Classification of Mexican audiences by their interest in digital news content and socioeconomic characteristics

Abstract

The news industry faces challenges due to the global macro and microeconomic environment. The current digital situation leads to the study of the characteristics of the audience interested in news content products. The central aim of this research is to classify the main attribute interest in digital news content in Mexico of the audience’s market by the attributes of age group, education level, and income level. This research is based on a survey of 2,005 digital news consumers in Mexico, directed in 2022 by the Reuters Institute for the Study of Journalism at the University of Oxford for the annual Digital News Report Study. The statistical method used is data mining with decision trees that classify the audience by the attribute of interest in the news as the dependent variable and attributes of age groups, education level, and income level as independent variables. These findings confirm the segmentation of digital news consumers’ audiences. The classification in which the attributes of age groups, level of education, and income level are considered simultaneously concerning audiences’ interests indicates that some of the predictions made show that some attributes may not be significant in some subsets, except for age group. The lowest average interest in the news is between 18 and 24 years, and the highest average interest in the news, which is nearly very interested, has audiences over 35 years.

Keywords

Digital journalism, audiences, media management, news interest, market segmentation.

1. Introduction

The economic dynamics of the news industry led us to explore some of the characteristics of audiences who consume news through the Internet. Authors such as Fletcher and Nielsen (2017), Fletcher and Park (2017), Junior (2023), Martin and Sharma (2022), Newman et al. (2022), and Yang and Peng (2022) have delved into the evolution of the news market in a digital environment on a global scale. Some of the main topics addressed are the decrease in trust in the news industry and interest in the news (Newman et al., 2022), various levels of political polarization, and audience avoidance of news content (Goyanes, 2020).
The macro- and microeconomic environment in which the Mexican sector develops is similar to that of other Latin American countries (Junior, 2023; Newman et al., 2022). The knowledge of digital news consumer audiences has become a relevant issue because of the importance of the media in society’s public opinion (Thompson, 1995). Understanding the public from the academic perspective of media management allows news firms to implement effective market strategies that help them clearly define their target markets. News companies can communicate with the different audience segments participating in the digital environment (Arrese, Medina & Sánchez-Tabernero, 2019; Xiau & Su, 2022); above all, video offers attractive and varied content.

In Mexico, more research needs to deal explicitly with socioeconomic variables that can classify audiences’ interests in digital news content. Industry and academia are concerned about understanding how the audience is classified in terms of their interest in the news of those who consume this content in its digital version, according to the generational segments of the market and socioeconomic level to which they belong. It is necessary to analyze the influence of socioeconomic factors that affect interest in the news according to the various segments of the market audience in this country.

The aim of this study is to analyze the interest in digital news and its correlation with audience fragmentation, as measured by socioeconomic factors in Mexican society.

This study is divided into four parts. The first part presents academic literacy related mainly to media management studies and those related to the classification of audiences by their interest in news. The second part deals with the general background of Mexico’s digital news industry. In the third part, the methodology is presented, and in the fourth part, the results are detailed. Finally, the main conclusions are presented, followed by future research directions and limitations of this study.

1.1. Literature related to media management studies
Interest in the news and fragmentation of audiences are topics of academic interest due to the media’s role in the democratic lives of countries (Fletcher & Nielsen, 2017; Lee et al., 2020; Putnam, 1995).

This research belongs mainly to the academic area of media management, detached from the science to which the media economy belongs (Albarrán, Mierzejewska & Jung, 2018). Audiences’ knowledge matters in elaborating a competitive market strategy, and news media models should be adapted to the strategy of news media firms to be effective in the digital environment (Chan-Olmsted, 2005; Gutiérrez-Rentería & López-Hernández, 2021; Ha, 2021; Mierzejewska & Kolo, 2019).

Currently, audiences have greater power to influence the news programming of media firms because of the multiple accesses they have to this content on digital platforms and the place and time that interests and suits them (Zheng et al., 2021; Xiau & Su, 2022; Yang & Peng, 2022). At the same time, audience fragmentation has modified the modes of interaction between the supply and demand of news content in the industry, as stated by Doyle (2020) and Tseng and Fogg (1999).

One type of fragmentation is given by age groups with different characteristics. Below are some distinctive notes that contribute to understanding the characteristics of the audience (Avendaño, Chavez & Muñoz, 2019) by generation:

1. Baby Boomers (1946–1964): They are characterized by having become accustomed to the use of legacy media under an analogous system that functioned independently. Their primary motivation is order and respect for the institutional or company hierarchy. They are loyal to the brands they consume. This generation likes to spend time with their family and home.
2. *Generation X* (1965-1979): This group is considered the digital immigrant. This generation had the challenge of learning to use the first computers and email to communicate. Their primary motivation is to set achievements and goals.

3. *Generation Y*, known as the Millennials (1980–1999): They are considered digital natives. This generation had to deal with the arrival of mobile phones, electronic screens, and digital mobile devices. This generation prefers digital media such as social networks and instant communication through messages.

4. *Generation Z* (2000–2014): This group is also considered digital natives and, in some ways, is like the Millennial generation. Regarding media use, this generation is distinguished by the use of fashionable social networks and video consoles as the leading entertainment and media consumption sources. They communicate via mobile devices. They are constantly looking for change. Their primary motivator is their social contribution to improving the planet’s health, and they want constant mobility. Otherwise, the topic of interest in the news of audiences may be correlated with socioeconomic factors and personal motivations (Chyi & Lee, 2013; Boczkowski, Mitchelstein & Matassi, 2018; Drok, Hermans & Kats, 2018; Fletcher & Nielsen, 2017; Salaverria, Harlow & De Lima, 2022; Schröder, 2019). These motivators can be linked to social identities (Gil de Zúñiga et al., 2010; Markov & Min, 2020). Based on Domenico et al. (2021), Holmes (2021), and Park et al. (2020), audiences select news consistent with their beliefs and the socioeconomic environment to which they belong.

The central objective of this research is to verify whether socioeconomic factors influence the audience’s interest in news. These socioeconomic factors include the age, annual income, and education level of people who consume digital news in Mexico during the first two months of 2022.

1.2. Digital news industry in Mexico

In the Mexican news industry, legacy media and digital native media are trying to get ahead due to an economic contraction, advertisers’ advertising revenue falls, and a different industry dynamic due to electronic commerce and entertainment media products—such as social media and platforms of video streaming—on the Internet (García, 2022; Inegí, 2022; Sánchez-Nuevo, Guerrero-Martínez & Carrasco, 2022).

In this Latin American region, leading brands have been harmed by a decline in the levels of trust and interest in the news industry, loss of confidence in various institutions, changes in audience consumption habits, and the amount of false news information distributed through social networks (Gutiérrez-Rentería et al., 2018; Newman et al., 2022).

Undoubtedly, Mexican media is not exempt from the acceleration of a digital economy open to the global market, which should encourage them to be disruptive and innovative in their business models, as suggested by Doyle (2020), Salaverria, Harlow and De Lima (2022), and Wirtz (2019).

News brands must establish a close relationship with the target audience (Lischka, Siegert & Krebs, 2018). Audience segmentation helps understand how media companies can communicate effectively with their target audience. For instance, Albarrán et al. (2018), Arrese, Medina and Sánchez-Tabernero (2019), Chan-Olmsted (2005), Doyle (2020), Ha (2021), and Mierzejewska and Kolo (2019) point out that market segmentation by the age of audiences is crucial for creating an effective market strategy for the media firm participating in the current digital economy environment.

On the other hand, there are authors like Seifert, Clement and Otten (2020), Doyle (2020), and Tseng and Fogg (1999) that establish that the fragmentation of audiences is influenced by socioeconomic factors. In this order of ideas, the work carried out by Goyanes (2020), Newman et al. (2022), and Xiao and Su (2022) agree that people’s socioeconomic level and age influence their interest in the news.
RQ1. Which are the most homogeneous subsets of age groups with a similar average interest in the news, and which are they?

RQ2. It is relevant to identify the classification of how interest in news content changes according to education and income levels. For this reason, the second research question is: What are the predictions of average interest in the news with information about the attributes of education level, and what is the classification of average interest in the news with information about the attributes of income level?

RQ3. What will be the classification of average interest in the news if the attributes of education level and income level are added to the attributes of age groups?

2. Methodology

2.1. Subjects

The research is based on a survey of 2,005 people in Mexico by the digital market research company YouGov, commissioned by the Reuters Institute for the Study of Journalism at the University of Oxford (Newman et al., 2022). The surveys were conducted during the last week of January and the first week of February 2022. Of these 2,005 surveys, 384 were discarded because of the lack of data required for this research.

The survey was carried out such that the people surveyed stated that they accessed the news online at least three times per week. The population used for statistical analysis corresponds to a random sample of people over 18 years of age who consume digital news in Mexico. Of the people surveyed, 48% were male and 52% were female.

The digital audience of the market, measured by age, comprises the following segments: 18–24, 25–34, 35–44, 45–54, 55–64, and 65+ years. The age groups to which these audiences belong would correspond to the following generational segments: Baby Boomers (people between 55–64 and over 65 years old); b) Generation X (people between 45–54 years old); c) Generation Y –known as Millennials– (35 and 44 years old), and d) Generation Z –Centennials– considered digital natives’ media (18–24 and 25–34 years old).

The question used to measure the dependent variable of interest in the news was: How interested if at all, are you in the news? This question is measured on a Likert scale: 1) extremely interested; 2) very interested; 3) somewhat interested; 4) not very interested; and 5) not at all interested.

The annual income level of the people surveyed is measured on a scale from 1 to 19. 18 corresponds to “I do not know” and 19 to “I do not want to say.” Three hundred fifty-six survey participants with these two responses about their income levels were discarded. Level 1 corresponds to an annual income of fewer than 5,400 USD. The increments from level 1 to level 12 are 5,400 USD. Level 12 is an income ranging from 59,400 USD to 64,800 USD per year. The increment between levels 12 and 14 was 10,800 USD. The increment from level 14 (86,400 USD) to level 15 is 21,600 USD. Level 16 was incremented by 54,000 USD, equivalent to an income of USD 162,000. Level 17 is an annual income higher than 162,000 USD.

Respondents are asked about the highest level of education they have regarding: 1) those who did not complete any formal education; 2) first years of kindergarten; 3) elementary education; 4) secondary; 5) high school; 6) high school with technical studies; 7) technical studies without an academic degree; 8) bachelor’s degree; 9) master’s degree; and 10) doctoral degree.

2.2. Procedure

The method to analyze interest in Mexican audiences’ news integrates statistics and computer science in a machine learning (ML) process. Predictive data mining is the most important method for this purpose. One such technique is classification using a decision tree (DT).

In the domain of categorical data analysis (as in this research), decision trees (DTs) frequently demonstrate superior performance compared to linear regression because of their
adeptness in managing nonlinearity and collinearity. They categorize instances into distinct output values and are well suited for automating decision-making processes, segmenting groups, and recommending pertinent segmentation strategies.

One of the notable attributes of decision trees is their high interpretability, which allows for straightforward tracing of the decision-making process. This interpretability is pivotal in applications in which elucidation and transparency are crucial, as it reveals how decisions are derived from categorical features. Decision trees provide a potent and transparent decision-making framework, especially for handling categorical data and producing results that can be easily interpreted across various domains of research and analysis.

In general, decision trees represent a disjunction of the conjunctions of constraints on the attribute values of the instances. Each path from the tree root to a leaf corresponds to a conjunction of attribute tests, and the tree itself to a disjunction of these conjunctions (Mitchell, 1997, p. 73).

Since the research questions ask about interest in the news, interest (average interest) will always be the main attribute at the root of the DT; age group, education, and income level are the independent variables (Cardona, 2004; Berlanga, Rubio & Vilá, 2013). In the next section, the DTs are shown to answer every research question, and the splitting and predictions at the leaf node are explained. Any path of DT always begins at the root, in this case, with interest in news. The trees are organized hierarchically with a collection of “questions.” Every node, not a leaf, contains a condition that splits a tree into branches. DT describes data separating sequences until a Boolean outcome at a leaf is achieved, where the value of every leaf contains a prediction.

A tree grows if the next split reduces its overall complexity. Otherwise, the growth process was stopped. The complexity parameter (cp) controls and selects the optimal tree size. The default value of cp is 0.01; the higher the value, the smaller the tree. While running a DT, the cp argument helps pre-prune the tree. The DT may discard some values of a given attribute and classify them as “unused,” meaning that they are insignificant for decisions.

For this research, the DTs were run in R, with the “rpart” and “rpart.plot” instructions, which generate a tree with nodes, their conditions, branches, and final nodes, to facilitate making predictions and taking decisions. The optimal complexity parameter “cp” was calculated, and a graph of the relative error against tree size was run for all DTs.

An important fact for the DTs is that the reported percentage in the leaf nodes corresponds to the percentage of people surveyed who showed attributes following the splitting. A percentage of 0% reported in the DT means that although few people have been surveyed (less than 0.5% of the total persons surveyed), the leaf is significant for those attributes and the predictions.

In the next section, the DTs are shown to answer every research question, and the splitting and predictions at the leaf node are explained.

3. Results
To answer the first research question, which is the most homogeneous subset of age groups with similar responses to interest in the news, and which they are, DT builds a model of classification of interest in the news as the dependent attribute based on the independent attribute age group. In Figure 1, it is predicted that the audience is split into two subsets.

The right leaf node is represented by an audience no older than or equal to age group 3 (age segments 1 and 2 from 18 to 34 years old), cataloged into class 3 of interest, which characterizes them as somewhat interested in the news. The left leaf node is the audience aged between 35 and 65+ (age groups greater than or equal to 3), compiled to be interested in the news in class 2, representing them as being very interested in the news.
The first box, the root of DT, reports the percentage distribution of interest in the digital news of Mexican audiences (1, 2, 3, 4, and 5 of interest). Interest in the news, classes 1, 4, and 5 are unused, which means that only classes 2 and 3 were significant (see 39% and 31% for interest in the news of class 2 and class 3). Figure 1 shows a segmentation of the people surveyed into two main groups: those under 35 years of age, who are somewhat interested in the news content, and the other group belongs to people over 34 years of age, who are very interested in the news.

However, the authors consider it essential to make a finer classification, which is why R is run with average interest in news values. Figure 2 displays the DT for the average interest in news and attribute age groups.

Running R classification models with “Anova” (that is, with average interest in the news), it was found that the overall average interest in the news is 2.4 (this value will be found in all decision trees).
The optimal cp value of 0.0000895 by R resulted in classifying all age groups with their corresponding averages in the interest of news content.

The results show that their average interest in the news grows as people get older. Note that interest in the news 2 is “very interested,” and 3 is “somewhat interested.”

Audiences older than 65 years have an average interest in the news of 2.1, and surveyed people between 55 and 64 years old have an average interest in the news of 2.2. Audiences of age groups 4 and 3 (between the ages of 35 and 54) have the same interest in the news of Section 2.3. The age group 2 (between 25 and 34), and age group 1 (between 18 and 24) have an average interest in the news of 2.5 and 2.9, respectively.

The second research question concerns predictions at the leaf nodes of the dependent attribute of average interest in the news by the independent attributes of education level and income level.

Figure 3 shows the DT for the attribute of average interest in the news by education level. The left-leaf node predicts that an audience with an education level greater than or equal to 7, that is, education levels 7, 8, 9, and 10 (from technical studies without a degree to a doctorate) will have an average interest in the news of 2.2. The middle leaves with an average interest of 2.5 and 2.6 relate to the audience with an education level of 6, 5, 4, and 3, 2 (from high school with technical studies down to kindergarten). An audience with an education level of 1 (with no formal education) will have an average interest of 3.4, that is, between somewhat interested and not very interested in the news. Audiences with no formal education have the lowest average interest in the news however they consult the news at least 3 times a week.

As a resume, it could be said that Figure 3 suggests a segmentation of the audiences with respect to interest in the news into three main groups, considering only education level. The first one with an education level higher than 7, the second one is between 2 and 6, and the last one with education level of 1. Audiences with an education level of two to six have almost the same average interest in the news (2.5 and 2.6), while audiences with an education level higher than six have the highest average interest in the news. There is a difference in the average interest in news between education levels 1 and 7 to 10.

**Figure 3.** TREE3, Average interest in news by education level.

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TREE3 = rpart(Interest ~ Education, data = AGE, method = "Anova," minsplit = 2, minbucket = 1, cp = 0.000723616)
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Source: Own elaboration.

For the second part of the second research question, a DT was run (TREE4) for the average interest in the news by the attribute income level.
First, the annual income level was split into income levels of less than 10 (less than 54,000 USD) and income levels over 54,000 USD.

The third leaf node, on the right, predicts an average interest in the news of 2.8 (nearly somewhat interested) for audiences with an income level of not less than 10 (equal to or greater than 10). The left branch splits into income levels greater than or equal to two (2, 3, 4, 5, 6, 7, 8, and 9) and an income level of one. The prediction of an average interest in news of 2.3 corresponds to an inclusive income level between 2 and 9. The audience with the lowest income level (1) is predicted to have an average interest in the news of 2.4.

The analysis of DT (TREE4) shows that the difference lies in income levels less than 10 and greater than 10.

**Figure 4.** TREE4, Average interest in news by income level.

TREE4 = rpart(Interest ~ Income, data = AGE, method = “Anova,” minsplit = 2, minbucket = 1, cp = 0.0035)

Source: Own elaboration.

In fact, only 4% of the surveyed people registered an annual income level higher than 54,000 USD, they have the lowest interest in digital news. This suggests that, if one considers only the income level, 96% of the surveyed people with an annual income level from 1 to 9 have a similar interest in the news (2.3 and 2.4). This means that the annual income levels of these groups (1–9) did not differ from each other.

In relation to Research Question 3, what will be the classification of Mexican audiences by average interest in the news if the attributes of education level and income level are added to the attributes of age groups?

First, the audience members were split into two groups: age groups 3 to 6 and age groups 1 and 2. Subsequently, audiences of age groups from 3 to 6 (35 to 65+ years) were split into two subsets, with an education level greater than 1 (any formal education) and equal to education level 1 (no formal education), with an average interest in news of 2.2 and 5. This last group is represented by a percentage of the audience of less than 0.5%, but it is significant for DT.

Age group 1 was split into three subsets, first by income level less than 8 with an average interest in the news of 2.8 (education level was not significant) and further by an income level greater than 7 with an education level less than 5 with an average interest in the news of 2 (very interested) and an education level greater than 4 with an average interest in the news of 3.7. Audiences of age group 2 (25 to 34), the third leaf node from the right, are classified with an interest in the news of 2.5. For this subset, the education and income levels were not significant (Figure 5).
Figure 5. Average interest in news by age, education level and income level.

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TREE5 = rpart(Interest ~ Age + Education + Income, data = AGE, method = "Anova," minsplit = 2, minbucket = 1, cp = 0.00468)
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Source: Own elaboration.

Running Tree5, including age groups, income level, and education level, the interpretation states that for some groups, income level and/or education level is insignificant. This means, for example, that age group 2 has an average interest in the news of 2.5, and neither income level nor education level is important. For age groups 3 to 6, education, but not income level, is significant, with an average interest of 2.2. At least for age group 1 only income level 1 to 7 is significant and the average interest for this group is 2.8. These findings correspond only to the age groups with more than 10% of the total surveyed people.

To clarify the meaning of the predictions and classifications, for example, if we ask a 45 years old person with a master’s degree who consumes news digital content at least three times a week, she/he will probably be very interested in the news, while his/her income level is not essential.

4. Conclusions

This is the first study of digital news audiences in the current environment in Mexico in 2022, conducted by the Reuters Institute for the Study of Journalism, based at the University of Oxford. The survey follows the same criteria and rigor in the 46 countries that participate. In Mexico, research that contributes to the understanding of audiences in the current digital context primarily focuses on the gaze on political science and the behavior of citizen news consumption during the various presidential elections, and other studies related to media management of Mexican audiences focus on social media and video platform consumption on the Internet (Álvarez-Monsivais, 2022; Gutiérrez-Rentería & López-Hernández, 2021; Avendano, Chavez & Muñoz, 2019; Benavides & García-Béjar, 2021; Cornelio-Marí, 2022; Macías & García, 2019; Meneses, Ortega & Urbina, 2014; Sued, 2022).

The research presented here focuses on classifying Mexican digital news consumer audiences according to their interest in the news regarding the attributes of socioeconomic variables such as age, education level, and income level. This concept relates to media market segmentation.

This study predicts the interests of a person with specific attributes or characteristics will have. Classifying audiences based on these attributes can identify whether the product offered by the news firm and the way it is presented will be welcomed by the segments of the groups identified in the research.
For example, the first ramification (Figure 1) is by age group, and that, in turn, represents the generation to which they belong. The Centennial and Millennial generations are somewhat interested in the news (Category 3), while the other segmentation represents generations Y, X, and Baby Boomers, which are very interested in the news (Category 2).

However, the method used leads the authors to delve even deeper into the attributes of the age groups of the Mexican digital audience (Figure 2). It is found that interest in news increases with increasing age. This fact coincides with other research on audience fragmentation (Fletcher & Nielsen, 2017; Park et al., 2020). In this sense, these findings reinforce the idea that the content product should be directed, well-adapted, and attractive in the topics, narrative, and language to engage persons of the generation they belong to, as suggested by Albarran (2017), Chan-Olmsted (2005), and Sylvie (2008).

The authors run the classifications shown in Figures 3 and 4 in an attempt to explore how the level of education and income level independently influence the interest in the news due to the characteristics of Mexican society. It is found that the higher the education, the greater the interest in the news. However, the finding in the Mexican case that the higher the income, the less interest in the news confirms the words exposed by Fletcher and Nielsen (2017, p. 492): “All communication exists in the context of its audience. This context is changing around the world, in part due to large trends like the rise of digital media that many associate with a more fragmented media environment.”

The classification in which the attributes of age groups, level of education, and income level are considered simultaneously concerning the interest of audiences in digital news indicates that some of the classifications or predictions made by the DT model indicate that some attributes may not be significant in some subsets, except for age group.

For example, the prediction for a person between the ages of 35 and 65 with any education will be classified in the interest group of 2.2, which means close to very interested. This audience segment does not have ramifications regarding income level. In other words, income is not significant. Another example is the classification of a person between 25 and 34 years old (age group 2), whose interest in the news is 2.5 (between very interested and somewhat interested), regardless of their levels of education and income (see Figure 5 and Table 2).

One of the findings is that the Centennial generation requires from news companies to adapt their differentiating offer based on these attributes of income and education since there is a classification regarding the level of education and the level of income in this Mexican segment. The media firm must pay special attention to the segmentation marked by DT.

In the Mexican case, it is confirmed that age is the main socioeconomic criterion to segment audiences according to their interest in digital news. Second, the level of education matters, and finally, the income level. On the other hand, the Centennial generation and Millennials have specific characteristics that distinguish them from other age segments and make them particular. For example, in these groups, income level had a greater influence than education level. Therefore, marketing strategies aimed at these segments of the Mexican audience must be analyzed in greater detail, and according to the results of this research, this research also adds to what was established by Doyle (2020), who points out that the fragmentation of audiences and the progressive empowerment of people to express their editorial preferences through digital platforms have modified the modes of interaction between supply and demand in the industry.

The consolidation of the competitive advantage of the news media firm also consists of achieving effective market segmentation and emphasizing the target market to which the content is directed according to the specific characteristics of the audience groups mentioned in this research, as affirmed by Albarran (2017, 2019), Sylvie (2008), and Doyle (2020).

Finally, this research coincides with the findings on young people’s low interest in news and that interest increases as age increases (Casero-Ripollés, 2012; Newman et al., 2022). In this sense, in the Mexican case, the idea is validated that readers cannot be thought of as a
single audience, but rather as different groups of audiences that must be understood mainly from the generational segment to which they belong and that participate in the current digital economy environment, as pointed out by Vara–Miguel (2023). This research provides evidence that the main socioeconomic criterion for segmenting audiences concerning their information interest is age, followed by academic level, and finally, the economic income in this country in the Latin American region.

4.1. Future lines of research and limitations

This study shows the need to delve into the descriptive characteristics of the digital news consumer profile according to the motivator they have to be interested in the news product according to the target market defined by the company.

This study promotes the development of other research that addresses the qualitative characteristics of news and entertainment content consumers in the current digital environment in Mexico. Likewise, this work invites scholars and industry to understand the structure of the competitive market of this national news industry from the point of view of supply, where traditional legacy media and digital natives’ news media firms compete to capture the time and economic resources of audiences and advertisers.

This research is confined to a sample of Mexicans who consume digital news at least three times a week. This is relevant because the Internet penetration rate in this country was 67% in 2022, the year when the survey was conducted. However, the survey design limits further delving into the qualitative characteristics of the low interest these audiences have in Mexico.

This work was supported by the grant PID2021-122534OB-C22 funded by the Ministry of Science, Innovation, and Universities of the Spanish Government ref. 10.13039/501100011033, and the European Regional Development Fund, ERDF. The authors declare that they have no conflicts of interest.

The authors appreciate the leadership of the Reuters Institute for the Study of Journalism of the University of Oxford, as well as the various institutions, companies, and partners that support the production of the Digital News Report each year, especially the support for carrying out this research.

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