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Article

Determinants of the socioeconomic level of entrepreneurs in Mexico: a probabilistic analysis of mobile phone use and associated variables

Determinantes del nivel socioeconómico de los empresarios en México: un análisis probabilístico sobre el uso del teléfono móvil y variables asociadas

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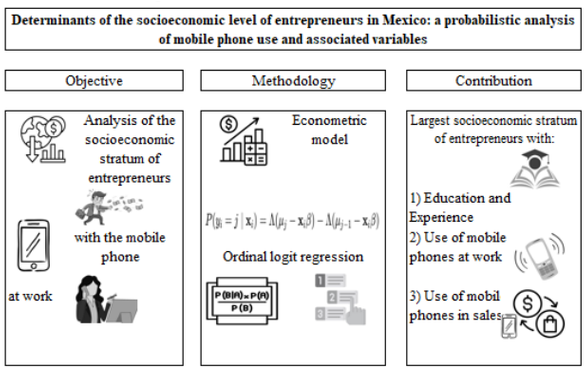
Abstract

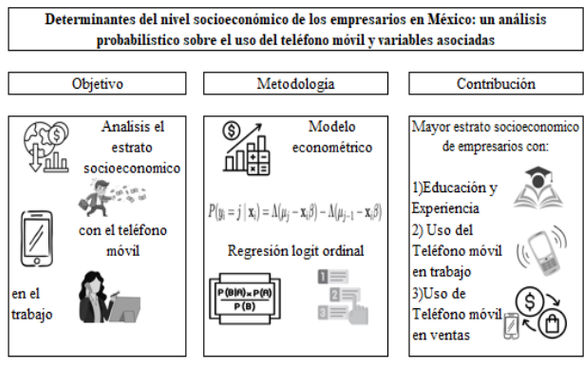
Various economic growth theories have demonstrated the economic growth associated with the use of digital technology. The objective of this study was to analyze the socioeconomic status of business owners in relation to their use of mobile phones for work activities and sales of their products or services, including educational level, experience, and area of residence. The research was quantitative with a probabilistic approach, using data from the 2024 National Survey on the Availability and Use of Information Technologies in Households. An econometric model was developed using ordinal logistic regression. The study found that socioeconomic status is influenced by education, experience, urban location, and the interaction of mobile phone use with work activities and sales. It concludes that business owners should know how to use mobile phones for work activities.



Socioeconomic level, business owners, mobile phone

Resumen

Diversas teorías de crecimiento economico han comprobado el crecimiento economico con el uso de la tecnología digital. El objetivo fue realizar un análisis el estrato socioeconomico de empresarios con el uso del telefono móvil en actividades laborales y en las ventas de sus productos o servicios, incluyendo el nivel educativo, la experiencia, y el área de residencia. La investigación fue cuantitativa con enfoque probabilístico con datos de la Encuesta Nacional sobre Disponibilidad y Uso de las Tecnologías de la Información en los Hogares 2024, y se realizó un modelo econométrico mediante una regresión logística ordinal. Se encontró que en el estrato socioeconomico influyen la educación, la experiencia, el area urbana, así como la interacción del telefono celular con su uso, con actividades laborales y con el uso destinado a las ventas. Se concluye que los empresarios deben saber usar el telefono movil para actividades laborales.



Nivel socioeconómico, empresarios, teléfono móvil

Area: Development of strategic leading-edge technologies and open innovation for social transformation

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Introduction

Companies must use digital technology to overcome obstacles and remain in the market [Martini et al., 2023] and to achieve sustainable growth [Kim & Ha, 2023], as companies face great difficulties with monopolies [Sipos et al., 2024]. This is why it is important to include digital technology, as digital transformation has been a development related to labour demand [Cevallos et al., 2021], since companies seek to include professionals who use digital technology as an added value for greater productivity and competitiveness [Jaimes et al., 2024]. It is therefore necessary for entrepreneurs to adapt to the use of new digital technologies [Pacheco-Ruíz et al., 2020]. Therefore, it is of interest to thoroughly analyse technological adoption, particularly the adoption of mobile phones by entrepreneurs, and its impact on mobile payments can contribute to poverty reduction and the Sustainable Development Goals established by the United Nations [Suresh et al., 2025]. This is where the importance of analysing the use of mobile phones by entrepreneurs in work activities and to sell their products through payment applications comes in.

At the same time, access to mobile phone technologies must be considered, as it has shown a promising and relevant effect on well-being. It is also important to investigate its effect on other vulnerable groups, such as those headed by women [Ngwilizi & Selejio, 2025].

Similarly, entrepreneurs, although operating under severe resource constraints, have proven to be one of the key drivers of a country's economic growth and development. However, entrepreneurs face challenges ranging from a shortage of necessary resources, difficulty in accessing finance, lack of economies of scale, to greater vulnerability to unpredictable external factors [Suresh et al., 2025].

The research has identified the problem that entrepreneurs do not use mobile phones for work activities or for selling their products, which means that entrepreneurs have not triggered economic growth. Therefore, the objective of this research was to analyse the socio-economic status of entrepreneurs who use mobile phones for work activities and to sell their products or services, including their level of education, experience, and area of residence.

The research question posed was: Can a mobile phone increase the socio-economic status of an entrepreneur in Mexico? This will be answered in the results of this research.

The added value of this research is the interaction of mobile phone variables and their use in work activities and in the sale of products and services, as there are several studies that analyse mobile phones individually with other variables, but not with the interaction presented in this research.

In this research, after the theoretical background, an econometric model is presented using ordinal logistic regression, this model being the main contribution with the findings of the interaction between phone ownership and its use in work activities and in the sale of products or services.

Theoretical background

In Bangladesh, a study was conducted with 212 companies to analyse the implementation of strategies in businesses related to digital technology, mainly with the use of digital marketing through mobile devices. To this end, they carried out a study of structural equations by partial least squares.

In this research, they found a significant and positive effect of the use of digital marketing on company performance [0.444 p-value 0.001] in financial terms and concluded that MSMEs need to train their employees on the adoption of e-commerce in their regular operations.

It is therefore suggested that MSMEs learn and practise digital marketing tools and techniques, as well as big data analysis and social media analysis to ensure customer satisfaction, which leads to business sustainability and success, as they can predict customer demands in order to offer tailor-made products and services [Gao et al., 2023].

On the other hand, in Tanzania, research was also conducted with 277 owners and managers of manufacturing SMEs, using structural equation modelling with a partial least squares approach to assess product and market innovation in business performance.

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They found a positive relationship between market innovation and business performance [β = 0.915; p < 0.01], indicating that companies that prioritise innovation in either products or processes can attract more customers and promote long-term growth by being more competitive through the use of innovative practices based on digital technology [Ndahani et al., 2024].

Similarly, in Pakistan, research was conducted with 282 microentrepreneurs and analysed a mobile payment system technology called 'e-paisa' that improved the well-being perceived by microentrepreneurs during the COVID-19 pandemic. It was found that the adoption of this mobile technology was positively related to the business success of microentrepreneurs [β = 0.201, 95% CI [0.101, 0.298]]. On the other hand, in terms of gender, women had a better perception [β = 0.236, 95% CI [0.122, 0.312]] than for men [β = 0.171, 95% CI [0.144, 0.251]], which acts as a catalyst for inclusion in female entrepreneurship in vulnerable communities [Shahid, 2024].

Similarly, in Spain, qualitative research was conducted with 31 older adults aged between 61 and 96, through an ethics review panel at the University of Luxembourg, and sociodemographic information was collected, including the number of internet devices in the home, age when they first used the internet, frequency of internet use, gender, profession and socioeconomic status.

To this end, a workshop called 'magic machine' was developed, with the aim of devising solutions and strategies to help them prevent situations of online manipulation and how to address a problem. Four main needs were identified to resist manipulation: knowledge, awareness, right to privacy, and control [Chamorro et al., 2024]. Similarly, in Tanzania, quantitative research was conducted with an empirical analysis of a sample of 1,641 households to analyse the causal effect of mobile phones on the participation of female-headed households in non-agricultural self-employment and income growth. and found that mobile phone technology significantly increased the probability of female-headed households participating in non-agricultural self-employment by 11.4% [p-value 0.032] and improved the share of income from self-employment enterprises in total household income by 7.9% [p-value 0.031].

Furthermore, female heads of household residing in urban areas, with higher levels of education and younger ages experienced greater income gains than their counterparts. Therefore, efforts that support and promote access to and use of mobile phone technology, coupled with higher levels of education among vulnerable groups, encourage job creation and improved incomes for these groups [Ngwilizi & Selejio, 2025].

In addition, in India, rural women with limited education are supported through digital financial inclusion, mentoring and training programmes to reach larger markets and thereby promote economic and social development. This has been achieved through e-commerce platforms that enable women entrepreneurs to run their businesses in rural and semi-urban areas by creating flexible, work-from-home models [Pal & Bhowmick, 2024].

Similarly, in China, quantitative and empirical research was conducted and access to information on entrepreneurship for disadvantaged groups was analysed using the China General Social Survey dataset for 2017, 2018 and 2021, through multi-stage and multi-level random sampling using a Probit model. It was found that access to information via the internet has contributed to a 1.6% increase in the probability of entrepreneurship for disadvantaged groups with characteristics such as agricultural households, low sociability and middle age.

This indicates that governments can improve the information environment, optimise information services, improve the awareness and information skills of disadvantaged groups. Similarly, it was found that mobile phone ownership in vulnerable groups is highly correlated with access to information, as it presented significant values [0.428 p-value 0.033] [Liu et al., 2025].

Similarly, in India, quantitative research was conducted with data from 410 micro-entrepreneurs from different regions who basically belonged to an informal and itinerant market and who used mobile payment technology in their businesses, through a system of structural equations by partial least squares and a hierarchical component model with a two-stage approach.

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It was found that mobile phones and mobile payments are significant values that influence economic strengthening for micro-entrepreneurs. This occurs with the adoption of mobile payment technologies such as QR codes, Google Pay, Amazon Pay, and Paytm, all of which have proven to be potential factors that reinforce people's behaviour in coping with resource scarcity, thus securing their livelihoods [Suresh et al., 2025].

On the other hand, quantitative and correlational research was carried out in Peru to analyse the effect of mobile phone use on the income of women in rural areas of Peru. The 2016-2022 National Household Survey was used for this purpose, through the Mincer model with socio-economic explanatory variables such as mobile phone ownership, years of education, work experience and the individual's own characteristics. It was found that in 2018, mobile phone ownership was associated with a 39.3% increase in income levels and in 2022, this effect was 49.9%; Therefore, the income of rural women in Peru is positively linked to mobile phone ownership, but it also depends on factors such as years of education, work experience, and participation in the labour market [Vela Meléndez et al., 2025].

Methodology

The research is descriptive and correlational in nature, as it presents a predictive model of socioeconomic status and the social variables that influence it. The data were collected from the 2024 National Survey on the Availability and Use of Information Technologies in Households [INEGI, 2025a].

Sample size

Individuals over the age of 16 were selected, and a question was filtered in which only those who had the option of being an employer or who hired workers for a salary or self-employed workers were selected.

Data on these individuals was cross-referenced in relation to their use of technology, specifically their possession of a mobile phone, as well as their use of the mobile phone for work activities and to sell their products or services online. The sample size was 30,804 individuals.

Study variables

The study variables used in this research, both dependent and independent, were some sociodemographic and technological variables related to mobile phones, all of which were used to create an econometric and predictive model of the socioeconomic status of people who own a business in Mexico, as described in Table 1.

Box 1

Table 1

Study Variables

Variable	Description
Socio-economic stratum [Y]	Dependent variable. This variable was calculated directly by INEGI based on the sociodemographic characteristics of individuals, taking into account their housing and certain indicators from the population and housing census, using a multivariate statistical method [INEGI, 2025b]. Ordinal numerical variable [Low Stratum = 1, Middle Stratum = 2, Upper Middle Stratum = 3, and High Stratum = 4]
Years of Education [YearsEduc]	Independent and numerical variable, the data was transformed by years of education considering the following educational levels: None = 0, Preschool = 3, Primary = 9, Secondary = 12, Baccalaureate = 15, Technical studies with secondary education = 15, Basic teacher training = 15, Higher technical studies with baccalaureate = 18, Bachelor's degree or engineering = 19, Specialisation = 20, Master's degree = 21, Doctorate = 25
Experience	An independent, numerical variable, it was an approximation of potential work experience and was calculated using the formula: experience = age - years of education - 6.
Area	The independent and numerical variable was the area according to the geographical location in which the entrepreneurs live, classified as urban or rural. This classification was carried out by INEGI and considered rural areas to be those with fewer than 2,500 inhabitants [INEGI, 2025b].
Possession of mobile phone [PosTel]	Independent and binary variable, it was related to whether the respondent had a mobile phone [Yes = 1, No = 0].
Mobile phone usage [UsoTel]	Independent and binary variable, it was related to whether the respondent used a mobile phone [uses mobile phone = 1, does not use mobile phone = 0].
Possession and use of mobile phones [PosyUso]	Independent variable, refers to the combined interaction of mobile phone ownership and use, calculated as the multiplication of both variables [Mobile phone ownership * Mobile phone use].
Use of Mobile Phones in Work Activities [UsoLab]	Independent and binary variable, refers to the use of mobile phones in work activities [If you use your mobile phone in work activities = 1, You do not use your mobile phone in work activities = 0]
Possession and use of mobile phones in work activities [PosyUsoLab]	Independent variable, refers to the combined interaction of mobile phone ownership and its use in work activities, calculated as the multiplication of both variables [Mobile phone ownership * Mobile phone use in work activities].
Use of mobile phones for sales [UsoVentas]	Independent and binary variable, refers to the use of a mobile phone for sales [If you use a mobile phone for sales = 1, You do not use a mobile phone for sales = 0]
Possession and use of mobile phones for sales [PosyUsoVentas]	Independent variable, refers to the combined interaction of mobile phone ownership and its use for sales, calculated as the multiplication of both variables [Mobile phone ownership * Mobile phone use for sales].

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Data análisis

With the selected variables shown in Table 1, an ordered logical model was constructed, as presented in Equation 1.

$$logit[P[Y \leq j]] = k_j + \beta_1(AñosEduc) + \beta_2(Experiencia) + \beta_3(Área) + \beta_4(PosTel) + \beta_5(UsoTel) + \beta_6(PosyUso) + \beta_7(UsoLab) + \beta_8(PosyUsoLab) + \beta_9(UsoVentas) + \beta_{10}(PosyUsoVentas) \quad [1]$$

Results

This section first presents the descriptive results to illustrate the behaviour of all variables.

Figure 1 shows the socioeconomic stratum of the entrepreneurs, and it is clear that the predominant socioeconomic stratum is stratum number 2. Similarly, Table 2 shows the level of education, and it can be seen that the majority have secondary, high school, and bachelor's degrees, but secondary education is the most common.

Box 2

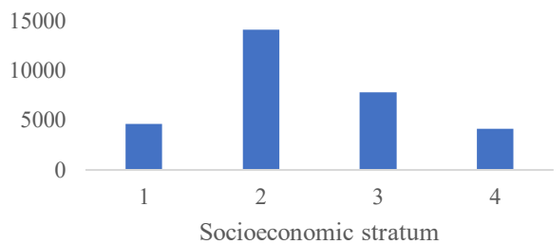

Figure 1
Socioeconomic status of entrepreneurs
Source: own elaboration based on the results

Box 3

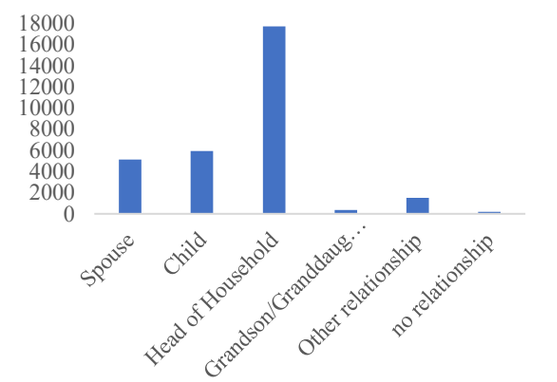

Figure 2
Family relationships in participants' households
Source: compiled by the authors based on the results

Box 4

Table 2
Educational background of the business owners who participated in the survey

Schooling	Quantity
None	1148
Pre-school	34
Primary	5212
Secondary	7827
High school	6718
Technical studies with secondary education	359
Basic teacher training	33
Higher technical studies with high school	637
Bachelor's degree or engineering degree	7800
Specialisation	124
Master's degree	765
Doctorate	147
Grand total	30804

Source: Prepared internally based on data from the INEGI survey.

Figure 2 shows the relationship between entrepreneurs, clearly indicating that the predominant relationship is that of head of household. Figure 3 shows the gender of the entrepreneurs who participated, revealing that the majority are men. Figure 4 shows the age of the entrepreneurs, revealing that the majority are between 25 and 60 years of age.

Box 5

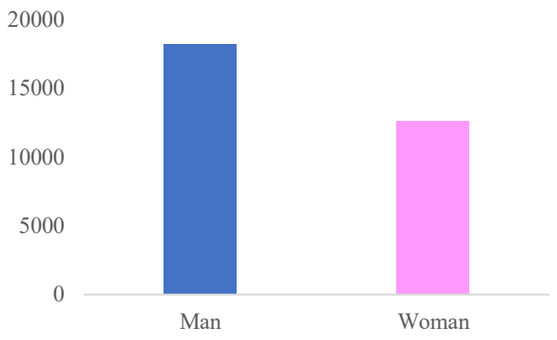

Figure 3
Gender of participating entrepreneurs
Source: own elaboration based on the results

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Box 6

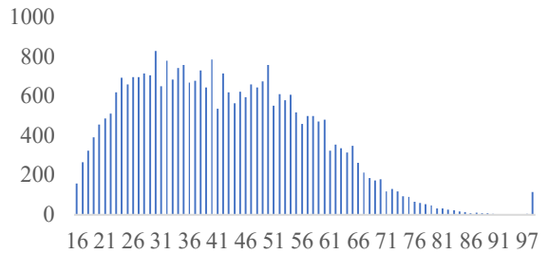

Figure 4
Age of entrepreneurs
Source: own elaboration based on the results

Figure 5 shows mobile phone ownership and reveals that most entrepreneurs have a mobile phone. On the other hand, Figure 6 shows mobile phone use in work activities, and similarly, a majority use it and a very representative number do not use it in their work activities. Likewise, Figure 7 shows mobile phone use for sales, and the majority of entrepreneurs do not use the phone, while a minority do use the phone for this purpose.

Box 7

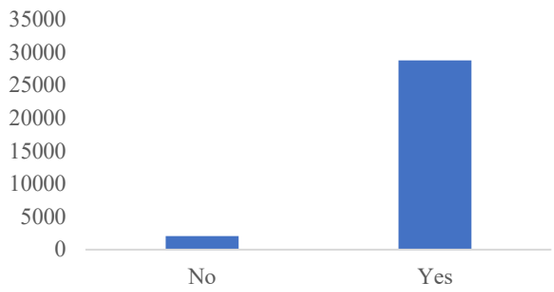

Figure 5
Mobile phone ownership
Source: own elaboration based on the results

Box 8

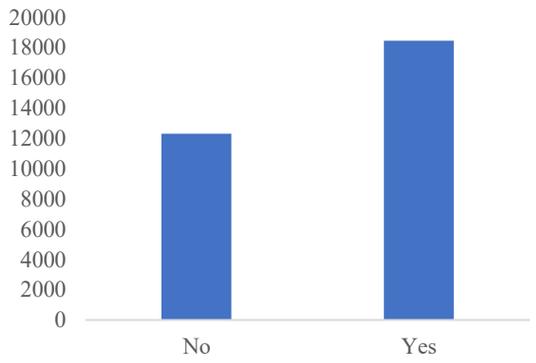

Figure 6
Use of mobile phones in work activities
Source: own elaboration based on the results

Box 9

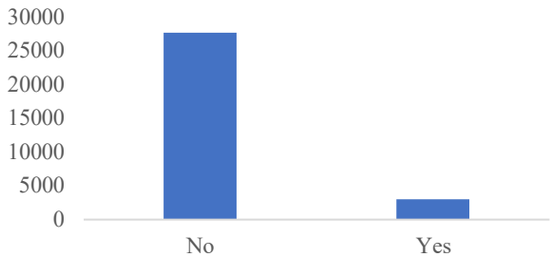

Figure 7
Use of mobile phones for sales
Source: own elaboration based on the results

Econometric model of socioeconomic status

Table 3 presents the results of the econometric model with socioeconomic status as the dependent variable and the other independent variables described in Table 1. The odds ratios are also presented, and the coefficients are very high for urban area values, as well as for mobile phone ownership and use and mobile phone ownership and use for sales.

Box 10

Table 3
Result of the econometric model of socioeconomic status

Estrato socioeconomico	Odds Ratio	Std. Err.	P>z
Years of Education	1.246	0.000	0.000
Experience	1.025	0.000	0.000
Urban Area	10.319	0.015	0.000
Mobile Phone Ownership	0.006	0.001	0.000
Mobile Phone Use	0.035	0.002	0.000
Mobile Phone Ownership and Use	11.605	0.748	0.000
Mobile Phone Use in Work Activities	0.783	0.009	0.000
Mobile Phone Ownership and Use in Work Activities	1.025	0.011	0.028
Mobile Phone Use for Sales	0.311	0.010	0.000
Mobile Phone Ownership and Use for Sales	2.684	0.086	0.000
Prob > chi2 = 0.0000			
n=30804			

Source: Prepared internally based on the results of the econometric model.

Discussion of Results

For each additional unit of years of education, socioeconomic status increases by 24% [value-p=0.000]. Similarly, when work experience increases by one year, socioeconomic status increases by 0.25% [value-p=0.000], which is directly related to other research [Vela Meléndez et al., 2025].

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On the other hand, living in an urban area results in a 931% increase in socioeconomic status, which clearly shows that rural communities that are obviously far from urban areas are greatly disadvantaged.

With regard to mobile technology specifically, owning a mobile phone decreases socioeconomic status by 0.994%, and using a mobile phone also decreases socioeconomic status by 0.965%. However, it should be noted that when there is a relationship between owning a mobile phone and using it at the same time, this can increase the socioeconomic level by 1060.5%, which implies that all microentrepreneurs should be trained to not only own a mobile phone but also use it so that together they can increase their socioeconomic status, as technology is considered a source of economic growth through technological innovation [Ndahani et al., 2024].

On the other hand, owning and using a mobile phone for work activities increases socioeconomic status by 0.25%. Among the most important findings is the ownership of a mobile phone and its use in the sale of products, as this shows an increase of 168%. This is of interest because, according to various authors, the use of mobile phones has a significant economic impact and contributes to economic development in general. Furthermore, it has been confirmed that the adoption of mobile payment technologies has been shown to increase income [Suresh et al., 2025].

Conclusions

In Mexico, the following aspects influence an entrepreneur's ability to increase their socioeconomic status: 1] years of education, 2] living in an urban area, 3] owning and using a mobile phone, since simply owning a mobile phone sometimes means it is not used, and when it is used, it can increase an entrepreneur's socioeconomic status, 4] Possession and use of a mobile phone for work activities, which implies that sometimes a mobile phone is owned but not used for work activities, i.e., it is basically used for other activities such as entertainment, 5] Possession of a phone and use for the sale of products and services, similarly, it must be considered that sometimes entrepreneurs have a mobile phone but do not use it to sell their products.

It is therefore recommended that the government implement public policies to train all entrepreneurs to achieve digital transformation through the use of mobile phones and learn how to apply this in their work activities and for the sale of their products, as well as in mobile payment activities.

Declarations

Conflict of interest

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

Contribution of the authors

Jiménez-García Martha: Contributed with the idea for the project, the development of the econometric model, methodology, analysis of the results, and conclusions.

Gómez-Miranda Pilar: Contributed to the introduction and analysis of the results.

Soto-Mejía, Ana Karen: Contributed to the document review and data cleaning.

Hernández-Horta, Ingrid Anai: Contributed to the methodology and analysis of results.

Availability of data and materials

The data can be found in the National Survey on the Availability and Use of Information Technologies in Households [ENDUTIH] 2024. INEGI. At the following link: https://www.inegi.org.mx/programas/endutih/2024/#datos_abiertos.

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Abbreviations

CI	Confidence interval

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INEGI	National Institute of Statistics and Geography
MIPYMES	Micro, Small and Medium-sized Enterprises
Odds ratio	Statistical measure indicating how likely an event is to occur
Pymes	Small and Medium-sized Enterprises
Valor-p	Statistical measure indicating how likely it is to observe the data according to significance

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Background

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