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ICT Households

SURVEY ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN BRAZILIAN HOUSEHOLDS

2025

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Brazilian Network Information Center

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2025

Brazilian Internet Steering Committee
www.cgi.br

São Paulo
2026

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Foreword

The Internet is a network built over decades through collective effort. It has established itself as an essential infrastructure for contemporary society, enabling economic activities, public policies, fundamental services, and various forms of social interaction. More than just offering a set of applications and services visible to end users, the Internet operates on an open, neutral, interoperable, and distributed technical architecture, whose integrity is a prerequisite for innovation, inclusion, and the exercise of rights in the digital environment.

Following the guiding principles of the Internet and in constant interaction with the Brazilian Internet Steering Committee (CGI.br), the Brazilian Network Information Center (NIC.br) plays its role in coordinating and strengthening the Internet in Brazil. In 2025, 20 years after its reconfiguration as a legal entity, NIC.br reaffirmed its commitment to managing critical network resources, operating stable infrastructure, and promoting a secure, accessible, and high-quality digital environment for Brazilians. This institutional milestone occurred in an equally significant context, alongside the celebration of the 30th anniversary of CGI.br—internationally recognized as a successful experiment in multistakeholder Internet governance.

One of NIC.br's various areas of activity focused on digital security is the Brazilian National Computer Emergency Response Team (CERT.br), which has played a central role in coordinating incident responses, disseminating best practices, and strengthening technical capabilities for online security, contributing to the resilience of the country's Internet infrastructure. These actions are linked to the publication of extensive awareness-raising and training material, always reinforcing the importance of a preventive and collaborative approach to security in the digital environment.[1]

Promoting a more accessible and inclusive Internet is also part of NIC.br's agenda. The Web Technologies Study Center (Ceweb.br) plays a role in this area, developing initiatives focused on digital accessibility and the standardization of web technologies.[2]

[1] More information about these actions can be found at https://internetsegura.br/

[2] Among the initiatives related to technical standards, Ceweb.br|NIC.br was part of the committee that drafted the ABNT NBR 17225 standard, focused on accessibility requirements for web content and applications. More information at https://ceweb.br/projetos/norma-abnt/

In a more technical field, the Center of Study and Research in Network Technology and Operations (Ceptro.br) works to continuously improve Brazil's Internet infrastructure through initiatives to measure connection quality, disseminate best practices for network protocols, train professionals, and provide services essential to Internet operations.[3] It was also through the actions of Ceptro.br|NIC.br that the Brazil Internet Exchange (IX.br)[4] originated and operates. It currently reaches more than 40 Tbit/s of aggregate traffic in the 38 locations where it is present, being the largest set of Internet exchange points (IXPs) in the world, with approximately 3,900 participating Autonomous Systems (AS). It should be noted that the São Paulo point is currently the world's leading IXP.

Adding to NIC.br's efforts is the creation of the Brazilian Artificial Intelligence Observatory (OBIA). It provides data and indicators that broaden understanding of the impacts and challenges of Artificial Intelligence (AI) in the country, supporting public debate and the formulation of policies aimed at its responsible use.[5]

Throughout its activities, NIC.br maintains and supports initiatives to promote the Internet and its safe, responsible, and conscious use. Annual events such as Safe Internet Day,[6] the Seminar on Privacy and Personal Data Protection,[7] and the Symposium on Children and Youth on the Internet[8] represent the ongoing effort to coordinate technical, legal, and social debates on key issues on the digital agenda. These actions highlight the importance of protecting personal data, ensuring information integrity, and safeguarding rights in the digital environment, especially for children.

In this context, the Regional Center for Studies on the Development of the Information Society (Cetic.br) is the NIC.br department responsible for regularly producing indicators and analyses on access, use, and appropriation of information and communication technologies (ICT) in Brazil. Cetic.br|NIC.br has established itself as a national and international reference in the production of reliable, comparable data aligned with internationally recognized methodological standards, which support the formulation of public policies, academic research, and multisectoral debate on the development of digital technologies.

In 2025, Cetic.br|NIC.br expanded its participation in international forums and agendas, contributing empirical evidence and methodological expertise to debates within the scope of BRICS and the Southern Common Market (Mercosur) meetings,[9] as well as other multilateral spaces. In these instances, topics such as meaningful connectivity, AI adoption, and reducing inequalities in access to and use of digital technologies took center stage, underscoring the importance of comparable, context-specific indicators to guide both regional and international cooperation.

[3] The main projects and initiatives of Ceptro.br|NIC.br can be accessed at https://ceptro.br/#projetos

[4] More information at https://ix.br/

[5] More information at https://obia.nic.br/

[6] More information at https://www.diadainternetsegura.org.br/

[7] More information at https://seminarioprivacidade.cgi.br/

[8] More information at https://criancaseadolescentesnainternet.nic.br/

[9] Publications with BRICS and Mercosur, among other international organizations, can be accessed at https://cetic.br/en/publicacoes/indice/outros/

This year, Cetic.br|NIC.br began new studies focused on strategic topics for the development of the Brazilian digital ecosystem, such as the analysis of data center infrastructure, which is now essential for data processing, storage, and sharing, as well as for the expansion of applications based on cloud computing and AI. Another strategic topic concerns information integrity, which is central to analyzing information flows and trust in data sources, as well as to addressing challenges associated with misinformation in the digital environment.

By swiftly addressing emerging and relevant topics such as connectivity quality, digital competencies, privacy, AI use, critical infrastructure, and security, Cetic.br|NIC.br's surveys help understand the multiple factors that enable effective, meaningful connectivity. Measuring access remains essential, but it is increasingly necessary to understand the conditions of use, associated risks, and capabilities required for individuals and organizations to fully benefit from digital technologies.

The financial resources generated by .br domain registrations, managed by Registro.br|NIC.br, enable continuous investment in research, security, training, and technological development, sustaining a virtuous cycle that benefits the Internet in Brazil. In a scenario of rapid technological change and growing dependence on digital infrastructure, the governance model adopted by the country since 1995 remains current and fundamental, supporting an open, secure Internet guided by the public interest.

The purpose of this publication is to contribute to the quality of public debate and strengthen the formulation, monitoring, and evaluation of evidence-based public policies. By gathering reliable data and consistent analyses, NIC.br and CGI.br reaffirm their commitment to multistakeholder governance, the promotion of rights, the reduction of inequalities, and the construction of a more inclusive, accessible, and secure digital environment, capable of responding to contemporary challenges and expanding opportunities for Brazilian society.

Enjoy your reading!

Demi Getschko
Brazilian Network Information Center – NIC.br

Presentation

The intensification of digital transformation has significantly expanded the role of the Internet as an essential infrastructure for exercising rights and accessing information, education, social participation, and knowledge production. The Internet is also a strategic tool for formulating, implementing, and evaluating public policies aimed at innovation and economic and social development. In a context of rapid technological change, the expansion of digital platforms, and the growing use of automated data-based systems, there are increasing challenges associated with organizing the digital ecosystem. Ensuring that this ecosystem reduces inequalities, protects rights, and serves the public interest and national sovereignty is an urgent task that requires participatory institutional arrangements capable of guaranteeing democratic governance.

It is in this context that the Brazilian Internet Steering Committee (CGI.br) operates. In 2025, it celebrated 30 years of defending an open, secure, and inclusive Internet. The Brazilian multistakeholder model of Internet governance has established itself as a legitimate space for dialogue and collective construction, bringing together the government, the private sector, civil society organizations, and technical and academic communities in the formulation of principles, recommendations, and guidelines that steer the development of the Internet in the country. This approach becomes even more relevant in light of the growing complexity of challenges associated with the digital environment, such as personal data protection, transparency and accountability of digital platforms, tackling disinformation, and the impact of the use of automated systems and Artificial Intelligence (AI) on fundamental rights.

Throughout 2025, CGI.br actively participated in key debates on the future of Internet governance in Brazil and around the world, with an emphasis on discussions and public consultations[1] related to the regulation of digital platforms and the protection of rights in the online environment. The Committee contributed to the formulation of principles and recommendations aimed at balancing technological innovation, the protection of freedom of expression, and the need to safeguard users, particularly groups in situations of greater vulnerability, such as children.

[1] One of the results of this debate was the publication, in 2025, of the *Princípios do CGI.br para Regulação de Plataformas de Redes Sociais* (CGI.br Principles for the Regulation of Social Networks), available in Portuguese at https://cgi.br/pagina/principios-cgibr-regulacao-redes-sociais/

The contributions of CGI.br to the debate on the Brazilian Digital Statute of the Child and Adolescent (ECA Digital),[2] enacted in 2025, were based on the understanding that the comprehensive protection of children in the digital environment must be accompanied by measures that preserve the open architecture of the Internet and avoid solutions that compromise fundamental rights. The recommendations on age verification, the responsibility of application providers, and the promotion of safer digital environments reflect the pursuit of proportionate, evidence-based solutions aligned with the principles of multistakeholder Internet governance.[3]

Within the scope of this activity, the 15th edition of the Brazilian Internet Governance Forum (FIB, as per its acronym in Portuguese) in 2025 reinforced CGI.br's role as a facilitator of plural and qualified debates on the digital environment. The FIB brought together representatives from different sectors to discuss topics such as platform regulation, information integrity, digital sustainability, and meaningful connectivity. More than just a space for debate, the event has established itself as an environment for listening, building consensus, and formulating proposals aligned with both the national context and international Internet governance agendas.

The work of CGI.br is inseparable from the production of quality data and empirical evidence that inform public debate and decision-making. The Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br), plays a strategic role in providing fundamental data for the formulation, monitoring, and evaluation of public policies related to digital technologies. In 2025, upon completing 20 years of operation, Cetic.br|NIC.br reaffirmed its ability to respond quickly and competently to debates on the digital environment, systematically incorporating new topics and indicators into its research agenda.

An example of this responsiveness is the production of indicators and analyses widely used to monitor the implementation of public policies and regulatory frameworks, such as ECA Digital and Law No. 15.100/2025,[4] which provides for the use of personal devices by students in basic education facilities. Regular surveys by Cetic.br|NIC.br, such as ICT Kids Online Brazil and ICT in Education, produce data on the use of digital technologies by children and families, school mediation practices, and exposure to risks in the online environment. This data contributes to a deeper understanding of the challenges these young people face and is essential for evaluating the effectiveness of adopted policies and regulations, as well as guiding adjustments that protect rights without compromising access to or the positive use of digital technologies.

[2] Available at https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2025/lei/L15211.htm

[3] CGI.br's recommendations regarding the ECA Digital can be found at https://cgi.br/media/docs/publicacoes/4/pt/20251118175422/CGIbr_Contribuicoes_Consulta_MJ_Afericao_Idade.pdf and https://cgi.br/media/docs/publicacoes/4/pt-br/20251215152052/Contribuicoes_CGIbr_Tomada_Subsidios_ANPD_ECA_Digital.pdf

[4] Available at https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2025/lei/l15100.htm

By disseminating indicators and studies on meaningful connectivity, digital competencies, responsible use of technologies, information integrity, and protection of rights, among other topics, Cetic.br|NIC.br helps to provide a more comprehensive understanding of the effects of digital transformation on Brazilian society and to strengthen evidence-based public policies.

At the international level, in coordination with CGI.br and in cooperation with ministries, Cetic.br|NIC.br maintained active participation in multilateral and regional forums, such as the BRICS and the Southern Common Market (Mercosur) agendas, contributing to debates on digital governance, connectivity, inclusion, and sustainability. This action reinforces the importance of international collaboration and the production of comparable indicators to address common challenges, while respecting national and regional specificities. In the same vein, it is worth highlighting Brazil's commitment to multisectoral governance, evidenced by CGI.br's participation in the WSIS+20 renewal process.

In 2025, a sectoral study on data centers in Brazil was launched and conducted by Cetic.br|NIC.br with the support of a multisectoral group of experts and government agencies, including the Ministry of Science, Technology, and Innovation (MCTI), the Ministry of Development, Industry, Trade, and Services (MDIC), and the Ministry of Finance (MF). The study seeks to fill information gaps in a context where these infrastructures play an increasingly strategic role in the digital economy, development policies, technological sovereignty, and environmental challenges.[5]

Therefore, in a global environment marked by growing tensions, rapid technological advances, and disputes over regulatory models, CGI.br reaffirms the centrality of multistakeholder governance to strengthen a secure, open, and public-interest-oriented Internet. This publication showcases the efforts to gather reliable, robust public data produced within the scope of Cetic.br|NIC.br, which supports democratic debate, the formulation of public policies, and the construction of a more just, inclusive, and human-development-oriented digital environment.

Renata Vicentini Mielli
Brazilian Internet Steering Committee – CGI.br

[5] The initial results of this study can be accessed at https://cetic.br/en/publicacao/ano-xvii-n-4-data-centers-no-brasil/

Executive Summary

ICT HOUSEHOLDS SURVEY 2025

Executive Summary ICT Households 2025

The 2025 edition of the ICT Households survey highlights new indicators on the use of generative Artificial Intelligence (AI), online betting, and the use of the gov.br platform. It also presents data on the level of meaningful connectivity (MC) of the Brazilian population, the increase in the proportion of connected households, and the rotating module of cultural activities carried out on the Internet.

Meaningful connectivity

In 2025, 30% of the Brazilian population were at the lowest MC level (0 to 2 points) and 20% at the highest level (7 to 9 points). In recent years, there has been a reduction in the lower MC bracket and growth in the intermediate levels, suggesting gradual but uneven progress.

Inequalities remain significant across social class, level of education, race or color, age, and territory. The highest MC levels were concentrated in social classes A and B, among people with tertiary education, White individuals, residents of urban areas and large cities, and in the South and Southeast regions. In contrast, lower levels predominated in classes DE, among people with lower levels of education, and residents of rural areas, *favelas*, and the rural areas of the Legal Amazon.

IN 2025, 30% OF THE BRAZILIAN POPULATION WAS AT THE LOWEST LEVEL OF MEANINGFUL CONNECTIVITY

Although most households in social classes DE paid up to BRL 100 for Internet access (77%), many did not meet the international affordability target (cost of connection less than 2% of monthly family income). States in the North and Northeast regions showed the worst results in this indicator.

In mobile access, prepaid plans prevailed, especially among classes DE. The survey reveals that 39% of users had their data allowance run out in the three months prior to the data collection, a more common occurrence among young people, those with lower income, and residents of the North and Northeast regions. This proportion was 54% among users with prepaid plans, resulting in blocks or restrictions on Internet use (Chart 1).

Internet access reached 86% of households (Figure 1), with an increase in classes DE (73%), indicating that the difference relative to class A (100%) continued to decrease. There was an increase in the presence of cable or fiber optics (73%) in connected households. Computers were present in 32% of households. Only 15% of people in classes DE lived in households with more than one device per resident, compared to almost all in class A.

There has been an expansion of cable or fiber optic connections in households, including among classes C and DE. Nevertheless, regional and area-specific inequalities persist. The proportion of households with connection speeds of 51 Mbps or more reached 38% but was lower in households in classes DE (21%).

Internet sharing with neighboring households (15%) remains a relevant strategy in contexts of restricted access, particularly in rural areas (26%) and the North and Northeast regions (21%).

Daily Internet use was nearly universal among users (96%), but the diversity of access locations was uneven. Only half of the population accessed the Internet in more than one location, a significantly lower proportion among classes DE (32%).

Internet use

In 2025, 85% of the Brazilian population 10 years old or older were Internet users, a percentage that has remained stable since 2023. Proportions were lower among individuals 60 years old or older (59%), from classes DE (79%), and with elementary education (79%).

There were approximately 28 million non-Internet users, concentrated mainly among people 60 years old or older (16 million), with up to elementary education (20 million), and belonging to classes C (12 million) and DE (14 million). For 47% of them, not knowing how to use the Internet was the main reason for not using it.

INTERNET USE ON MOBILE PHONES

Mobile phones were used to access the Internet by 99% of users, and 65% accessed it exclusively through these devices (Chart 2). This pattern was more frequent in classes DE (87%), those with elementary education (84%), residents of rural areas (83%), and among Black (73%) and Brown (69%) people. This exclusive use can restrict the development of digital skills and is associated with less diversity in online activities. Although Wi-Fi is widely used, the prevalence of prepaid mobile plans (52% of people with mobile phones) imposes limitations on Internet use, especially among the most vulnerable groups.

Digital skills

The survey reveals a low prevalence of digital skills among Internet users (Chart 3). The most common were verifying the reliability of information found online (50%), adopting security measures to protect devices and online accounts (46%), and using copy-and-paste tools to duplicate or move content in documents or messages (45%). Still, 29% of users did not report any of the skills investigated. Nearly half of the population demonstrated a level of digital skill "below basic," and only 15% "above basic," with marked differences by level of education, social class, and color or race.

75% OF INTERNET USERS REPORTED MAKING PAYMENTS OR TRANSFERS VIA PIX

Activities carried out online

In the three months before the survey, 92% of Internet users sent instant messages, 81% used social media, and 80% made voice or video calls. 57% of users looked up information about products and services, and 52% about health-related topics.

As for education and work activities, in 2025, 39% of users had completed school activities or research, a proportion that reached 79% among users 10 to 15 years old. Furthermore, 38% studied on the Internet on their own, and 35% completed work activities. Moreover, 24% looked up information about courses, and 17% took distance learning courses.

Furthermore, 75% of Internet users reported making payments or transfers via Pix, and 58% searched for financial information, made payments, and other financial transactions. Pix usage was less prevalent among users in classes DE (60%), although the difference between social classes were smaller than in other digital financial services (39% among users in classes DE).

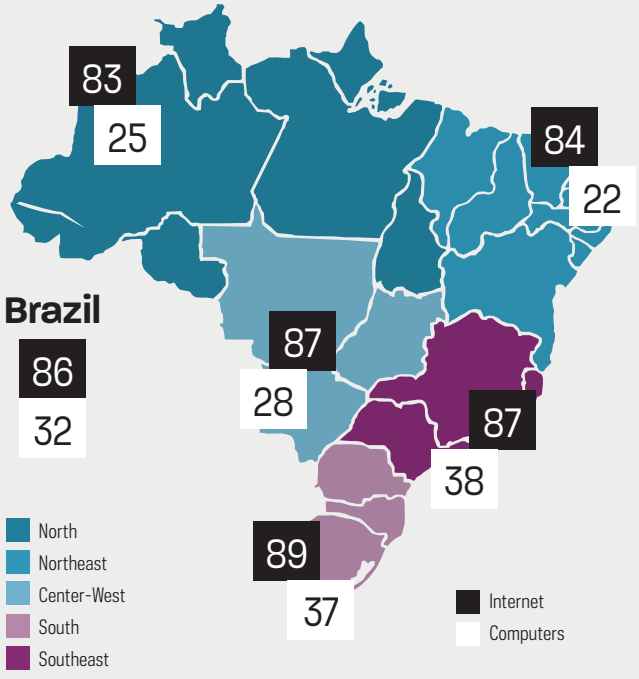
The results show that 19% of Internet users placed bets online, which represents approximately 30 million individuals. The proportion reached 29% among people 25 to 34 years old, with 25% among men, while it was

FIGURE 1

–

Households with access to computers and the Internet, by region (2025)

Total number of households (%)



43.4 million
households with Internet only

296,000
households with computers only

24.7 million
households with computers and Internet

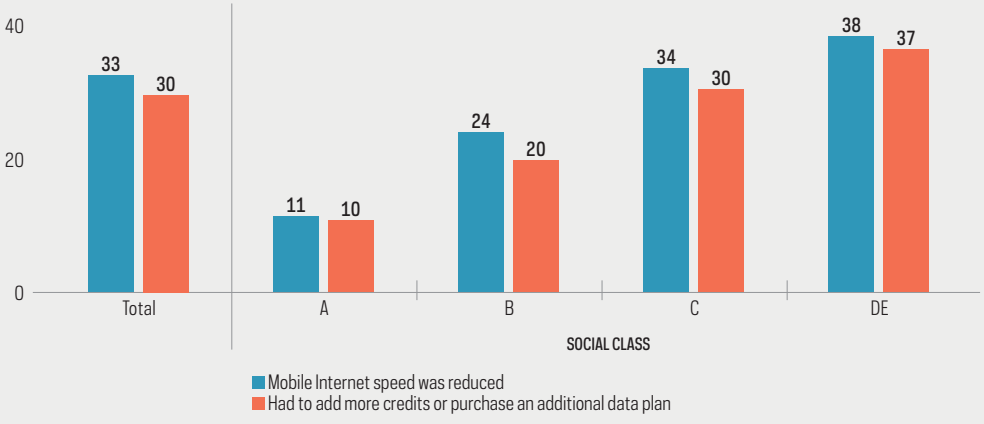
10.5 million
households with neither computers nor Internet

CHART 1

–

Internet users via mobile phone by situations experienced after the depletion of data allowance on the mobile phone plan (2025)

Total number of Internet users via mobile phones (%)



14% among women. The difference was greater in sports bets (7%), carried out by 12% of men and 2% of women.

ARTIFICIAL INTELLIGENCE

The results of the ICT Households 2025 survey show that 32% of Internet users used generative AI tools in the three months before the survey. The highest proportion was among users in class A (69%) and those with tertiary education (59%). Among AI users, 84% reported using it for personal purposes, 53% for studying, and 50% for professional activities. Among those who did not use AI, the main reasons were lack of interest or need (76%), concerns about security and privacy (63%), lack of skills (58%), and lack of awareness of the existence of this type of tool (52%).

ELECTRONIC GOVERNMENT

71% of Internet users 16 years old or older used electronic government services in 2025, with public health services (37%) being the most accessed type. The gov.br platform was accessed by 56% of users, with 49% carrying out a public service for themselves, 18% for someone else, while 12% asked someone else to access the platform to carry out a public service for themselves. The proportion was significantly higher in class A (94%).

CULTURAL ACTIVITIES

Cultural activities carried out online showed relative stability compared to 2023. In 2025, 60% of the population listened to music online, mainly through websites or applications for sharing videos (55%) or subscription services (31%). Also, 61% watched videos, programs, or movies, primarily through websites or applications for sharing videos (51%), social media (46%), instant messaging apps (42%), and subscription services (41%).

Survey methodology and access to data

The ICT Households survey has been carried out since 2005 and investigates access to and use of information and communication technologies (ICT) in households and by individuals 10 years old or older. For this edition, interviews were carried out in 27,177 households and with 24,535 individuals throughout the country. Data collection was conducted via face-to-face interviews between March and September 2025. The survey results, including tables of results with proportions, totals, and margins of error, are available at https://cetic.br. The "Methodological Report" can be accessed in both the full publication and on the website.

BOX 1

—

AI AT WORK

Generative AI has become increasingly popular in recent years, reaching its first million users in 2022. In 2025, approximately one third of Internet users reported having used generative AI (32%). Among the activities investigated by the survey, about half (50%) of AI users reported using it for professional purposes. Considering only the employed population, this percentage reached 64%, with similar levels between formal (65%) and informal (59%) workers. Significant differences are observed according to level of education: 23% of those with elementary education, 41% of those with secondary education, and 69% of those with tertiary education. These results indicate that, although generative AI can contribute to productivity gains, enhanced capabilities, and support for task completion at work, its use remains uneven across different population groups. As these technologies become more prevalent in professional environments, differences in access and ability to use them can influence opportunities for entry, retention, and career advancement in the job market, with potential impacts on income inequality and employment conditions.

CHART 2

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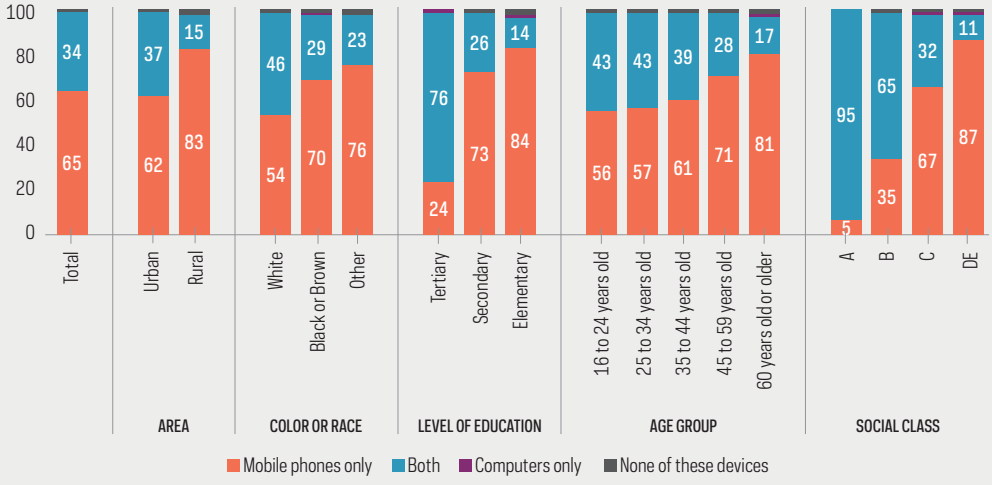
Internet users by exclusive access via mobile phones (2025)

Total number of Internet users (%)



Of the 157 million Internet users…

92%
sent instant messages

71%
watched videos, programs, films, or series online

58%
searched for financial information, made payments, and other financial transactions

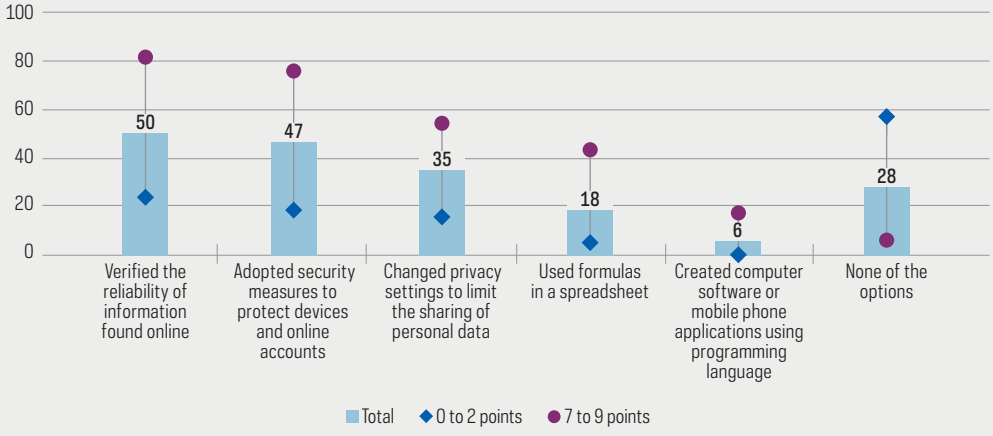
52%
purchased goods and services online

CHART 3

—

Internet users by types of digital skills and level of meaningful connectivity (2025)

Total number of Internet users (%)



Access the full survey data!

In addition to the results presented in this publication, tables of indicators, questionnaires, information on how to access the microdata, and the presentation of the results of the launch event are available on the Cetic.br|NIC.br website, as well as other publications on the topic of the survey. The tables of results (https://cetic.br/en/pesquisa/domicilios/indicadores/), available for download in Portuguese, English, and Spanish, present the statistics produced, including information on the data collected and cross-referencing for the variables investigated in the study. The information available in the tables follows the example below:

Code and indicator name

Population to which the results refer

C5 - INTERNET USERS BY ACTIVITIES CARRIED OUT ON THE INTERNET - COMMUNICATION

Total number of Internet users

PERCENTAGE (%)		SENT OR RECEIVED E-MAILS	SENT INSTANT MESSAGES	MADE VOICE OR VIDEO CALLS	USED SOCIAL MEDIA	TOOK PART IN ONLINE DISCUSSION FORUMS OR GROUPS
TOTAL		59	92	80	81	13
AREA	Urban	62	92	81	82	15
	Rural	39	85	73	73	4
REGION	Southeast	66	94	82	83	17
	Northeast	49	89	75	76	8
	South	62	93	82	84	13
	North	53	86	76	81	11
	Center-West	58	92	84	81	16
SOCIAL CLASS	A	87	99	95	95	48
	B	81	97	85	92	27
	C	60	93	82	81	12
	DE	40	84	71	73	4

Indicator responses

Results tabulation cut-outs: total (population as a whole) and characteristics of analysis (region, age group, etc.), different in each survey

Results: can be in % or totals

Source: Brazilian Network Information Center. (2025). *Survey on the use of information and communication technologies in Brazilian households: ICT Households 2025* [Tables].

How to reference the tables of indicators

This publication is also available in Portuguese on the Cetic.br|NIC.br website.

Methodological Report

ICT HOUSEHOLDS
SURVEY 2025

Methodological Report
ICT Households 2025

The Brazilian Internet Steering Committee (CGI.br), through the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br), presents the methodology of the Survey on the use of information and communication technologies in Brazilian households: ICT Households.

The ICT Households survey incorporates, in its data collection process, the target population of the ICT Kids Online Brazil survey, which comprises those who are 9 to 17 years old. Thus, both surveys share the method for selecting respondents, described in detail in the "Sampling Plan" section. Although the data were collected jointly, the results of the two surveys are released through specific reports for each audience.

Survey objective

The main goal of the ICT Households survey is to measure the ownership and use of information and communication technologies (ICT) by residents in Brazil who are 10 years old or older.

Concepts and definitions

CENSUS ENUMERATION AREA

According to the Brazilian Institute of Geography and Statistics (IBGE) definition for the Population Census, a census enumeration area covers the smallest territorial unit consisting of a contiguous area with known physical boundaries, located in an urban or rural area, and of a scale suitable for data collection. The combination of census enumeration areas in a country represents the entire national territory.

AREA

A household may be urban or rural, according to where it is located, based on the legislation in force for the Population Census. Urban status applies to cities (municipal centers), villages (district centers), and isolated urban areas. Rural status applies to all areas outside those limits.

LEVEL OF EDUCATION

This concept refers to the level of education that the individual was attending or had attended, even if they had not completed the entire cycle. For data collection purposes, the level of education was divided into 20 subcategories, ranging from "did not attend school" up to "PhD."

MONTHLY FAMILY INCOME

Monthly family income is defined as the sum of the income of all members of the household, including the respondent. For purposes of data publication, six income levels were established, starting at the monthly minimum wage (MW) as defined by the Brazilian federal government. The first level refers to households with a total income of up to one MW, while the sixth level refers to households with an income of over ten MW:

- up to one MW
- more than one MW up to two MW
- more than two MW up to three MW
- more than three MW up to five MW
- more than five MW up to ten MW
- more than ten MW

SOCIAL CLASS

The most precise term to designate this concept would be "economic class." However, this survey refers to it as "social class" in the tables and analyses. The economic classification was based on the Brazilian Economic Classification Criteria (Brazilian Criteria), as defined by the Brazilian Association of Research Companies (Abep). This classification is based on ownership of durable goods for household consumption and the level of education of the head of the household. Ownership of durable goods is based on a scoring system that divides households into the following economic classes: A1, A2, B1, B2, C, D, and E. The Brazilian Criteria was updated in 2015, resulting in a classification that is not comparable to the one previously in effect (Brazilian Criteria 2008). For results released in 2016 onward, the 2015 Brazilian Criteria were adopted.

ECONOMIC ACTIVITY STATUS

This refers to the economic activity status of respondents 10 years old or older. From a set of four questions, seven classifications were obtained related to respondents' activity status. These alternatives were classified into two categories for analysis, as shown in Table 1.

TABLE 1
–
Classification of economic activity status

Response options in the questionnaire		Status classification
Code	Description	Description
1	Works with pay	In the workforce
2	Works with no pay, i.e., apprentice, assistant, etc.	
3	Works, but is on leave of absence	
4	Attempted to work in the last 30 days	
5	Unemployed and has not looked for a job in the last 30 days	Not in the workforce

PERMANENT PRIVATE HOUSEHOLDS

This refers to a private household located in a unit that serves as a residence (house, apartment, or room). A permanent private residence is the dwelling of a person or group of people, where the relationship is dictated by kinship ties, domestic dependence, or shared living arrangements.

INTERNET USERS

Internet users are considered to be individuals who have used the Internet at least once in the three months prior to the interview, as defined by the International Telecommunication Union (ITU, 2020).

Target population

The survey target population was made up of permanent private Brazilian households, and also all individuals 10 years old or older residing in permanent private Brazilian households.

Reference and analysis unit

The survey was divided into two units of analysis and reference: permanent private households and residents 10 years old or older.

Domains of interest for analysis and dissemination

For the reference and analysis units, the results are reported for domains based on the variables and levels described below.

For the variables related to households:

- **area:** corresponds to the definition of census enumeration areas, according to IBGE criteria, whether rural or urban;
- **region:** corresponds to the regional divisions of Brazil, according to IBGE criteria: the macroregions Center-West, Northeast, North, Southeast, and South;
- **family income:** corresponds to the division of the total income of the households or residents into ranges of MW. These ranges are the following: up to one MW, more than one MW up to two MW, more than two MW up to three MW, more than three MW up to five MW, more than five MW up to ten MW, or more than ten MW;
- **social class:** corresponds to the division into A, B, C, and DE, in accordance with the Brazilian Criteria.

Regarding variables concerning individuals, the following characteristics were added to the domains mentioned above:

- **sex:** corresponds to the division into male or female;
- **color or race:** corresponds to the divisions of White, Black, Brown, Asian, or Indigenous;
- **level of education:** corresponds to the divisions of illiterate/preschool, elementary education, secondary education, and tertiary education;
- **age group:** corresponds to the divisions of 10 to 15 years old; 16 to 24 years old; 25 to 34 years old; 35 to 44 years old; 45 to 59 years old; and 60 years old or older;
- **economic activity status:** corresponds to the division between "in the workforce" and "not in the workforce."

Data collection instrument

INFORMATION ON THE DATA COLLECTION INSTRUMENTS

Data were collected through structured questionnaires with closed questions and predefined answers (single or multiple-choice answers). For more information about the questionnaire, see the section "Data Collection Instruments" in the "Data Collection Report."

Sampling plan

SURVEY FRAME AND SOURCES OF INFORMATION

To incorporate the new survey frame derived from the 2022 IBGE Population Census, the sampling plan was redone, aiming to improve the reach of the survey's traditional objectives, increase the capacity to produce estimates by federative units (a new objective), and improve the efficiency of the sample.

Two survey frames developed by the IBGE were used to implement the project sample:

- Registration of census enumeration areas from the Geographic Operational Base (BOG) of the 2022 IBGE Population Census (IBGE, 2024a)
- The National Address Registry for Statistical Purposes (CNEFE) of the 2022 IBGE Population Census (IBGE, 2024b)

The first survey frame was released by the IBGE on November 14, 2024, and consists of three sets of information: the definitive sectoral grid of the 2022 Census, with polygons describing census enumeration areas; tabular data aggregated by census enumeration areas of this sectoral grid; and the starting point and perimeters of the census enumeration sectors.

The second survey frame (CNEFE) contains a list of addresses for all buildings found by the IBGE during the 2022 Population Census data collection and classified as establishments or dwellings. This survey frame will serve as the basis for the address update phase in the sectors of the selected sample before selecting household addresses for the survey. After updating the addresses for each of the sample sectors, this information will serve as the basis for selecting the sample of households for the survey.

An important aspect of defining the survey population resulted from the exclusion of a set of census sectors from the sectoral grid. Such exclusion is a standard practice in household sampling surveys and follows established patterns in surveys of a similar nature. The following were excluded:

a. 1,101 areas classified by the IBGE as "Water Bodies," according to the variable "cd_sit";

b. 180 areas classified by the IBGE as "Barracks," according to the variable "cd_tipo";

c. 143 areas classified by the IBGE as "Accommodation/Camping," according to the variable "cd_tipo";

d. 7,805 areas classified by the IBGE as "Indigenous grouping," according to the variable "cd_tipo";

e. 837 areas classified by the IBGE as "Prison unit," according to the variable "cd_tipo";

f. 716 sectors classified by the IBGE as "Convent/hospital/ILPI (long-term care institution for the elderly)/IACA (shelter institution for children and adolescents)," according to the variable "cd_tipo";

g. 2,085 sectors classified by the IBGE as "Settlement project village," according to the variable "cd_tipo"; and

h. 5,591 sectors classified by the IBGE as "Quilombola grouping," according to the variable "cd_tipo."

After the indicated exclusions, the set of census enumeration areas considered eligible and maintained in the register for sample selection then totaled 449,639. Table 2 shows the distribution by situation and type.

TABLE 2
–
Total number of eligible census enumeration areas in the survey frame and total number of occupied private households and residents in those areas, by area situation

Situation	Areas	Households	Residents
Urban area with a high density of buildings in a city or town	308 451	58 891 797	162 192 390
Urban area with low building density in a city or town	31 975	3 685 672	10 650 356
Urban center	12 038	1 347 629	3 932 118
Rural cluster – Village	13 997	1 222 429	3 712 325
Rural cluster – Rural nucleus	286	16 211	51 261
Rural cluster – Hamlet	1 371	61 780	181 060
Rural area (excluding clusters)	81 521	6 673 098	19 669 294
Total	**449 639**	**71 898 616**	**200 388 804**

Source: Aggregated Archive of Census Enumeration Areas of the 2022 Population Census (IBGE, 2024a).

One of the difficulties encountered during the preparation of the registration for the survey was the fact that there are many census enumeration areas with a small number of households surveyed. For example, we found 21,558 eligible areas with fewer than 15 households (4.8%) and 74,367 of them with 15–59 households (16.5%).

This difficulty motivated the construction of primary sampling units (PSU) through aggregation or combination of census enumeration areas, in order to avoid selecting very small areas, in which the survey might eventually fail to obtain the desired sample. This operation is described in the "PSU Formation" section.

PSU FORMATION

This section describes the process of constructing the PSU, based on the new IBGE census sector grid described in the previous section. To carry out this construction, the R programming language was used, in which three optimization algorithms were implemented (Goldbarg et al., 2015), which were applied within previously defined geographic and situational strata. Taking into account geographical stratification, criteria related to formation, contiguity, and capacity were applied. In the end, each PSU corresponded to a grouping of census enumeration areas that met the defined criteria.

Within each municipality and situational stratum, two types of PSU were constructed: (I) PSU with, obligatorily, a minimum of 60 occupied permanent private dwellings (DPPO, as per its acronym in Portuguese)—capacity criterion—whose census enumeration areas were contiguous; and (II) PSU that preferably have a minimum of 60 DPPO but with noncontiguous census tracts.

Additionally, for the type I PSU, the goal was to maximize the number of PSU formed. Regarding type II, each PSU consisted of, at most, two census enumeration areas that had high dissimilarity regarding the stratification variable corresponding to the percentage of residents in households with up to one bathroom in each area. More specifically, if a municipality's situational stratum has n census enumeration areas, where n is even, $n/2$ PSU will be formed, and if n is odd, there will be $n/2+1$ PSU.

The definition of a PSU, considering the aforementioned criteria of capacity and contiguity, refers to a problem of capable and connected clustering (Brito & Montenegro, 2010), in which each object corresponds to a census sector and the PSU refers to the groups. This can be formulated as a graph optimization problem (Ahuja et al., 1993) in which the goal is to maximize the objective function associated with the number of PSU formed. For the construction of type I PSU, two algorithms were implemented: the minimum spanning tree-based heuristic (MSTBH) and the node aggregation heuristic (NAH), both based on graph concepts. In the case of type II PSU, an algorithm was developed that uses the concepts of median and sector position in the ordered list based on the stratification variable.

To apply these three algorithms, briefly described below, a code was developed in the R language containing a set of procedures—in particular, a procedure that reads and validates the neighborhood file and the census enumeration area registration file from the 2022 census, which contains the values of the stratification variable considered. The neighborhood file comprises a list of codes for the areas neighboring each area, with only those belonging to the same municipality being considered neighbors.

The information from these two files was separated by federative unit, and the developed algorithms were applied to each of its municipalities, using the two aforementioned files as input.

In general terms, after applying the reading and validation procedures, a second procedure was carried out for each federative unit (FU), which constructs a data structure that reflects the combination of geographic and situational strata, resulting in the nine types of segments listed in Tables 3 and 4 below:

TABLE 3

–

Segments considered in the formation of the PSU

Type of segment (by municipality)	Criteria considered
Capital_Urban_Nonspecial	Capacity and contiguity
Capital_Urban_Slum_Community	Capacity and contiguity
Capital_Rural	Capacity and contiguity
MR_Capital_and_Nonspecial_Urban	Capacity and contiguity
MR_Capital_and_Urban_Slum_Community	Capacity and contiguity
MR_Capital_Rural	Capacity and contiguity
Noncapital_Nonspecial_Urban	Capacity and maximum dissimilarity
Noncapital_Urban_Slum_Community	Capacity and maximum dissimilarity
Interior_Rural	Capacity and maximum dissimilarity

TABLE 4

–

Total number of PSU formed according to the nine types of segments

Segment	Total of PSU
Capital_Urban_Nonspecial	70 386
Capital_Urban_Slum_Community	17 188
Capital_Rural	985
MR_Capital_and_Nonspecial_Urban	47 323
MR_Capital_and_Urban_Slum_Community	7 023
MR_Capital_Rural	3 974
Noncapital_Nonspecial_Urban	102 932
Noncapital_Urban_Slum_Community	4 566
Interior_Rural	46 949
Total	**301 326**

Source: Aggregated Archive of Census Enumeration Areas of the 2022 Population Census (IBGE, 2024a).

Due to the contiguity criterion established for segments 1 to 6, a procedure was implemented that constructed a graph G with n vertices and m edges for each municipality, from the information in the neighborhood file. This graph fulfilled the contiguity criterion of the problem and was used as the input data structure for the MSTBH and NAH algorithms. In this graph, each vertex v_i corresponds to a census enumeration area i, and each edge $a_{ij} = (v_i, v_j)$ expresses a neighborhood relationship between two vertices v_i and v_j, corresponding to two areas i and j that are part of the same municipality and are neighbors (share a border). Additionally, each vertex v_i of G was assigned the value corresponding to the DPPO number of sector i, and each edge a_{ij} was assigned absolute difference (dissimilarity) between the DPPO number of sectors i and j.

The MSTBH algorithm is based on the construction of a minimum spanning tree (MST) (Ahuja et al., 1993), which corresponds to a graph T containing all n vertices of G (areas) and the $n-1$ edges of G with the smallest absolute difference values.

To construct a set of k PSU, where k is at most equal to n, in which all sectors have a DPPO number ≥ 60, a partitioning procedure is applied to T that iteratively removes $k-1$ edges of T, ensuring immediately, by the properties of the AGM, the satisfaction of the contiguity constraint—that is, each edge a_{ij} removed produces two connected subtrees corresponding to two contiguous partitions that are candidates for the formation of two PSU.

To obtain the largest number of possible PSU at the end of the partitioning process, in each iteration, all possible edge removals from T are evaluated, removing the one that produces two subtrees with the largest difference between the sums of the DPPO associated with the sectors corresponding to their vertices, so that the two partitions (subtrees) T_1 and T_2 are feasible (sum of DPPO ≥ 60), thus defining two possible PSU.

Next, the feasible partition (subtree T_1 or T_2) with the lowest sum of DPPO is defined as a new PSU, which is added to the current set of PSU under construction, while the feasible partition with the highest sum of DPPO is associated with the current T tree. This process is repeated in subsequent iterations until it is no longer possible to produce new feasible partitions (PSU) by removing any edge from the current tree T. The pseudocode below outlines the basic steps of the MSTBH algorithm.

BOX 1

—

MSTBH ALGORITHM

Construct graph G from the neighborhood relationship of the sectors that make up the processed municipality.
Construct the MST T from G.
$T_{current} \leftarrow T$
part_viable ← 1
$C_{PSU^{**}} \leftarrow \varnothing$ (Set of formed PSU)
While (part_viable = 1) **Do**
  Remove each edge a_{ij} from the $T_{current}$ and evaluate the total DPPO in the two partitions produced (candidates for PSU).
  If there is at least one edge removal that produces two feasible partitions, T_1 and T_2, **then**
    Remove from the $T_{current}$ edge a_{ij} that produces two partitions with the **largest difference** between the sums of the DPPO
    $C_{PSU} \leftarrow C_{PSU} \cup T_{smallest}$ (subtree corresponding to the feasible partition with the smallest sum of DPPO)
    $T \leftarrow T_{largest}$ (subtree corresponding to the feasible partition with the largest sum of DPPO)
  If not
    part_viable ← 0
  End-If
End-While
Return C_{PSU}

Due to the processing time required by the MSTBH algorithm—as the number of sectors analyzed increases and in order to validate the results produced regarding the quality of the solutions, measured by the largest possible number of PSU formed per municipality—a second algorithm, called NAH, was implemented. This algorithm also uses the previously defined graph *G* as its input data structure, but it differs from the MSTBH algorithm in how it constructs the PSU, being applied in two basic steps:

- **Step 1:** A procedure is applied that identifies all areas in the municipality undergoing processing that have a DPPO number greater than or equal to 60, with each of these sectors automatically defined as a PSU.
- **Step 2:** After step 1, if there are areas with fewer than 60 DPPO, the goal is to form new PSU by joining these sectors, evaluating whether they are contiguous (based on graph *G*), and aiming to maximize the number of PSU. In this sense, to form new PSU, various combinations of these areas are evaluated to perform the joining, prioritizing those with the fewest number of sectors and that meet the criteria of capacity and contiguity.

The MSTBH and NAH algorithms were applied to all municipalities defined by segments 1 to 6.

Finally, for the construction of PSU associated with municipalities defined by segments 7 to 9, where the contiguity restriction is not considered, and the capacity restriction associated with the number of DPPO is desirable but not mandatory, an algorithm called heuristic for median maximization (HMEDMAX) was implemented. This algorithm

was developed to enable the formation of PSU with two census enumeration areas each, such that the areas allocated to the same PSU are as dissimilar as possible to each other (Euclidean distance) with respect to the stratification variable corresponding to the percentage of residents in households with up to one bathroom in each area.

The algorithm was applied considering two possible cases: (1) an even number of areas and (2) an odd number of areas. In case 1, the areas are ordered in ascending order, in relation to the values of the stratification variable, forming $n/2$ PSU by joining the area in position 1 with that in position $n/2$, the area in position 2 with that in position $(n/2)+1$, and so on. In case 2, where n is odd, the first step involves evaluating all combinations of the n areas taken $(n-1)$ to $(n-1)$ $(C_n^{(n-1)})$, producing n subsets formed by $(n-1)$ areas. In each subset, its sectors are ordered in ascending order by the stratification variable, and their joints are performed in a manner analogous to that described in case 1, then calculating the median of the dissimilarities for the $n/2$ pairs of areas. The subset of n sectors associated with the $n/2$ pairs with the highest median dissimilarity and that meet the capacity constraint is considered the solution set for the PSU. Finally, the area not included in this set of $n/2$ PSU is defined as a new PSU, separately.

SAMPLE STRATIFICATION

The proposed sampling plan for the survey considers a strategy based on stratified and cluster sampling in three or four stages—for an understanding of the technical terms used here, see Silva et al. (2020).

Stratification was carried out in three stages, the first being geographical in nature, associated with the demand for estimates for predefined areas of interest; the second was based on the separation of a PSU from each natural stratum according to its situation (with three categories: "non-special urban," "urban community or slum" and "rural"); the third was statistical in nature, aiming to increase the efficiency of the sampling plan by grouping sectors of similar socioeconomic level.

For geographic stratification, the following were defined as areas of interest:

a. Municipalities that are the capitals of the 26 states of the federation, plus the Federal District, totaling 27 natural strata.

b. The groups of municipalities surrounding 11 metropolitan regions based in capital cities—Manaus, Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo, Curitiba, and Porto Alegre—and the Integrated Development Region (RIDE, as per its acronym in Portuguese) of the Federal District and its surroundings, totaling 12 natural geographic strata, since, in the case of the RIDE of the Federal District and its surroundings, there are municipalities in two states: Minas Gerais and Goiás.

c. The sets of municipalities in noncapital cities of 26 states, obtained by excluding those already considered in the natural strata formed by the domains of interest *a* and *b* above.

Thus, at the end of this stratification stage, 65 natural strata were formed, whose descriptions can be seen in Table 5 below.

TABLE 5

–

Total number of PSU in the population, by natural stratum

Federative unit	Natural stratum	Number of PSU (population)
Rondônia	11 - Capital city	708
Rondônia	11 - Noncapital cities	1 251
Acre	12 - Capital city	638
Acre	12 - Noncapital cities	589
Amazonas	13 - Capital city	3 098
Amazonas	13 - Noncapital cities	1 770
Amazonas	13 – Metropolitan Region of Manaus (AM)	991
Roraima	14 - Capital city	479
Roraima	14 - Noncapital city	283
Pará	15 - Capital city	1 995
Pará	15 - Noncapital cities	5 555
Pará	15 - Metropolitan Region of Belém (PA)	1 776
Amapá	16 - Capital city	647
Amapá	16 - Noncapital cities	363
Tocantins	17 - Capital city	609
Tocantins	17 - Noncapital cities	1 777
Maranhão	21 - Capital city	1 674
Maranhão	21 - Noncapital cities	6 573
Piauí	22 - Capital city	1 437
Piauí	22 - Noncapital cities	2 976
Ceará	23 - Capital city	4 041
Ceará	23 - Noncapital cities	6 605
Ceará	23 - Metropolitan Region of Fortaleza (CE)	2 664
Rio Grande do Norte	24 - Capital city	1 068
Rio Grande do Norte	24 - Noncapital cities	3 013
Paraíba	25 - Capital city	1 602
Paraíba	25 - Noncapital cities	4 383

CONTINUES ►

► CONTINUES

Federative unit	Natural stratum	Number of PSU (population)
Pernambuco	26 - Capital city	2 739
Pernambuco	26 - Noncapital cities	5 738
Pernambuco	26 - Metropolitan Region of Recife (PE)	4 187
Alagoas	27 - Capital city	1 475
Alagoas	27 - Noncapital cities	2 501
Sergipe	28 - Capital city	1 087
Sergipe	28 - Noncapital cities	2 318
Bahia	29 - Capital city	4 359
Bahia	29 - Noncapital cities	11 622
Bahia	29 - Metropolitan Region of Salvador (BA)	2 044
Minas Gerais	31 - Capital city	4 878
Minas Gerais	31 - Noncapital cities	19 636
Minas Gerais	31 - RIDE of the Federal District and surrounding area	192
Minas Gerais	31 - Metropolitan Region of Belo Horizonte (MG)	6 043
Espírito Santo	32 - Capital city	621
Espírito Santo	32 - Noncapital cities	5 414
Rio de Janeiro	33 - Capital city	13 022
Rio de Janeiro	33 - Noncapital cities	6 983
Rio de Janeiro	33 - Metropolitan Region of Rio de Janeiro (RJ)	12 718
São Paulo	35 - Capital city	25 597
São Paulo	35 - Noncapital cities	27 989
São Paulo	35 - Metropolitan Region of São Paulo (SP)	18 299
Paraná	41 - Capital city	3 125
Paraná	41 - Noncapital cities	8 775
Paraná	41 - Metropolitan Region of Curitiba (PR)	2 907
Santa Catarina	42 - Capital city	956
Santa Catarina	42 - Noncapital cities	8 521
Rio Grande do Sul	43 - Capital city	2 624
Rio Grande do Sul	43 - Noncapital cities	8 744
Rio Grande do Sul	43 - Metropolitan Region of Porto Alegre (RS)	5 202

▶ CONCLUSION

Federative unit	Natural stratum	Number of PSU (population)
Mato Grosso do Sul	50 - Capital city	1 597
Mato Grosso do Sul	50 - Noncapital cities	2 144
Mato Grosso	51 - Capital city	1 094
Mato Grosso	51 - Noncapital cities	4 085
Goiás	52 - Capital city	2 242
Goiás	52 - Noncapital cities	4 839
Goiás	52 - RIDE of the Federal District and surrounding area	1 297
Federal District	53 - Capital city	5 147
Total		**301 326**

The second stage of stratification used the PSU situation (with three categories: "non-special urban," "urban community or *favela*," and "rural"). Next, the total sample size of each natural stratum was allocated to the corresponding situational strata, using an allocation proportional to the power of 0.8 of the number of PSU in the stratum, but maintaining a minimum of three PSU in the sample from each stratum. The use of this allocation aimed to reduce situations of very small samples in the smallest strata.

After being separated by situation, the PSU were further stratified based on the percentage of people living in households without a bathroom or with up to one bathroom, per PSU. This stratification variable was used because, at the time of sample selection, there were no data on the average income, by census enumeration area, of the person responsible for the household. Based on experience from previous censuses, this stratification variable is one with the greatest predictive power regarding income levels in census enumeration areas.

At this stage of stratification, a stratum formed by the combination of the natural stratum and the PSU situation could or could not be subdivided into socioeconomic strata. Strata with sample sizes smaller than eight PSU were not subdivided. For strata with eight or more PSU in the sample, the subdivision had a number of strata that varied according to Table 6.

TABLE 6

–

Number of strata formed according to the sample size of PSU in the natural and situational strata

Number of PSU in the sample	Number of strata
8 to 11	2
12 to 18	3
19 to 24	4
25 or more	5

The formation of socioeconomic level strata used the quantiles of the percentage of people living in households without a bathroom or with up to one bathroom, and the equal allocation of the sample across the resulting strata. Thus, for example, in a natural and situational stratum with a sample size of 20 PSU, four strata were formed based on the quartiles of the distribution of the stratification variable, with five PSU allocated to each of the strata formed at the end. This process resulted in the formation of 378 strata, from which the PSU sample was then selected.

SAMPLE ALLOCATION

The allocation of the PSU sample to the natural strata was defined based on two criteria: (1) allocating larger samples to the capital city and Federal District strata to allow for the development of reasonably accurate estimates for these domains; and (2) allocating equal samples to the other natural strata, aiming to obtain estimates of similar accuracy for these strata. Sample sizes were determined after analyzing the accuracy of estimates obtained in the latest editions of the ICT Households survey. Table 7 below shows the allocation of the PSU sample.

TABLE 7

–

Total number of PSU in the sample by natural stratum

Federative unit	Natural stratum	Number of PSU (sample)
Rondônia	11 - Capital city	30
Rondônia	11 - Noncapital cities	30
Acre	12 - Capital city	30
Acre	12 - Noncapital cities	30
Amazonas	13 - Capital city	40

CONTINUES ▶

▶ CONTINUES

Federative unit	Natural stratum	Number of PSU (sample)
Amazonas	13 – Noncapital cities	30
Amazonas	13 – Metropolitan Region of Manaus (AM)	30
Roraima	14 – Capital city	30
Roraima	14 - Noncapital cities	30
Pará	15 – Capital city	40
Pará	15 – Noncapital cities	30
Pará	15 – Metropolitan Region of Belém (PA)	30
Amapá	16 – Capital city	30
Amapá	16 - Noncapital cities	30
Tocantins	17 – Capital city	30
Tocantins	17 - Noncapital cities	30
Maranhão	21 – Capital city	30
Maranhão	21 - Noncapital cities	30
Piauí	22 – Capital city	30
Piauí	22 - Noncapital cities	30
Ceará	23 - Capital city	40
Ceará	23 - Noncapital cities	30
Ceará	23 - Metropolitan Region of Fortaleza (CE)	30
Rio Grande do Norte	24 – Capital city	30
Rio Grande do Norte	24 - Noncapital cities	30
Paraíba	25 – Capital city	30
Paraíba	25 - Noncapital cities	30
Pernambuco	26 - Capital city	40
Pernambuco	26 - Noncapital cities	30
Pernambuco	26 – Metropolitan Region of Recife (PE)	30
Alagoas	27 – Capital city	30
Alagoas	27 - Noncapital cities	30
Sergipe	28 – Capital city	30
Sergipe	28 - Noncapital cities	30
Bahia	29 - Capital city	40
Bahia	29 - Noncapital cities	30

► CONCLUSION

Federative unit	Natural stratum	Number of PSU (sample)
Bahia	29 - Metropolitan Region of Salvador (BA)	30
Minas Gerais	31 - Capital city	40
Minas Gerais	31 - Noncapital cities	30
Minas Gerais	31 - RIDE of the Federal District and surrounding area	15
Minas Gerais	31 - Metropolitan Region of Belo Horizonte (MG)	30
Espírito Santo	32 – Capital city	30
Espírito Santo	32 - Noncapital cities	30
Rio de Janeiro	33 - Capital city	40
Rio de Janeiro	33 - Noncapital cities	30
Rio de Janeiro	33 - Metropolitan Region of Rio de Janeiro (RJ)	30
São Paulo	35 - Capital city	40
São Paulo	35 - Noncapital cities	30
São Paulo	35 - Metropolitan Region of São Paulo (SP)	30
Paraná	41 - Capital city	40
Paraná	41 - Noncapital cities	30
Paraná	41 – Metropolitan Region of Curitiba (PR)	30
Santa Catarina	42 – Capital city	30
Santa Catarina	42 – Noncapital cities	30
Rio Grande do Sul	43 - Capital city	40
Rio Grande do Sul	43 - Noncapital cities	30
Rio Grande do Sul	43 - Metropolitan Region of Porto Alegre (RS)	30
Mato Grosso do Sul	50 – Capital city	30
Mato Grosso do Sul	50 - Noncapital cities	30
Mato Grosso	51 – Capital city	30
Mato Grosso	51 - Noncapital cities	30
Goiás	52 - Capital city	40
Goiás	52 - Noncapital cities	30
Goiás	52 - RIDE of the Federal District and surrounding area	15
Federal District	53 - Capital city	70
Total		**2 070**

SAMPLE SELECTION

SELECTION OF PSU

In each of the strata, the selection of PSU was made using Pareto's method of probability proportional to size (Rosén, 2000). This method was also adopted by the IBGE to carry out the sampling for the Integrated System of Household Surveys (Freitas & Antonaci, 2014). The size measurement considered for PSU selection was defined as follows:

$$T_i = max\,(10^{0.8}; D_i^{0.8})$$

where D_i represents the number of occupied private households in the PSU, as determined in the 2022 Population Census. Using a power of 0.8 reduces the asymmetry in the distribution of PSU sizes, and the lower limit was specified to prevent PSU with very small inclusion probabilities from having excessively large weights when weighting the sample.

It is worth noting that, despite applying the described algorithm to create PSU with an adequate minimum size, for various reasons, a few PSU finished the process with sizes still below the desired minimum limit. Thus, it was important to maintain the idea that PSU with fewer than 10 occupied private households should have their size imputed at a value corresponding to this lower level, after the adopted power transformation.

In PSU with up to two census enumeration areas, both were surveyed. In areas comprising three or more areas, two of them were randomly selected to participate in the survey. The selection of census enumeration areas within the PSU was also done using Pareto's method of probability proportional to size (Rosén, 2000). The size measurement considered for selecting sectors used the same transformation as for the PSU—in this case, the number of occupied private households was that of each census enumeration area.

After applying this process, PSU and census enumeration areas were selected for the research sample. An important distinction occurred in the stage of selecting households within census enumeration areas. In the PSU of the capital cities and metropolitan regions of capital cities considered, 15 households were always selected per PSU. When the PSU in question had two areas in the sample, 8 households were selected from the larger of the two areas and 7 from the smaller of the two. In the case of a PSU located in the natural strata of the interior, 15 households were always selected per area in the sample, whether the PSU had one or two sectors in the corresponding sample.

SELECTION OF HOUSEHOLDS AND RESPONDENTS

Permanent private households within each PSU were selected using simple random sampling. In the first stage, the interviewers listed all the households in the PSU (approximately two census enumeration areas) to obtain a complete and updated record. After updating the number of households per PSU selected, 30 households per PSU were randomly chosen to be visited for interviews.

All households in the sample responded to the ICT Households questionnaire – Module A: Access to ICT in the household.

To determine which survey should be administered in the household (ICT Households – Individuals or ICT Kids Online Brazil), all the residents in each household were listed, and the survey was selected as follows:

1. When there were no residents in the 9 to 17 age group, the ICT Households interview was conducted with a resident 18 years old or older randomly selected from among the household's residents.
2. When there were residents in the 9 to 17 age group, a random number was generated between 0 and 1, and:
    a. If the number generated was smaller than or equal to 0.54, an interview using the ICT Kids Online Brazil survey was conducted with a resident 9 to 17 years old, randomly selected from among the household's residents in this age group, and with the person responsible for this selected resident.
    b. If the number generated was greater than 0.54 and equal to or less than 0.89, the ICT Households survey interview was conducted with a resident 10 to 17 years old, randomly selected from among the household's residents in this age group.
        - In households selected for the ICT Households survey (with a resident 10 to 17 years old) that only had residents 9 years old or younger, in addition to members 18 years old or older, the ICT Households survey was conducted with a randomly selected resident 18 years old or older.
    c. If the number generated was greater than 0.89, the interview for the ICT Households survey was conducted with a resident 18 years old or older randomly selected from among the residents of the household in this age group.

The selection of respondents in each household selected to answer the questionnaire was done after listing the residents.

Data collection procedures

DATA COLLECTION METHOD

Data collection was conducted using computer-assisted personal interviewing (CAPI), which consists of having a questionnaire programmed in a software system for tablets and administered by interviewers in face-to-face interaction.

Data processing

WEIGHTING PROCEDURES

The selection process for each household and resident, as described above, established an initial selection probability for each PSU. Based on the data collection results, nonresponse corrections were made for each step of the selection process. These steps are described below.

WEIGHTING OF PSU

Each PSU has a selection probability, as described in the "Selection of PSU" section. The inverse of this selection probability corresponds to the basic weight of each selected PSU. During data collection, it is possible that no answers will be collected from households for a PSU. In this case, nonresponse is adjusted considering that the nonresponse is random within the stratum. The correction of the weights of the responding PSU by stratum is given by Formula 1.

FORMULA 1

$$w_{ih}^{r} = w_{ih} \times \frac{\sum_{h=1}^{H} w_{ih}}{\sum_{h=1}^{H} w_{ih} \times I_{h}^{r}}$$

w_{ih}^{r} is the weight of PSU i in stratum h adjusted for nonresponse

w_{ih} is the base weight of the sampling design of PSU i in stratum h

I_{h}^{r} is an indicating variable that is assigned value 1 if PSU i in stratum h had at least one responding household and 0 otherwise

WEIGHTING OF HOUSEHOLDS IN THE PSU

Similar to the weighting of PSU, each household also has an initial selection probability. This probability is defined as the ratio between 15 (the number of households selected per census enumeration area) and the number of eligible households in each census enumeration area making up the PSU.

The first factor for calculating the weight of households is the estimated total of eligible households in the census enumeration area. Eligible households are permanent private households with residents able to answer the surveys (excluding only households with individuals unable to communicate in Portuguese or who have other conditions that make it impossible to carry out the survey), according to Formula 2.

FORMULA 2

$$E_{jih} = d_{jih} \times \frac{d^{E}_{jih}}{d^{A}_{jih}}$$

E_{jih} is the estimated total number of eligible households in census enumeration area j in PSU i in stratum h

d^{E}_{jih} is the total number of eligible households approached in census enumeration area j in PSU i in stratum h

d^{A}_{jih} is the total number of households contacted in census enumeration area j in PSU i in stratum h

d_{jih} is the total number of households listed in census enumeration area j in PSU i in stratum h

The second factor is the total number of eligible households in which the survey was conducted in the census enumeration area. The weight of each household in a census enumeration area is given by Formula 3.

FORMULA 3

$$w_{jih} = \frac{E_{jih}}{\sum_{k=1}^{n_{jih}} I^{r}_{kjih}}$$

w_{jih} is the weight of the households in census enumeration area j in PSU i in stratum h adjusted for nonresponse in the census enumeration area

E_{jih} is the estimated total number of eligible households in census enumeration area j in PSU i in stratum h

I^{r}_{kjih} is an indicating variable that is assigned value 1 if household k in census enumeration area j in PSU i in stratum h answered the interview and 0, otherwise

n_{jih} corresponds to the number of households selected in census enumeration area j in PSU i in stratum h

As with the PSU, some of the households selected refuse to participate in the survey. In some cases, a census enumeration area of a PSU may have no responding households. Therefore, it is necessary to correct the nonresponse of the census sector within the PSU.

Nonresponse for the households within the PSU is adjusted after calculating the weights of the households in the census enumeration area, as presented above. This adjustment is carried out using Formula 4.

FORMULA 4

$$w^{r}_{jih} = w_{jih} \times \frac{SC_{ih}}{\sum_{j=1}^{SC_{ih}} I^{r}_{ih}}$$

w^{r}_{jih} is the weight of the households in census enumeration area j in PSU i in stratum h adjusted for nonresponse in the PSU

w_{jih} is the weight of the households in census enumeration area j in PSU i in stratum h adjusted for nonresponse in the census enumeration area

SC_{ih} is the total number of census enumeration areas making up PSU i in stratum h

I^{r}_{ih} is an indicating variable that is assigned value 1 if census enumeration area j in PSU i in stratum h had at least one responding household and 0, otherwise

The final weight of each household, adjusted for nonresponse, is given by:

$$w^{d}_{jih} = w^{r}_{ih} \times w^{r}_{jih}$$

Calibration of households

Based on the household weight adjusted for nonresponse (w^{d}_{jih}), these weights are calibrated to known totals for households and the general population, obtained from estimates in the most recent Continuous National Household Sample Survey (Continuous Pnad) available (IBGE, 2023).

The calibration method considers the characteristics of households and population totals separately. The method used is the iterative proportional updating (IPU) (Ye et al., 2009). This algorithm makes it possible to establish equal weights for the people living in the same household, respecting marginal household and population totals. The methodology is applied to the set of residents who make up the sample and are listed in the household roster, with all residents initially receiving the same calculated household weight w^{d}_{jih}.

The characteristics used in the calibration are listed below:

For households:

- federative unit (2021 to 2024),
- area (rural or urban),
- household size (1, 2, 3, 4, 5, and 6 or more people).

For individuals:

- macro-region,
- area (rural or urban),
- sex,

- age group (0 to 2 years old, 3 to 5 years old, 6 to 8 years old, 9 years old, 10 to 15 years old, 16 to 24 years old, 25 to 34 years old, 35 to 44 years old, 45 to 59 years old, 60 years old or older).

As a result, a final weight is obtained for each household, given by w^{c}_{jih}, which is the weight of households in census enumeration area j in PSU i in stratum h adjusted for nonresponse and calibrated for household population and individual population totals.

The weights are calibrated using the *mlfit*[1] package of the free statistical software R.

WEIGHTING OF RESPONDENTS IN EACH HOUSEHOLD

In each selected household, the ICT Households survey was applied according to the composition of the household and a random survey and respondent selection process. The basic weight of each respondent in the survey is calculated using Formulas 5 and 6.

Residents 10 to 17 years old

FORMULA 5

$$w^{T}_{l/kjih} = \frac{1}{0.35 \times (1\text{-}p^{*})} \times P^{T}_{kjih}$$

$w^{T}_{l/kjih}$ is the weight of the respondent 10 to 17 years old in household k in census enumeration area j in PSU i in stratum h

P^{T}_{kjih} is the number of people in the 10 to 17 age group in household k in census enumeration area j in PSU i in stratum h

Residents 18 years old or older

FORMULA 6

$$w^{A}_{l/kjih} = \frac{1}{0.11 \times (p^{*} \times 0.35)} \times P^{T}_{kjih}$$

$w^{A}_{l/kjih}$ is the weight of the respondent 18 years old or older in household k in census enumeration area j in PSU i in stratum h

P^{T}_{kjih} is the number of people 18 years old or older in household k in census enumeration area j in PSU i in stratum h

p^{*} is an estimate of the proportion of households with only 9-year-old residents compared to the total number of households with residents 9 to 17 years old, obtained from the most recent microdata available from the Continuous National Household Sample (Continuous Pnad). In households selected to participate in the ICT Households – Individuals survey (with residents 10 to 17 years old) with only 9-year-olds, in addition to members 18 years old or older, the ICT Households – Individuals survey was conducted with a randomly selected resident 18 years old or older

[1] See https://cran.r-project.org/web/packages/mlfit/

FINAL WEIGHT OF EACH RESPONDENT

The final weight of each individual interviewed in the survey was obtained by multiplying the weights obtained in each step of the weighting process.

a. Weight of the respondent to the ICT Households survey (with residents 10 to 17 years old):

$$w_{lkjih} = w^{c}_{jih} \times w^{T}_{l/kjih}$$

b. Weight of the respondent to the ICT Households survey (with residents 18 years old or older):

$$w_{lkjih} = w^{c}_{jih} \times w^{A}_{l/kjih}$$

CALIBRATION OF THE WEIGHT OF EACH RESPONDENT

The weights of the interviews were calibrated to reflect certain known and accurately estimated population counts, obtained from the most recent Continuous Pnad survey, as it is also done for households. This procedure, in addition to correction for nonresponse, sought to correct biases associated with nonresponse of specific groups in the population, for all the respondents selected in the households to answer the survey.

The variables considered for calibration of the weights of individuals in the ICT Households survey were as follows: sex, age group (six categories: 10 to 15 years, 16 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 59 years, and 60 years old or older), household area (urban or rural), ICT strata, economic activity status (two categories: in the workforce or not in the workforce), and level of education (four categories: illiterate/preschool, elementary education, secondary education, or tertiary education).

The calibration of the weights was implemented using the calibration function of the survey library (Lumley, 2010), available in the free statistical software R.

SAMPLING ERRORS

Estimates of margins of error took into account the sampling plan set for the survey. The replication method was used for the individuals who responded to the survey, using the *as.svrepdesign* function in the R survey package. In this method, 200 weights are generated, which correspond to 200 samples with replacement of the original sample, following the same design (stratified and conglomerate).

The replication method was also used to estimate margins of error for the households responding to the survey. In this case, as the calibration process is not available in the R survey package, replicas were generated based on the population using the following algorithm:

1. 200 replicas were generated with weights only adjusted for nonresponse, leaving the base with 201 weights.

2. The original weight, adjusted for nonresponse, is scaled to the totals for households and individuals using the IPU method.
3. For the 200 replicate weights generated, calibrations were made for the 200 replicate weights available in the Continuous Pnad.

The result is a household database with 201 weights: the weight that provides precise estimates and 200 replicate weights used to calculate the errors of the precise estimates. This adjustment methodology is described in Opsomer and Erciulescu (2021).

From the estimated variances, we opted to disclose errors expressed as the margin of error of the sample. For publication, margins of error were calculated at a 95% confidence level. Thus, if the survey were repeated several times, 19 times out of 20, the range would include the true population value.

Other values derived from this variability are usually presented, such as standard deviation, coefficient of variation, and confidence interval.

The margin of error is calculated by multiplying the standard error (square root of the variance) by 1.96 (sample distribution value, which corresponds to the chosen significance level of 95%). These calculations were made for each variable in all tables. Therefore, all indicator tables have margins of error related to each estimate presented in each cell of the table.

Data dissemination

The results of this survey are presented according to the variables described in the section "Domains of interest for analysis and dissemination."

In some results, rounding caused the sum of partial categories to be different from 100% for single-answer questions. The sum of frequencies in multiple-answer questions usually exceeds 100%. It is worth mentioning that, in the tables of results, hyphens (-) are used to represent nonresponse. Furthermore, since the results are presented without decimal places, cells with zero value mean that there was an answer to the item, but it was explicitly greater than zero and lower than one.

The results of this survey are published online and made available on the website (https://www.cetic.br/) and on the data visualization portal of Cetic.br|NIC.br (https://data.cetic.br/). The tables of proportions, totals, and margins of error for each indicator are available for download in Portuguese, English, and Spanish. More information on the documentation, metadata, and microdata databases of the survey are available on the microdata webpage (https://www.cetic.br/en/microdados/).

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Data Collection Report

ICT HOUSEHOLDS SURVEY 2025

Data Collection Report
ICT Households 2025

The Brazilian Internet Steering Committee (CGI.br), through the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br), presents the "Data Collection Report" of the ICT Households 2025 survey. The objective of this report is to provide information about specific characteristics of this edition of the survey, including changes made to the data collection instrument, sample allocation, and response rates.

The complete survey methodology, including the objectives, main concepts, definitions, and characteristics of the sampling plan, is described in the "Methodological Report" in this publication.

Sample allocation

Sample allocation, as described in the "Methodological Report," is based on the selection of 40 primary sampling units (PSU) per federative unit. For the 2025 collection, the response rates for the 2024 survey were analyzed. In order to mitigate a fall in these rates for some locations, complementary census enumeration areas were incorporated into the original sample.[1] Table 1 presents the number of census enumeration areas and households planned for selection per federative unit for the sample selected for the ICT Households 2025 survey.

[1] Complementary census enumeration areas were added for the following states: Ceará, Minas Gerais, Rio de Janeiro, Paraná, and Rio Grande do Sul.

TABLE 1
–
Sample allocation by federative unit

Federative unit	Census enumeration areas	Households
Acre	91	1 350
Alagoas	86	1 275
Amapá	81	1 170
Amazonas	138	1 935
Bahia	131	1 935
Ceará	142	1 950
Federal District	73	1 050
Espírito Santo	78	1 125
Goiás	125	1 650
Maranhão	84	1 245
Mato Grosso	89	1 320
Mato Grosso do Sul	90	1 350
Minas Gerais	166	2 175
Pará	135	1 950
Paraíba	88	1 260
Paraná	130	1 935
Pernambuco	131	1 950
Piauí	85	1 260
Rio de Janeiro	134	1 935
Rio Grande do Norte	77	1 155
Rio Grande do Sul	132	1 935
Rondônia	91	1 350
Roraima	79	1 185
Santa Catarina	89	1 305
São Paulo	134	1 920
Sergipe	84	1 245
Tocantins	87	1 230
Total	**2 850**	**41 145**

Data collection instrument

THEMES

For surveys conducted in 2017 and on, the ICT Households survey has adopted a rotation system for its thematic modules, considering both the demand for specific and more in-depth thematic indicators, and also the time constraints in administering questionnaires to respondents.

The thematic rotation of the modules involves collecting in-depth information about a given topic in alternate editions of the survey, to generate broad estimates at greater time intervals without impacting the time needed to administer the questionnaire.

In the 2025 edition of the survey, giving continuity to this system, in addition to contextual and sociodemographic variables, indicators were collected according to the following thematic modules:

- **Module A:** Access to ICT in the household;
- **Module B:** Computer use;
- **Module C:** Internet use;
- **Module G:** Electronic government;
- **Module H:** Electronic commerce;
- **Module I:** Digital skills;
- **Module J:** Mobile phone use;
- **Module L:** Use of selected publications;[2]
- **Module TC:** Cultural activities.

PRETESTS

Pretests were conducted to identify possible problems in the stages of the fieldwork, such as approaching households, selecting the interview on the tablets, and administering the questionnaire. This also helped to evaluate how well the questionnaires flowed and the time needed to administer them.

A total of ten interviews were conducted in households located in municipalities in the state of São Paulo, including São Paulo, Itaquaquecetuba, and Mairiporã.

[2] The indicators in Module L refer to an experimental methodology to investigate Internet use by individuals who do not identify it through the traditional questions, but who carry out activities on mobile phones that presuppose Internet access. The results of this module are available in the microdata database.

In the 2025 edition, households were approached intentionally for pretests, without prior listing or random selection of households. On approaching the households, the interviewers first certified whether there were any residents 10 years old or older in the different profiles desired for the pretest.

Furthermore, not all visits were conducted as foreseen in the procedure for approaching households on different days and at different times. Interviewers only listed the residents who were present at the time of the approach.

During pretests, the complete interviews took an average of 34 minutes.

CHANGES TO DATA COLLECTION INSTRUMENT

Due to overlap in module rotation, the 2025 ICT Households survey used the 2023 questionnaire. The module on cultural activities (TC) and the full version of the module on electronic government (G) were administered, in addition to the abbreviated version of the module on electronic commerce (H), which contained only the question regarding the purchase of products or services online.

The questionnaire underwent extensive revision for this edition of the survey, with the inclusion of new indicators and changes to existing ones. The module on ICT in households (A) was modified to explore the concept of households connected to the Internet. The question about Wi-Fi in the household (A7A) is now applied to all households, not just those with Internet access, and a question about Internet access in the household by any resident was added (A7D).

Similarly, for households with a mobile Internet connection, a question was included regarding the source of the mobile connection (A7C)—whether via a mobile phone, a USB modem connected directly to the computer, a modem plugged into an outlet, or another device. It is worth noting that during the cognitive interviews conducted in December 2024, some respondents understood their connection type as "modem," a term removed from the mobile network connection options to avoid such confusion. Finally, given the increase in new subscription speeds, the connection speed ranges were revised and are now more aligned with other Cetic.br|NIC.br surveys.

In the "Individuals" section, within the module on Internet activities (C), an item regarding the use of Pix was added to the regular indicator of online activities. This indicator differs from the one used in the module on electronic commerce (H) in alternate years, which refers only to the use of this payment method for purchasing goods or services online. This question was placed after the question regarding the use of the Internet for financial information, making payments, and other financial transactions, which some users associate with transactions made through banking apps or websites, which is not necessarily the case with Pix. Also in Module C, a question regarding online betting was included, distinguishing between different types of betting (casino, sports betting, federal lottery, and raffles).

Also in Module C, three questions regarding Artificial Intelligence (AI) were included. The first concerned the use of generative AI; the second, the domain in which it was used (personal, education, or work); and the third, directed at those who had not used it, asked why they had not done so. These questions are aligned with those included in the same year by the European Commission's Statistical Office (Eurostat), allowing for a comparison of Brazil's results with those of dozens of European Union countries. It is worth noting that this topic has also been discussed within the Expert Group on ICT Household Indicators (EGH) of the International Telecommunication Union (ITU), in which Cetic.br|NIC actively participates.

In the module on electronic government (G), a question was added regarding the use of gov.br, both for conducting transactions on one's own behalf and on behalf of third parties. The categories for the question regarding the reasons for not using electronic government and the methods of contacting the government or public institutions were also revised.

In the module on mobile phone use (J), three questions were included regarding the expiration of data packages of mobile plans. The first investigates whether the respondent's mobile plan ran out at least once in the three months prior to the survey; the second examines the impact of this on the ability to continue using (fully or partially), after the data package ran out, the apps they usually used; and the last one assesses situations that occurred under these circumstances, such as reduced speed or purchasing additional data to continue accessing the Internet.

In the module on cultural activities (TC), the question regarding the types of videos watched online now includes the options "Cooking or recipes" and "Personal care, beauty, or health," which were the most frequently mentioned responses in the open-ended field ("other types") now excluded.

Finally, in the household survey, questions regarding disability—which were previously asked every other year—have been removed.

INTERVIEWER TRAINING

The interviews were conducted by a team of trained and supervised interviewers. They underwent basic research training, organizational training, ongoing improvement training, and refresher training. They also underwent specific training for the ICT Households 2025 survey, which addressed the process of manually or electronically listing census enumeration areas, household selection, selecting the survey to be conducted, approaching the selected households, and properly filling out the data collection instruments. The training also addressed all field procedures and situations, as well as the rules regarding return visits to households.

Interviewers were provided with three field handbooks, which were available for reference during data collection to ensure the standardization and quality of the work. Two of them provided all the information needed to conduct household listing and selection. The other contained all the information required to approach the selected households and administer questionnaires.

In total, 319 interviewers and 18 field supervisors collected the data.

Field data collection

DATA COLLECTION METHOD

Data collection was conducted using computer-assisted personal interviewing (CAPI), which consists of having a questionnaire programmed in software for tablets and administered by interviewers in face-to-face interaction.

DATA COLLECTION PERIOD

Data collection for the ICT Households 2025 survey took place between March and September 2025 throughout Brazil.

FIELD PROCEDURES AND CONTROLS

Various measures were taken to ensure the greatest possible standardization of data collection.

The selection of households to be approached for interviews was based on the number of private households found at the time of listing. Up to four visits were made on different days and at different times in an effort to conduct interviews in households, in case of the following situations:

- no member of the household was found,
- no resident was able to receive the interviewer,
- the selected resident was not able to receive the interviewer,
- the selected resident was not at home,
- denial of access by the gatekeeper or administrator (to a gated community or building),
- denial of access to the household.

It was not possible to complete the interviews in some households even after four visits, as in the final field situations described in Table 2. In some cases, no interviews were conducted in entire census enumeration areas because of issues related to violence, blocked access, weather conditions, and absence of households in the area, among other issues.

TABLE 2

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Final field situations by number of cases recorded

Situation	Number of cases	Rate (%)
Interview completed	27177	66
Residents were not found or were unable to receive the interviewer	3436	8
The selected respondent or their legal guardian was not at home or was not available	192	0
Refusal by the person selected or the person responsible	1319	3
The selected respondent was traveling and would be away for longer than the survey period (prolonged absence)	349	1
Household up for rent or sale, or abandoned	1461	4
Household used for a different purpose (store, school, summer house, etc.)	765	2
Refusal	1618	4
Denial of access by a gatekeeper or another person	1733	4
Household not approached because of violence	716	2
Household not approached because of access difficulties, such as blocked access, unfavorable weather, etc.	435	1
Household with people who are unqualified (e.g., under 16 years old) or unable to answer the survey (e.g., due to disability or language)	3	0
Other situations	994	2
Non-existent household	737	2

Throughout the data collection period, weekly and biweekly control procedures were carried out. Every week, the number of municipalities visited, the listed census enumeration areas, and the number of interviews completed were recorded, by type of survey in each ICT stratum and census area. Every two weeks, information about the profile of the households interviewed was verified (such as income and social class), information about the profile of residents (such as sex and age), use of ICT by the selected respondents, the record of situations for households in which interviews were not conducted, and the number of modules answered in each interview.

In general, it was difficult to achieve the desired response rate in some census enumeration areas with specific features, such as areas with a high incidence of violence and those with a large number of gated communities or buildings, where access to the households was more difficult. In these cases, to motivate residents to participate in the survey, letters were sent via the post office to 448 selected households.

VERIFICATION OF INTERVIEWS

To ensure the quality of the data collected, 8,989 interviews from the ICT Households and ICT Kids Online Brazil surveys—which have shared the same field operation since 2015—were verified. This corresponds to 22% of the total initial sample and 33% of the total effective sample. The verification procedure was carried out by means of on-site visit, listening to audio recordings of the interviews or, in some cases, through phone calls.

Whenever corrections were needed to the interviews in part or in their entirety, return calls or visits were carried out, depending on the result of the verification.

DATA COLLECTION RESULTS

A total of 27,177 households in 720 municipalities were approached, reaching approximately 66% of the planned sample of 41,145 households. However, during the fieldwork and after counting households by sector, it was observed that the sample represented 40,408 households. The response rate was calculated based on the result of the total number of households counted in the selected sectors (Table 3). In 24,535 households, interviews were conducted with individuals who were the target population for the ICT Households survey (individuals 10 years old or older). In the other 2,642 households, interviews were conducted relative to the ICT Kids Online Brazil survey.

TABLE 3

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Response rate by federative unit

Federative unit	Response rate (%)
Acre	70
Alagoas	66
Amapá	73
Amazonas	74
Bahia	76
Ceará	60
Federal District	68
Espírito Santo	66
Goiás	64
Maranhão	70
Mato Grosso	66
Mato Grosso do Sul	71
Minas Gerais	56
Pará	67
Paraíba	68
Paraná	61
Pernambuco	71
Piauí	67
Rio de Janeiro	46
Rio Grande do Norte	75
Rio Grande do Sul	56
Rondônia	82
Roraima	68
Santa Catarina	60
São Paulo	56
Sergipe	85
Tocantins	66
Total	**66**

Analysis of Results

ICT HOUSEHOLDS SURVEY 2025

Analysis of Results
ICT Households 2025

Since 2005, the ICT Households survey has been investigating access to and use of information and communication technologies (ICT), especially the Internet, in households and among individuals 10 years old or older residing in Brazil. Throughout its historical series, which reaches its 21st edition in 2025, the survey has been showing the advances and challenges of digital inclusion in the country: While Brazil has been successively approaching universal access, the survey also shows that this access is still unequal, with a considerable part of the population having very little connectivity.

The 2025 edition features several new indicators, including questions about situations faced by Internet users after their mobile Internet data plans run out. This allows for a better understanding of a reality that affects a considerable portion of the population, highlighting connectivity limitations. In a context where Internet access happens predominantly via mobile phones, this information becomes even more relevant to the debate about barriers and inequalities in connectivity.

Another new development is the investigation into the use of generative Artificial Intelligence (AI) tools by Internet users. With the expansion of AI tools and their increasing dissemination across various online and offline platforms and services, the unequal appropriation of these technologies tends to deepen other social disparities, such as those already observed in access to and use of the Internet itself. Furthermore, the spread of AI tools also generates risks, such as impacts on the job market, privacy and copyright violations, increased disinformation campaigns, and mental health problems. Therefore, the ICT Households survey plays an important role in monitoring how the population is interacting with this technology and providing a better-informed discussion about its access and use.

The survey also expands the analysis of activities carried out on the Internet and now includes investigations into online betting, another topic that has gained prominence in recent years and has been the subject of regulation and extensive debate in the country. The data presented in this edition is therefore fundamental to understanding the scope of this phenomenon and supporting the development of policies and regulations on the matter, by revealing the profiles and numbers of online bettors in the country.

Finally, in the e-government module, a new indicator stands out regarding the use of the gov.br platform, which is consolidating itself as an increasingly relevant digital public infrastructure (DPI) for the provision of online public services. In addition, the ICT Households 2025 survey updates the indicator of ways to contact the government. Together, the indicators in this module allow for a better understanding, from a demand-side perspective, of the ways in which the population interacts online with governments, and the challenges that still limit the reach and impact of their digital transformation.

In addition to these new findings, the survey continues to explore aspects relevant to the agenda of meaningful connectivity, including Internet use, ownership and use of digital devices, connection characteristics, online activities, and the digital skills of Internet users. Furthermore, in 2025, the ICT Households survey again included the cultural activities module, which is applied every two years and investigates the enjoyment of online cultural content, the creation and dissemination of digital content, and the use of the Internet for carrying out in-person cultural activities.

In Brazil, the year 2025 was marked by meetings of the Interministerial Working Group, which was tasked with producing input for the development of the National Digital Inclusion Plan, and internationally by the World Summit on the Information Society +20 (WSIS+20), a multi-stakeholder process of the United Nations (UN) on digital governance and cooperation. In both cases, the importance of having robust systems for monitoring digital inclusion policies was highlighted, which in turn depend on regular and high-quality indicators. In this context, the ICT Households 2025 survey continues to play an important role in producing data to support evidence-based public policies and enhance the public debate surrounding pressing issues involving access to and use of ICT by the Brazilian population.

This report presents the results for 2025, divided as follows:

- Meaningful connectivity;
- Profile of Internet users;
- Digital skills;
- Activities carried out on the Internet.

Meaningful connectivity

In recent years, the literature on digital inclusion has incorporated the debate about the importance of meaningful connectivity (MC) for reducing digital inequalities. Meaningful connectivity is a multifaceted concept that presupposes a combined analysis of distinct dimensions capable of producing a satisfactory, secure, and productive online experience for Internet users (Alliance for an Affordable Internet [A4AI], 2020; Katz & Gonzalez, 2016).

In 2020, based on the report of the High-level Panel on Digital Cooperation and multi-stakeholder consultations, the UN Secretary-General published the *Roadmap for Digital Cooperation*,[1] which aims to promote universal and meaningful connectivity (UMC) for all. In 2021, a working subgroup led by the International Telecommunication Union (ITU) was convened and tasked with developing a baseline and formulating targets for digital connectivity by 2030 (ITU, 2022).

In 2024, the Regional Center for Studies on the Development of the Information Society (Cetic.br) made an important contribution to this discussion by launching a proposal to operationalize the measurement of meaningful connectivity based on data already collected by the ICT Households survey (Brazilian Network Information Center [NIC.br], 2024). The proposal is based on a set of nine dichotomous indicators (presence or absence), added together to create a scale from zero to nine, assigned to each individual in the survey's respondent base.

These indicators were distributed across four pillars:

- **Affordability:** (1) cost of household Internet connection less than 2% of household income; (2) postpaid or control type mobile phone plan.
- **Access to devices:** (3) more than one Internet access device (mobile phones or computers) per resident 10 years old or older; (4) presence of a computer in the household; (5) access via mobile phones and computers.
- **Quality of connection:** (6) household connection via fiber optics or cable; (7) speed of the main Internet connection in the household greater than 10 megabits per second (Mbps).
- **Environment of use:** (8) daily or almost daily use of the Internet; (9) use of the Internet in the household and in at least one institutional location (school, work, and/or free and paid Internet access centers).

In this section, we present the results of the ICT Households 2025 survey relating to these pillars of meaningful connectivity, including both the indicators used in calculating the MC level and other related indicators.

GENERAL RESULTS

Data from the ICT Households 2025 survey indicate that, in that year, 30% of the Brazilian population was at the lowest level of meaningful connectivity (0 to 2 points), while 20% were at the highest level (7 to 9 points).

The historical series of the survey suggests a trend of increasing indicators over the last decade. In 2015, 55% of the population was in the lowest MC bracket and 7% in the highest, indicating a distribution more concentrated in the lower levels at that time.

[1] The full publication is available at: https://www.un.org/en/content/digital-cooperation-roadmap/

Over the past two years, the results showed stability in the highest range, with a decrease of two percentage points (pp). During the same period, there was also a noticeable increase in the proportion of the population in the 3-to-4-point range (from 24% in 2023 to 29% in 2025), with a 3 pp reduction in the 0-to-2-point range (from 33% to 30%), suggesting a transition to intermediate levels of meaningful connectivity (Chart 1).

CHART 1

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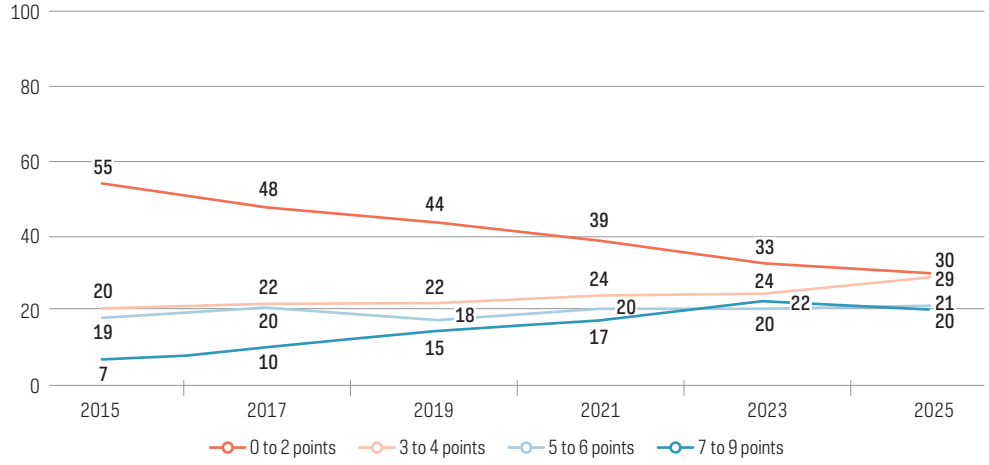
Individuals by level of meaningful connectivity (2015–2025)

Total population (%)



Important intersections were observed between meaningful connectivity and factors such as class, color or race, level of education, and age group (Chart 2). The proportion of people in the highest MC range (7 to 9 points) was significantly higher, for example, among those in class A (77%), as well as among those with a tertiary education (58%). The higher prevalence in the higher MC ranges also increased among White individuals (30%) compared to Black or Brown individuals (16%). Connectivity levels were also higher among age groups with greater participation in the labor market (29% among people 25 to 34 years old and 27% among those 35 to 44 years old).

CHART 2

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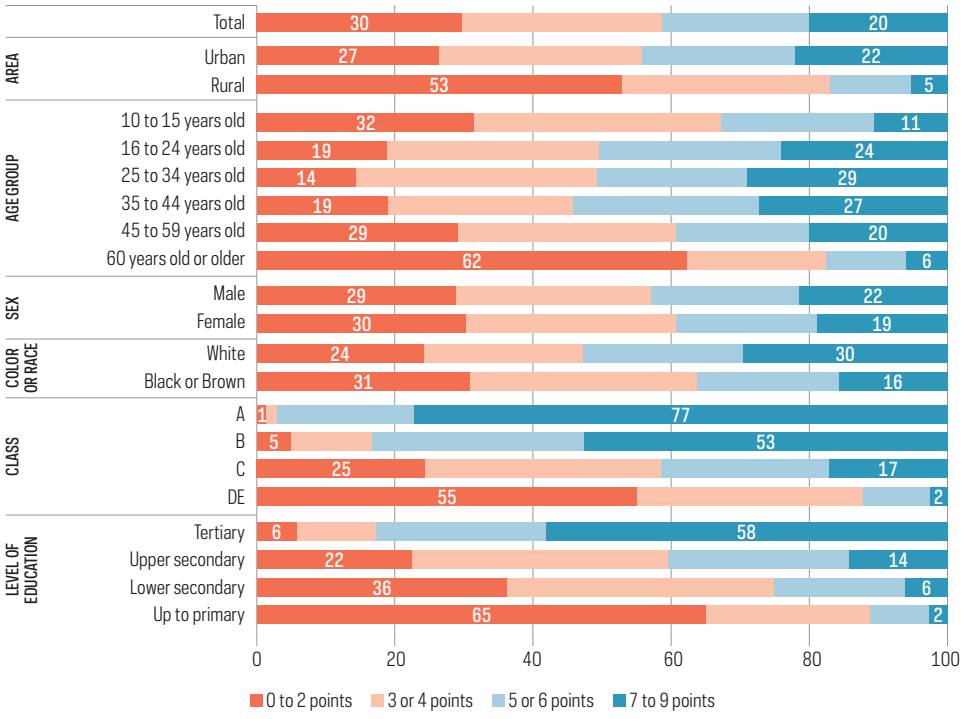
Individuals by level of meaningful connectivity (2025)

Total population (%)



It was also possible to observe a significant variation in connectivity levels according to geographic dimension. The highest proportions in the highest MC range (7 to 9 points) were found among inhabitants of the South (28%) and Southeast (24%), and the lowest were for individuals in the North (14%) and Northeast (11%). The highest levels of MC were also more prevalent among those residing in cities with more than 500,000 inhabitants (26%), as well as among residents in urban areas (22%).

The ICT Households database also allows for the disaggregation of urban area data into subcategories, supporting a more in-depth analysis of the intersection between territory and connectivity. For residents in densely populated urban areas (excluding *favelas*)—a category that includes four out of every five Brazilians—participation in the highest level of meaningful connectivity was 23%, a result close to that observed in low-density areas (21%). This proportion was significantly lower, however, for the nearly fifteen million Brazilians who live in areas classified as *favelas* (14%), which indicates substantial inequalities in quality access to the Internet even within the urban context.

The results also showed that connectivity conditions were also poor in the rural areas of the Legal Amazon, inhabited by more than four million Brazilians. In these locations, only 3% of individuals were in the highest level of meaningful connectivity (7 to 9 points), while 63% were in the lowest (0 to 2 points). Although the proportions of daily Internet use (72%) were relatively close to the national average (84%), this territory showed significant limitations in relation to several of the criteria analyzed in the meaningful connectivity indicator, especially the cost of household Internet connection and the presence of a computer in the home—the latter criterion was met by only 11% of the inhabitants of the rural areas of the Legal Amazon, compared to 39% in the national average.

AFFORDABILITY

COST OF HOUSEHOLD CONNECTIONS

The ICT Households survey investigates the amount paid by households for Internet access, highlighting the most prevalent cost ranges. In 2025, 29% of households with Internet access paid more than BRL 100 for their main connection, a proportion that reached 59% among those in class A. In classes DE, 77% of households paid up to BRL 100.

The UN's target for affordable broadband access by 2030 is 2% of gross national income per capita (ITU, 2022). Figure 1 shows the proportion of individuals in each federative unit whose household connection costs were equal to or less than 2% of their monthly family income. The states of Maranhão (8%) and Amazonas (10%) had the lowest proportions of individuals in such households, while the state of Espírito Santo (35%) and the Federal District (33%) had the highest proportions.

FIGURE 1

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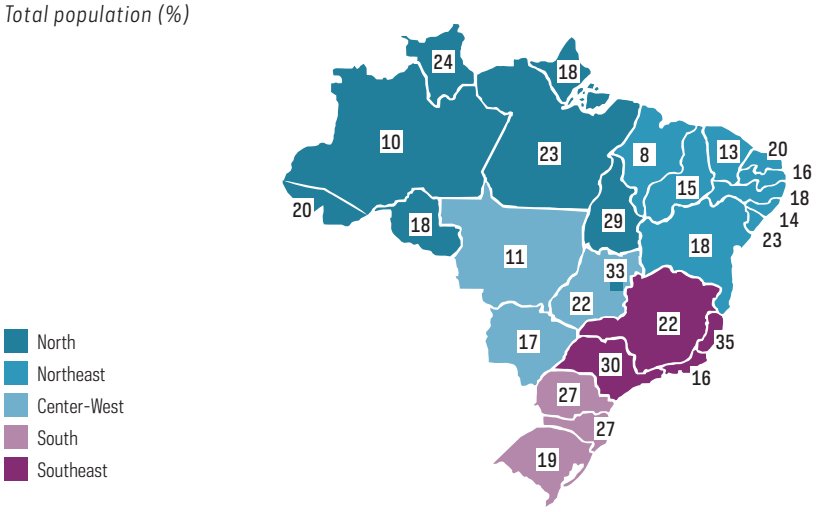
Individuals in households with connection costs equal to or less than 2% of monthly family income, by federative unit (2025)

Total population (%)



MOBILE PHONE PLANS

The ICT Households 2025 survey continued the investigation into mobile phone plans used by the population, with new indicators on situations encountered after the depletion of the data allowance. The results shed light on important dynamics for understanding inequalities related to Internet access in the country, following the research by the Brazilian Institute of Consumer Protection (Idec) and Locomotiva Institute (2021) conducted among users in classes C and DE.

Among individuals 10 years old or older who owned devices, about half (52%) reported having prepaid plans; 19%, postpaid plans; and 21%, "control" plans, which combine features of prepaid and postpaid. While postpaid plans were more common among mobile phone owners in class A (57%), prepaid plans stood out among users in classes DE (61%).

In 2025, 39% of individuals (approximately 64 million) stated that their mobile data plans had run out at least once in the past three months (Chart 3). This proportion was 54% among users with prepaid plans, 21% for those with postpaid plans, and 29% for those with control plans. The survey results indicated that this situation was more prevalent among social classes DE (49%), those 16 to 24 years old (54%) and 25 to 34 years old (47%), and for residents in the North (54%) and Northeast (49%) regions.

CHART 3

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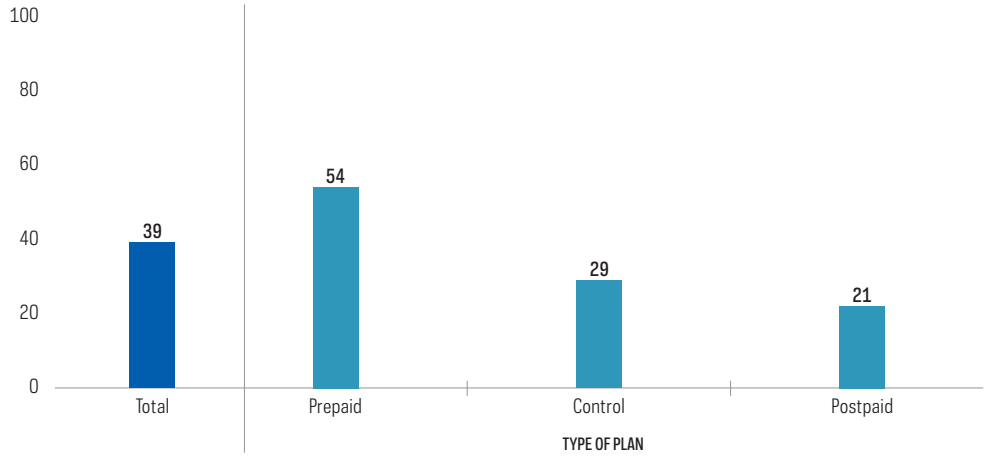
Internet users via mobile phones by depletion of data allowance of mobile plan (2025)

Total number of Internet users via mobile phones (%)



The survey also explored the consequences of having their data allowance run out. Among those who experienced this situation, 41% stated that they were only able to use some of the applications they usually used, 39% said they could not use any of those applications—meaning their Internet was actually blocked—and 19% said they were able to use all of them. It is worth noting that this last group included not only those who did not suffer any type of restriction after their data allowance ran out, but also those whose Internet use was limited to sponsored applications included in their mobile plan (zero-rated).

Furthermore, among the situations that occurred after the data allowance ran out, 83% mentioned that the Internet speed on their mobile phone was reduced, and 75% said they had to add more credits or purchase additional data.

INTERNET AND DEVICE ACCESS

The recurring analysis of data on Internet access, devices, and their specific attributes allows for the creation of a comparative historical overview of the quality of Internet access for the Brazilian population, as well as the identification of inequalities that are still present throughout the national territory, which helps guide public policies aimed at reducing them.

INTERNET IN HOUSEHOLDS

The results of the ICT Households 2025 survey indicated that 86% of Brazilian households had Internet access, marking significant growth since the beginning of the historical series in 2008, when the percentage was 18%. This represents approximately 68 million households with Internet access in the country. Compared to 2024, the indicator showed an increase of three percentage points, which was greater in households in rural areas (rising from 74% to 81%), those with family income up to 1 minimum wage (from 73% to 77%), and those in social classes DE (from 68% to 73%).

As has already been observed throughout the historical series of the survey (Chart 4), household Internet access was widespread in classes A (100%) and B (98%) but remained less significant in classes DE (73%). Internet access in Brazilian households was above 80% in all Brazilian regions, ranging from 89% in the South to 83% in the North.

CHART 4

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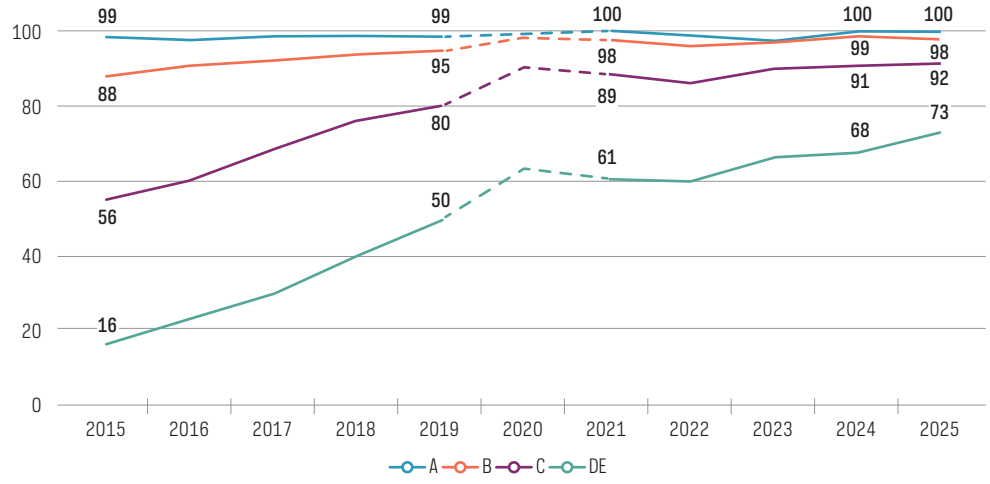
Households with Internet access by class (2015–2025)

Total number of households (%)



In 2025, the survey questionnaire was modified to improve the understanding of households connected to the Internet.[2] The results indicated that approximately 70 million Brazilian households had Internet access (89% of the total), considering a broader concept of households with Internet access, including those with Wi-Fi connection or at least one resident who accessed the Internet at home.[3]

In a scenario of increasing digitalization of environments and services, understanding the barriers that prevent access to the Internet is crucial for the development of effective public policies for digital inclusion. The ICT Households 2025 survey sheds light on the challenges faced by households without Internet access in Brazil, highlighting the main barriers to universal access. In this regard, lack of digital skills stood out, with more than half of households without Internet access not having it "because residents don't know how to use the Internet" (57%), and "because residents considered it too expensive" (49%). It is worth highlighting that these two reasons were more common among households in classes DE, with cost being the most mentioned in the North region (71%) and lack of skills in the Southeast (67%). Furthermore, not knowing how to use the Internet remains the main reason for the lack of access in 31% of households without Internet access in the country, while in 21%, the cost was reported as the main reason.

[2] See details in the "Changes to data collection instrument" section of the "Data Collection Report."

[3] Access modalities that are not always identified by the respondent in the question about households with Internet access, based on the standard question from the ITU manual (2020), although they are considered in other indicators of households with Internet access, such as in the Continuous National Household Sample Survey (Continuous Pnad) (Brazilian Institute of Geography and Statistics [IBGE], 2023).

COMPUTERS IN HOUSEHOLDS

In 2025, the presence of computers in households remained stable compared to the previous edition, with the devices present in 32% of households (approximately 25 million). After a period of expansion in the proportion of households with computers in the early 2010s, reaching its peak in 2014 (50%), a decline was observed in subsequent years, so that today's levels are similar to those observed in 2009.

The presence of computers was reported more frequently among urban households (34%) than rural households (15%), as well as among households in the South (37%) and Southeast (38%), compared to those in the North (25%) and Northeast (22%). The differences were more pronounced between socioeconomic classes: While computer ownership was reported by almost all households in class A (97%), this was the case for only one in ten households in classes DE (10%).

The results also revealed a strong association between the presence of computers in households and the likelihood of accessing the Internet through them: 87% of users who accessed the Internet via computers lived in households with the device at the same time, while only 8% of users residing in households without computers accessed the Internet through these devices. The results, therefore, highlight the importance of having a computer in the home for accessing the Internet from more than one device.

Among households with computers, 72% reported owning laptops, a proportion that was 39% for desktop computers and 26% for tablets. Regarding the presence of different types of computers, whether exclusively or simultaneously, the ICT Households 2025 survey revealed that approximately one third of households with computers had more than one type of device (29%). On the other hand, almost half of households with computers had only laptops (45%), 17% only desktop computers, and 9% only tablets. These percentages remained stable compared to 2024.

DEVICES PER CAPITA

The devices used to access the Internet are a relevant dimension in the discussion about meaningful connectivity (ITU, 2022). The survey's historical series has shown, for years, greater appropriation of the Internet by those who own their own mobile phones. A limited number of devices in the home, therefore, results in a significant barrier to Internet use. This factor, combined with the lack of Internet access, prevented or hindered, for example, students from carrying out school activities and professionals from carrying out their work activities during the pandemic (Benítez-Larghi et al., 2023).

The ICT Households survey investigates the number of mobile phones and computers by type (desktop computers, laptops, or tablets) in households. Although it does not determine whether each of these devices is owned, borrowed, or shared, the ratio between the number of devices and the number of residents in the household gives an idea of the availability of access.

To measure this indicator of meaningful connectivity, the ratio of the number of devices (computers and mobile phones) to the number of residents 10 years old or older (the target audience of the survey) was calculated. Subsequently, a dichotomized indicator was created, with a value of 1 when the ratio (as a continuous value) was greater than 1 and a value of 0 otherwise.

In 2025, 40% of the total population 10 years old and older lived in households with more than one device per resident. Significant differences were observed by class: The proportion was 98% among individuals in class A, 81% of those in class B, 39% of those in class C, and only 15% of those in classes DE.

COMPUTER USE

The results of the 2025 ICT Households survey indicated that 59% of Brazilians 10 years old or older used some type of computer, while 35% were considered users of these devices—that is, they used them at least once in the three months prior to the survey—a reduction compared to the percentage observed in 2024 (39%). The data revealed the persistence of striking differences in usage among different user profiles. Compared to 2024, there was a reduction in the proportion of computer users in urban areas (from 42% to 38%), among men (from 44% to 35%), for those who self-identified as Black (from 41% to 27%), and among those with secondary education (from 41% to 32%). On the other hand, the proportions of users of these devices remained higher for those with a tertiary education (78%), those with a family income between 5 and 10 minimum wages (75%), and those belonging to social classes A (94%) and B (70%).

Regarding the locations where these devices are used, the user's own home (80%) was the most frequently mentioned location, with higher proportions among those in social classes A (94%) and B (88%) and lower proportions for those with elementary education (62%). Using these devices at work (48%), cited by about half of the users, stood out among those with tertiary education (67%) and those 35 to 44 years old (66%), compared to those with elementary education (8%). Approximately 3 out of 10 users also reported using computers in schools or educational institutions (27%), with a higher incidence among users 10 to 15 years old (64%) and 16 to 24 years old (40%), and those attending school or university (58%). Furthermore, 25% stated that they had used them in someone else's house, such as friends', neighbors', or family members'. These proportions remained stable compared to 2024.

It is worth highlighting that the proportion of use at work was higher among users in formal occupations (72%) than in informal occupations (45%). The lack of suitable devices, along with limitations in digital skills (partly affected precisely by the lack of access to such devices) restricts the reach of digitization in the professional world for a large part of the employed workforce.

DIVERSITY OF ACCESS DEVICES

Regarding the types of devices used to access the Internet, among users 10 years old and older, the 2025 results indicated that mobile phones continued to be the most used devices by almost all of them (99%). Furthermore, after a period of increase that began in 2014, the proportion of those who accessed the Internet via television has remained stable since 2023 (58%). The percentage of users who went online via computers, in turn, decreased by 5 percentage points compared to 2024, going from 40% to 35%. This reduction was even more significant among men (46% to 35%), people who self-identified as Black (43% to 26%), and users with secondary education (37% to 27%).

Considering the different characteristics and functionalities of Internet access devices, especially between mobile phones and computers, the use of multiple devices enables the development of a wider range of skills and interactions in the online environment (Correa et al., 2020). According to the ICT Households 2025 survey, around two-thirds of users connected to the Internet using only their mobile phones (65%). Among them, those with the most unfavorable socioeconomic conditions stood out, such as those in classes DE (87%) and those with lower levels of education, such as those with primary education (84%), as well as those who self-identify as Black (73%) and those residing in rural areas (83%). The survey also showed a five-percentage point increase, compared to 2024, in exclusive Internet access via mobile phones (from 60% to 65%), with more pronounced growth among men (54% to 64%, an increase of 10 pp), self-declared Black users (56% to 73%, an increase of 17 pp) and those with secondary education (63% to 73%, an increase of 10 pp).

Approximately one third of all users (34%) used both mobile phones and computers to access the Internet in the three months prior to the survey, a usage pattern that is associated with engaging in a wider range of online activities and possessing a greater repertoire of digital skills. Access via multiple devices was more frequent among groups with better socioeconomic conditions, reaching 95% of users in class A and 74% of those with tertiary education. Both exclusive use of mobile phones and combined use of mobile phones and computers remained stable compared to 2024.

QUALITY OF CONNECTION

TYPES OF HOUSEHOLD CONNECTIONS

Given advances in infrastructure and the demand for higher speeds, the latest data painted an updated picture of the characteristics of Internet connectivity in Brazilian homes. Compared to 2024, the most common type of connection in households with Internet access continued to be fixed broadband (76%), with a notable 8 percentage point increase for connections via cable TV or fiber optics (73%)—an increase driven by the expansion of this type of connection among households in class C (from 68% to 75%, a growth of 7 pp) and classes DE (from 49% to 60%, an increase of 11 pp).

Among households in class A, almost all had cable TV or fiber optic connections (95%), while this proportion was 60% in classes DE. The proportions were similar when comparing households in urban (75%) and rural (57%) areas. According to the ICT Providers 2024 survey (Brazilian Internet Steering Committee [CGI.br], 2025), 97% of Internet service providers offered fiber optic connections, and 66% had customers in rural areas, a proportion that reached 80% among providers in the South (CGI.br, 2025).

Of all households with Internet access, 11% reported using mobile network connections. This edition of ICT Households explored this type of access in detail for the first time. Of all households with Internet access, 9% connected via mobile phones and 2% via USB modems or modems plugged into power outlets. Mobile phone connectivity was especially prevalent among households in the North (13%), in social classes DE (13%), and with a family income up to 1 minimum wage (13%), compared to households in the South (6%), in class A (1%), and with family income of more than 5 up to 10 minimum wages (2%).

SPEED OF HOUSEHOLD CONNECTIONS

The 2025 edition also updated the ranges of the home connection speed indicator, aligning them with those currently offered and bringing them in line with other Cetic.br surveys. In this edition, the ICT Households survey worked with higher speed ranges: the lowest was "up to 4 megabits per second (Mbps)" and the highest, "above 501 Mbps". In 2024, the highest segment investigated ("up to 51 Mbps or more") included 30% of households with Internet access; in 2025, 38% of connected households were distributed among "from 51 Mbps to 100 Mbps" (9%), "from 101 Mbps to 300 Mbps" (10%), "from 301 to 500 Mbps" (11%) and "501 Mbps or more" (7%).[4]

WI-FI PRESENCE

In addition to the types of connections, the presence of Wi-Fi in Brazilian households was also analyzed. The results showed that around nine out of ten households with Internet access had Wi-Fi (91%), a scenario that has remained stable since 2022 (89%). It is worth highlighting that, despite its widespread dissemination, barriers to its adoption still persist, linked to socioeconomic conditions: Almost all (99%) households in class A connected to the Internet using Wi-Fi, a proportion that was 84% among those in classes DE.

INTERNET SHARING

Internet sharing between neighboring households was also investigated, and this indicator remained stable compared to the previous year. In 2025, this practice was carried out by 15% of Brazilian households with Internet access. It was more common among strata with known connectivity limitations: 26% for households in rural areas, 23% among those in classes DE, and 21% in homes in the North and Northeast regions.

ENVIRONMENT OF USE

INTERNET USE FREQUENCY

The survey also explored the frequency of Internet use among its users. The data reaffirmed the scenario already observed throughout the historical series, with 96% of them using it daily or almost every day, a trend that has remained stable since 2021. This proportion was slightly lower among those 60 years old or older (89%), those with elementary education (92%), and those in social classes DE (93%).

[4] This variation does not necessarily indicate an increase in household connection speeds, given that the change in categories may have affected how respondents answered the question.

DIVERSITY OF PLACES OF USE

The results of the ICT Households 2025 survey showed that the home remained the primary place of Internet use, mentioned by virtually all users (99%). Someone else's house, such as that of friends, neighbors, or family members, was the second most cited location (60%), followed by while on the move (55%).

Almost half of users used the Internet at work (45%). Among those who were part of the workforce, 67% accessed the Internet in that location, with 82% being formally employed users and 56% being informally employed. Furthermore, 18% connected to the Internet in educational institutions, reaching 50% for those who attended school or university. Considering the main access location, the home was the most common (86%), while about 10% of users indicated work as the main location.

Regarding the diversity of locations, 50% of individuals 10 years old or older accessed the Internet in more than one location. This proportion varied significantly according to different breakdowns: Among social classes, while 69% of users in class A did so in more than one location, this was the case for only 32% of those in classes DE. Furthermore, considering those who accessed the Internet only via mobile phones, 57% connected from more than one location. This proportion was lower among those who relied on only one type of connection, either mobile network (30%) or Wi-Fi (33%), compared to those who used both types of connection (65%).

SUMMARY AND PERSPECTIVES

Overall, the data showed a continued upward trend in the meaningful connectivity indicator, particularly a decrease in the proportion of the population in the lowest connectivity bracket. However, the corresponding increase occurred in the second lowest bracket, with stability in the two highest brackets since 2023. The proportion of the population with the highest level of meaningful connectivity (20%) continued to deviate from the main indicators of Internet universalization, namely the percentage of households with Internet access (86% of households) and the percentage of Internet users (85% of the population).

In all dimensions analyzed, inequalities already known from the various survey analyses persisted, especially by class, area, and region. Analyzing this composite indicator allows us to identify differences that are not always perceptible when considering the indicators individually (due to the margin of error), revealing the cumulative effect of the numerous layers of inequality.

The difference between the highest and lowest MC brackets narrowed among women and increased among men compared to 2024. It will be necessary to observe the changes in gender disparity in the coming years to better understand this dynamic.

Profile of Internet users

Throughout its historical series, the ICT Households survey has portrayed the levels of access to and ways of using the Internet by the Brazilian population, detailing the country's connectivity landscape and the barriers faced by individuals when using the Internet. The data in this section shows who the Internet users and non-users are in the country, including a specific snapshot of Internet access via mobile phones.

The proportion of Internet users, defined as those who used the Internet at least once in the three months prior to the survey,[5] reached 85% of the population, representing approximately 157 million people. This indicator has remained stable since 2023, fluctuating within the margin of error in 2025.

Since 2016, an expanded indicator of Internet users has also been included, incorporating individuals who declare themselves as non-users but whom the survey identifies as having accessed the Internet through additional coverage questions.[6] By this criterion, 88% of individuals 10 years old or older were considered Internet users, equivalent to approximately 164 million Brazilians, a proportion that remained stable compared to 2024 (Chart 5).

CHART 5

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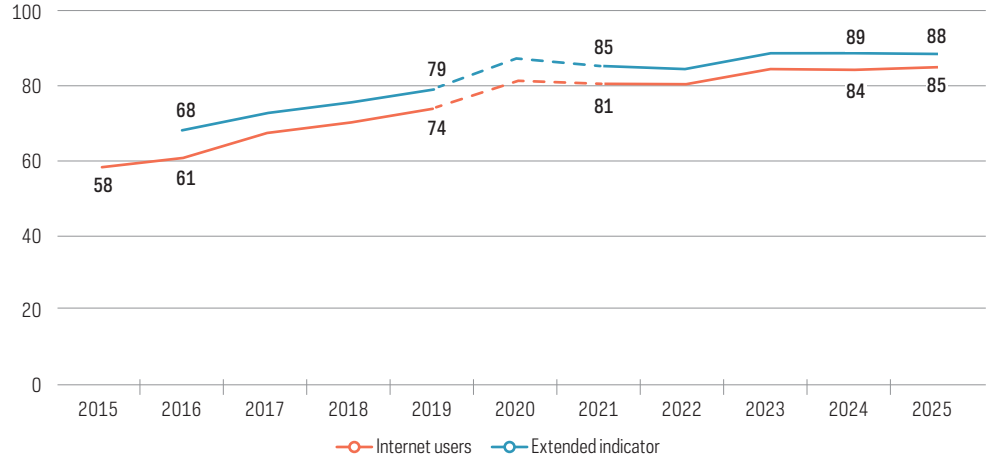
Internet users (2015–2025)

Total population (%)



[5] Following the international standard (ITU, 2020), thus allowing its comparison with other countries.

[6] The expanded indicator also considers those who, although considered non-users by the standard indicator, reported having performed activities on their mobile phones that depended on the Internet, such as using social media, accessing pages or websites, sending instant messages through applications, and downloading applications.

Considering the standard indicator, as in previous editions of the survey, differences by class, age, and education level continued to mark access to the Internet. Among social classes DE (74%), people 60 years old or older (54%), and those with elementary education (74%), the percentages of users were lower when compared to those in classes A (99%) and B (95%), those 16 to 24 years old (95%) and 25 to 34 years old (95%), and those with tertiary education (98%). And although the proportion of Internet users was higher among females (88%, a 4% increase compared to 2024), and that of Black or Brown individuals (85% combined) was close to that of White individuals (87%), the data showed that these strata still had lower levels of meaningful connectivity.

In 2025, there were 28 million people in Brazil who did not use the Internet (Chart 6). Most of them were concentrated in urban areas (23 million) and in the Southeast (12 million) and Northeast (9 million) regions of the country. Most had elementary education (20 million) and belonged to social classes DE (14 million) and C (12 million). Among them, the Black or Brown population also predominates (17 million), as do males (16 million, compared to 12 million women) and people 60 years old or older (16 million).

CHART 6

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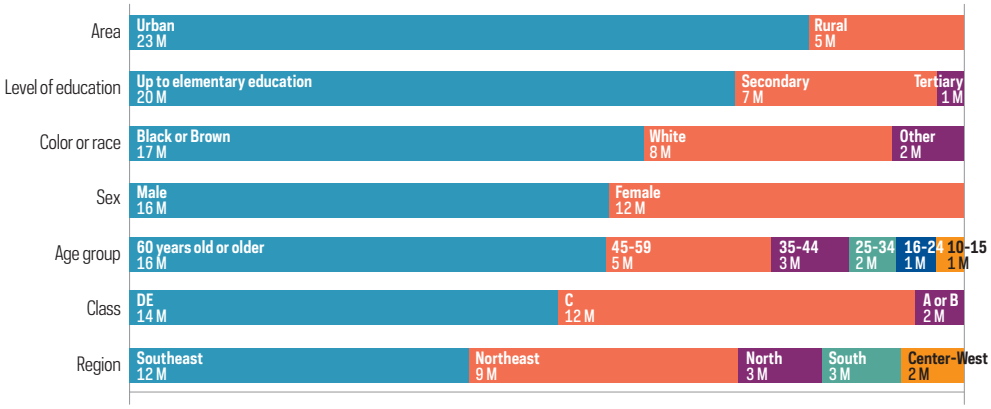
Non-Internet users (2025)

Total population (millions)



The 2025 edition of the ICT Households survey once again investigated the reasons associated with not using the Internet. The most frequently cited reason was not knowing how to use the Internet, mentioned by 82% of those who had never accessed the network, particularly those with lower levels of education and in older age groups. Lack of interest or need was also still mentioned by most non-users, almost two-thirds of this group (63%).

When considered as the main reason, not knowing how to use the Internet again stood out, mentioned by half of non-users (47%), with a higher incidence among people in social classes DE (52%) and those 60 years old or older (52%). Lack of interest or need appeared next, mentioned by 18% of them.

INTERNET USE ON MOBILE PHONES

Since its first edition, the ICT Households survey has tracked the use of mobile phones and Internet access through these devices. Furthermore, throughout the historical series, the activities that the population 10 years old or older carry out on their mobile phones have also been investigated, as well as the types of plans contracted and connections used. The results indicated that at least nine out of ten people used mobile phones in the three months prior to the survey (92% in 2025, stable since 2002), a proportion that represents approximately 170 million Brazilians. However, people 60 years or older (73%), those in classes DE (85%), and those living in rural areas (84%) still showed lower levels of use of these devices. All other cross-referencing categories reported by the survey showed usage rates above 90%.

In 2025, approximately nine out of ten Brazilians 10 years old or older owned mobile phones (89%), a percentage that remained stable compared to 2024. Individuals 60 years old or older (74%) and those 10 to 15 years old (71%) had mobile phone ownership rates below 80%. Regarding the number of mobile phone lines, most of the population (75%) had only one, while 12% of Brazilians stated they had two.

The ICT Households survey also investigated the activities carried out on mobile phones by users in the three months prior to the survey. Operations related to communication—such as making and receiving calls (91%) and sending instant messages (86%)—were reported by about nine out of ten mobile phone users, while sending SMS messages decreased from 46% in 2024 to 39% in 2025.

Regarding the types of connections used to access the Internet via mobile phone, almost all users stated that they use Wi-Fi (95%). In turn, about eight out of ten of them reported connecting via mobile networks (79%). Both types of connection have remained stable in the historical series, with Wi-Fi since 2022 and mobile connection since 2021.

Differences based on area, level of education, age group, and social class were also observed among those who used the mobile network to access the Internet via mobile phones. This type of connection was more common for residents in urban areas (82%), from the Southeast (87%), as well as those with tertiary education (94%) and belonging to class A (98%). On the other hand, it was reported in lower proportions among users in rural areas (62%), the Northeast (66%), with elementary education (63%) and social classes DE (65%).

The survey results also indicated that individuals from higher social classes and with higher levels of education tend to use more than one type of connection. About three-quarters of users who accessed the network via mobile phone used both Wi-Fi and mobile networks (75%), a percentage that is much higher among those in class A (98%) and with tertiary education (92%), compared to those in classes DE (58%) and with elementary education (57%). Regarding the exclusive use of Wi-Fi (20%) and mobile networks (4%), the proportions were smaller—however, exclusive use of Wi-Fi was more common among young people 10 to 15 years old (45%).

Finally, the type of connection used is also associated with the activities performed on the mobile phone. The practices investigated were carried out at significantly higher rates among those who accessed the Internet through both types of connection (Wi-Fi and mobile networks), as opposed to those who did so only through Wi-Fi or mobile networks. Downloading applications, for example, was the activity reported by 31% of those who connected only via mobile network, a proportion that was 44% for those who did so only via Wi-Fi and 73% for both. Another interesting fact is that playing games on mobile phones is heavily influenced by the presence of Wi-Fi, reported by 12% of those who accessed the Internet only via mobile networks, 39% of those who did so only via Wi-Fi, and by 46% of those who used both types of connection.

Digital skills

The ICT Households 2025 survey investigated the digital skills of Internet users through questions about carrying out activities related to information and data literacy, communication and collaboration, digital content creation, security, and problem-solving in the three months prior to the survey. As in previous editions, the most frequently reported activities among the ones investigated were cited by approximately half of Internet users.

Among the most frequently mentioned skills were the verification, by 50% of users, of the reliability of information found online; the adoption of security measures to protect devices and online accounts (such as setting strong passwords or two-factor verification) (46%); and using copy-and-paste tools to duplicate or move content (for example, in documents or messages) (45%).

In smaller proportions, about a third of Internet users said they had installed computer software or mobile apps (37%), changed privacy settings on their devices, accounts or applications to limit the sharing of personal data (35%), or attached documents, images, or videos to instant messages, e-mails, or SMS (34%). In addition, just over a quarter of them mentioned having copied or moved files or folders (28%) and transferred files or applications between devices, including via the cloud (27%).

However, performing more complex tasks was less frequent, such as using formulas in spreadsheets (18%), connecting or installing new wired or wireless devices (17%), creating slide presentations (16%), or creating computer software or mobile phone applications using programming language (6%). It is also noteworthy that 29% of Internet users reported not having carried out any of the activities investigated. These 2025 results were stable compared to those of the 2024 edition.

The results revealed that the development of reported digital skills was strongly associated with the level of education. Among Internet users with tertiary education, 74% verified the reliability of information found online and adopted security measures—such as strong passwords or two-factor authentication—compared to 30% and 24%, respectively, of those with elementary education (Chart 7).

CHART 7

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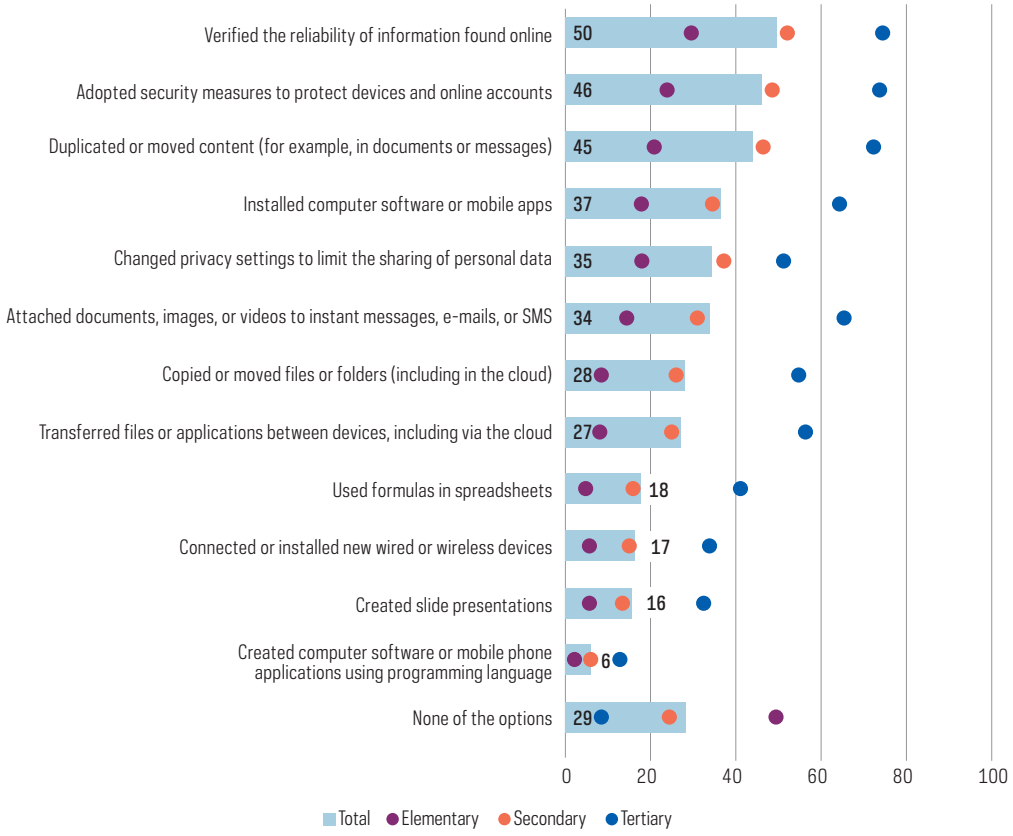
Digital skills by level of education (2025)

Total number of Internet users (%)



Disparities related to educational attainment were also evident in digital skills involving the use and appropriation of devices—such as attaching documents, images, or videos to instant messages, e-mails, or SMS—reported by 65% of Internet users with a tertiary education and only 15% of those with elementary education, as well as copying or moving files or folders, mentioned by 55% of those with a tertiary education and by 8% of those with elementary education.

Some differences were also observed between men and women in relation to the digital skills investigated. The activities that were mentioned most frequently were installing computer software or mobile apps (41% for males vs. 33% for females), using formulas in spreadsheets (23% vs. 14%), and connecting or installing new devices (22% vs. 12%).

The survey also revealed inequalities in digital skills based on color or race. The adoption of security measures, for example, was mentioned by 53% of users who identified as White, a higher percentage than that observed among those who identified as Black (42%) and Brown (44%). The same occurred with the verification of information found on the Internet, an activity carried out by 56% of those who identified as White, compared to 48% among those who identified as Black, and 47% of those who identified as Brown. These inequalities in digital skills result in the unequal appropriation of the benefits and opportunities offered by the digital environment and can be a factor in maintaining or even exacerbating social disparities, highlighting the importance of policies that promote the equitable development of these skills.

The digital skills subgroup of the ITU's Expert Group on ICT Household Indicators (EGH) presented a methodology for calculating an aggregate indicator of digital skills in 2023 (Vuorikari, 2023). Based on this approach, Internet users are classified into three ordered levels ("below basic," "basic," and "above basic") based on the activities investigated in this and other survey indicators. The application of this methodology indicated that, in 2025, 49% of Internet users in Brazil possessed a level of digital skill "below basic," 21% "basic," and 15% "above basic," while the remaining 15% corresponded to non-users (Chart 8). The presence of higher levels of these skills was more frequent among groups with better socioeconomic conditions: 52% of individuals in class A and 30% of those in class B were "above basic," as were 36% of those with a tertiary education. In turn, these proportions were significantly lower among those in classes DE (5%) and with elementary education (3%).

CHART 8

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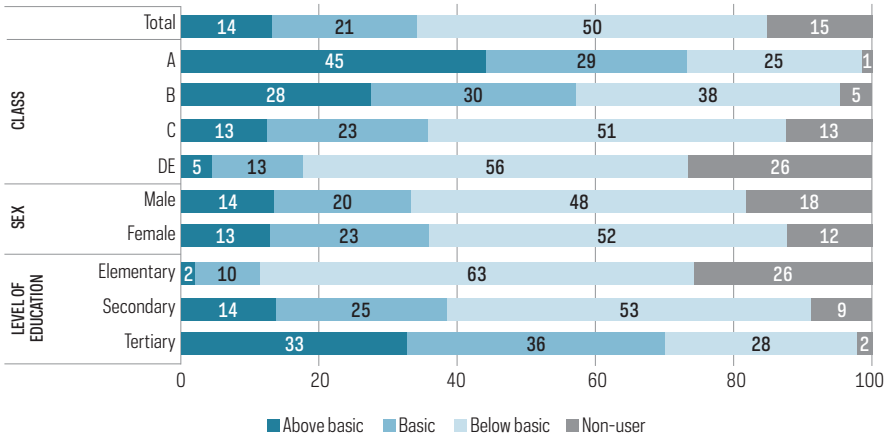
Level of digital skills – ITU methodology (2025)

Total population (%)



Activities carried out on the Internet

The investigation of activities carried out by Internet users in the digital environment is deepened in the ICT Households survey through specific dimensions, such as communication, content creation and sharing, cultural activities, and the use of e-government. The 2025 edition of the survey included new indicators regarding online activities. For the first time, questions were asked regarding online betting and the use of generative AI. Furthermore, the use of e-government was explored in greater depth, including access to the gov.br platform.

COMMUNICATION

Regarding communication activities, 92% of Internet users reported sending instant messages, 81% used social media, and 80% made voice or video calls. Furthermore, 59% sent or received emails—24% of those 10 to 15 years old—13% participated in discussion lists or forums, and 8% used microblogs. These indicators showed no variation compared to 2024.

LOOKING UP INFORMATION

Another aspect explored by the survey is activities related to looking up information. In the three months prior to the survey, 57% of Internet users reported searching for information on products and services, and 52% searched for information on health. Smaller percentages of users sought information on travel and accommodation (29%), searched virtual encyclopedia websites (25%), and used the Internet for job searches or sending resumes (19%)—the latter was carried out in greater proportion by users 16 to 24 years old (38%). As with the other categories, these results remained stable compared to the previous year.

ARTIFICIAL INTELLIGENCE

The 2025 edition brought new indicators on the use of generative AI tools by Internet users. One of the most popular tools, ChatGPT, reached its first million users less than a week after its launch in November 2022, making it one of the fastest-adopted technologies (Chatterji et al., 2025). The use of these applications is associated with seeking answers to questions and problems, creating and modifying digital content, systematizing information, developing programming codes, and even acting as "digital companions" or "virtual therapists" (Chatterji et al., 2025). Beyond the use of specific tools that can assist in daily tasks, the implementation of AI assistants has spread across various online platforms and, with the emergence of "agentic AI," they have begun to perform tasks more autonomously. However, its use can also generate problems related to privacy, copyright infringement, disinformation campaigns, and mental health issues (Moore et al., 2025). As generative AI tools become increasingly prevalent, not only in workplaces but also in homes, schools, and the daily lives of the population, understanding how they are being used is fundamental to understanding their impact on society.

The results of the ICT Households 2025 survey showed that 32% of Internet users used generative AI tools in the three months prior to the survey (Chart 9). This usage was significantly higher among people with tertiary education (59%), those with a family income above 10 minimum wages (62%), and those in class A (69%). This practice was also more frequently reported by users who self-identified as White (37%), as opposed to those who identified as Black (30%) or Brown (30%), as well as by residents of urban areas (34%) compared to those of rural areas (18%).

CHART 9

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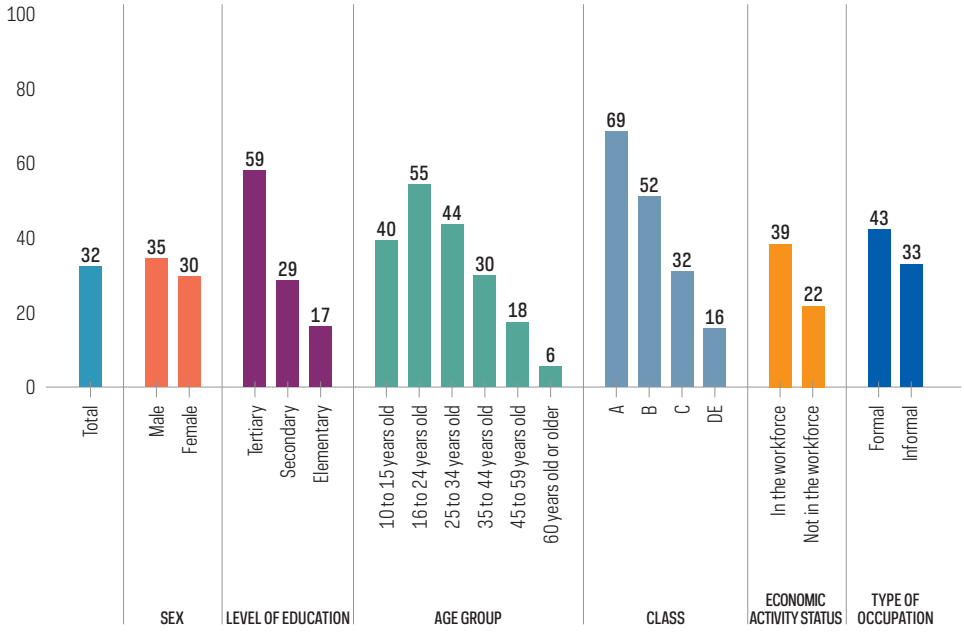
Use of generative AI tools (2025)

Total number of Internet users (%)



Regarding the purpose of use, 84% of Internet users who used generative AI in the three months prior to the survey stated that they did so for personal use, a proportion that reached 93% in class A and 79% in classes DE, as well as 67% among those with elementary education (Chart 10). Furthermore, 53% reported using it for school or college research/work, 50% for professional or work use, and 4% for other purposes. It is worth highlighting that there was no significant difference in the use for professional purposes between users in formal (65%) and informal (59%) occupations. Furthermore, use for academic purposes was higher among AI users with elementary education (67%), reaching 86% among those who attended school or university.

CHART 10

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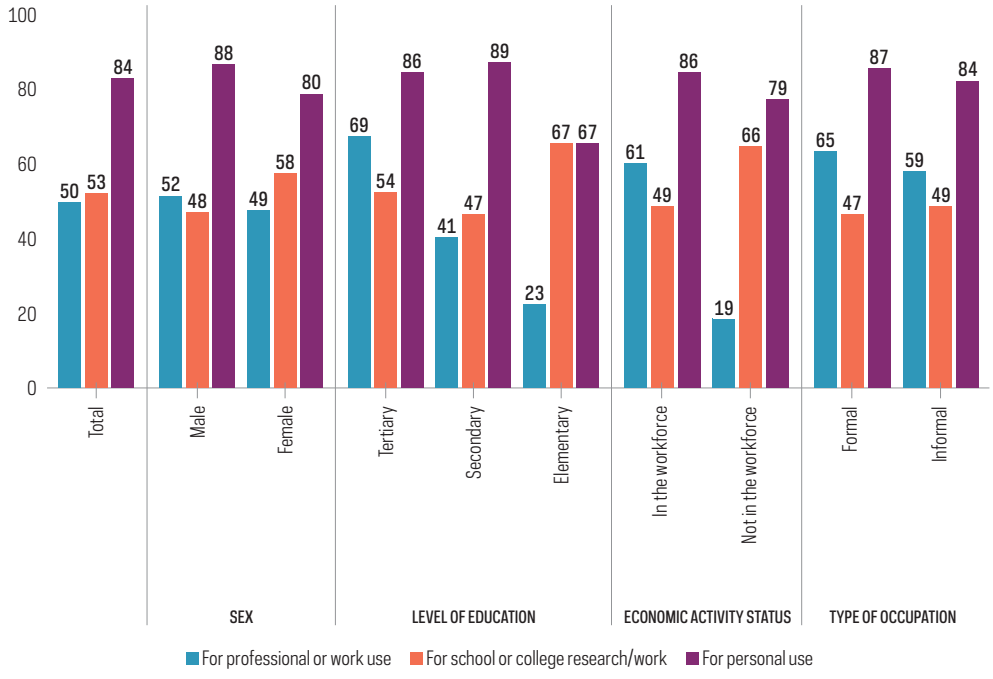
Purpose of generative AI use (2025)

Total number of Internet users who used AI (%)



The survey also investigated the reasons why Internet users did not use generative AI (Chart 11). The results indicated that the most cited reason was lack of interest or need (76%), followed by concerns about security and privacy (63%), lack of skills to use this type of tool (58%), and lack of awareness of the existence of this type of tool (52%)—a reason more prevalent among Black people (59%) and those in classes DE (59%) than among White people (45%) and people in class A (43%). Furthermore, while among those with elementary education, the four reasons were reported in similar proportions, for those with secondary education and, especially, those with tertiary education, lack of interest or need prevailed (81% and 87%, respectively) along with concerns about safety or privacy (62% and 68%, respectively).

CHART 11

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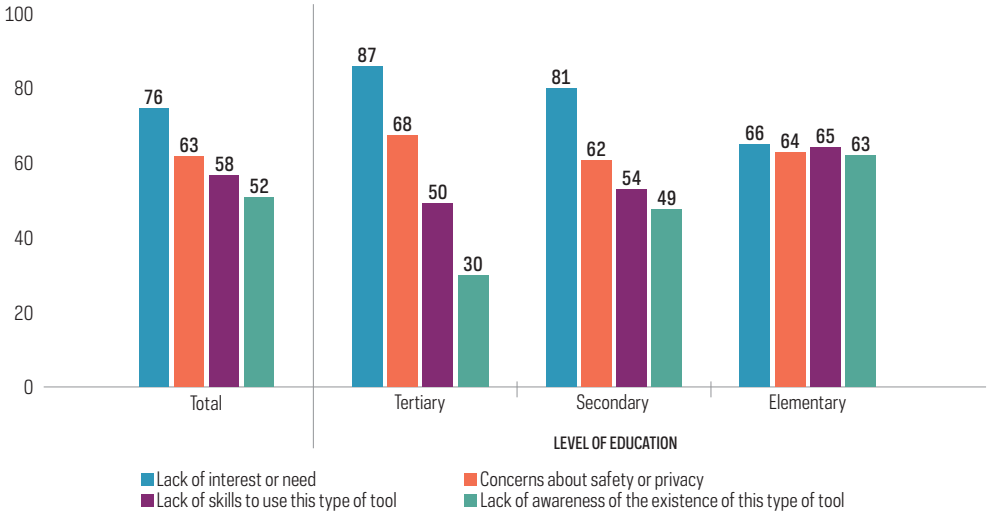
Reason for not having used AI by level of education (2025)

Total number of Internet users who did not use AI (%)



MULTIMEDIA

For multimedia activities, the percentages of Internet users who played games online (38%), listened to podcasts (33%), and visited online exhibitions or museums (12%) in the three months prior to the survey showed no variation compared to those of 2024. On the other hand, listening to or watching audio or video live streaming decreased between 2024 and 2025 (from 46% to 41%), as did the percentage of users who read newspapers, magazines, or news online, which fell from 55% to 49%—in rural areas the decrease was from 44% to 35%. The proportion of those who listened to music online also decreased (from 76% to 69%), and the same happened with the percentage of those who watched videos, shows, movies, or series online (from 77% to 71%).

CONTENT CREATION AND SHARING

Activities related to the creation and sharing of content were also investigated by ICT Households 2025. Compared to 2024, in the three months prior to the survey, the percentage of Internet users who created or updated blogs or web pages remained stable (15%). On the other hand, there was variation in activities such as posting texts, images or videos produced by respondents on the Internet (from 41% to 30%) and in sharing content on the Internet such as texts, images or videos (from 67% to 62%). Regarding posting user-generated content, this decrease occurred in all regions of the country and among both women and men. Regarding the sharing of content online, there was a more significant decrease among users 35 to 44 years old (from 74% to 60%).

EDUCATION AND WORK

The study also analyzed the performance of activities related to education and work in the three months before the survey. In 2025, 39% of Internet users completed school activities or research, a percentage that reached 79% among those 10 to 15 years old. The results followed the same pattern observed in 2024: 38% stated that they studied on the Internet on their own; 35% that they completed work activities; 30% that they stored files online; 24% that they looked up information about courses; and 17% that they took distance learning courses.

FINANCIAL TRANSACTIONS

In 2025, 58% of Internet users reported carrying out consultations, payments, or other financial transactions online. Stable compared to 2024, the proportion grew substantially during the pandemic, driven by restrictions on in-person activities and the movement of emergency aid through mobile applications. Since then, this situation has continued to show a growth trend, albeit at a slower pace.

This year's edition investigated, for the first time, Internet users who made payments or transfers via Pix as a separate category from carrying out financial transactions or payments.[7] The results indicated that three out of four Brazilian Internet users reported having made payments or transfers via Pix (75%). This usage was more frequent among users in younger age groups (93% among users 25 to 34 years old and 88% for those 16 to 24 years old and 35 to 44 years old) and those in social classes A (98%) and B (88%), but occurred to a lesser extent among users in the Northeast (68%), those with elementary education (47%), those in social classes DE (60%), and those with an income up to 1 minimum wage (60%). Still, the differences in Pix usage were less pronounced between social classes than those observed in the traditional indicator of financial transactions (Chart 12).

[7] This option was chosen both to maintain the historical comparability of the financial transaction indicator and because Pix can be carried out through non-banking institutions, something some respondents might not consider when answering the question.

CHART 12

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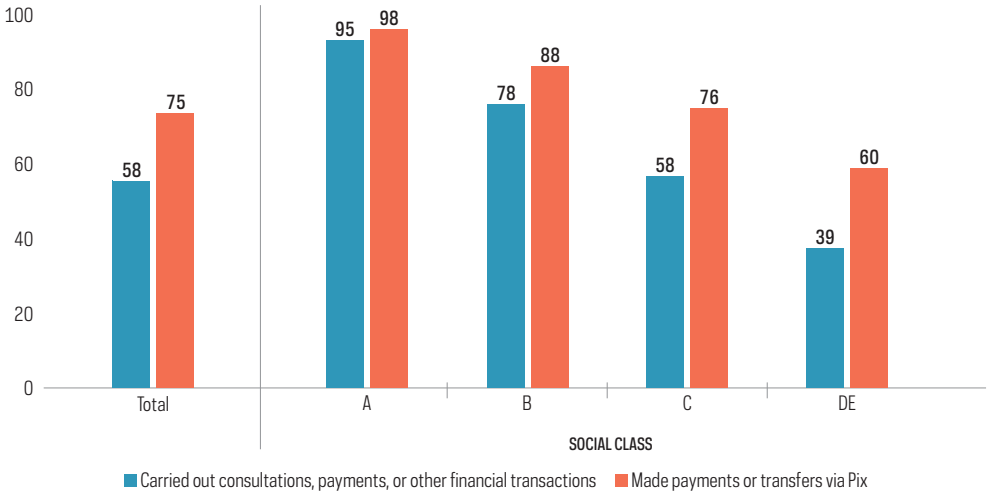
Carrying out financial transactions on the Internet (2025)

Total number of Internet users (%)



ELECTRONIC COMMERCE

Following the module rotation adopted by the survey, in 2025 the ICT Households survey applied the reduced version of the questions about e-commerce, investigating the proportion of Internet users who purchased goods and services over the Internet. The results showed that, considering the 12 months prior to the survey, 52% made this type of purchase, even if the payment was not made online. The result represented a six-percentage point increase compared to 2024 (46%), but remained stable compared to 2023 (50%), thus continuing the growth trend observed since 2015 (39%). This is the highest level in the historical series, also corresponding to the highest value in absolute numbers, with an estimated 82 million Brazilians purchasing goods and services online.

The proportion of users who made purchases on the Internet varied by region, with 61% in the Southeast and 39% in the Northeast; and by age, being 70% among those 25 to 34 years old and significantly lower for people 60 years old or older (35%). The indicator also showed substantial variations depending on the class, reaching 91% in class A, 76% in class B, 53% in class C, and 30% in classes DE. Regarding family income, a gradual increase was also observed as earnings rise, ranging from 33% among those with a family income of up to 1 minimum wage to 73% for those with more than 10 minimum wages.

ONLINE BETTING

For the first time, the ICT Households 2025 survey explored online betting by Internet users. This topic has gained relevance in the recent context of debate about and regulation of the betting sector, with the year 2025 being marked by the opening of the operator authorization process, the consolidation of advertising and responsible gambling rules, and a firmer stance against illegal offerings of this service.[8] In this context, the ICT Households survey asked users about their participation in four types of online betting.

According to the survey results, 19% of Internet users placed some type of online bet in the three months preceding data collection. In absolute numbers, this represents approximately 30 million individuals. The practice was more frequent among men (25%) than women (14%) in all types of bets (Chart 13), with the biggest difference being found in sports betting.

CHART 13

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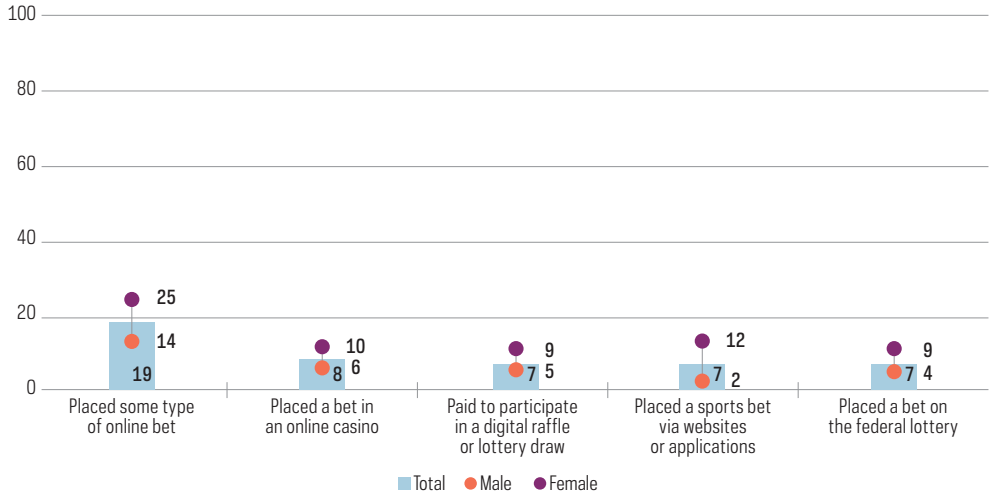
Online betting by sex (2025)

Total number of Internet users (%)



Regarding the types of online betting, all were reported by fewer than one in ten Internet users. Placing a bet in an online casino, for example, was cited by 8% of users, while the proportion was 7% for "paying to participate in a digital raffle or lottery draw," "placing a sports bet via websites or applications," and "placing a bet on the federal lottery."

[8] Brazilian legislation regarding betting, especially sports betting or "bets," was regulated by Law No. 14.790/2023, whose guidelines came into effect on January 1, 2025.

Furthermore, the results indicated that 8% of Internet users under the age of 18, or approximately 1.7 million individuals, reported having placed some type of online bet in 2025. This is prohibited by the country's current legislation.

CULTURAL ACTIVITIES

Every two years, the ICT Households survey uses a set of questions to explore aspects related to engaging in cultural activities online. The results for 2025 showed little variation compared to what was observed in 2023, especially in the consumption of music and videos online. It is worth noting that the data presented here considers proportions in relation to the total population and not the total number of Internet users, making it easier to compare with other research in this area.

In 2025, 61% of the population watched videos, programs, films, or series online, 60% listened to music online, 28% listened to podcasts, and 26% posted texts, images, photos, videos, or music that they created. The enjoyment of music via the Internet was higher among those 16 to 24 years old (81%) and 25 to 34 years old (80%), with differences also by class (89% in class A and 47% in classes DE) and level of education (82% among those with tertiary education and 44% of those with elementary education). The ICT Households survey also investigated the origin of the music listened to and indicated that, in 2025, 59% of the population reported listening to Brazilian music, compared to 36% for foreign music.

The 2025 edition also explored which platforms were used to listen to music online. The most frequently mentioned were video sharing websites or applications (55%), such as YouTube or Vimeo, followed by subscription services (31%), such as Spotify or Deezer. For both items, it was possible to observe lower usage among people in classes C and DE, an inequality that appeared more prominently in subscription services—for these, the proportion varied from 70% in class A and 54% in class B, to 30% in class C and 16% in classes DE. It was also possible to observe differences in relation to color or race, with the use of subscription services being mentioned by 37% of White individuals, 27% of Black individuals, and 28% of Brown individuals.

The types of videos watched online in the three months prior to the survey were also investigated. During this period, 52% of the population reported watching movies, 46% watching series, and 34% watching TV shows, proportions that remained stable compared to 2023. For movies and series, there was also variation in relation to class, with such content being consumed more by people from higher classes. For movies, for example, 85% of people in class A accessed this type of content, 70% in class B, 54% in class C, and 36% in classes DE. For series, the percentages were 77%, 63%, 48%, and 31%, respectively.

Regarding the origin of the films, no variation was observed compared to 2023, with 43% of the population reporting having watched Brazilian films and 39% foreign films. The same can be said regarding series, with 35% of the population having consumed Brazilian productions and 38% foreign ones. Here, too, important differences were observed in relation to class, with more people in class A consuming foreign content.

The survey also investigated the type of content in the videos watched by the population. The data indicated that 46% of Brazilians watched news videos, a proportion that remained stable compared to 2023. Music, concerts, or video clips, however, saw a reduction compared to the previous edition, dropping from 50% to 44%. There was also a decrease in content from digital influencers, whose share dropped from 38% to 33% during the period. The percentages for other types of content remained stable compared to 2023. Two new items were added to this indicator in 2025: videos on personal care, beauty, or health, watched by 36% of the population—more reported by the female audience (45%)—and cooking or recipe videos (30%), which had a similar pattern, being mentioned by 37% of women.

The indicator regarding the platforms on which this content was consumed also remained stable compared to 2023, with video sharing websites or applications (51%) in first place, followed by social media (46%). There was also no change in subscription services (41%), video rental or purchase services (10%), and free content download platforms (7%).

Another aspect investigated by ICT Households was the posting of online content by the population in the last three months. The results indicated stability compared to 2023 and showed that the most posted content were images (24%), videos (19%) and text (13%), with a smaller share of music (5%). The purpose of the posts was also explored (Chart 14), with the main reason being to publicize everyday events (16%), while the least cited was to sell products or services (7%). These results also showed no significant variation when compared to 2023.

CHART 14

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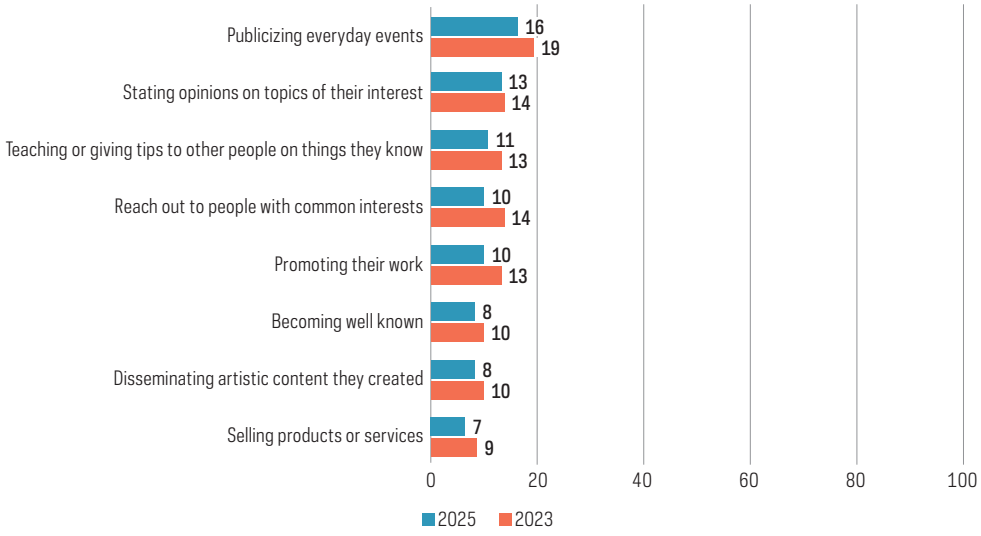
Individuals by purpose of posting their own content on the Internet (2023–2025)

Total population (%)



In 2025, only 3% of the population received some type of payment for posting their own content online. This percentage reached 4% in the Southeast region, 4% among Black people, 6% for those with a tertiary education, 6% among individuals 16 to 24 years old, and 6% for those in class B. The results remained stable compared to 2023 and showed that, even though social media is being used by a large part of the population and has become an important space for content dissemination, advertising, and a means of work, the proportion of people who profit from these activities is still small.

Finally, looking up information online to carry out in-person cultural activities was also investigated (Chart 15). The results showed no variation compared to 2023, with the main online searches being for information on watching movies in cinemas (28%), while the least cited was the search for information on going to libraries (5%). For all the activities analyzed, it was possible to observe a higher proportion among people in higher social classes compared to those in lower social classes. The greatest inequalities are found in the search for information for going to music concerts, reported by 53% of people in class A and 9% in classes DE, and for watching plays or live performances, with 46% of people in class A and 4% in classes DE. It is worth noting that the search for this information on the Internet may also be related to how often these activities are carried out by different social strata.

CHART 15

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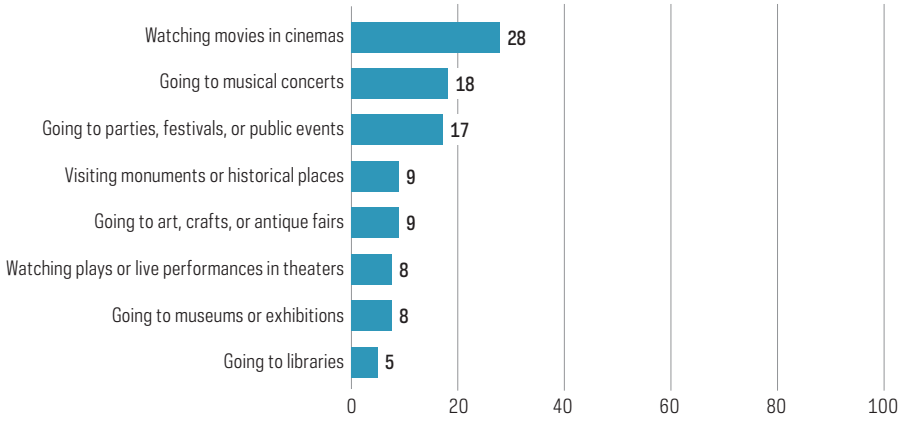
Individuals who looked up information online to carry out in-person cultural activities (2025)

Total population (%)



Overall, the results of the ICT Households 2025 survey regarding cultural activities carried out on the Internet by the Brazilian population pointed to significant inequalities in online cultural enjoyment. Differences based on income or social class, for example, were observed even on platforms offering free content. The survey data showed an association between Internet access conditions, such as the type of connection used, and the observed proportions of people who used the Internet to watch videos or listen to

music, for example. Despite the increasing online availability of cultural productions, and the potential of the Internet to democratize access to them, barriers—including technological ones—persist in making this a reality for society as a whole.

ELECTRONIC GOVERNMENT

The ICT Households 2025 survey also investigated the use of e-government by Internet users 16 years old or older, an activity that increased by 10 percentage points compared to 2024, rising from 61% to 71%. This increase occurred across various socioeconomic profiles, but with greater intensity among people with a family income of up to 1 minimum wage (from 42% to 60%) and those in class A, who already had above-average usage (from 74% to 92%).

The types of public services used by Internet users 16 years old or older in the 12 months prior to the survey did not change compared to 2024 (Chart 16). The most sought-after or carried out services were those related to public health (37%), such as booking appointments or other services of the public health system, and those related to personal documents (35%), such as ID cards, taxpayer registry, passports, or labor registry cards, among others, while services related to police and safety (10%), such as police reports, police records, or complaints, remained the least accessed.

In this edition, the survey also began to investigate the use of the justice system, such as case consultations or the public defender's office, an activity carried out by 16% of Internet users 16 years old or older, a proportion that was 27% for those with a tertiary education and reached 40% among users in class A, but remained at 11% in classes DE.

CHART 16

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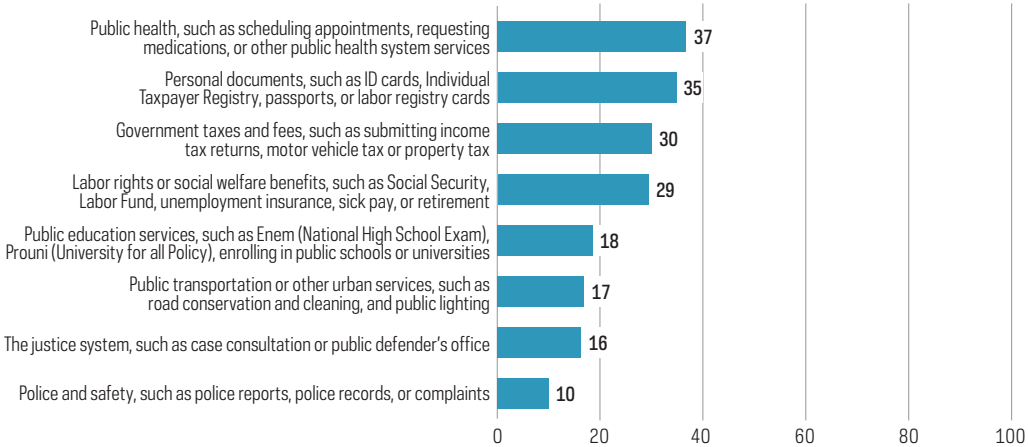
Internet users by type of information regarding public services sought or public services carried out in the last 12 months (2025)

Total number of Internet users 16 years old or older (%)



Other relevant information regarding the use of government-related services concerns the proportion of Internet users 16 years old or older who used e-government entirely online, those who started the services online but needed to go to in-person citizen service locations to complete them, and those who only looked up information online. This indicator allows us to assess, albeit indirectly, the degree of digitalization of public services, even though in some cases, due to their very nature, in-person completion is necessary, as in the case of procedures related to healthcare services.

The 2025 results remained stable compared to the previous year regarding the provision of services entirely online, and the highest percentage in this category was observed for those related to government taxes and fees (18%). Among those who carried out the activities online but needed to go to in-person citizen service locations, services related to personal documents (11%), those related to public education (3%), those related to labor rights (5%), and government taxes or fees (3%) remained stable. On the other hand, for those who needed to go to health centers to access public health services, there was an increase from 12% to 17%.

Among Internet users who only looked up information online, no change was observed compared to 2024. In this case, the highest percentages were observed for services related to labor rights (13%), public health (11%), and personal documents (11%). The least cited service type was related to police and safety (3%).

Another new feature of the ICT Households 2025 survey was the investigation into how Internet users 16 years old or older contacted the government in the 12 months prior to the survey. The results showed that the most used means to make this contact were messaging applications (12%), e-mail (11%), the "contact us" option of mobile applications (10%), websites or electronic chats (10%) and, at a slightly lower level, social media profiles (6%). It is worth highlighting that interactions via e-mail, websites, and the "contact us" option tend to have higher engagement among people in higher socioeconomic classes—13%, 16%, and 16%, respectively, for class A, and 7%, 6%, and 7%, in the same order, among classes DE.

The survey also explored, for the first time, access to the gov.br platform by Internet users 16 years old or older. Created in 2019 to unify the digital channels of the Federal Government, the gov.br platform has become, on the one hand, a portal that brings together thousands of digital public services from the three levels of government, and on the other hand, a mobile application and a digital public infrastructure (DPI) that allows citizens to authenticate and access these services through a single login.

The results indicated that, in 2025, access to gov.br, whether for personal use or on behalf of third parties, was made by 56% of Internet users 16 years old or older (Chart 17). The proportion was significantly higher among people in class A (94%) and gradually decreased, falling below the average in classes DE (35%). Regarding those who used the platform, 49% of Internet users 16 years old or older accessed it to carry out a public service for themselves and 18% for someone else, while 12% stated that they asked someone else to access their gov.br account and carry out a public service for them—a more common situation, for example, in the case of having accounting firms handle tax returns.

CHART 17

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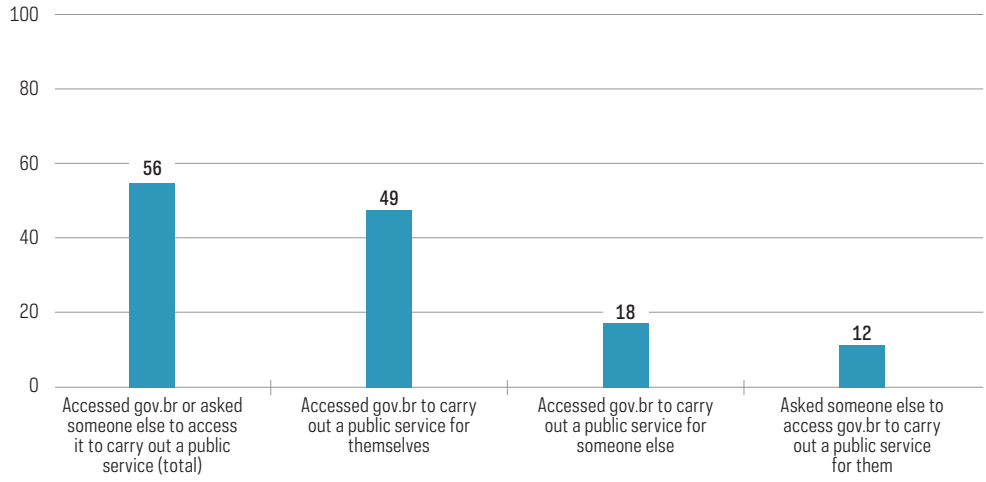
Internet users by access to gov.br to carry out public services (2025)

Total number of Internet users 16 years old or older (%)



Finally, the 2025 survey investigated the reasons why Internet users 16 years old or older did not use any e-government services in the last 12 months (Chart 18). The most cited reason was preferring personal contact (71%), followed by the lack of need to seek out information about or carry out public services (60%)—a reason reported by 92% of users in class A, 75% in class B, 60% in class C, and 55% in classes DE. Concerns about data protection and security were cited by 48%, especially by those 45 to 59 years old (54%) and 60 years old or older (55%)—and by only 28% of those 16 to 24 years old. Furthermore, 33% said they had difficulties finding the information or using services online, a proportion that reached 45% among those with elementary education. Finally, 17% stated it was not possible to complete the services online, and 17% said they could not find the services they needed online.

Overall, the results indicated that, despite the expansion and optimization of online services, barriers related to lack of trust and digital skills, and the availability of fully online services, persist.

CHART 18

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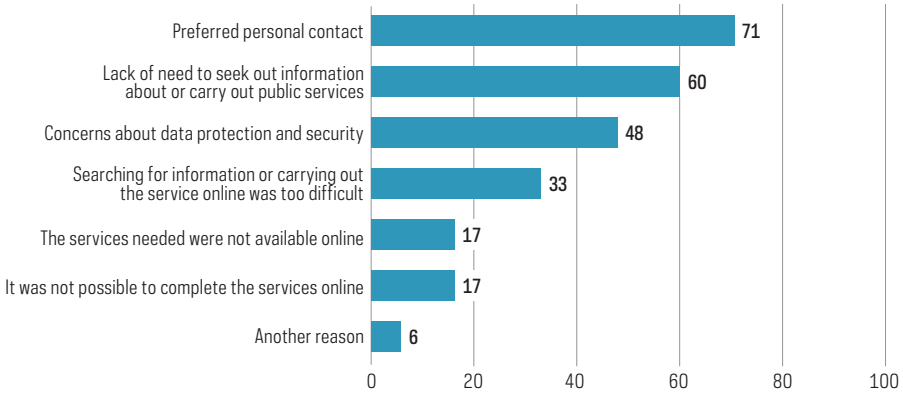
Internet users who did not use electronic government services in the last 12 months, by reason for not using them (2025)

Total number of Internet users 16 years old or older who did not use electronic government services (%)



Final considerations and agenda for public policies

The results of the ICT Households 2025 survey show important progress in Internet access in Brazil, while also revealing the persistence of inequalities in access to and use of the Internet among different segments of the population. The expansion of household connectivity, the growth of fiber optic connections, and the use of the Internet by the vast majority of the population indicate significant progress toward the universalization of the Internet and the incorporation of ICT into people's daily lives. However, these advances do not occur equally.

The survey shows that, despite progress in overcoming access barriers, a significant portion of the Brazilian population still faces restrictions in terms of connection quality and cost, dependence on prepaid mobile plans, limited access to computers, and other obstacles to more efficient use of the Internet and the appropriation of its benefits. Although data from this edition indicates a shift of individuals from the lowest levels to the intermediate levels of meaningful connectivity, the stability observed in the highest range reinforces the need for policies that promote not only access, but also more equitable conditions for Internet use. The results of the ICT Households 2025 survey reinforce the centrality of the concept of meaningful connectivity for the design of digital inclusion policies.

The results also show that Internet access exclusively via mobile phones remains a prominent characteristic of the Brazilian landscape, especially among users with lower incomes and lower levels of education, and those residing in rural areas. This unprecedented investigation into mobile data depletion reveals concrete limitations to Internet use, with direct impacts on activities, access to information, and essential digital services. These results reinforce the importance of connection quality aspects in the debate on digital inclusion.

Expanding access alone is not enough to guarantee the full appropriation of the opportunities offered by the digital environment. In 2025, almost half of the Brazilian population had a digital skill level "below basic". The inequalities observed, associated with level of education, social class, and color or race, show that digital literacy remains a central challenge for reducing social inequalities and ensuring more autonomous, critical, and secure participation of the population on the Internet.

The incorporation of new topics into the survey, such as the use of generative AI tools, online betting, and access to the gov.br platform, offers an updated picture of the relationship between Internet users and emerging technologies with significant social impact. The data reveals inequalities in the adoption of generative AI tools, which could widen existing gaps, given their growing presence in the online and offline world. There was an increase in the use of e-government, along with persistence of barriers related to lack of trust and digital skills, and availability of fully digitized services.

With this edition, the ICT Households survey reaffirms its commitment to producing high-quality, regular, and comparable indicators to support the design and monitoring of digital inclusion policies, guide multi-sectoral initiatives, and enhance the public debate on access to and use of ICT in Brazil.

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Articles

Balcão gov.br: Design of inclusive digital government policies

Daniela Baldez,[1] *Hudson Mesquita,*[2] *Lizandro Lui,*[3] *and Ciro Avelino*[4]

The digital transformation of the Brazilian State has been consistently advancing in several aspects, notably the expansion of the portfolio of public services available through digital channels, the improvement of service platforms, and the consolidation of digital public infrastructures, such as the one that brings together the new National Identity Card and the gov.br account for identification and authentication. The process is supported by Laws No. 14.129/2021 and No. 13.460/2017, which prioritize digital government and guarantee users' rights, such as accessibility and adequate service. The goal is to increase efficiency, reduce costs, and improve citizen experience, following international trends in digital integration.

Research on information and communication technologies (ICT) shows that digitization does not guarantee equal and efficient access to digital public services, even though it is fundamental. Lack of digital skills, understanding of processes, credential management, and trust in government technologies are persistent barriers, especially among older adults, people with low levels of education, and those from lower socioeconomic classes (Brazilian Internet Steering Committee [CGI.br], 2025; Brazilian Network Information Center [NIC.br], 2025).

Despite the progress, in-person channels remain necessary. The ICT Households 2024 survey found that 84% of the population 10 years old or older were Internet users, but the sheer number of the 28 million people who did not use the Internet remains a

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challenge (CGI.br, 2025). It is also worth noting that the low availability of connectivity infrastructure and the high cost of access are not the only factors of exclusion; many people have difficulty with complex online tasks, such as authentication and the use of multiple devices.

The continued demand for in-person service does not necessarily represent resistance to digitalization; it may signal limitations in the current design of digital services and the need for complementary strategies. It is within this context that a pilot program for in-person services—Balcão gov.br—was implemented. It was conceived as an experimental response to a well-defined public problem: the difficulty faced by a significant portion of the population in accessing and autonomously using digital public services based on the gov.br account.

Recent literature on meaningful connectivity and functional digital inclusion has reinforced this interpretation. It indicates that Internet access, while necessary, is insufficient to ensure the effective use of digital public services, especially when it involves authentication, multiple procedural steps, and digital identity management (CGI.br, 2024; Mesquita, 2023).

This article analyzes the pilot project as a deliberate sociotechnical experiment, whose conception, implementation, and evaluation are based on principles of scientific research applied to policy design. The challenge faced in adopting this approach is to respond to an immediate practical problem, producing evidence and lessons that can be generalized and incorporated into digital government public policies. The aim of this article is to describe the experiment, analyze its empirical results, and discuss its implications in light of the legal framework and the evidence produced by ICT surveys. The study engages with the idea of ongoing evaluation and monitoring the implementation of the policy.

Administrative and institutional data is used as a source of information; it was obtained directly through an internal pilot evaluation report, without identifying citizens by name. This data was analyzed in aggregate form. Because this is an operational pilot in a real public policy environment, the questionnaires were not administered in a census-based manner, which may introduce response biases. Furthermore, the results reflect a limited observation period and a restricted set of units and cannot be automatically generalized to the entire universe of in-person assistance in the country.

During the pilot program, which was conducted in state and municipal citizen service centers using an assisted in-person mediation model, both quantitative and qualitative data were recorded. Approximately 25,000 services were provided, an estimate based on the issuance of provisional service tickets and surveys conducted with service providers. In addition, structured digital questionnaires were applied on a non-mandatory basis. One was directed at service providers, with 4,114 responses focused on problem-solving and the type of support offered. Another was directed at the citizens served, with 3,925 responses, which analyzed the use of the gov.br account, difficulties faced, and perceptions of digital autonomy. Qualitative feedback was also collected from the participating units at the end of the pilot period, addressing operational difficulties, the profile of the target audience, technological limitations, and suggestions for improving systems and processes.

Analysis

DIGITAL GOVERNMENT AND USER RIGHTS

Law No. 14.129/2021 establishes that the digital provision of public services must observe principles such as user-centeredness, simplicity, and interoperability, explicitly recognizing that digital services should not exclude citizens who face barriers to access or use. This guideline aligns with Law No. 13.460/2017, which guarantees users the right to public services that are appropriate to their specific conditions and needs.

From an analytical point of view, this regulatory framework recognizes that digital transformation is consolidated through the complementary use of service channels, without proposing the elimination of physical channels, but redefining their role. In-person service cannot be seen merely as a substitute channel, but as an aid to perform mediation, guidance, and support functions for digital autonomy.

This redefinition is consistent with international approaches to "one-stop shops" and assisted public services, which indicate that integration between in-person and digital channels can reduce transaction costs, increase problem-solving capacity, and mitigate inequalities in access to and use of public services (Fredriksson, 2020; Soni & Mitchell, 2022).

PERSISTENT BARRIERS

Data from the ICT Households 2024 survey revealed significant differences in the observation of digital skills and more complex uses, such as the provision of online public services (CGI.br, 2025). In 2024, only about 32% of households owned a computer, a percentage that was even lower in socioeconomic classes DE, limiting the ability to perform tasks that require multiple steps, extensive reading, or the simultaneous use of applications. Meanwhile, mobile phones remained the preferred means of accessing the Internet for Brazilians, with 88% of individuals using them (CGI.br, 2025).

The ICT Households 2025 survey reinforces this diagnosis by pointing out that people who do not use the Internet are more concentrated among individuals with lower education levels and advanced age (NIC.br, 2025). Even among Internet users, a significant portion reported having to go to an in-person citizen service location to complete public services initiated online.

These findings align with the notion of functional digital inclusion, according to which the ability to use digital technologies to access rights and services depends not only on connectivity, but also on skills, confidence, and institutional support during critical moments of digital interaction (CGI.br, 2024; Mesquita, 2023).

Additionally, the 2023 ICT Electronic Government survey showed that 67% of federal and state government organizations were unable to fully offer the most demanded public service via the Internet during the analyzed period, citing both institutional limitations and user difficulties as reasons (CGI.br, 2024). This data suggests that the need for in-person service is associated with structural and sociotechnical factors and not just delays in digitalization.

Furthering their analysis, Vaz and Campagnucci (2025) argued that centralized public digital infrastructures increase efficiency but raise the costs of exclusion when not accompanied by mechanisms to support users. Filgueiras and Lui (2024) highlighted that the governance of digital government policies depends on the State's ability to recognize inequalities in access and use and to design appropriate institutional responses.

Despite the expansion of the portfolio of digital services, inequality in the appropriation of these technologies also reflects regional disparities and state capacity limitations that cannot be resolved solely by the federal sphere. There is a strategic opportunity to strengthen the joint work between the federal government, which articulates structuring solutions (such as the gov.br account), and local governments, which already operate consolidated integrated service networks, the so-called one-stop shops. Addressing the issue of inclusive digital access requires considering the power of Brazilian states to act as coordinators of policies that reduce the technical and financial disparities of smaller municipalities. As highlighted by Ribeiro et al. (2023), state-level coordination has the potential to institutionalize collaborative networks and leverage existing subnational infrastructures to scale solutions such as Balcão gov.br. By integrating assisted in-person mediation with state and municipal reference centers, the Brazilian State ceases to treat the physical channel as an analog remnant and transforms it into a multi-layered hub, essential for tackling "digital illiteracy" and ensuring that digital transformation results in tangible benefits for populations in situations of greater social vulnerability.

PUBLIC PROBLEM AND THE CHOICE OF AN EXPERIMENTAL APPROACH

In the context of the expansion of the gov.br account, a recurring and relevant problem was identified: A significant number of citizens had difficulty creating, recovering, or using their digital credentials. This is especially true in situations involving facial recognition, two-step authentication, lack of registered email or phone number, and limited understanding of the account's security levels (Brazilian Institute of Consumer Protection [Idec], 2025; MGI, 2025).

These difficulties directly impact access to digital public services, generating increasing demand for in-person service, often in units unprepared to act as digital mediators. This highlights that the problem goes beyond technology, involving processes, staff training, and user experience. The literature on user-centered design and digital government points out that such difficulties reveal gaps in the sociotechnical design of services, and not just individual limitations of users (Gray et al., 2018; Junginger, 2018). Given this scenario, it was decided to conduct a controlled experiment in a real-world environment, based on scientific principles applied to the design of public policies. This experiment aimed to create and evaluate artifacts to solve the complex problem of practice, simultaneously generating applicable knowledge and analytical contributions (Dresh et al., 2015; Gregor & Hevner, 2013; Hevner et al., 2004).

In the case of Balcão gov.br, the problem had high social and institutional relevance. The solution required the creation of sociotechnical artifacts that combined processes, technology, and human capacity, and there was explicit interest in testing, evaluating, and improving the solution iteratively before any eventual expansion.

The central artifact of the experiment consisted of a standardized model of assisted in-person care, composed of:

- service flows geared toward digital mediation;
- training materials for managers and customer service representatives;
- specific functionalities in the Balcão gov.br system;
- structured instruments for collecting data from service providers and citizens.

The pilot program was conducted between March 15 and June 15, 2024, in four citizen service units located in different institutional and territorial contexts, as described below:

- Citizen Service Desk: citizen service center of the municipality of Lages (Santa Catarina).
- Citizenship Space: citizen service center for the state of Piauí.
- Digital Urban Platform: an environment for scientific dissemination, popularization of science, and access to new technologies and innovation in the municipality of Niterói (Rio de Janeiro).
- Integrated Service Unit: citizen service center for the state of Minas Gerais.

During this period, the pilot's administrative records reported that approximately 25,000 citizens were served in person, based on 20,215 services that required the issuance of a temporary service ticket, plus an estimated 25% of services without ticket generation.

The evaluation of the pilot experiment took place in a real-world environment and used both quantitative and qualitative methods.

- 4,114 responses from customer service providers;
- 3,925 responses from citizens;
- structured feedback from participating units.

The indicators analyzed included the effectiveness of the service, the motivation to use the in-person channel, the understanding of the gov.br account, and the perception of digital autonomy.

Results of the experiment

The pilot data indicated that the search for in-person service was primarily associated with difficulties in use and appropriation:

- 77% of citizens reported difficulties related to technology or the absence of a registered email and phone number.
- 21% pointed out specific problems with the functionalities of the gov.br account, such as facial recognition (12%) and two-step authentication (9%).
- Only 3% reported having no access to the Internet or mobile phones.

The results of the experiment indicated that the main gap in the use of digital public services is not necessarily connectivity, but skills and the management of digital identities, highlighting that difficulties related to technology and information registration are the main reasons for seeking in-person service. This finding is corroborated by international experiences with assisted digital services, which demonstrate that human mediation contributes to increasing the perception of usefulness and facilitating use, especially among socially vulnerable groups (Soni & Mitchell, 2022). This reinforces the importance of investing in personalized training and support to promote effective digital inclusion.

The resolution rate for service requests was 94%, with only 6% of cases remaining unresolved. In 67% of the cases, citizens received some type of assistance, often associated with the issuance of a temporary service ticket.

After receiving assistance, 78% of citizens stated that they understood what a gov.br account is and recognized the importance of not sharing their password. In terms of perceived autonomy:

- 49% said they had learned enough to try using digital services on their own in the future.
- 31% indicated that they still believe they will need additional help.

It is worth highlighting, as limitations of the experiment, the absence of a comparison group and the heterogeneity among the participating units. These limitations do not compromise the exploratory value but suggest the need for further evaluations on a larger scale.

Conclusion

The pilot project for Balcão gov.br demonstrated that in-person service can be redesigned as a strategic tool of digital government, acting as a mediator between citizens and digital public infrastructure. Conceived as an experiment guided by principles of applied research in public policy design, the pilot produced not only an operational solution, but also a body of evidence relevant to the formulation of such policies.

In light of the literature on meaningful connectivity, functional digital inclusion, and integrated services, the results suggest that assisted in-person service should be understood as a complementary infrastructure of digital government, and not as a remnant of an analog model.

Among the main implications, the following stand out:

1. the feasibility of institutionalizing assisted in-person service as a fundamental component of digital government policy;
2. the importance of focusing this model on audiences with greater digital barriers, as evidenced by ICT surveys;

3. the potential of in-person service as a source of institutional learning and continuous improvement of digital services.

These findings reinforce the need for a digital government approach that combines technological innovation, institutional experimentation, and a commitment to inclusion.

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LEO satellites as a promise: Challenges and outstanding issues

Nathalia Foditsch[1]

In August 2025, respected media outlets[2] fell into the trap of repeating the false report that Starlink would begin offering free direct-to-cell Internet, a technology that would allow the satellite to communicate directly with mobile phones. The headlines sounded utopian: Suddenly, we would have Internet for free. The reality, as is almost always the case, is more complex. This type of advancement depends on three factors that are far from trivial: commercial agreements with local carriers, formal authorization from regulatory agencies, and cutting-edge devices compatible with this technology. In other words, there was nothing "free and immediate" about it.

The incident, which could be seen as a minor editorial blunder, revealed something much deeper: the collective desire for high-quality connectivity. It is not just about being "connected" but about achieving what we call "meaningful connectivity"—that is, fast connectivity with low latency, enough data, and compatible devices to study, work, start a business, or fully exercise digital citizenship. According to data from the ICT Households 2025 survey, about 80% of the Brazilian population still does not meet this standard (Brazilian Network Information Center [NIC.br], 2025). This helps explain why the promise of free, high-quality Internet finds such fertile ground in the popular imagination.

All types of satellites are playing an increasingly important role in providing connectivity to rural and remote areas in the Global South (Bojczuk, 2025), and low Earth orbit (LEO) satellite constellations, such as Starlink's, have accelerated this transformative potential in recent years. Countries such as Canada, Iran, and China, and groups such as the European Union, are investing in developing their own LEO constellations to enhance their technological sovereignty and strengthen cybersecurity and defense capabilities (Kulesza, 2025; Stachoń, 2025; York, 2025). China alone has at least three LEO constellations currently under development (York, 2025).

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[2] Some examples include *Veja*, *Jovem Pan*, and *Infomoney*.

This brief article aims to contextualize the emergence of LEO satellites in contemporary public discourse, outlining their key technological characteristics and their role in the current reshaping of global connectivity infrastructure. In addition to presenting the main challenges associated with the rapid proliferation of these constellations, the text examines a pending international issue regarding the use of the electromagnetic spectrum, currently under discussion at the International Telecommunication Union (ITU). The article concludes with some final considerations.

What are LEO satellites, and why have they become a topic of public debate?

Satellite communications coverage is already global, made up of satellites in geostationary Earth orbit (GEO), medium Earth orbit (MEO), and LEO constellations. LEO and MEO satellites are often grouped under the category of non-geostationary satellite orbits (NGSO). LEO satellites promise lower latency and much higher speeds than other types, characteristics particularly relevant in rural and remote areas. Although the technical literature acknowledges that, even with recent technological advances, GEO satellite systems will continue to exhibit substantially higher latencies than LEO constellations, due to their greater physical distance from the Earth's surface (Garrity & Husar, 2021), recent studies demonstrate that the latency performance of LEO networks cannot be adequately explained solely by models based on this orbital distance. The latency pattern of LEO satellites is strongly influenced by systemic factors, such as the adopted network architecture, routing strategies, and the geographic distribution of points of presence, which together play a role as decisive as—or even more decisive than—the physical distance of the orbit from Earth (Izhikevich et al., 2023).

SpaceX, the owner of Starlink—the largest existing LEO satellite constellation—is already providing services in dozens of countries worldwide[3] and has obtained authorization to operate a constellation of 7,500 satellites in Brazil.[4, 5] The enterprise is valued at $400 billion (Petrova, 2025), and its growth has been rapid. There are already nearly 10,000 satellites in orbit[6] (McDowell, n.d.), and it plans to launch 42,000 satellites in total (Pechtol, 2025; Pultarova, 2025). This number would account for 65% of all satellites in orbit worldwide, even when other types are included, which currently total 13,487.[7]

[3] More information can be found at the Starlink website https://starlink.com/map?srsltid=AfmBOoqmK-i04kBOhJm-k14Ve41CB6zojfKtgKXqKZbYaXzVvN7yPdtt

[4] Read more information at https://pesquisa.in.gov.br/imprensa/servlet/INPDFViewer?jornal=515&pagina=11&data=09/04/2025&captchafield=firstAccess

[5] Other constellations, such as OneWeb, Kuiper, Telesat, and Iridium, are also authorized or in the process of obtaining authorizations.

[6] Data from March 2026.

[7] See footnote 6.

SpaceX is owned by Elon Musk, whose growing public profile has helped make Starlink—and, more broadly, LEO satellite constellations—known to the general public. However, it is rarely emphasized that SpaceX has been significantly driven by US public funds. The company has received billions of dollars in government funding, both through direct contracts with the National Aeronautics and Space Administration (NASA) and the US Department of Defense, as well as through grants, tax credits, and federal innovation programs. According to Butler et al. (2025), Tesla and SpaceX have received at least $38 billion from the US government since 2006, through contracts, loans, grants, and tax credits.

SpaceX has innovated not only by offering higher speeds and lower latency than GEO satellites but also because of its vertically integrated business model. The enterprise develops everything in-house (including rocket engines, satellites, and space suits) and operates a facility in Texas[8] dedicated to satellite launches; it has also been forming an astronaut corps (Reim, 2024).

Starlink's entry has intensified competition among providers, as observed in Kenya, where existing providers lowered prices and increased speeds following the enterprise's arrival in the market (Alam & Dosunmu, 2025; Bonsall, 2025). In several African countries, including Ghana, Kenya, Zimbabwe, Mozambique, and Cape Verde, Starlink's service is already cheaper than that of the leading national provider, altering local price and supply dynamics (Alam & Dosunmu, 2025).

It is worth noting that the satellite market is concentrated in the hands of a few foreign corporations. In addition to the American enterprise Starlink, the other three largest constellations with LEO satellites currently in operation (Qianfan, Guowang, and Geespace) are from China, as shown in Figure 1. The difference between Starlink and the other enterprises is striking in terms not only of the size of the constellations already in orbit but also their ambitions for satellites in operation.

[8] Called "Starbase." More information at https://www.spacex.com/launches

FIGURE 1

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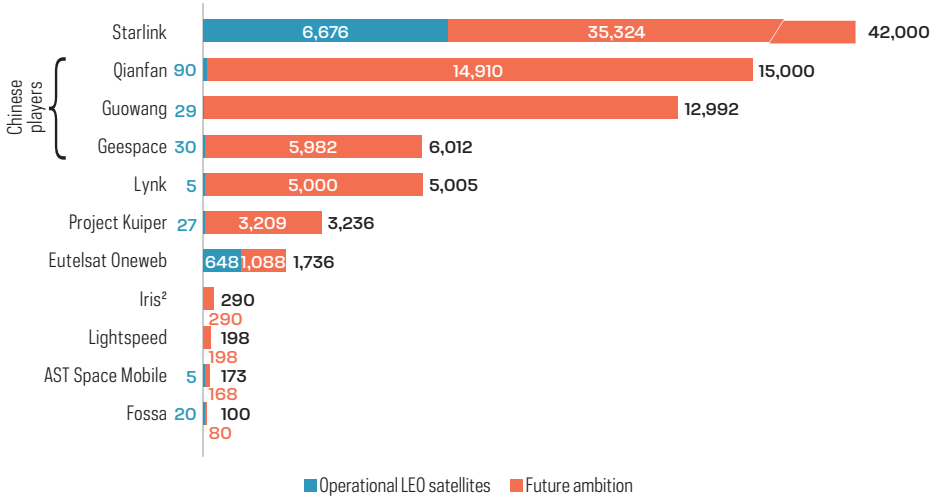
LEO satellite providers — Constellation size



Source: EY Parthenon (2025, p. 4).

According to estimates presented by the World Economic Forum (WEF), in partnership with McKinsey & Company, the space economy is expected to grow from approximately $630 billion in 2023 to roughly $1.8 trillion in 2035. This represents an average annual growth rate of nearly 9%, significantly higher than that of the global economy over the same period (McKinsey & WEF, 2024). Even if the figure may be overestimated, the data highlights the sector's economic and strategic importance. It is therefore not surprising that the debate over LEO satellites has already entered the agenda of discussions on connectivity, particularly in rural and remote areas.

Does the scenario described above mean that we are migrating exclusively to LEO satellites? The answer is no. It is worth noting that this technology's share of the Brazilian market still accounts for less than 1% of fixed broadband in Brazil (Teleco, 2025). Globally, according to the ITU's *Global Connectivity Report 2025*, satellite penetration remains relatively low compared to other broadband technologies, at less than one user per thousand people (ITU, 2025). Furthermore, GEO satellites, which orbit at higher altitudes, continue to play a key role. Today, various network architectures are being developed—including combinations of multiple orbits—to meet the growing demand for connectivity.

What challenges do LEO satellite constellations present?

The enterprises shown in Figure 1 are located only in the United States, Canada, Europe, and China; in other words, none of them are from developing countries. Starlink, Lynk, Project Kuiper, and AST SpaceMobile are from the United States; Qianfan, Guowang, and Geespace are from China; Eutelsat OneWeb is from the United Kingdom/France; Iris² is from the European Union; Lightspeed is from Canada; and Fossa Systems is from Spain. This data alone deserves attention, as it indicates a heavy reliance on foreign enterprises.

Another point of concern is the rapid proliferation of LEO satellites, which poses substantial sustainability challenges, for reasons examined below. First, there is the issue of space debris, which accumulates rapidly. The recommendation in the United States and Europe is that LEO satellites be removed from orbit after a maximum of five years (European Space Agency [ESA], 2024; Federal Communications Commission, 2022; Vale & Furman, 2025). It is possible to get a concrete sense of the scale of the space debris problem by simply accessing LeoLabs' real-time visualizations,[9] which monitor thousands of objects in orbit, both active and inactive. The density of points displayed in these visualizations makes clear the magnitude of the space debris that has already accumulated.

The astronomical community is observing this situation with growing concern. This is because any increase in the number of orbital objects raises the likelihood of interference, especially for research that relies on high-resolution images captured by telescopes. Even Hubble, one of the most iconic telescopes, operates in low Earth orbit and is susceptible to such impacts (Foditsch & De Mello, 2021). This concern has even been empirically reinforced. Kruk et al. (2023) analyzed images produced by Hubble between 2002 and 2021 and documented a consistent increase in the occurrence of satellite trails crossing the telescope's field of view. The study provides robust evidence that the proliferation of satellites, especially in low-orbit constellations, is already producing measurable and growing impacts on scientific research.

In addition, there are concerns about increased carbon dioxide emissions from the fuels used in LEO satellites. Osoro et al. (2024) measured the environmental impact of rocket fuel combustion and reported alarming results. According to the researchers, LEO constellations will be responsible for six to 14 times more carbon dioxide emissions than those from terrestrial mobile broadband. Furthermore, there is the issue of aluminum oxide nanoparticles when the satellite reenters the atmosphere—that is, when its lifespan ends—an impact investigated by Ferreira et al. (2024). Although it takes years for these particles to reach the ozone layer, these scientists estimate that satellites that reentered in 2022 have already caused a 29.5% increase in the natural atmosphere level (Ferreira et al., 2024). These nanoparticles can also remain in the atmosphere for decades, severely affecting the ozone layer (Ferreira et al., 2024).

[9] For more information, visit LeoLabs: https://platform.leolabs.space/visualization

Mechanisms for containing and mitigating the risks arising from the aforementioned issues remain underdeveloped, while concerns persist and continue to grow. In light of this, coordination is essential—not only at the international and intergovernmental levels but also across multiple sectors, involving enterprises, civil society, and academia—to ensure that the connectivity provided by LEO satellites does not compromise the sustainability of the space and terrestrial environments.

Outstanding issues at the international level

Although these are highly complex issues, orbital space is nothing more than a public natural resource, like others, that is limited and requires responsible, strategic management. Debates on this subject aim to prevent a "tragedy of the commons," which arises when multiple users exploit a shared resource in an uncoordinated manner,[10] depending on how things unfold. Two major issues related to these commons currently under discussion internationally are described below.

The first topic seems straight out of the most dystopian action movies. In 1978, a former NASA employee hypothesized that a cascade effect would occur due to the amount of space debris, called the "Kessler syndrome" (Conklin, 2024; Hermer-Fried, 2019; Nomura et al., 2024). According to this hypothesis, collisions in space create even more space debris and consequently more collisions. Thus, at some point, it may become impossible to operate satellites due to the volume of space debris. Although this scenario remains distant, there is consensus among scientists that the Kessler syndrome is a well-established concept and should guide international efforts (Kelvey, 2024).

International treaties and standards, such as the Outer Space Treaty (OST) and the Liability Convention, have proven insufficient to effectively address the issue of space debris (Nomura et al., 2024). Thus, there is room for international coordination on orbital debris management strategies. Such strategies include: (i) systematic monitoring of objects in orbit; (ii) mitigation measures to prevent the generation of new debris; and (iii) technologies and operations aimed at the active removal of space debris. According to Nomura et al. (2024), the combined and timely adoption of these actions may be sufficient to prevent the orbital environment from reaching a critical irreversible state, such as that described by the Kessler syndrome.

Even though there is still hope of stemming the "tragedy of the commons" currently unfolding, the issue has increasingly been framed as a matter of national security, which poses additional challenges. According to Elinor Ostrom, who was awarded the Nobel Prize in Economics in 2009 for demonstrating how communities can collectively manage common resources, the conditions for shared resources to be properly managed are: (i) the existence of common interests; (ii) low communication costs; and (iii) low costs of reaching agreements that are binding and effectively enforceable (Ostrom, 2008). Given that the intensification of geopolitical tensions tends to reduce countries' willingness to collaborate, the outlook for containing the "tragedy of the commons" is less favorable.

[10] This theory was developed by Garrett Hardin in 1968. It is widely known and frequently cited in discussions about the sharing of a common good.

The management of satellite connectivity also includes an invisible yet strategic resource: the electromagnetic spectrum. Without it, there would be no Wi-Fi, mobile, or satellite connectivity. It is a resource that can be imagined as an invisible rainbow, with each color representing a frequency band with distinct applications: mobile networks, television, satellites, and radio. Just like in a rainbow, the bands cannot overlap without the image becoming distorted. When occupied in a disorderly manner, these frequencies generate interference and exclusion. Ensuring the organization of this invisible rainbow is the role of the state, through national regulators (in Brazil, the National Telecommunications Agency [Anatel]) and regional and global bodies, particularly the ITU, the United Nations (UN) telecommunications arm.

One of the most significant debates regarding spectrum and satellite use concerns the pressure being exerted by NGSO system operators (primarily SpaceX) to update the rules governing these systems. The central issue in this dispute is the request to increase the limits on equivalent power flux density (EPFD), a parameter used to measure the power of a radio signal at the Earth's surface (Bonsall, 2025). GSO enterprises fear that raising these limits will result in harmful levels of interference, capable of degrading the quality of services provided by geostationary satellites (Kirby, 2025). SpaceX, on the other hand, argues that the current rules were adopted about a quarter of a century ago and that they may have overestimated the level of protection required for GSO, which is why it advocates revising the EPFD limits (Kirby, 2025).

The issue of EPFD limits will be one of the central themes of the 2027 World Radiocommunication Conference (WRC-27), to be held in Shanghai, China, which could define the global regulatory framework for NGSO systems—a matter of great importance, given that commercial satellite megaconstellations appear to be dominating the spectrum and space (Bonsall, 2025; Kirby, 2025; Rennó Nunes & Teixeira, 2025).

Brief conclusions

The false news story about free Internet access in August 2025 went viral because it taps into a legitimate aspiration of Brazilian society. It is understandable and justifiable to desire fast and universal access to meaningful connectivity. As noted by the ICT Households survey (NIC.br, 2025), although a very high proportion of the population already has some form of access, only 20% of Brazilians benefit from the highest level of meaningful connectivity, highlighting the depth of digital inequalities in the country. Turning this aspiration into reality, however, requires much more than high-profile headlines: it requires investment, governance, updated regulation, and coordination at the national and international levels.

This article has shown that the large-scale deployment of LEO satellites poses complex challenges. Some of these relate to classic debates on the management of scarce public goods, but others introduce entirely new dynamics. What is new is that a single connectivity technology is expanding so rapidly, simultaneously across dozens of countries, with an accelerated adoption rate and projected environmental impacts on a scale unprecedented in previous cycles of telecommunications innovation. Added to this is the growing mobilization of scientific communities seeking to mitigate the effects of these systems on, for example, the viability of astronomical research and other sensitive observations.

Another critical factor is the current concentration of economic and technological power: the majority of these megaconstellations are owned by a small number of foreign enterprises, primarily based in the United States and China. This concentration increases structural dependencies and limits developing countries' ability to shape the direction of this new layer of global digital infrastructure.

Furthermore, the issue is intrinsically dependent on international coordination—a task that is always challenging and becomes even more complex in a context of heightened geopolitical tensions. Because it is a global commons, the governance of orbital space faces real risks of a "tragedy of the commons," the prevention of which will depend on the ability of states and multisectoral efforts to build robust and effectively implementable regulatory consensus. In this regard, one of the most sensitive debates today concerns the management of the electromagnetic spectrum. More specifically, one of the major current controversies concerns the increase in EPFD limits, a key parameter for mitigating interferences between GSO and NGSO systems. The revision of these limits will be one of the most important topics at the WRC-27.

In short, realizing the legitimate desire for meaningful connectivity requires recognizing both the transformative potential of LEO satellites and their risks and externalities. The future of this ecosystem will depend less on the pace of technological innovation and more on the quality of policy and regulatory decisions and governance structures at the local and global levels.

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The drivers of political communication in messaging apps: Five years of learning[1]

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The survey *Os vetores da comunicação política em aplicativos de mensagens: hábitos e percepções* [The drivers of political communication in messaging apps: Habits and perceptions], conducted since 2020 by InternetLab[5] and the Rede Conhecimento Social,[6] has continuously and thoroughly monitored the habits and perceptions of the connected Brazilian population regarding the use of messaging apps in their daily communications, with special attention to interactions related to political issues and electoral processes. This article presents a summary of the lessons learned over five years of research, highlighting what has been consolidating and what has been transforming during this period regarding how citizens interact with each other and with information on messaging platforms.

The central objectives of the survey are to identify the drivers of dissemination of political content, understand the factors that influence message sharing, map individuals' perceptions of their role in the circulation of information, and investigate how these factors vary across sociodemographic groups. The decision to focus on this topic was a response to the post-2018 election scenario, in which discussions about disinformation, content going viral, and the dynamics of private groups gained prominence in the public debate, prompting

[1] The survey *The drivers of political communication in messaging apps: Habits and perceptions* is a joint effort of the InternetLab and Rede Conhecimento Social teams, especially Francisco Brito Cruz, Heloisa Massaro, Ester Borges, Igor Andrade, Ana Rita Sbragia, Caroline França, and the authors of this article. The teams have the support of the Research Council, composed of Camila Rocha, João Guilherme Santos, Laila Belix, Leticia Cesarino, Leonardo Nascimento, Nina Santos, and Paulo Almeida.

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[5] InternetLab is a non-profit organization that brings together academics and representatives from the public, private, and civil society sectors, encouraging the development of projects that address the challenges of creating and implementing public policies on new technologies, in areas such as privacy, freedom of expression, and issues related to gender and identity.

[6] Rede Conhecimento Social is a non-profit civil society organization, founded in 2016, that promotes social participation to strengthen democracy through the collective construction and dissemination of knowledge.

an empirical investigation of communication practices in the country. In its first edition, in 2020, the focus was on broadening the understanding of the mechanisms that were shaping the sharing of political content on WhatsApp and its implications for the public debate.

In subsequent editions, the survey expanded its scope, keeping pace with changes in the informational context and platforms. WhatsApp remained the central object of analysis, but early qualitative approaches already demonstrated a growing trend of migration by certain segments to Telegram, motivated by concerns about security and privacy, as well as technical limitations. Starting with the second edition, this app was incorporated into the survey, revealing new uses and patterns of engagement.

Due to the constant addition of features in the investigated apps—such as channels, communities, status updates, audio transcription, and Artificial Intelligence (AI) tools—the survey needs to adapt continuously. Although new objects of analysis are incorporated as they emerge, the research maintains core questions from the first edition, which allows for the construction of historical series of changes in dimensions such as participation in groups, reception of content, circulation of information, and perceptions of security.

This constant evolution of the survey is supported by a methodological design that has remained relatively stable across editions: a mixed-methods approach combining qualitative and quantitative methods in a sequential, complementary manner. The qualitative stage (conducted in editions 1, 2, 3, and 5)[7] was conducted in October—the period when elections are held—via online discussion groups. These discussions play a central role in identifying trends and understanding the meanings users attribute to their practices, as well as providing fundamental elements for refining the quantitative questionnaire and incorporating new themes throughout the editions. The quantitative phase, in turn, is carried out in all editions between November and January—the period following the election in election years—through a survey with national representativeness and data collection from an online panel of respondents. The focus has always been on the Brazilian population 16 years old or older, who have Internet access and are users of the selected messaging apps.

In this fifth edition (2024–2025), the survey included a group of citizen researchers, participants since the first edition, who have evolved toward greater protagonism in the scope of the survey. As part of this process, they reflected on their experience with the apps, interpreted the data, and engaged in dialogue with the team, becoming co-producers of knowledge within a participatory research framework. The group, made up of eight women and one man—who together represent the five regions of the country—brings together a diversity of experiences and perspectives for critical analyses of the social and political context and collective interpretations of the phenomena observed.

By integrating five years of ongoing research, this article presents a summary of how connected Brazilians use messaging apps and how these uses relate to their experience of social interaction and political life in digital environments. This trajectory demonstrates that political communication on messaging apps is not a static practice, but a process that reinvents itself with each election cycle, each new platform feature, and each individual or collective experience of users.

[7] In the fourth edition, the qualitative phase was not conducted because the survey period (2023) was neither an election year northe year preceding a national election.

Sample profile

The fifth edition of the survey was conducted between September 2024 and September 2025. In the qualitative phase, 12 online focus groups were conducted, with between five and eight participants in each. Their composition took into account three forms of segmentation: (i) age (under 40 years old, and 40 years old or older) and size of the municipality (capital, metropolitan region, and noncapital cities), totaling six groups; (ii) self-declared political positioning (Bolsonaro supporter, Lula supporter, far right, far left, and no political positioning), totaling five groups; and (iii) religion (specifically evangelicals), one group.

The quantitative data collection consisted of 3,113 interviews, distributed proportionally across the five regions of Brazil. The estimated margin of error was 3 percentage points for the total sample, with a 95% confidence interval. In terms of municipality size, there was a distribution among capital cities, metropolitan regions, and noncapital cities. In 2024, approximately 35% of respondents lived in capital cities, 27% in metropolitan areas, and 38% in noncapital cities. In terms of gender, the distribution was 52% women and 48% men. Regarding age, the 20–29 and 30–39 age groups concentrated the largest proportions of respondents, followed by 16–19, 40–49, and finally, 50 years old or older, forming a profile consistent with the Internet user population in Brazil (Brazilian Internet Steering Committee [CGI.br], 2025). Regarding education, in 2024, 23% of the people had up to elementary education (grades 6–9), 47% had secondary education (grades 10–12), and 31% had tertiary education (undergraduate or graduate).

CHART 1

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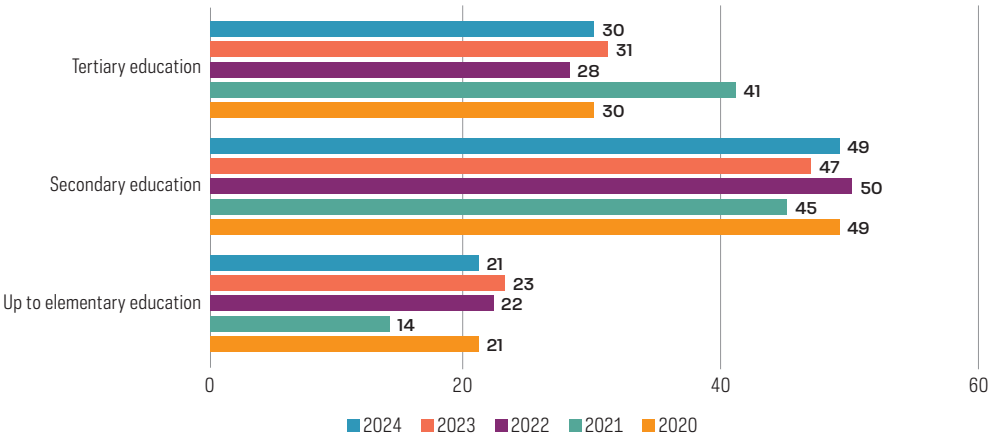
Level of education of respondents in *The drivers of political communication in messaging apps: Habits and perceptions* survey (2020–2024)

Total number of respondents (%)



Source: InternetLab and Rede Conhecimento Social (2025a).

In 2024, there were slight variations in the educational levels of the survey population compared to previous editions, with the combination of secondary and tertiary always accounting for the largest part of the sample, highlighting the significant presence of people who had completed secondary education (Chart 1). The biggest variation occurred in the 2021 edition, which had an overrepresentation of people in social classes AB and those with completed tertiary education, a fact taken into account in comparative analyses in the historical series (InternetLab & Rede Conhecimento Social, 2021).

CHART 2

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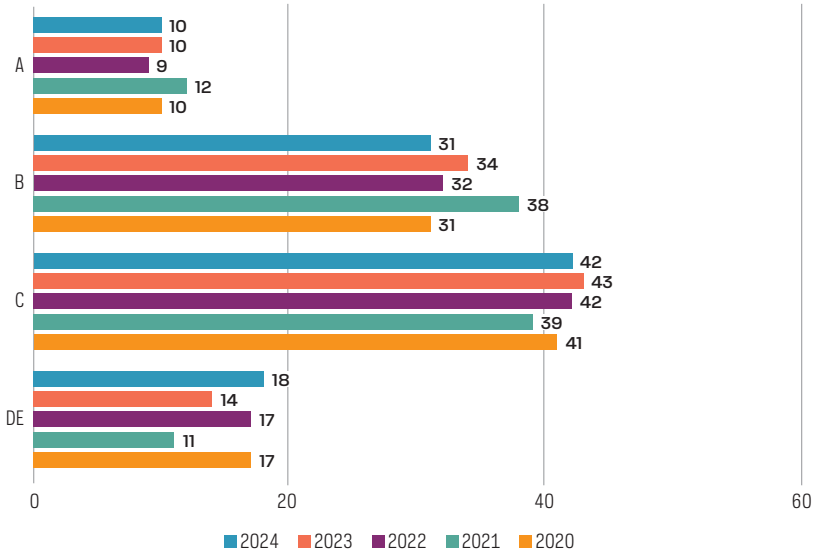
Social class of respondents in *The drivers of political communication in messaging apps: Habits and perceptions* survey (2020–2024)

Total number of respondents (%)



Source: InternetLab and Rede Conhecimento Social (2025a).

Regarding socioeconomic classification, in 2024, 10% of the sample belonged to class A, 34% to class B, 43% to class C, and 14% to classes DE (Chart 2). In previous editions, these percentages have varied, but the predominance of classes C and B has remained, with less participation from classes A and DE.

The survey also uses self-declared political positioning. Respondents place themselves on a ten-point scale, with one extreme indicating the left and the other the right. The analyses consider the following groupings: left (scores 1 to 3 on the scale), center (scores 4 to 7), right (scores 8 to 10), and no political positioning (respondents who chose the option "I don't know/I don't want to answer"). In 2024, regarding this issue, approximately 16% identified as left-wing, 27% as centrist, 34% as right-wing, and 23% were classified as having no political positioning (Chart 3). These data have been relatively stable throughout the series, with only minor fluctuations.

CHART 3

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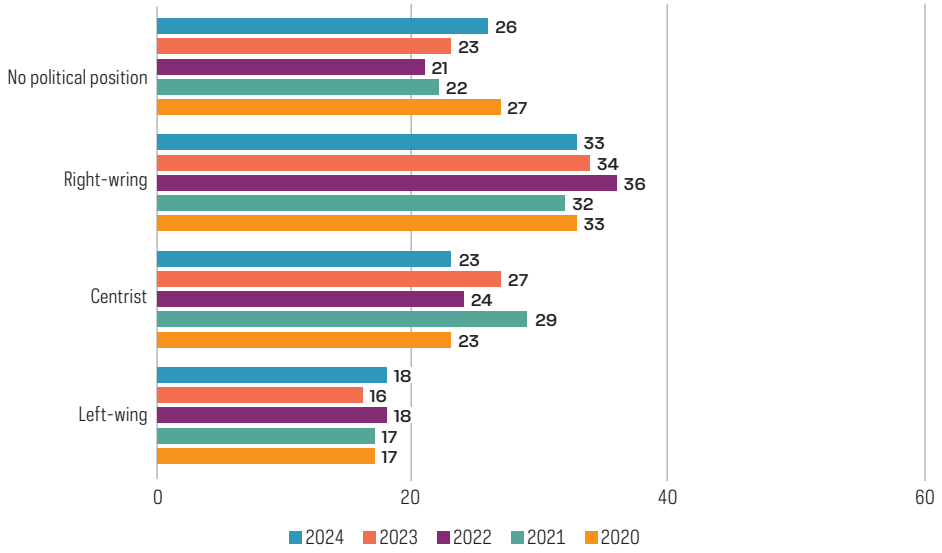
Self-declared political positioning of respondents in *The drivers of political communication in messaging apps: Habits and perceptions* survey (2020–2024)

Total number of respondents (%)



Source: InternetLab and Rede Conhecimento Social (2025a).

Regarding race/color, considering the Brazilian Institute of Geography and Statistics (IBGE) criteria, the 2024 sample consisted of 45% White people, 42% Brown people, 11% Black people, 1% Asian people, and 1% Indigenous people (Chart 4). Adding together Black and Brown people, 52% of the sample identified as Black. In previous editions, the distributions also fluctuated around 50% Black people and 50% White people, with slight variations over the years. It is worth mentioning that in the survey analyses, when comparing these profiles, no differences by race are perceived that point to distinct behaviors in the use of the apps.

CHART 4

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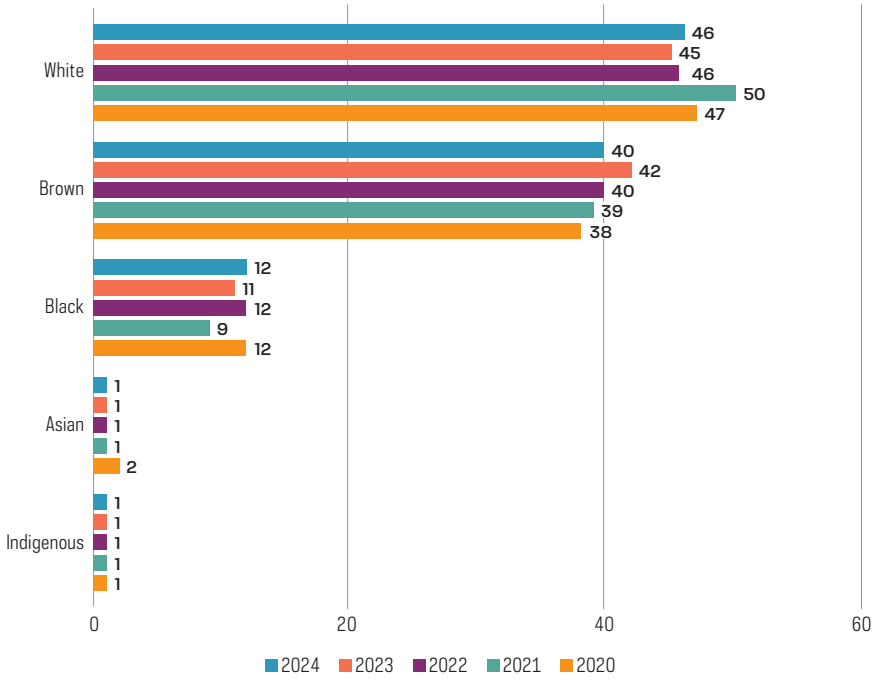
Race/color of respondents in *The drivers of political communication in messaging apps: Habits and perceptions* survey (2020–2024)

Total number of respondents (%)



Source: InternetLab and Rede Conhecimento Social (2025a).

Messaging apps and their uses

Throughout the entire historical series, the survey has focused on how Brazilians use messaging apps. In all years, virtually all Internet users reported using WhatsApp in the month prior to the survey, reinforcing the app's central role in everyday communication. The use of direct messages on Instagram, in turn, has remained virtually constant, with little variation since 2020. Facebook Messenger experienced a downward trend from 2020 onward, but its usage has stabilized since 2023. Telegram, which saw an increase between 2021 and 2022, stabilized from 2023 onwards, being used more by people with tertiary education.

CHART 5

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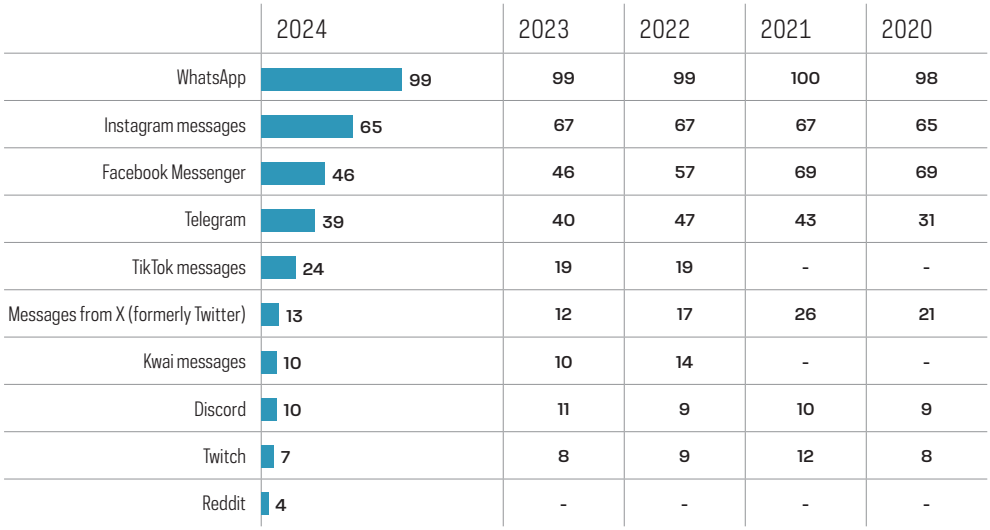
Internet users by use of messaging apps (2020–2024)

Total number of respondents (%)



	2024	2023	2022	2021	2020
WhatsApp	99	99	99	100	98
Instagram messages	65	67	67	67	65
Facebook Messenger	46	46	57	69	69
Telegram	39	40	47	43	31
TikTok messages	24	19	19	-	-
Messages from X (formerly Twitter)	13	12	17	26	21
Kwai messages	10	10	14	-	-
Discord	10	11	9	10	9
Twitch	7	8	9	12	8
Reddit	4	-	-	-	-

Source: InternetLab and Rede Conhecimento Social (2025a).

The average number of messaging apps utilized per person was 3.0 in 2020, rising to 3.5 in 2022, then decreasing to 3.2 in 2024, indicating a contraction and stabilization. Most platforms have consolidated into specific functions, with TikTok being the only exception, experiencing considerable growth in 2024, especially among people in class A. The testimonies from the focus groups illustrated how the apps were used for different purposes: WhatsApp remained the app for communicating with acquaintances; Telegram consolidated itself as a space for interaction based on affinity, interest and access to content and files, sometimes associated with the idea of a "new deep web"; Facebook Messenger was cited as an important tool for communicating with vendors and stores; and TikTok was linked to entertainment, fun, and the consumption of short videos.

Looking at the types of groups people participate in on both WhatsApp and Telegram, some overlaps are noticeable, but users differentiate the use of each app based on their objectives and conveniences. On WhatsApp, in 2024, family groups (54%) and friend groups (53%) appeared among the most frequent, followed by work groups (38%), study groups (25%), buying/selling/trading groups (24%), religious groups (19%), promotion groups (19%), job and extra income groups (18%), neighborhood or community groups (17%), and news groups (17%). On Telegram, during the same period, the main groups were friends (27%), work (23%), news (23%), sales (23%), games (20%), jobs and extra income (20%), buying/selling/trading (19%), and family (18%).

In general, people were in fewer groups than in previous years. Over time, there has also been a decrease in the average number of groups people participate in: in 2021, this average on Telegram was 4.4 and dropped to 3.6 in 2024; on WhatsApp, the decrease was even greater, from 5.1 in 2021 to 4.2 in 2024. This trend reinforces what previous editions have already pointed out and what qualitative reports suggest: there is a noticeable saturation of virtual interactions, an exhaustion associated with the bombardment of information across different platforms.

> "I think there are too many apps, and I don't really like that. I like to concentrate my contacts in a few places. I feel very tired with the amount of information and things we have to keep up with to stay in touch and informed." [Woman, 50 years old, state of São Paulo]. (InternetLab & Rede Conhecimento Social, 2025a, p. 24)

Many people also described a deliberate movement away from groups they cannot keep up with or find unhelpful, choosing and prioritizing spaces where they want to be, thus trying to reduce their daily information overload.

In addition to mapping the types of groups, the study explored people's behavior within them, recording a high degree of passivity: 26% of people were in many groups where they did not read anything, and 29% were in several groups where they read but did not say anything.

Information consumption

Regarding the consumption and sharing of news, the survey shows a complex scenario, in which there is a growing perception that the digital environment is marked by scams, data theft, and the circulation of fake news. In this context, there are frequent reports of strategies developed for self-protection and coexistence in the digital environment, such as avoiding accessing external links and verifying the veracity of accessed pages or content.

This situation has been corroborated by other research, which has demonstrated frequent efforts towards the verification of information. According to the ICT Households 2024 survey, 52% of Internet users reported having verified, in the three months prior to the interview, whether information found online was accurate (CGI.br, 2025). However, the *Os vetores da comunicação política em aplicativos de mensagens: hábitos e percepções* survey revealed that it is common for people to worry about fact checking, but they do not always know which sources are reliable.

> "To be perfectly honest, I don't even bother researching anymore, because you never really know what the true source is. When you watch the news, there's the issue of the station supporting a certain candidate. […] So, I try not to research anymore. I'm just letting things happen and whatever comes, comes, because you'll go crazy if you really stop to analyze it, you'll go insane." [Woman, 40 years old, state of Alagoas]. (InternetLab & Rede Conhecimento Social, 2023, p. 41)

Therefore, concern may not translate into effective fact-checking practices. Furthermore, in 2024, 47% of respondents still reported believing in news sent by trusted sources without necessarily performing additional verification, a percentage that was even greater among people in the upper class and those with higher levels of education.

New behaviors in the face of tools and updates

The survey also analyzes how the Brazilian population has been establishing new practices based on specific functionalities. In 2024, on WhatsApp, 90% said they had seen, and 76% said they had posted their status, numbers close to those verified in 2023 (95% and 78%, respectively). Qualitative responses showed that status is perceived as a relevant space for following information, disseminating campaigns (such as those of a church or a candidate), staying up to date on people's lives, and expressing opinions and positions without the discomfort and potential friction of direct messages.

WhatsApp status is also used in an electoral context: 19% said they followed and posted political content on their status in 2024, using this feature to show support for candidates, publicize proposals, and share content with a broad reach, but in a less intrusive way than in groups or private messages. Changing profile pictures to support candidates was another practice adopted by a segment of users.

Viewing and posting content on status updates was more frequent among women than among men, which reinforces other research findings: Women felt less comfortable talking about politics with their contacts since the 2022 elections (45% of women and 34% of men), they policed themselves more about what they said in groups (56% and 49%), and they felt more afraid to give their opinion on politics because they felt the environment was too hostile (60% and 53%).

Among the other WhatsApp features analyzed, it is worth highlighting the integrated AI, which was recently introduced in Brazil during the 2024 data collection. Half of the respondents reported using WhatsApp's AI in the 12 months prior to the study, with a higher proportion of use among younger people and those in social class A. Its use has been described as a way to conduct quick research and get tips and guidance on everyday topics without resorting to an external browser.

In the context of political communication, 25% reported receiving content they believed was produced by AI tools, such as videos, images, or audio. The difficulty of identifying AI-generated content was perceived as high: 30% believed they had already received this type of content without knowing it was artificially generated. The environment surrounding these tools is marked simultaneously by apprehension—because they facilitate the mass production of disinformation, deepfakes, and manipulated campaign materials—and by optimism—associated with their positive potential for creativity, income generation, and innovation.

Conclusions

By bringing together five consecutive editions, the survey offers an integrated view of how connected Brazilians use messaging apps in their daily lives and how these practices relate to forms of social interaction and political participation in digital environments.

Based on the accumulated knowledge, InternetLab and the Rede Conhecimento Social carried out further development of this investigation in the new *Vetores e implicações da desordem informacional na América Latina* [Drivers and implications of information disorder in Latin America] survey (InternetLab & Rede Conhecimento Social, 2025b). This study mapped the dynamics of dissemination and consumption of online information in this region and focused on users' habits on digital platforms, their perceptions of source and information reliability, and their perspectives on strategies to combat disinformation.

The historical series generated and analyzed by the *Os vetores da comunicação política em aplicativos de mensagens: hábitos e percepções* survey offers a robust set of primary data—both quantitative and qualitative—that can be opened up for exploration by other researchers interested in understanding the multiple aspects of communication in messaging apps in Brazil, especially in relation to politics. Among other approaches, the research examines trust, participation, content circulation, technological mediation, and interaction dynamics in private groups.

If communication on messaging apps transforms with each election, adapts to innovations in digital platforms, and continuously responds to the individual and collective experiences of users, it is essential that research in this field continues to investigate the topic in a dynamic and systematic way to improve the quality of the public debate.

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List of Abbreviations

A4AI – Alliance for Affordable Internet

Abep – Brazilian Association of Research Companies

AI – Artificial Intelligence

Anatel – National Telecommunication Agency

BOG – Geographic Operational Base

CAPI – computer-assisted personal interviewing

Cetic.br – Regional Center for Studies on the Development of the Information Society

CGI.br – Brazilian Internet Steering Committee

CNEFE – National Address Registry for Statistical Purposes

DPI – digital public infrastructure

DPPO – occupied permanent private dwellings

EGH – Expert Group on ICT Household Indicators

Enem – National High School Exam

EPFD – equivalent power flux density

ESA – European Space Agency

FGV – Getulio Vargas Foundation

FU – federative unit

GEO – geostationary Earth orbit

GSO – geostationary orbit satellite

HMEDMAX – heuristic for median maximization

IACA – shelter institution for children and adolescents

IBGE – Brazilian Institute of Geography and Statistics

ICT – information and communication technologies

Idec – Brazilian Institute of Consumer Protection

ILPI – long-term care institution for the elderly

IPU – iterative proportional updating

ITU – International Telecommunication Union

LEO – low Earth orbit

Mbps – megabits per second

MC – meaningful connectivity

MEO – medium Earth orbit

MGI – Ministry of Management and Innovation in Public Services

MST – minimum spanning tree

MSTBH – minimum spanning tree-based heuristic

MW – minimum wage

NAH – node aggregation heuristic

NASA – National Aeronautics and Space Administration

NGSO – non-geostationary satellite orbit

NIC.br – Brazilian Network Information Center

pp – percentage points

Prouni – University for all Policy

PSU – primary sampling unit

RIDE – Integrated Development Region

UMC – universal and meaningful connectivity

UN – United Nations

WRC-27 – 2027 World Radiocommunication Conference

WSIS+20 – World Summit on the Information Society +20

unesco
Centre
under the auspices
of UNESCO

cetic.br
Regional Center for
Studies on the
Development of the
Information Society

nic.br
Brazilian Network
Information Center

cgi.br
Brazilian Internet
Steering Committee