ECORFAN Journal-Mexico June, 2024 Vol.15 No.32 9-18
Article

Analysis of the impact of ICT by socioeconomic level

Análisis del impacto de las Tic por nivel socioeconómico

Jiménez-García, Martha *[a], Caamal-Olvera, Cinthya Guadalupe [b], Gómez-Miranda, Pilar [c] and Jiménez-Jiménez, Rosa Sara [d]

[a] Instituto Politécnico Nacional – UPIICSA • AGW-9031-2022 • 0000-0002-8556-2955 • 292983
[b] Universidad Autónoma de Nuevo León • AAO-3896-2020• 0000-0003-0249-4027 • 46294
[c] Instituto Politécnico Nacional, UPIICSA • KFB-8604-2024 • 0000-0002-1480-3061 • 551606
[d] Universidad Nacional Autónoma de México • GPP-1875-2022 • 0000-0003-0760-5697 • 1016274

CONAHCYT classification:

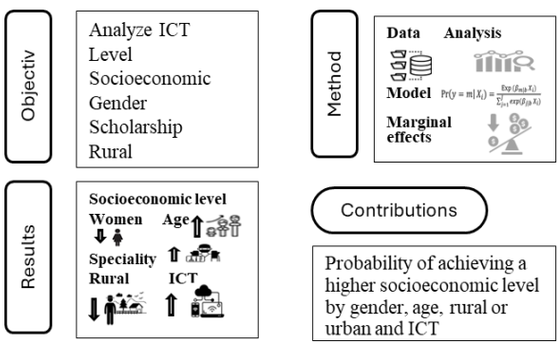
Area: Social Sciences
Field: Economic Sciences
Discipline: Economics of technology change
Subdiscipline: Technology and social change

https://doi.org/10.35429/EJM.2024.32.15.9.18
History of the article:
Received: February 18, 2024
Accepted: June 30, 2024

* ✉ [majimenez@ipn.mx]

Abstract

Information and communication technologies (ICT) strengthen the economy. Likewise, the socioeconomic level in Mexico is classified into 4 levels. The objective was to analyze ICT by socioeconomic level, considering gender, education and territorial scope. Data from the National Survey of Availability and Use of Information Technologies in Households 2021 were used. The sample was 15,325,746 households. An econometric model was developed using the Logit and Probit methods. The following was found: 1) Women cannot reach high levels, 2) The older they are, the higher the level, 3) The specialty educational level has a higher socioeconomic level, 4) The urban area reaches a higher stratum compared to the rural area, 5) The use of the computer and the Internet also presents high levels. It is concluded that the most vulnerable are rural women with primary level who do not use ICT.

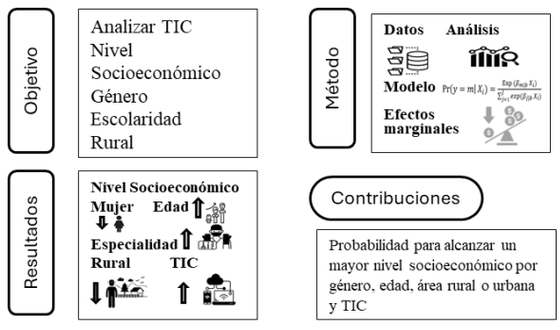


Predictive model of socioeconomic level

Technologies, Socioeconomic, Rural

Resumen

Las Tecnologías de información y comunicación (TIC) fortalecen la economía. Asimismo, el nivel socioeconómico en México está clasificado en 4 niveles. El objetivo fue analizar las TIC por nivel socioeconómico considerando el género y la escolaridad y el ámbito territorial. Se utilizaron los datos de la Encuesta Nacional de Disponibilidad y Uso de Tecnologías de Información en los Hogares 2021. La muestra fue de 15,325,746 hogares. Se elaboró un modelo econométrico por los métodos Logit y Probit. Se encontró lo siguiente:1) La mujer no puede alcanzar niveles altos, 2) A mayor edad mayor nivel, 3) El nivel educativo especialidad tiene un mayor nivel socioeconómico, 4) El área urbana alcanza mayor estrato en comparación con la rural, 5) El uso de la computadora y del internet tambien presenta altos niveles. Se concluye que las más vulnerables son las mujeres rurales con nivel primaria que no usan las TIC.



Modelo predictivo del nivel socioeconómico

Tecnologías, Socioeconómico, Rural

Citation: Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18

Introduction

Mexico's socioeconomic stratum is classified by housing according to certain social and economic characteristics of the people who live there, as well as their physical characteristics and equipment (INEGI, 2021). In this research it is necessary to analyze their relationship with information and communication technologies (ICT), which include physical devices that are emerging with digital innovation, such as: fixed, mobile and smart phones, computers, electronic tablets, as well as the Internet, which is based on a technological infrastructure (Sánchez and García, 2020).

It is necessary to consider technology, since the 2030 Agenda for Sustainable Development recognizes that digital technology is an instrument that can help to achieve the 17 Sustainable Development Goals (Sánchez and García 2020). To this end, Mexico presents great heterogeneity in social stratification, this means that, according to the stratification carried out, the bulk of the population is in the middle strata and a small percentage in each of the very high and very low strata, in addition to the fact that in Mexico, the percentage of people who access the Internet varies according to the socioeconomic stratum to which people belong (Sánchez and García 2020), which affects society (Graña, Murillo, and Murillo 2023) . It is worth mentioning that socioeconomic status is related to economic growth, income growth and job creation to reduce poverty and inequality (Barata 2019).

It should be considered that the digital divide is an obstacle to Mexico's economic development in the information and knowledge society, since there are huge economic and social inequalities that restrict both access and productive use of the Internet, which provide direct benefits to the population (Martínez-Domínguez and Fierros-González 2022). Therefore, it is important to close the digital divide by improving access to ICTs, especially for the most vulnerable groups (Díaz de León Castañeda and Martínez Domínguez 2020). To decrease the significant differences between urban and rural living areas (Khan, Ikram, and Saleem 2023). Therefore, this is a justification for the analysis of this work, since the analysis by socioeconomic level by social variables such as gender, age, schooling and the inclusion of ICTs favors economic development.

The objective of this work is to analyze ICTs by socioeconomic stratum considering gender and schooling, as well as the territorial scope considering rural and urban, through a Logit model. The research questions posed in this research are: Do ICTs help to have a higher socioeconomic level, does the educational level facilitate obtaining a high socioeconomic level, these questions will be answered with the results of the econometric model that will be presented later. A review of scientific literature related to the variables of the study is presented below.

Literature Review

This section presents an analysis of socioeconomic level, education, gender and age, internet access at home and at work, information and communication technologies, rurality related to socioeconomic level, socioeconomic level and working hours. The analysis of this literature gives us a guideline to continue with the research to later formulate a series of variables that are presented in the methodology, as well as to propose an econometric model directly related to the socioeconomic levels of Mexico.

Socioeconomic level

It is important to consider that low socioeconomic factors reflect the lack of opportunities for access to education, employment, income and public health services (Gómez-Ugarte and García-Guerrero 2023). On the other hand, in Turkey socioeconomic status was considered by parental educational level (both mother's and father's educational level) and household income (Kobul, 2023), so it is important to consider parental educational level in socioeconomic status.

Moreover, socioeconomic conditions impact people's lives in contemporary societies (Antonoplis 2023). Therefore, more socioeconomic studies are needed to establish how spending considers the type of household and socioeconomic level. (Lozada-Urbano et al. 2022). Since households of lower socioeconomic levels are the most dissatisfied in various aspects, especially with their housing (Manríquez 2023), people of a higher socioeconomic level relate to their environment and to people who live in other places and who are of the same level (Lenormand and Samaniego 2023). So this tells us that studying socioeconomic level implies including several variables to find possible associations.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Education

In relation to education, we have that in some countries such as India, the government understands the importance of education to improve the socioeconomic status in rural areas and is committed to ensure that everyone has access to education (Utpal 2023).

Regarding the educational level of the head of household, it should be considered that parents with higher education provide a warmer home environment and develop closer ties and better communication with their children (Kobul 2023), which leads to greater welfare and income, such that the maximum level of education attained by the head of household is an indicator of access to economic and social resources (Mejía-Guevara and Fuentes 2024).

Likewise, it should be considered that the time young people spend online and what they do on the Internet are strongly influenced by the educational level of their parents and household income. For these young adults are not as tech-savvy as assumed. So, they may spend too much time online, even too much, but this does not necessarily guarantee that they make the most of their time for academic purposes and improve their educational level. Since they mainly connect to the Internet for social networking and gaming purposes (Kobul 2023). Similarly, in Argentina, students who have access to a computer with Internet connection at home achieve higher educational attainment in both language and mathematics (Alderete and Formichella 2023).

Gender and Age

Gender differences are important and become powerful when they interact with age and socioeconomic differences, as women spend fewer hours in paid productive activities than men, in almost all age ranges. For people of higher socioeconomic status tend to spend almost an extra hour doing personal activities that give them well-being, compared to people of lower socioeconomic status.

This could be the result of the need for people of lower socioeconomic status to work longer hours to meet their basic needs, thus reducing the total amount of time they can devote to personal activities (Avolio and Moreno 2023).

In some sub-Saharan African countries, the gender of the household head, age, education level, household size, income, poverty, and food prices are the problem of household food security (Drammeh, Hamid, and Rohana 2019), which also relates socioeconomic status to well-being and income and provides an impetus to look at gender, age, and education to achieve higher socioeconomic statuses

Internet access at home and at work

Regarding the internet, in 2016 a study was conducted through an analysis of the National Survey of Availability and Use of Information Technologies in Households, and it was found that internet access can become an efficient resource to boost economic development, which is determined by the characteristics of human capital; since through a Logit model in Mexico, it was found that the level of schooling, has different effects in the rural and urban sectors, where the impacts are greater for urban areas that have greater educational infrastructure in the heads of households (0.056***). Similarly, the probability that an individual living in the rural or urban sector can access the Internet increases significantly if the age of the person is between 33 and 64 years compared to any other age range, in addition, the probability of having access to the Internet increases in both sectors, by approximately 3% in the rural sector and 14.6% in the urban sector (Mora-Rivera and García-Mora 2021).

Similarly in Mexico, another study was conducted in 2018 with data from the National Survey of Availability and Use of Information Technologies in Households, through a Probit model and it was found that for online health information searches, the significant variables were: being a woman (1.51***); being an adult (1. 67***); having a higher level of education (6.01***); having low strata (-1.29**); having superior digital skills (1.82***) ;and living in an urban area (Díaz de León Castañeda and Martínez Domínguez 2020), and the influence of educational level with internet use and a negative influence with low levels of economic strata is observed. Likewise, in 2020, in another research with the countries of Uruguay and Mexico on internet access and the deep digital divide, through certain indicators by means of a chi-square association analysis and found for the Mexican case that the deep digital divide is based on internet access.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Since this is the first approach to technologies and is positively related to socioeconomic stratum. However, once the population in Mexico can access this resource, the difference by gender is almost nonexistent (Sánchez and García 2020).

Regarding the internet at work, there is a need to modernize workplaces and develop employees' competencies in Information and Communication Technologies (Anikin 2021) for due to the popularization of the internet in rural areas, mobile internet use has become an essential part of the life and work of rural residents (Nie, Ma, and Sousa-Poza 2021).

Information and Communication Technologies

In Medellín, Colombia, they found that Internet adoption fosters economic growth and development, and the most important variables for adaptation are monthly income, education, having a computer and cable TV at home (Ramírez-Hassan and Carvajal-Rendón 2021). Likewise, in Colombia the economic gaps generated by the pandemic became technological gaps, so it is necessary to design policies to compensate for the adverse effects of the increase in economic gaps (Palacios Mena and Ariza Bulla 2023).

On the other hand, in China, technology related to Big Data and artificial intelligence was found to reduce labor production costs and increase economic income (Ye and Xu 2023).

Likewise, the rapid progress of information and communication technologies (ICT) creates a new image of the economy, transforming from a conventional economy to a digital economy, which includes e-commerce, which in turn produces economic growth (Barata 2019). Similarly ICT focused on online marketing, to expand market segments, optimize marketing partners, find potential partners and promotion to get new consumers, are effective in maximizing sales and increasing revenue for a company (Muhammad, Iskandar, and Yusuf 2023). On the other hand, in India they conducted research on the technology gap in the population and in their findings they determined the urgent need to address educational and income inequality among different social class groups, with a special focus on the most disadvantaged classes.

For they considered education to be a crucial factor in explaining the digital skills gap, such as knowledge of computer and Internet use, as a disadvantaged class group is more likely to be poor and less educated and therefore less likely to have a computer at home (Rajam, Reddy, and Banerjee 2021).

Mobile ICT can also provide more opportunities for rural entrepreneurship and innovation, particularly by motivating young farmers to actively participate in rural e-commerce enterprises that can increase nonfarm income (Nie et al. 2021). For ICT infrastructure improved digital literacy and strengthened the economy and community activities (Ko, Routray, and Ahmad 2019).

However, it should be considered that the digital native also depends on the socioeconomic level (Kobul 2023). On the other hand, in Pakistan socioeconomic and digital disparities are reproduced in the use of digital knowledge and skills, as people of low socioeconomic levels are at risk of being victims of cyber threats (Khan et al. 2023).

Rural

COVID-19 pandemic was associated with different indicators of well-being, and concluded the urgent need to take measures to support vulnerable groups, in particular women, households with children, and those in the lowest socioeconomic status (Vilar-Compte et al. 2022) Children from lower and lower-middle socioeconomic strata and living in rural areas have fewer opportunities to access, use and engage in online activities (homework, courses and blogs) on the Internet, in contrast, students living in urban areas and high strata, so these households are the most likely to be part of the information and knowledge society (Martínez-Domínguez and Fierros-González 2022).

In addition, digital literacy contributes significantly to increasing the income of rural residents. (Liu and Zhou 2023). Another important point is the globalization of markets, which represents a challenge for addressing the new rurality; therefore, it is necessary to improve production conditions and patterns to influence the quality of life of rural families (González-Félix et al. 2021).

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Thus, local governments should invest in Internet infrastructure to promote agricultural activities and develop specific rural services to increase agricultural incomes through better access to information on agricultural production and market networks (Nie et al. 2021).

Hours

Higher socioeconomic status is associated with a decrease in hours spent on productive activities. This means that people of lower socioeconomic status have a higher total workload than people of higher socioeconomic status. This can be explained by the fact that people with a lower socioeconomic level require more hours of paid work to satisfy their needs. This can also be explained by the fact that those from a lower socioeconomic level do not have access to external services that can support unpaid productive activities (Avolio & Moreno, 2023). Methodology. The National Survey on the Availability and Use of Information Technologies in Households 2021 was used; this survey aims to obtain information on the availability and use of information and communication technologies in households and their use by individuals aged six years or older in Mexico, to generate statistical information on the subject and support decision-making in terms of public policies (INEGI 2021).

Participants

Data on heads of household in Mexico from the National Survey on Availability and Use of Information Technologies in Households 2021 (INEGI 2021) were considered, including gender, age, schooling, rural or urban residence, as well as some ICT data, such as the use of computer equipment at home or at work, as well as Internet use.

Study variables

The variables considered were those presented in Figure 1 and described in Table 1. The dependent variable was socioeconomic stratum and the independent variables were sex, age, schooling, working hours, use of computer equipment, use of computer at work, use of internet, use of internet at work, all variables corresponding to the head of household. The household factor provided by the survey was also considered as an estimation variable for the Logit model.

Box 1

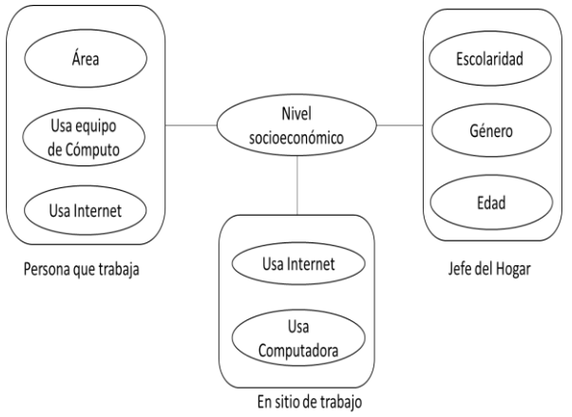


Figure 1

Variables of analysis of socioeconomic level

Box 2

Table 1

Variables used in the model

Variable	Description
Socioeconomic level	Refers to the socioeconomic level of households, which is determined by INEGI based on physical characteristics and equipment. These strata are categorized as follows: 1= Low, 2= Lower middle, 3= Upper middle, 4= High. It is a polytomous categorical variable.
Genre	It is the gender of the head of household, classified using the following values: 1 = Male, 0 = Female.
Age	Is the age of the head of the household in years completed
Schooling	It is the level of schooling of the head of household, measured as years of study, and was classified with the following categories: None=0, Primary=6, Secondary=9, High school=12, Bachelor's or engineering= 16 Specialty=17, Master's=18, Doctorate= 20
Area	Refers to the area where the worker resides and his/her home is located, being its classification as: 1 = urban, 0= rural.
Uses computer equipment	Refers to whether the worker uses the computer, laptop or Tablet, printer, scanner, cloud computing, either at work or at home: 1=Yes, 0=No
Uses Computer at Work	Is the worker's use of the computer only for work activities: 1=Yes, 0=No
Use the Internet	Is the worker's use of the Internet in general, either at home or at work, for different activities: 1=Yes, 0=No
Use the Internet Work	Uses the Internet at work: 1=Yes, 0=No

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

AnálData Analysis

The data were collected from the National Survey on Availability and Use of Information Technologies in Households for the year 2021, provided by INEGI.

These data were segmented in such a way that only the heads of household were selected, and then several filters were applied to select and classify the variables mentioned in the previous section and subsequently an econometric model was elaborated by the Logit and Probit methods.

Econometric model

An econometric model was made with a predictive analysis of multinomial Logit estimation, since the dependent variable included 4 categories of values.

For the Logit model, the model of equation 1 was used.

In addition, the assumption of independence of irrelevant alternatives was considered. In the same way, a Probit estimation was performed.

$$\Pr(y = m|X_i) = \frac{\text{Exp}\,(\beta_{m|b}\,X_i)}{\sum_{j=1}^{J} exp(\beta_{j|b}\,X_i)} \qquad (1)$$

Results

Analysis of descriptive data

Table 2 presents the data by socioeconomic stratum of the heads of household using ICTs and Table 3 shows the same data, but using the expansion factor provided by the survey.

Box 3

Table 2

Frequency of data by socioeconomic stratum

Socioeconomic level	Frequency	Percentage
1	4,492	17.99
2	12,631	50.6
3	5,597	22.42
4	2,243	8.99
Total	24,963	100

Box 4

Table 3

Frequency of data by socioeconomic level using Factor

Socioeconomic level	Frequency	Percentage
1	2,750,621	17.95
2	7,365,927	48.06
3	3,521,146	22.98
4	1,688,052	11.01
Total	15,325,746	100

In terms of schooling, Figure 2 shows that most of the population has basic education, with primary and secondary education being the main ones, while the number of people with professional or higher education has decreased drastically..

Box 5

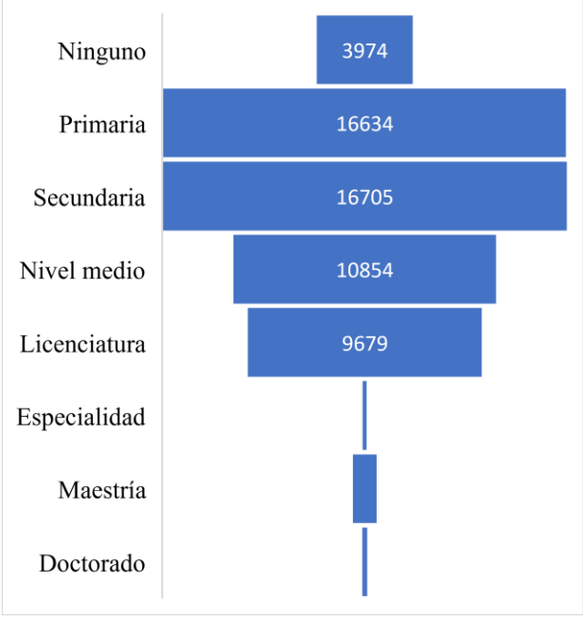


Figure 2

Frequency of data by socioeconomic level using expansion factor.

Logit and Probit model

Table 4 shows the results of the Logit and Probit regression, as well as their respective p-values of the estimated coefficients, and the validity of the models through a chi-square p-value.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Box 6

Table 4

Logit and Probit regression

	Logit Model		Probit Model	
Variables	**Coef.**	**P> |z |**	**Coef.**	**P> |z |**
Gender of head of household Male	-0.1938	0.0011 ***	-0.1124	0.0006 ***
Age of head of household	0.0343	0.0000 ***	0.0194	0.0000 ***
Schooling Primary	0.8755	0.0025 ***	0.4709	0.0013 ***
High school	1.4842	0.0027 ***	0.8123	0.0015 ***
High school	1.9790	0.0029 ***	1.1024	0.0016 ***
Bachelor's degree	2.6005	0.0030 ***	1.4666	0.0016 ***
Specialty	2.8818	0.0082 ***	1.6281	0.0047 ***
Master's Degree	2.8780	0.0044 ***	1.6183	0.0025 ***
Doctorate	2.7973	0.0080 ***	1.5776	0.0046 ***
Urban Area	3.3119	0.0018 ***	1.8695	0.0009 ***
Uses computer equipment	0.4404	0.0019 ***	0.2574	0.0011 ***
Uses computer at work	0.2438	0.0021 ***	0.1443	0.0012 ***
Uses Internet in general	0.4190	0.0016 ***	0.2374	0.0009 ***
Uses Internet at work	0.1520	0.0015 ***	0.0859	0.0009 ***
Observations	24,927		24,927	
	Prob > chi2 =0.000		Prob > chi2 =0.000	
*** p<0.01, ** p<0.05, * p<0.1				

Box 7

Table 5

Marginal effects of Logit models

	Logit Model			Probit Model	
Variables	**Coef. dy/dx**	**P> |z |**	Variables	**Coef. dy/dx**	**P> |z|**
Gender Male			Schooling Master's degree		
Socioeconomic level 1	0.0148	0.000	Socioeconomic level 1	-0.2394	0.000
2	0.0162	0.000	2	-0.2178	0.000
3	0.0144	0.000	3	0.2413	0.000
4	0.0166	0.000	4	0.2159	0.000
Age			Schooling Doctorate		
Socioeconomic Level 1	0.0026	0.000	Socioeconomic level 1	-0.2354	0.000
2	0.0028	0.000	2	-0.2081	0.000
3	0.0025	0.000	3	0.2401	0.000
4	0.0029	0.000	4	0.2034	0.000
Primary Schooling			Urban Area		
Socioeconomic level 1	0.0953	0.000	Socioeconomic level 1	-0.4566	0.000
2	0.0072	0.000	2	0.0933	0.000
3	0.0768	0.000	3	0.2439	0.000
4	0.0258	0.000	4	0.1192	0.000
Secondary Schooling			Uses computer equipment		
Socioeconomic level 1	0.1487	0.000	Socioeconomic level 1	-0.0333	0.000
2	0.0533	0.000	2	-0.0408	0.000
3	0.1427	0.000	3	0.0360	0.000
4	0.0593	0.000	4	0.0380	0.000
High School			Uses computer at work		
Socioeconomic level 1	0.1860	0.000	level 1	-0.0184	0.000
2	0.1074	0.000	2	-0.0217	0.000
3	0.1928	0.000	3	0.0188	0.000
4	0.1006	0.000	4	0.0212	0.000
Undergraduate Schooling			Uses Internet in general		
Socioeconomic level 1	0.2250	0.000	level 1	-0.0331	0.000
2	0.1839	0.000	2	-0.0346	0.000
3	0.2343	0.000	3	0.0346	0.000
4	0.1747	0.000	4	0.0331	0.000
Schooling Specialty			Uses the Internet at work		
Socioeconomic level 1	0.2396	0.000	Socio E	-0.0116	0.000
2	0.2183	0.000	2	-0.0129	0.000
3	0.2414	0.000	3	0.0117	0.000
4	0.2165	0.000	4	0.0128	0.000

Discussion of results

For the marginal effects of the Logit Model, we have the following. For the case of gender: Recall the base category 0=female, so then the probability of the household reaching high levels of socio-economic stratum 3 and 4) is reduced with respect to the head of household being female. Likewise, the probability of reaching level 2 socio-economic stratum for the male is 1.6%. For the age of the head of household: the socio-economic level, it is observed that the older the head of household, the higher the socio-economic level, as there is a small probability of 0.2% of belonging to level 4 of the stratum at an older age.

For the schooling of the head of household: the socio-economic level shows that the higher the level of education, the higher the socio-economic level, as the levels of stratum 3 and 4 have a higher probability. The probability is 2.5% for primary school, 5.9% for secondary school, 10.06% for high school, 17.4% for bachelor's degree, 21.65% for specialisation, 24% for master's degree and 20.34% for doctorate, so that in general it is observed that the higher the level of education, the higher the level of stratum 4, with the exception of doctorate, although the percentage of schooling with a doctorate is very low in Mexico.

For the area level: Rural=0, Urban=1, it is found that the urban area is the one that reaches the highest level of socio-economic stratum, compared to the rural area. It was found that the urban area has the highest percentage of probability of 24.39% for level 3 and 11.92% of probability for level 4.

For the use of Hardware: In terms of computer or Tablet, the use of hardware also reaches the levels of socio-economic stratum 3 and 4, as there is a probability of 3.6% and 3.8% respectively for the levels mentioned. For the use of the computer at work: The levels of socio-economic stratum 3 and 4 are also reached when it is used in work activities. There is a 1.8% and 2.1% probability of reaching these levels respectively. For internet use, and internet use at work: Use reaches socio-economic stratum levels 3 and 4. In the case of internet use, there is a probability of 3.4% and 3.3% for socio-economic stratum levels 3 and 4 respectively, while for internet use at work there are percentages of 1.1 and 1.2 for these levels.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Comparison of results with other studies

The results coincided with Díaz de León Castañeda & Martínez Domínguez (2020), in terms of women using the internet, as well as the level of education and living in an urban area, as these are positive factors that are related to socio-economic status, although our results present a segment by stratum and indicate greater detail. Similarly, the educational level of the heads of household coincides with Mora Rivera & García-Mora (2021), they present an estimator 0.056 and this work indicates a probability with a primary level of 2.5%, secondary of 5.9%, baccalaureate of 10.06%, bachelor of 17. 4%, speciality of 21.65%, master's degree of 24%, doctorate of 20.34%, so that in general it is observed that the higher the level of schooling, the higher the level of stratum 4 can be reached, with the exception of the doctorate, although the percentage of schooling with a doctorate is very low in Mexico. It should also be considered that education promotes economic progress (Gui & Alam, 2024). Regarding the rural area that does not reach a high socio-economic level compared to rural areas, it should be considered that investment in telecommunications infrastructure should be distributed equitably so that rural areas can achieve a greater digital economy (Boma Sonimiteim Jacks et al. 2024).

Conclusions

After analysing the results and remembering that the socio-economic levels were classified from 1 to 4, where 4 is the highest and 1 the lowest, the main conclusions to reach the highest socio-economic stratum are the following: 1) Being male, 2) Having a specialised schooling, 3) Living in an urban area, 4) Using computer equipment and 5) Using the internet in general. This is in line with certain economic theories that indicate that both human capital based on education and the use of technology generate higher economic income.

On the other hand, age is an important factor in achieving high socio-economic status. For people with only primary and secondary schooling, they reach the lowest socio-economic level. For people with a high school or bachelor's degree, they are concentrated in socio-economic level 3, for those with a master's degree and doctorate, they reach socio-economic level 3. For those who live in urban areas, they reach level 3.

As for the Internet in general, level 3 is reached, but when the Internet is used at work, the highest level is reached. The main conclusion is that age and ICTs based on computer equipment and the internet at work achieve the highest levels of socio-economic status.

Statements

Conflict of interest

The authors declare no interest conflict. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

Author contribution

Jiménez-García, Martha: Contributed to the introduction, scientific literature search, data management and validation, revision and editing of the final paper, supervision of results, discussion of results and conclusions.

Caamal-Olvera, Cinthya Guadalupe: Contributed to the scientific literature search, econometric model elaboration and discussion of results.

Gómez-Miranda, Pilar: Contributed to the scientific literature search, methodology and results of descriptive analysis.

Jiménez-Jiménez, Rosa Sara: Contributed to the methodology, scientific literature search, data management and results.

Availability of data and materials

The data is publicly available in the "Encuesta Nacional de Disponibilidad y Uso de Tecnologías de Información en los Hogares 2021", on INEGI's website.

Funding

This work has been funded by **Instituto Politécnico Nacional** [SIP:20231648].

References

Background

Barata, A. (2019). Strengthening National Economic Growth and Equitable Income Through Sharia Digital Economy in Indonesia. *Journal of Islamic Monetary Economics and Finance*, *5*(1), 145–168.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Graña, R., Murillo, F Javier, & Murillo, F. J. (2023). Una mirada a la segregación escolar por nivel socioeconómico en méxico y sus entidades federativas. *Revista Mexicana de Investigación Educativa RMIE* 28(97).

Khan, N. F., Ikram, N., & Saleem, S. (2023). Effects of socioeconomic and digital inequalities on cybersecurity in a developing country. *Security Journal*

Martínez-Domínguez, M., & Fierros-González, I. (2022). Determinants of internet use by school-age children: The challenges for Mexico during the COVID-19 pandemic. *Telecommunications Policy*, *46(*1). https://doi.org/10.1016/j.telpol.2021.102241

Sánchez, A., & García, K. (2020). Análisis compratraivo sobre nativos, migrantes digitales y brecha digital profunda en México y Uruguay , 2016. *Anuario Iberoamericano de Derecho Internacional Penal*, *8(*1), 1–29.

Basics

Alderete, M. V., & Formichella, M. M. (2023). Access to ICT at Argentine elementary school children's homes and its impact on school achievements. *Education and Information Technologies*, *28*(3), 2767–2790.

Anikin, V. A. (2021). Employment and Work of Middle Income Groups. In *The Middle Income Group in China and Russia. Research Series on the Chinese Dream and China's Development Path*. 51-67

Avolio, B., & Moreno, M. (2023). Analysis of sex, age and socioeconomic differences in time use: evidence from a Latin American country. *Community, Work and Family*, 1–27.

Drammeh, W., Hamid, N. A., & Rohana, A. J. (2019). Determinants of HH F-insecurity and its association with child malnutrition in Africa [Lit. Review].Pdf. *Current Research in Nutrition and Food Science*, *7*(3), 610–623.

Gómez-Ugarte, A. C., & García-Guerrero, V. M. (2023). Inequality Crossroads of Mortality: Socioeconomic Disparities in Life Expectancy and Life Span in Mexico Between 1990 and 2015. *Population Research and Policy Review*, *42*(57), 1–22.

González-Félix, G. K., Guevara, V. M. P., Peinado-Guevara, H. J., Cuadras-Berrelleza, A. A., Herrera-Barrientos, J., López-López, J. de J., & Guadalupe, Z. E. N. (2021). Backyard agricultural and farm activity as an option of socioeconomic and food improvement in the rural towns of the municipality of guasave, sinaloa. *Sustainability Switzerland)*, *13*(7), 3606.

INEGI. (2021). Encuesta Nacional sobre Disponibilidad y Uso de Tecnologías de la Información en los Hogares *ENDUTIH 2021*.

Ko, G., Routray, J. K., & Ahmad, M. M. (2019). ICT infrastructure for rural community sustainability. *Community Development*, *50*(1), 51–72.

Kobul, M. K. (2023). Socioeconomic status influences Turkish digital natives' internet use habitus. *Behaviour and Information Technology*, *42*(5), 624–642.

Liu, B., & Zhou, J. (2023). Digital Literacy, Farmers' Income Increase and Rural Internal Income Gap. *Sustainability Switzerland)*, *15*(14).

Mejía-Guevara, I., & Fuentes, M. E. R. (2024). Intergenerational paid and unpaid labor production and consumption inequality by gender in Mexico. *Journal of the Economics of Ageing*, *27*.

Muhammad, M., Iskandar, S., & Yusuf, S. (2023). Strategies to Increase MSME Income to Maintain Business Continuity in the Era of the Industrial Revolution 4 . 0 *(Study on Food and Beverage MSMEs in Sukabumi Regency)*. In *International Conference on Economics, Management and Accounting (ICEMAC 2022)*. Atlantis Press, 457-472.

Nie, P., Ma, W., & Sousa-Poza, A. (2021). The relationship between smartphone use and subjective well-being in rural China. *Electronic Commerce Research*, *21(*4), 983–1009.

Palacios Mena, N., & Ariza Bulla, J. F. (2023). Socioeconomic conditions and academic performance in higher education in Colombia during the pandemic. *Quality in Higher Education*, *29(*2), 242–260.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18

Rajam, V., Reddy, A. B., & Banerjee, S. (2021). Explaining caste-based digital divide in India. *Telematics and Informatics*, *65*.

Ramírez-Hassan, A., & Carvajal-Rendón, D. A. (2021). Specification uncertainty in modeling internet adoption: A developing city case analysis. *Utilities Policy*, *70*.

Utpal, R. (2023). Technology as a Tool for Development of rural education. *Journal of Research and Development*, *8(*5), 40–48.

Vilar-Compte, M., Hernández-F, M., Gaitán-Rossi, P., Pérez, V., & Teruel, G. (2022). Associations of the COVID-19 pandemic with social well-being indicators in Mexico. *International Journal for Equity in Health*, *21(*1), 1–10.

Ye, C., & Xu, L. (2023). Exploring User Experience Design in Computer-Based New Media Art. *Journal of Education, Humanities and Social Sciences*, *20*, 68–73.

Support

Antonoplis, S. (2023). Studying Socioeconomic Status: Conceptual Problems and an Alternative Path Forward. *Perspectives on Psychological Science*, *18*(2), 275–292.

Lenormand, M., & Samaniego, H. (2023). Uncovering the Socioeconomic Structure of Spatial and Social Interactions in Cities. *Urban Science*, *7*(1), 1–17.

Lozada-Urbano, M., Huamán, F., Xirinachs, Y., Rivera-Lozada, O., Alvarez-Risco, A., & Yáñez, J. A. (2022). Poverty, Household Structure and Consumption of Foods Away from Home in Peru in 2019: A Cross-Sectional Study. *Foods*, *11(*17), 1–13.

Manríquez, N. (2023). Determining elements of housing satisfaction in Mexico: analysis by estimating an Ordered Probit Model. *Vivienda y Comunidades Sustentables*, *14*, 71–86.

Differences

Boma, S. J., Olakunle A. A., Oluwaseun A. L., & Enyinaya S. O. (2024). Theoretical Frameworks for ICT for Development: Impact Assessment of Telecommunication Infrastructure Projects in Africa and the U.S. World Journal of Advanced Research and Reviews 21(3),394–400.

Díaz de León Castañeda, C., & Martínez Domínguez, M. (2020). Factors Related to Internet Adoption and Its Use to Seek Health Information in Mexico. *Health Communication*, *36*(13), 1768-1775.

Gui, P., & Alam, G. M. (2024). Does socioeconomic status influence students' access to residential college and ameliorate performance discrepancies among them in China? *Discover Sustainability*, *5*(1).

Mora-Rivera, J., & García-Mora, F. (2021). Internet access and poverty reduction: Evidence from rural and urban Mexico. *Telecommunications Policy*, *45(*2).

Discussions

Boma, S. J., Olakunle A. A., Oluwaseun A. L., & Enyinaya S. O. (2024). Theoretical Frameworks for ICT for Development: Impact Assessment of Telecommunication Infrastructure Projects in Africa and the U.S. *World Journal of Advanced Research and Reviews 21*(3),394–400.

ISSN Print: 2007-1582.
ISSN Online: 2007-3682
RENIECYT-CONAHCYT: 1702902

Jiménez-García, Martha, Caamal-Olvera, Cinthya Guadalupe, Gómez-Miranda, Pilar and Jiménez-Jiménez, Rosa Sara. Analysis of the impact of ICT by socioeconomic. ECORFAN Journal-Mexico. 2024. 15-32: 9:18
DOI: https://doi.org/10.35429/EJM.2024.32.15.9.18