.15 -4.17 4.83  
## school\_enroll 81.88 24.43 20.19 124.85  
## suicide 7.25 5.40 0.63 29.53  
## unemployment 7.43 6.02 0.12 34.01

# correlation coefficient

# make the world map

#run the model

m5 <- lm(suicide ~ gdp + pop\_growth + life\_exp + literacy, data = data\_scaled)  
m6 <- lm(suicide ~ gdp + pop\_growth + life\_exp + literacy + electricity, data = data\_scaled)  
m7 <- lm(suicide ~ gdp + pop\_growth + life\_exp + literacy + electricity + internet, data = data\_scaled)  
m8 <- lm(suicide ~ gdp + pop\_growth + life\_exp + literacy + electricity + internet + school\_enroll, data = data\_scaled)  
m9 <- lm(suicide ~ gdp + pop\_growth + life\_exp + literacy + electricity + internet + school\_enroll + unemployment, data = data\_scaled)  
  
models <- list(  
 "Model 5" = m5,  
 "Model 6" = m6,  
 "Model 7" = m7,  
 "Model 8" = m8,  
 "Model 9" = m9  
)  
  
 modelsummary(  
 models,  
 stars = TRUE,  
 fmt = 3,  
 statistic = "({std.error})",  
 gof\_map = c("r.squared", "adj.r.squared"),  
 gof\_omit = "IC|Log|F|RMSE",  
 title = "Hierarchical Linear Models Predicting Suicide Mortality Rate",  
 coef\_map = c(  
 "gdp" = "GDP per Capita",  
 "pop\_growth" = "Population Growth",  
 "life\_exp" = "Life Expectancy",  
 "literacy" = "Literacy Rate",  
 "electricity" = "Access to Electricity",  
 "internet" = "Internet Use",  
 "school\_enroll" = "School Enrollment",  
 "unemployment" = "Unemployment Rate",  
 "(Intercept)" = "Constant"),  
 output = "markdown")

Hierarchical Linear Models Predicting Suicide Mortality Rate

|  | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 |
| --- | --- | --- | --- | --- | --- |
| GDP per Capita | 0.145+ | 0.133 | 0.169+ | 0.140 | 0.158+ |
|  | (0.078) | (0.081) | (0.090) | (0.087) | (0.089) |
| Population Growth | -0.272\*\*\* | -0.280\*\*\* | -0.277\*\*\* | -0.259\*\*\* | -0.261\*\*\* |
|  | (0.071) | (0.073) | (0.073) | (0.071) | (0.071) |
| Life Expectancy | -0.482\*\*\* | -0.446\*\*\* | -0.446\*\*\* | -0.497\*\*\* | -0.485\*\*\* |
|  | (0.112) | (0.131) | (0.131) | (0.128) | (0.128) |
| Literacy Rate | 0.297\*\* | 0.314\*\* | 0.350\*\* | 0.203+ | 0.197+ |
|  | (0.098) | (0.103) | (0.110) | (0.112) | (0.112) |
| Access to Electricity |  | -0.060 | -0.023 | -0.119 | -0.106 |
|  |  | (0.111) | (0.118) | (0.117) | (0.117) |
| Internet Use |  |  | -0.103 | -0.200+ | -0.223\* |
|  |  |  | (0.111) | (0.110) | (0.112) |
| School Enrollment |  |  |  | 0.449\*\*\* | 0.419\*\*\* |
|  |  |  |  | (0.109) | (0.113) |
| Unemployment Rate |  |  |  |  | 0.071 |
|  |  |  |  |  | (0.067) |
| Constant | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
|  | (0.061) | (0.062) | (0.062) | (0.060) | (0.060) |
| R2 | 0.123 | 0.125 | 0.128 | 0.188 | 0.192 |
| R2 Adj. | 0.108 | 0.105 | 0.105 | 0.163 | 0.163 |
| * p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 | | | | | |