

Research Article

# The Use of Internet and Social Networks During covid-19 in Greece

Lambros Tsourgiannis<sup>1,2,3\*</sup>, Stavros Valsamidis<sup>4</sup>, Polina Karagianni<sup>5</sup>, Konstantinos Tassos<sup>6</sup>

<sup>1</sup>Directorate of Public Health and Social Care of Regional District of Xanthi, Region of Eastern Macedonia and Thrace, Headquarters Xanthi, Greece

<sup>2</sup>International Hellenic University, Department of Accounting and Finance, Campus of Kavala, 65404 Kavala Greece

<sup>3</sup>Hellenic Open University, School of Social Sciences, Management Studies, Patra, Greece

<sup>4</sup>International Hellenic University, Department of Accounting and Finance, Campus of Kavala, 65404 Kavala Greece

<sup>5</sup>Hellenic Army General Staff, 4<sup>th</sup> Army Corps, Headquarters, Xanthi, Greece

<sup>6</sup>Hellenic Army General Staff, 4<sup>th</sup> Army Corps, Headquarters, Xanthi, Greece

## Abstract.

Human civilization has been transformed dramatically due to the increase of information and communication technologies (ICTs). The new digital era, and more particularly the digitization of information has contributed to many changes in all areas of life. More specifically the social relations among people developed new social and cultural structures. Furthermore, the COVID-19 pandemic forced humanity to adopt digital technologies in most aspects of economic and social life. Internet, telework, remote work, and distance learning are now part of everyday life in society, and users of online social networks have increased dramatically in comparison with those of recent decades around the world. On the other hand, the situation that human experience due to the pandemic produced by COVID-19 disease may have increased the negative effects of excessive use of social networks.

This study aims to explore the attitudes of Greek citizens toward the use of the Internet and social media before and during the pandemic. A primary survey on random 525 Greek citizens was conducted from September–November 2021. Principal component analysis (PCA) was conducted to identify the main attitudes of Greek citizens toward the use of social media during COVID-19 era. Therefore, two main attitudes were derived from PCA: (a) use of social media to be informed, and (b) use of social media for entertainment.

Cluster analysis was performed to classify those citizens into groups according to their attitudes toward the use of social networks during COVID-19 period. It identified three groups of citizens: (a) those who are indifferent to the use of social networks (b) those who use social networks mainly to be informed, and (c) those who use social networks only for entertainment. Following that, a Friedman nonparametric test was performed to determine the primary reasons why Greek citizens use the Internet and social networks prior to and during the COVID-19 pandemic. Nonparametric tests, including the Chi-square and Friedman nonparametric tests were performed to develop the profile of each of the identified groups of citizens toward the main reasons they use the Internet and social networks, for what purposes, and their demographic characteristics.

Corresponding Author: Lambros Tsourgiannis; email: [ltsourgiannis@gmail.com](mailto:ltsourgiannis@gmail.com)

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## 1. Introduction

Social media consists of an important element in the development of information and communication technologies (ICT). Social networks were an important evolution in the development of ICT [11]. The ongoing changes in ICT, the fast digitalization, and the expansion of opportunities offered by the internet and online activities altogether form a “virtual mobility” [20]. Social networks have bridged the gap of communication by providing a vast number of features for transferring the data from one client to other [1]. In the new form of the society especially during the pandemic period, face to face interactions has been replaced with virtual ones, physical meeting with video conferences and online meetings [10]. Social networks including Facebook, Twitter, LinkedIn, etc. are part of social media which includes except the social networks and other media such as blogs (WordPress, Blogger etc), multimedia systems (iTunes, Youtube, Vimeo, etc), geolocation systems etc. Young people are using social networks for educational purposes, but the problem arises when these networks are mainly used within their leisure activities and diverse interpersonal communications [8, 18, 13, 9, 19]. On the other hand, social networks contribute significantly according to Yang et al. [21] in meeting diverse information needs, demands for online consultation and online inquiries for the public during the COVID-19 crisis. During the period of confinement imposed by the COVID-19 pandemic, messages, chats, or video calls to loved ones have brought family and friends closer together, making social isolation more bearable [9]. Social media has been playing a major role in fighting the virus and its impact through a multitude of measures including the continuous transmission of local and global updates about the pandemic as well as issuing warnings and guidelines for dealing with the pandemic and its aftermath [29]. In a large-scale study conducted in 2019 by Ofcom [30], the UK governments regular for the communications services that are used by the public, it was shown that Half of the adults in the UK now use social media to keep up with the latest news”. Furthermore, governments and major centers for disease control, including the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), are relying on social networks as a mean for managing the evolving pandemic by regularly disseminating guidance and updates and by providing emergency responses [29].

Efforts undertaken by the authorities to minimize the spread of COVID -19 have dramatically affected the social life [21]. Politicians, stakeholders, and universities undertook drastic measures that affected how citizens and students interact and socialize with each other [5]. In many countries people are required to reduce physical contact to others

outside their households. Many universities around the world switched the classroom teaching to the online teaching whilst the social distancing measures increased the social isolation of people [3].

Arab and Diaz [2] argued that the development of skills, creativity, new learning opportunities, socialization and motivation are some of the benefits of digital technologies whilst the lack of communication limits, reduced listening skills and emotional withdrawal consist of the negative aspects. Moreover, according to Gomez – Galan et al. [9] the pandemic of COVID -19 may contributed to the increase of the negative effects of the excessive use of social networks. On the other hand, they also mentioned that messages, chats, video calls, during the pandemic have brought family and friends closer together, making social isolation more bearable. Social media is one of the most effective mechanisms of communication as about four billion people are active social media users [14]. Social media can be used to increase public awareness during crises and share information by governments and stakeholders mainly during health crises including Ebola and Zika viruses outbreaks as well as for societal movements such as MeeToo and FridaysForFuture [26, 14]. Facebook is the most used social media followed by WhatsApp Instagram, Youtube and Twitter according to Kaya [14]. Most of the respondents used social media mainly for following recent news followed by chat and communication and finally following friends [14]. The same researcher argued that social media used mainly for information retrieval during the pandemic, increases public awareness and affects the decision-making process of stakeholders and public authorities. A good example can be seen with the peak of searches for information on the Internet and social media platforms in China preceding the peak of incidence in COVID-19 cases by 10-14 days, with which Internet and social media networks searches have a demonstrated correlation with the incidence of disease [1, 17].

Vahdat-Nejad [25] argued that regarding the COVID-19, the public which is the main audience can be segmented into different age, job and sex groups as well as to those with underlying disease which make them more conscious to COVID-19. They also argued that communication goal should be adherence to healthy behaviour and instructions related to COVID-19.

The most relevant information on the influence, and advantages, and disadvantages of the use of social networks during the COVID-19 pandemic is presented in [11]. Online activities replaced physical participation in activities and contributed to changes in urban mobility during the pandemic. Using data from a nationwide survey in Greece, the paper examines changes in the importance and the frequency of engaging in online activities before and during COVID-19 [20]. The digital technology played a critical role

in numerous aspects of the daily lives of Greek students, helping them to discover new ways to navigate the unprecedented new reality formed due to the COVID-19 pandemic [22].

Hence, this study aims to explore the attitudes of Greek citizens towards the use of Internet and social media during the pandemic.

Therefore, this study aims to examine the following null research hypotheses:

Ho1: "Greek citizens cannot be classified into similar groups according to their attitudes towards the use of social -media during COVID 19 period".

Ho2: "Greek citizens use Internet for different reasons before and during the pandemic".

Ho3: "The demographic and personal characteristics of Greek citizens are not significantly related to their attitudes towards the use of social media during COVID -19 period".

Ho4: "The duration of the use of social networks, are not significantly related to their attitudes towards the use of social media during COVID -19 period".

Ho5: "The media and social networks citizens use are not significantly related to their attitudes towards the use of social media during COVID -19 period".

## 2. Materials and Methods

For the purposes of the work, a primary electronic survey was carried out between the months of October - November 2021 using a structured questionnaire in a random representative sample of 525 Greek citizens. Prior to the main sampling, a pilot survey took place in September 2021 to evaluate if the research objectives were met by the designed questionnaire. The preliminary survey was performed for a total of 50 citizens. Based on the analyzed results, the survey sample was considered adequate to conduct the final survey with no further modification. The researchers based on the methodology presented by Oppenheim [21], in order to have representative sample for the geographical area of Greece, seven regions were randomly selected from a total of thirteen. In the second stage, two prefectures were randomly selected from each studied region. In the next stage the researchers used volunteer enumerators from each selected prefecture in order these enumerators to send the questionnaire electronically through their social networks to citizens of their area. Each enumerator should send the questionnaire to 50 people.

As it was not possible to know how many respondents are from each region (and this consist of one limitation of the current study), the representativeness of the sample assessed by checking the proportion of the members of the sample who declared that have an account and use social networks with those of the pilot survey adopting the methodology proposed by Siardos [23]. More specifically, the proportion of the of the citizens ( $p$ ) in the pilot survey who indicated that use social networks is 90%, whilst the total population of the Greece ( $N$ ) is 10,816,286 according to Greek Census data [6]. Therefore, in order to achieve a representative sample, the sample size should be at least 380 consumers (in order have  $z=3$  and  $d=5\%$ ). The researchers to secure a representative sample send the questionnaire electronically to 700 persons. The productive sample reached the 525 persons (75% response rate) and is reasonable representative according to Siardos [23] methodology ( $z=1.96$  and  $d=5\%$ ). Additionally, a power analysis ( $\beta = 0.95$ ) was conducted using the software package G\*POWER 3.1.9.2 [7, 24], indicating a minimum sample size of 111 people for a medium effect size [4]. Therefore, a sample size of 525 people has been considered as fully representative of the whole Greek population.

Moreover, multivariate statistical analysis conducted for the 525 cases that consist of the sample of this study. In particular factor analysis conducted to identify the main attitudes of Greek citizens towards the use of social media during COVID 19 era. More specifically Principal Component Analysis (PCA) was used to identify the variables that accounted for the maximum amount of variance within the data in terms of the smallest number of uncorrelated variables (components). The anti-image correlation matrix, as well as the Bartlett's test of sphericity and the Measure of Sampling Adequacy (MSA) were used, in order to check the appropriateness of the data for subsequent factor analysis [28]. An orthogonal rotation (varimax method) was conducted and the standard criteria of eigenvalue = 1, scree test and percentage of variance were used in order to determine the factors in the first rotation [10]. Cluster analysis performed to classify those citizens into groups according to their attitudes towards the use of social networks during COVID 19 period. Nonparametric tests including chi-square and Friedman nonparametric test performed to develop the profile of those citizens. In the next stage Friedman nonparametric test performed to identify the main reasons Greek citizens use Internet prior and during the COVID – 19 pandemics.

Nonparametric tests including chi-square and Friedman nonparametric test performed to develop the profile of each of the identified group of citizens towards the main reasons they use Internet and social networks, for what purposes and their demographic characteristics.

The chosen scale in this research, for the second part of the questionnaire, was the 5-point Likert scale where 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree. To ensure the appropriateness of the questionnaire, it has been tested for Content validity, Construct validity and Reliability.

### 3. Results

The survey involved a total of 525 cases, who were asked to answer a series of questions concerning both demographic data but mainly questions related to their attitudes towards the use of social networks during the COVID-19 outbreak, the reasons they use Internet during the pandemic, the duration of the use of Internet during COVID-19., the media and social networks Greek citizens use in order to be informed about the news and COVID-19 pandemic.

TABLE 1: Sociodemographic characteristics of the respondents.

Age	Percentage
<22 years old	35.4%
23-39 years old	32.4%
40-55 years old	29.3%
56-70 years old	2.9%
Total	100.0%
Education	Percentage
Primary School	5.7%
High School	31.7%
University Degree	38.3%
Postgraduate Degree	24.3%
Total	100.0%

Therefore, about one third of the respondents are postmillennial (<22 years old), one third millennials (23-39 years old), one third people of Generation X (40-55 years old) and about 3% BabyBoomers (56-70 years old). Furthermore, 5.7% of the respondents have finished the primary school, 31.7% attended the high school, 38.3% hold a university degree and 24.3% of them hold a postgraduate degree. Therefore, about a quarter of the respondents have a post graduate education and about 62% have a highest education (undergraduate and postgraduate).

#### 3.01. The attitudes of Greek citizens towards the use of social networks during COVID -19

### 3.0.2. pandemic

The researchers performed principal component analysis (through a varimax rotation) in order to identify the key variables describing the attitudes of the Greek citizens towards the use of social networks during COVID -19 era and the latent root criterion (eigenvalue =1) as well as the percentage of variance were used to determine the number of factors (Table 2). Several different trial rotations were conducted to compare factor interpretability as by Hair [12].

TABLE 2: The attitudes of the Greek citizens towards the use of social networks during COVID -19 pandemic.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.204	52.039	52.039	5.204	52.039	52.039
2	1.261	12.606	64.645	1.261	12.606	64.645
3	0.828	8.282	72.927			
4	0.757	7.574	80.501			
5	0.591	5.915	86.416			
6	0.356	3.564	89.980			
7	0.321	3.209	93.189			
8	0.317	3.166	96.355			
9	0.199	1.988	98.343			
10	0.166	1.657	100.000			

Two factors are formed such as interpreting 64.65% of total volatility. From charging variables to each of the two factors (Table 3) we can define them as follows: (a) Use of social media to be informed, and (b) Use of social media for entertainment.

In the next stage the researchers conducted cluster analysis in order to group Greek citizens in relation to their attitudes towards the use of social of social networks during COVID -19 period and identified three groups of people (Table 4): It identified three groups of citizens: (a) those who are indifferent to the use of social networks (b) those who use social networks mainly to be informed and (c) those who use social networks only of entertainment.

In particular, those who are indifferent to the use of social networks do not pay attention to any identified factor. On the other hand, most of the people who use social networks mainly to be informed they use them in order to be informed about the political news around world, social news, economic news, health evolutions, communication with friends. Most of the Greek citizens who use social networks only for entertainment use them to play videogames, to gossip, to do shopping and to be informed about the new fashion trends.

TABLE 3: The main attitudes of Greek citizens towards the use of social networks during COVID -19 pandemic.

	Component	
	1	2
Social networks are important for my information about the political news around the world	0.898	0.157
Social networks are important for my information about the social news around the world	0.871	0.222
Social networks are important for my information about the economic news around the world	0.855	0.191
Social networks are important for my information about health evolutions	0.842	0.189
Social networks are important for my information about educational evolutions	0.775	0.287
Social networks are important for my communication with my friends	0.512	0.293
Social networks are important for me in order to play video games	0.004	0.724
Social networks are important for gossip reasons	0.211	0.717
Social networks are important for my shopping	0.375	0.709
Social networks are important for my information about the fashion trends	0.410	0.621

KMO MSA = 0.885 Bartlett test of Sphericity = 3036.798 P <0.001

TABLE 4: Classification of the Greek citizens regarding their attitudes towards the use of social networks during COVID-19 period.

The main attitudes of citizens towards the use of social networks during COVID-19 period	Cluster			P
	Those who are indifferent to the use of social networks	Those who use social networks mainly to be informed	Those who use social networks only of entertainment	
Use of social media to be informed	-0.74959	0.36373	1.12037	0.001
Use of social media for entertainment.	-0.37258	1.11072	-0.76461	0.001
N=525	249	162	114	

Therefore,  $H_0$ : “Greek citizens cannot be classified into similar groups according to their attitudes towards the use of social -media during COVID 19 period” can be rejected.

The Friedman one-way nonparametric test used to identify the importance of the reasons Greek people use Internet before and during the pandemic. As Table 5 represents, Greek people, before the pandemic, mainly used Internet for social networking, watching online movies and for pay tv services such as Netflix whilst during the COVID-19 outbreak they mainly used Internet for social networking, online education and pay



TABLE 5: The reasons citizens use Internet before and during COVID-19 outbreak.

Importance of the reasons citizens use Internet	Before Covid-19	During Covid-19
Business/work (not teleworking)	5.17	4.45
Teleworking	3.24	3.92
Education	4.54	5.11
Online education	3.93	5.93
Playing games	4.61	4.32
Pay TV e.g. Netflix	5.98	5.69
Online movies	6.24	5.67
Social networking	7.19	6.25
Other	4.09	3.65

tv. Therefore, the importance of the reasons people in Greece use Internet before and during COVID-19 pandemic is different.

Therefore,  $H_{o2}$ : “Greek citizens use Internet for different reasons before and during the pandemic” may be rejected.

### 3.1. Profiling each group of Greek citizens according to their demographic characteristics and their preferences about the use of social networks

The chi-square analysis that has been conducted for each group of Greek citizens indicated (Table 6) that those who are indifferent to the use of social networks are mainly between 40-55 years old, are well educated and mainly free licensed. On the other hand, those who use social networks mainly to be informed are between 23-39 years old, having a university degree and working as free licensed. Those who use social networks only for entertainment are quite young (less than 22 years old), mainly students who have finished the high school.

Hence, the research hypothesis  $H_{o3}$ : “The demographic and personal characteristics of Greek citizens are not significantly related to their attitudes towards the use of social media during COVID -19 period” can be rejected.

Furthermore, as Table 7 indicates, most of the citizens who are indifferent to the use of social networks mainly use Internet for more than 4 hours per day and mainly for about 4-6 hours per day. The other two groups have similar patterns about the use Internet during COVID-19 period and mainly for more than 8 hours per day.

TABLE 6: Profiling each group of Greek millennials according to their demographics.

Demographic Characteristics		Those who are indifferent to the use of social networks		Those who use social networks mainly to be informed		Those who use social networks only of entertainment	
Age	<22 years old	$\chi^2=62,888$ ( $P<0.001$ )	29%	$\chi^2=55,432$ ( $P<0.001$ )	30%	$\chi^2=39,754$ ( $P<0.001$ )	45%
	23-39 years old		33%		44%		29%
	40-55 years old		35%		25%		23%
	56-70 years old		4%		1%		4%
Education	Primary School	$\chi^2=41,458$ ( $P<0.001$ )	8%	$\chi^2=84,222$ ( $P<0.001$ )	4%	$\chi^2=41,368$ ( $P<0.001$ )	3%
	High School		27%		30%		46%
	University Degree		36%		52%		24%
	Postgraduate Degree		29%		15%		29%
Occupation	Student	$\chi^2=143,928$ ( $P<0.001$ )	25%	$\chi^2=131,333$ ( $P<0.001$ )	13%	$\chi^2=77,368$ ( $P<0.001$ )	38%
	Civil Servant		22%		17%		24%
	Private Employee		14%		15%		11%
	Free Licensed		30%		48%		22%
	Retired		4%		6%		3%
	Unemployed		4%		0%		0%
	Housekeeping		1%		2%		3%

TABLE 7: Profiling each group of Greek citizens regarding the duration of the use of during COVID-19 period.

		Those who are indifferent to the use of social networks		Those who use social networks mainly to be informed		Those who use social networks only of entertainment	
Duration of the use of Internet during COVID-19	0-2 hours/day	$\chi^2=40.084$ ( $P<0.001$ )	5%	$\chi^2=55.432$ ( $P<0.001$ )	0%	$\chi^2=28.105$ ( $P<0.001$ )	3%
	2-4 hours/day		12%		6%		13%
	4-6 hours/day		25%		11%		13%
	6-8 hours/day		22%		20%		21%
	8-10 hours/day		19%		28%		29%
	10-12 hours/day		17%		35%		21%
	12+ hours/day		0%		0%		0%

Hence, the research hypothesis  $H_04$ : “*The duration of the use of social networks, are not significantly related to their attitudes towards the use of social media during COVID -19 period*” can be rejected

Friedman nonparametric test employed to profile the three identified groups towards the media and social networks they use in order to be informed about the news and COVID-19 pandemic. In particular, as Table 8 represents the Greek citizens who are indifferent to the use of social networks and those who use social networks for entertainment have similar profile. In particular, they mainly use websites/blogs in order to be informed about the pandemic, secondly Facebook and thirdly TV. During their daily routine they mainly use Youtube, secondly Facebook and thirdly Instagram. They also mainly use Facebook, secondly, Youtube and thirdly Instagram in order to be informed about the news in general and the evolutions regarding the COVID-19. On the other hand, those who use social networks to be informed they mainly use websites and blogs to be informed about the pandemic, secondly social networks and thirdly TV. During their daily routine they mainly use Youtube, secondly Instagram and thirdly Facebook. They mainly use Facebook, secondly Instagram and thirdly YouTube in order to be informed about the news and the evolutions regarding the pandemic.

Therefore, the research hypothesis  $H_05$ : “*The media and social networks citizens use are not significantly related to their attitudes towards the use of social media during COVID -19 period*” maybe rejected.

## 4. Discussion

This study indicated that Internet and social networks during the pandemic have significant impact on peoples’ information and entertainment supporting the findings [8, 18, 13, 9, 19]. They also use Internet and social networks either to be informed or for entertainment reasons and more particular in order to be informed about the political news around world, social news, economic news, health evolutions, communication with friends; as well as to play videogames, to gossip, to do shopping and to be informed about the new fashion trends.

According to the current research Greek citizens can be classified into similar groups according to their attitudes towards the use of social media during COVID 19 period. They use Internet for different reasons before and during the pandemic. Their attitudes towards the use of social media during COVID -19 period are significantly related to their sociodemographic characteristics as well as the duration of the use of social media and networks. As during the pandemic period, face to face interactions and communications

TABLE 8: The media and social networks Greek citizens use in order to be informed about the news and COVID-19 pandemic.

The media and social networks Greek citizens use		Those who are indifferent to the use of social networks ( $\chi^2=2871.708$ ; $P<0.001$ )	Those who use networks to be informed mainly ( $\chi^2=2304.038$ ; $P<0.001$ )	Those who use networks of entertainment only ( $\chi^2=1424.186$ ; $P<0.001$ )
Media used to be informed about COVID-19	TV	19.18	19.93	19.53
	Radio	14.73	12.32	12.93
	Websites/blogs	24.21	23.15	24.03
	Newspapers	12.77	10.64	11.83
	Social Networks	21.45	23.08	23.37
	Not informed	15.26	12.45	11.49
	Other	13.05	11.83	13.08
Social networks used during the daily routine	Facebook	7.95	7.96	7.63
	Instagram	7.86	8.45	7.53
	Youtube	8.89	8.85	8.42
	Viber	6.04	5.58	6.08
	Linkedin	3.93	3.74	4.16
	Twitter	3.69	3.63	3.75
	Reddit	3.75	3.69	3.38
	Tinder	3.54	4.81	3.83
	Tik Tok	4.59	5.02	4.74
	Other	4.76		5.49
Social networks used to be informed about the news in general	Facebook	22.04	22.89	22.86
	Instagram	15.52	20.65	16.21
	Youtube	17.32	18.96	18.42
	Viber	14.31	13.14	13.82
	Linkedin	11.78	10.17	11.20
	Twitter	10.44	10.24	11.17
	Reddit	10.52	9.44	8.99
	Tinder	10.05	9.15	8.99
	Tik Tok	10.58	10.68	10.97
	Other	11.79	12.02	14.26
Social networks used to be informed about the COVID-19	Facebook	20.05	22.06	21.87
	Instagram	12.81	17.96	13.18
	Youtube	14.66	15.69	16.49
	Viber	12.13	12.20	12.62
	Linkedin	10.78	9.06	10.11
	Twitter	10.18	9.69	10.36
	Reddit	10.54	9.69	9.18
	Tinder	9.92	9.01	8.63
	Other	12.00	12.29	13.42

has been replaced with digital ones, social networks are mainly used by young people within their leisure activities and diverse interpersonal communications [8, 18, 13, 9, 19], this study supports the above arguments.

Moreover, this study identified that the main difference in the use of internet by Greek citizens before and during the pandemic is that during the pandemic it is used for online education. On the other hand, Greek citizens use internet for social networking and online tv before and during the pandemic. Hence this study supported the arguments [10] that messages, chats, video calls are quite important during the pandemic to make isolation more bearable. Moreover, according to the current study, people in Greece mainly use websites/blogs Facebook, Instagram and Youtube to be informed about COVID-19 and other aspects of their routine. Besides, this study argues that social networks can be used to public awareness as it was used in the Ebola and Zika crises supporting the argument of Wu et al. [26] and Kaya [14].

Hence, the relative stakeholders should use social networks in order to increase the awareness of the Greek people regarding the prevention measures, self-protection measures and vaccination against COVID-19.

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