### PAPER DETAILS

TITLE: INTERNET USE AND LIFE SATISFACTION IN GEORGIA

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PAGES: 82-93

ORIGINAL PDF URL: https://dergipark.org.tr/tr/download/article-file/2807797

#### International Journal of Economics, Politics, Humanities & Social Sciences

e-ISSN: 2636-8137

Geçiş Ekonomilerinin 30. Yılı Özel Sayısı / 30th Year of Transition Economies Special Issue

### INTERNET USE AND LIFE SATISFACTION IN GEORGIA

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Makale İlk Gönderim Tarihi / Recieved (First): 01.12.2022 Makale Kabul Tarihi / Accepted: 30.12.2022

Makale Türü: Araştırma Makalesi / Article Info: Research Article

Attf / Cite: Doyar, B. V. (2022). Internet use and life satisfaction in Georgia, International Journal of Economics, Politics, Humanities & Social Sciences, Geçiş Ekonomilerinin 30. Yılı Özel Sayısı/30th Year of Transition Economies Special Issue, 82-93

#### **Abstract**

The current work investigates the determinants of life satisfaction in Georgia with a particular focus on Internet use by considering individuals as consumers and laborers. The main motivation is the idea that Internet use may increase the life satisfaction of individuals (consumers and workers) and eventually their productivity. Caucasus Barometer 2021 survey data covering 1,540 individuals are used for empirical analysis. Since life satisfaction is a binary variable (either satisfied or not satisfied), a logit model is employed to investigate the relationship. Findings indicate that the highest impact on life satisfaction is captured by income level. Accordingly, higher income levels end up with a higher probability of life satisfaction. Those who are female, young, educated, and employed are more likely to be satisfied with their lives. Finally, daily Internet use shows a positive effect on life satisfaction. In this context, it is stated that Georgia can develop and implement policies that encourage Internet use.

Keywords: Internet, Life Satisfaction, Microeconomics, Logit.

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#### 1. Introduction

Life satisfaction is what people pursue. It can be seen that happiness and life satisfaction are synonymously used terms in the literature. Veenhoven (2012) defines happiness as "the personal enjoyment of life overall". Although there may be more abstract ways, life satisfaction can be obtained from the consumption of goods or services. One of the services subject to consumption is the Internet. The Internet allows many things to be done quickly, such as communication, access to information, complex calculations, etc. Thus, Internet use may contribute to life satisfaction. In other words, the level of Internet use could be correlated with happiness level. Considering individuals as laborers, they are important parts of the country's production. In this respect, happier labor force may bring more output. It may be useful to examine the relationship between life satisfaction and Internet use because of both utility and productivity.

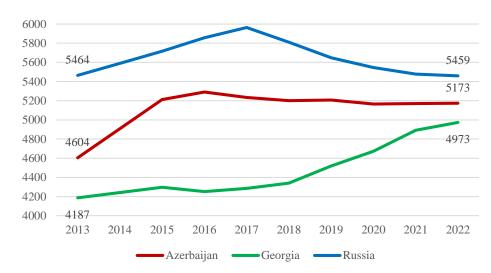


Figure 1. Happiness scores of Azerbaijan, Georgia, and Russia (2013-2022)

Source: Helliwell et al. (2013, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022)

Note: Observations in 2014 are calculated by averaging the observations in 2013 and 2015.

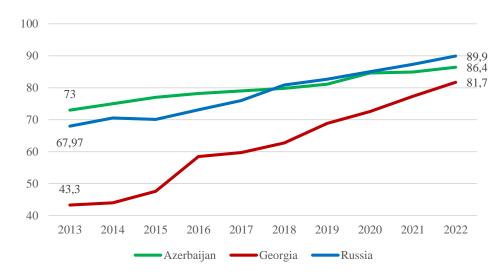
Georgia is one of the former Soviet countries. In 2021, its GDP per capita (2015=100) was about \$4,927. However, its former counterparts, say Azerbaijan (\$5,341) and Russia (\$10,220), had higher figures in 2021 (World Bank, 2022). Similar situations apply to happiness levels and the shares of Internet users as seen in Figures 1 and 2.

The level of happiness can be examined by looking at happiness scores calculated in the World Happiness Reports. First, it would be useful to explain the top countries by year. Denmark in 2013 and 2016; Switzerland in 2015; and Norway in 2017 were ranked first while Finland has ranked first since 2018. Now we can examine Georgia, as well as post-Soviet countries Russia and Azerbaijan for comparison, in Figure 1. It is seen that Georgia always falls behind each of its former counterparts. However, its ranking has increased year by year, 134th in 2013 and 105th in 2022.

Internet users as a percentage of the population for each country are given in Figure 2. All countries exhibit an increasing trend. Between 2014 and 2016, a parallel increase was observed in both the share of Internet users and the happiness scores in Georgia. However, the country falls behind the remaining countries each year. The share of Internet users in 2022 was predicted as 81.7% but the latest data from 2020 was 72.5%.



Figure 2. Internet users (%) in Azerbaijan, Georgia, and Russia (2013-2022)



Source: World Bank (2022)

Note: Observations in 2021 and 2022 are predicted using least squares.

Considering the Internet's importance on life satisfaction and Georgia's underperformance, this paper investigates the relationship between them in Georgia. It is hypothesized that "Internet use contributes to life satisfaction". Using 2021 survey data, the life satisfaction of individuals is modeled as logit. Among others, empirical results indicate that the highest impact on life satisfaction is from high income and daily Internet use also increases the probability of being satisfied.

The paper is organized as follows: The second section reviews the earlier works, the third section explains the empirical strategy, the fourth section gives empirical results, and the final section concludes.

#### 2. Literature Review

Table 1 summarizes the literature on life satisfaction and happiness and presents the coefficients of some explanatory variables. It can be said that frequently used explanatory variables include gender, age, marital status (partner), parental status (child), education, income, employment (job), health, and residency (city). However, technology-related variables, as well as religion, are used in a few studies.

Most of the studies considered here indicate that being female (e.g., Appleton & Song, 2008), having a partner (e.g., Owusu Ansah et al., 2022), and being younger (e.g., Helliwell et al., 2009) increase the probability of being satisfied. Education (e.g., Kolosnitsyna et al., 2017) and employment (e.g., Ngoo et al., 2015) also contribute to life satisfaction. The coefficient of income is either positive (e.g., Zhang et al., 2022) or insignificant (e.g., Kamo, 1998). Good health (Jovanović & Joshanloo, 2019) is also expected to increase life satisfaction. However, the impact of child and living in a city or urban remain unclear since the number of studies that found positive and negative effects are equal.



**Table 1. Summary of selected studies** 

Author	Time	Country/Region	Findings
Kamo (1998)	1995	Japan (Men)	Partner (+), Age (+), Education (.), Job (.), Income (+)
Kalilo (1996)	1993	Japan (Women)	Partner (+), Age (+), Education (+), Job (-), Income (.)
Ji et al. (2002)	1993	China	Health (.), Income (+), Education (.), Job (.), Child (.), City (+), Female (.), Age (.)
Appleton & Song (2008)	2002	China	Income (+), Employment (-), Age (-), Age-sq. (+), Female (+), Partner (+), Child (.), Health (+), Job (+), City (.)
Helliwell et al. (2009)	2007	Global	Female (+), Age (-), Age-sq. (+), Partner (.), Income (+)
Kavetsos & Koutroumpis (2011)	2005- 2008	Europe	Technology ownership (+), Female (+), Age (-), Age-sq. (+), Partner (+), Employed (+), Income (+), City (-)
Brown et al. (2012)	2008	New Zealand	Age (-), Age-sq. (+), Female (+), Child (.), Health (+), Education (+), Income (+), Employment (+), Partner (+)
Ebrahim et al. (2013)	2008	South Africa	Age (-), Age-sq. (+), Education (+), Partner (+), Female (-), Health (+), Religion (+), Child (+), Income (+), Employment (+), City (+)
Pénard et al. (2013)	2008	Luxemburg	Internet use (+), Age (.), Age-sq. (+), Partner (+), Female (.), Education (-), Job (-), Health (+), Income (+)
Meyer & Dunga (2014)	2014	South Africa (Low income)	Income (+), Employment (.), Age (.)
		East Asia	Female (.), Age (+), Education (+), Income (+), Partner (+), Employment (.)
Ngoo et al. (2015)	2005- 2007	South Asia	Female (.), Age (+), Education (+), Income (+), Partner (+), Employment (-)
		Central and West Asia	Female (-), Age (-), Education (.), Income (+), Partner (+), Employment (.)
		Southeast Asia	Female (.), Age (-), Education (+), Income (+), Partner (+), Employment (+)
Kolosnitsyna et al. (2017)	2009- 2012	Russia (Older age)	Age (+), Age-sq. (-), Health (-), Education (+), Income (+), Job (+), Partner (+), Child (.)
Jovanović and Joshanloo (2019)	2007	Serbia	Female (.), Age (-), Age-sq. (.), Health (+), Income (+), Religion (.), Education (+), Employment (+), City (.), Partner (.)
Wang et al. (2020)	2014	Guyana (Young adults)	Female (+), Partner (.), City (-), Education (.), Income (.), Internet user (.), Health (.)



Table 1. (cont'd)			
Ulutürk-Akman (2021)	2019	Türkiye	Female (+), Partner (+), Education (+), Age (+), Income (+),
Owusu Ansah et al. (2022)	2017- 2018	Ghana	Female (+), Age (-), Education (+), Partner (+), Child (-), Income (+), City (.)
Zhang et al. (2022)	2010- 2018	China	Female (+), Age (+), Education (-), Partner (.), Income (+), Health (+)

**Note:** (+) significant positive impact, (-) significant negative impact, (.) insignificant.

As for technology-related variables, Wang et al. (2020) find that being an Internet user has no significant influence on life satisfaction among young adults in Guyana. However, Pénard et al. (2013) reveal that internet use increases the probability of being happy in Luxemburg. Finally, the findings of Kavetsos and Koutroumpis (2011) support the positive impact of technology ownership in Europe. Also, Doyar et al. (2022) positive effects of technology ownership on internet use in Georgia.

### 3. Empirical Strategy

### **3.1.** Data

The survey data used is sourced from the Caucasus Research Resource Centers' (CRRC, 2021) website. The survey was implemented in Georgia in 2021 and includes 1,540 respondents.

Tablo 2. Variables

Variable	Categories	Explanation
Sex	1 for Female and 0 for Male.	Sex of the respondent
Age (18-24 years)	1 for 18-24 years, 0 otherwise.	Age of the respondent
Age (25-44 years)	1 for 25-44 years, 0 otherwise.	
Age (45-64 years)	1 for 45-64 years, 0 otherwise.	
Age (64+ <i>years</i> )	1 for 64+ years, 0 otherwise.	
Education (2-8 years)	1 for 2-8 years, 0 otherwise.	Years of education of the respondent
Education (9-16 years)	1 for 9-16 years, 0 otherwise.	
Education (16+ years)	1 for 16+ years, 0 otherwise.	
Child	1 for Yes and 0 for No.	Lives with children in the household.
Partner	1 for Yes and 0 for No.	The respondent is married or in a relationship.
Income (Low)	1 for Low income, 0 otherwise.	The economic status of the household.
Income (Middle)	1 for <i>Middle income</i> , 0 otherwise.	
Income (High)	1 for High income, 0 otherwise.	
Job (Unemployed)	1 for <i>Unemployed</i> , 0 otherwise.	Employment status of the respondent.
Job (Other)	1 for Other, 0 otherwise.	
Job (Employed)	1 for <i>Employed</i> , 0 otherwise.	



Table 2. (cont'd)

Internet use (*Never*) 1 for *Never*, 0 otherwise. Internet use density of the respondent.

Internet use (*Rarely*) 1 for *Rarely*, 0 otherwise.

Internet use (*Daily*) 1 for *Daily*, 0 otherwise.

Respondents' ages vary between 18 and 94 years while their years of education vary between 2 and 25 years The variables and their explanations are given in Table 2.

Table 3. Descriptive characteristics of the sample by life satisfaction

Variable	Category	Not satisfied	Satisfied	Total
Sex	Male	296 (55.33%)	239 (44.67%)	535
	Female	525 (54.01%)	447 (45.99%)	972
Age	18-24 years	19 (21.35%)	70 (78.65%)	89
	25-44 years	163 (41.58%)	229 (58.42%)	392
	45-64 years	311 (58.13%)	224 (41.87%)	535
	64+ years	328 (66.80%)	163 (33.20%)	491
Education	2-8 years	56 (74.67%)	19 (25.33%)	75
	9-16 years	700 (54.60%)	582 (45.40%)	1282
	16+ years	61 (44.53%)	76 (55.47%)	137
Child	No	532 (58.78%)	373 (41.22%)	905
	Yes	289 (48.01%)	313 (51.99%)	602
Partner	No	393 (62.78%)	233 (37.22%)	626
	Yes	427 (48.52%)	453 (51.48%)	880
Income	Low	580 (67.29%)	282 (32.71%)	862
	Middle	189 (39.38%)	291 (60.62%)	480
	High	36 (25.71%)	104 (74.29%)	140
Job	Unemployed	135 (60.00%)	90 (40.00%)	225
	Other	464 (60.81%)	299 (39.19%)	763
	Employed	220 (42.88%)	293 (57.12%)	513
Internet use	Never	371 (68.45%)	171 (31.55%)	542
	Rarely	88 (68.22%)	41 (31.78%)	129
	Daily	359 (43.41%)	468 (56.59%)	827

Table 3 shows descriptive statistics. Respondents in categories male, female, old age groups, low level of education groups, no children in the household, no partner, low income, unemployed and other job groups, Internet non-users, and rare Internet users are not satisfied with their lives. However, respondents in categories of young age groups, high level of education group, children in the household, having a partner, higher income groups, employed, and daily Internet users are satisfied with their lives.



### 3.2. Model and Methodology

The empirical strategy employed here can be explained by referring to Long & Freese (2001: 100-101). The dependent variable life satisfaction  $(y_i)$  has a binary nature as follows:

$$y_{i} = \begin{cases} 1 & \text{if } y_{i}^{*} = x_{i}'\beta + u_{i} > 0 \\ 0 & \text{if } y_{i}^{*} \le 0 \end{cases}$$
 (1)

 $y_i$  takes the value of 1 if the latent variable  $y_i^*$  is higher than zero. In this case, the respondent is said to be satisfied with their life. Otherwise,  $y_i$  takes the value of 0 and the respondent is understood not to be satisfied with their life.  $x_i$  is the vector of explanatory variables and includes sex, age, education, children in the household, marital status, income, job, and Internet use.  $\beta$  corresponds to the vector of coefficients. Finally, the random error term  $u_i$ , which has zero mean, is assumed to have logistic distribution. Therefore, the following logit model is employed to investigate the relationship:

$$Pr(y_i = 1|\mathbf{x}) = \frac{\exp(\mathbf{x}_i'\boldsymbol{\beta})}{1 + \exp(\mathbf{x}_i'\boldsymbol{\beta})}$$
(2)

#### 4. Estimation Results

Table 4 presents marginal effects calculated from the logit model. The logit model produced lower information criteria than the probit model. Results from the probit model can be found in the Appendix.

Table 4. Marginal effects calculated from the logit model

Variable	Marg. effect	Std. error
Sex: Female	0.072***	0.027
Age (Base: 18-24 years)		
25-44 years	-0.274***	0.062
45-64 years	-0.372***	0.061
64+ years	-0.352***	0.064
Education (Base: 2-8 years)		
9-16 years	0.088	0.059
16+ years	0.132*	0.071
Child: Yes	-0.002	0.027
Partner: Yes	0.141***	0.026
Lives in a city: Yes	-0.021	0.025
Economic status (Base: Low)		
Middle	0.189***	0.024
High	0.291***	0.043
Job (Base: <i>Unemployed</i> )		
Other	0.020	0.039



#### Tablo 4 (cont'd)

Employed	0.085**	0.037
Internet use (Base: Never)		
Rarely	-0.085*	0.047
Daily	0.072**	0.031
Observations	1,493	
Pseudo R-squared	0.133	
Chi-square	273.91***	
Akaike information criterion	1814.869	
Bayesian information criterion	1899.806	
*** p<0.01, ** p<0.05, * p<0.1		

The model's explanatory power is about 13.3%. It is known that pseudo  $R^2$  can be low in microeconometric models (Lera-López et al., 2011). The model is statistically significant as the chi-square test indicates. The logit model is presented because it produces lower information criteria than the probit model.

Females are %0.7 more likely to be satisfied compared to males. Compared to those between the ages 18-24 years, people in 25-44 years, 45-64 years, and 64+ years are respectively 27.4%, 37.2%, and 35.2% less likely to be satisfied. Only a higher level of education has a significant impact on Life satisfaction. People with 16+ years of education are 13.2% more likely to be satisfied than those with 0-8 years of education. Neither living with a child in the household nor residing in a city has no significant effect.

Those who have partners are 14.1% more likely to be satisfied than single. The highest impacts on life satisfaction are captured by income levels. Compared to low income, middle income and high income end up with 29.1% and 18.9% higher probability of satisfaction. There is no significant impact of being in the other job groups. However, the employed appear 0.85% more likely to be satisfied than the unemployed. Interestingly, rare Internet users are found 0.85% less likely to be satisfied than Internet non-users. However, everyday Internet users are 0.72% more likely to be satisfied than those who do not use the Internet.

#### 5. Conclusions

Life satisfaction of individuals as consumers and workforce can affect their utility and productivity levels. In the meantime, the place occupied by the internet, as well as other technologies, in people's lives has been increasing day by day. Therefore, if the internet influences life satisfaction, examining it will be important for a country's economy.

In this study, Georgia, which underperforms compared to some of its former partners, is examined. Survey data used for empirical analysis include 1,540 respondents and cover the year 2021. Life satisfaction is modeled as a function of internet use, as well as other variables. Within the framework of the logit model, findings indicate that being female, young, educated, and employed, as well as having a partner and high income are more likely to be satisfied with their life. These findings on sex, age, education, partner, income, and job are in parallel with Appleton and Song (2008), Helliwell et al. (2009), Brown et al. (2012), Ngoo et al. (2015), Ulutürk-Akman (2021), and Ebrahim et al. (2013), respectively. However, both child in the household and living in a city has no significant impact as in Ji et al. (2002) and Owusu Ansah et al. (2022). Young people and those in relationships being happier are



already expected outcomes. However, sources of positive impact of being female could be related to the social structure of Georgia. Therefore, it can be examined separately in the future research. Also, educated and employed people may be able to reach happiness more easily by using the knowledge and experience they own. Finally, employment and high income may be removing barriers to happiness.

A significant and positive coefficient of the life satisfaction variable confirms the hypothesis indicating "internet use contributes to life satisfaction". This finding is compatible with Kavetsos and Koutroumpis (2011) and Pénard et al. (2013). The country may develop and implement policies to encourage Internet use in this regard.

### Araştırmacının Katkı Oranı (Author's Contributions)

Bu makale yazarın kendi çabaları ve incelemeleri neticesinde oluşturulmuştur.

This article was created as a result of the author's own efforts and reviews.

### Destek ve Teşekkür (Fundings and Acknowledgments)

Çalışma, kamusal, özel, ticari nitelikte ya da kar amacı gütmeyen herhangi bir kurumdan destek alınmadan hazırlanmıştır.

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

#### **Catişma Beyani (Competing interests)**

Çalışmanın yazarı, herhangi bir çıkar çatışması olmadığını beyan etmektedir.

The author declares that has no competing interests.

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### APPENDIX

Table. Marginal effects from the probit model

Variable	Marg. effect	Std. erro
Sex: Female	0.070**	0.027
Age (Base: 18-24 years)		
25-44 years	-0.258***	0.059
45-64 years	-0.356***	0.058
64+ years	-0.336***	0.061
Education (Base: 2-8 years)		
9-16 years	0.087	0.058
16+ years	0.128*	0.070
Child: Yes	-0.000	0.027
Partner: Yes	0.137***	0.026
Lives in a city: Yes	-0.020	0.025
Economic status (Base: Low)		
Middle	0.193***	0.025
High	0.289***	0.043
Job (Base: <i>Unemployed</i> )		
Other	0.018	0.039
Employed	0.084**	0.037
Internet use (Base: Never)		
Rarely	-0.084*	0.046
Daily	0.074**	0.032
Observations	1,493	
Pseudo R-squared	0.132	
Chi-square	272.158***	
Akaike information criterion	1816.620	
Bayesian information criterion	1901.556	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1