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## The digital divide in Brazil and the accessibility as a fundamental right

*La brecha digital en Brasil y la accesibilidad como derecho fundamental*

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**ABSTRACT** The research analyses digital inequality in Brazil. We are based on official indicators, in addition to the literature on the subject. We argue that tackling the digital divide by general data alone can result in generic conclusions and, consequently, ineffective proposals. We propose that the particularities of individuals, together with their place of residence, have a significant impact on the identification of inequality. We collect research on digital accessibility and social exclusion. The results demonstrate the increase in access to information technologies in Brazil until 2018. However, we have identified unequal digital access. The article concludes that digital accessibility must be understood as a fundamental right in Brazil to demand specific public policies to reverse the situation.

**KEYWORDS** Brazilian digital divide, development, digital exclusion, digital accessibility, fundamental right to digital accessibility.

**RESUMEN** Esta investigación analiza el problema de la desigualdad digital en Brasil. Nos basamos en indicadores oficiales y literatura sobre el tema. Sostenemos que abordar la brecha digital solo con datos generales puede dar lugar a conclusiones genéricas y, en consecuencia, propuestas ineficaces. Proponemos que las particularidades de los individuos, junto con su lugar de residencia, tienen un impacto significativo en la identificación de la desigualdad. Recopilamos investigaciones sobre accesibilidad digital y exclusión social. Los resultados demuestran el aumento del acceso a las tecnologías de la información en Brasil hasta 2018. Sin embargo, hemos identificado un acceso digital desigual. El artículo concluye que la accesibilidad digital debe entenderse como un derecho fundamental en Brasil para exigir políticas públicas específicas para revertir la situación.

**PALABRAS CLAVE** Brecha digital brasileña, desarrollo, exclusión digital, accesibilidad digital, derecho fundamental a la accesibilidad digital.

## Introduction

In 2014, in an interview for the British network British Broadcasting Corporation-BBC, Stephen Hawking presented the following statement: “The development of total artificial intelligence could mean the end of the human race”<sup>1</sup>. Nevertheless, the consequences of new technologies are, for now, immeasurable. In other words, the finitude’s prediction of the humans in the face of its substitution by artificial intelligence – AI, as pointed out by Hawking, is in the field of probabilities. Nobody knows how the convergence of the offline world to the online world will result.

The debate about the future of the world due to the digital transition is fascinating. However, the fourth industrial revolution’s fleet emergence already reveals positive and negative aspects with tangible consequences. Mentions of more transparent governments (Future of Life Institute, 2015), real-time connections, provision, and purchase of online services embody the positive side. On the other flank, privations and violent extremism represent some of the subtraction situations that emerge (Ki-yindou, 2019).

Thus, the digital divide emerges as one of the biggest concerns. For no other reason, the number of studies on the subject increase, seeking to observe, identify, and analyse the development of a gap in the digital world, its equivalence, and correlation with offline exclusion.

The digital transformation and its inequality concern more in developing countries, given their substantial inequality in the offline world. Plus, although there is no doubt about inequality in the digital universe, most studies compare countries or macro-regions in a panoramic way.

Hence, we argue that looking solely at the gap for general data can result in primary conclusions and, consequently, ineffective proposals. Therefore, the paper aims to examine the digital divide in Brazil, identifying the scenario in which it unfolds in the country. We analyse data and indexes carried out by research institutes, as well as conclusions from the literature on the subject. From the results identified on the status of digital divide in Brazil, we propose legal tools and policies that can reduce inequality and offer directives that assist in promoting digital equality in the country.

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1. Rory Cellan-Jones, “Stephen Hawking: Inteligência artificial pode destruir a humanidade”, *BBC News*, 2 December 2014, available at <https://bbc.in/3hTgUCu>.

## The digital transformation: Strengths and weaknesses

During the 18<sup>TH</sup> Century, the Modern State hosted the first industrial revolution, which profoundly impacted the economy and society. For a century, the model organization has modified from manufacturing to the machine. It required constant adaptation, as employment eradication, urbanization, among others. Similarly, the second and third industrial revolutions also brought structural changes in economic, political, and social systems.

History, therefore, has demonstrated the correlation between technology's emergence with other structures (Fukuyama, 2014: 155). Joseph Schumpeter (1988) had already explained that a technological innovation inaugurates a rupture in the economic system, breaking with the State of equilibrium and promoting the alteration of production patterns. Subsequently, Christensen and Raynor (2003: 32-40), dealing with digital technological issues, agreed that a disruptive innovation occurs through a process in which it rises quickly, with the possibility of surpassing other established competing technologies.

The digital technologies are revolutionizing the economy, politics, and the production of knowledge. Entitled as Revolution 4.0, it constitutes the progressive transmutation of the analogue to the virtual world. Its main characteristics are speed, amplitude, and depth, in addition to the systemic impact. Indeed, information technology (IT) has transformed the domains of individual and community life: economic structures, politics, and administration, communication, socialization, work, and leisure. They are search engines, social networks, robotic factories, intelligent digital assistants, autonomous cars and airplanes, systems that speak, understand, and translate the language. IT provides excellent opportunities for individuals and communities. They bring economic development, promote education, build knowledge, improve public administration, and support cooperation (Sartor, 2017: 1).

However, IT carries risks among those, unemployment, and social alienation. They amplify productivity and the demand for jobs that require creativity and problem-solving skills that cannot yet be done by machines. On the other hand, other activities can be excluded or performed by the machine. Still, the rapid formation of this expansion is marked by inequality since the digital universe's opportunities are not equally accessible to all (Arretche, 2019). Today, internet giants like Google control large amounts of data, which are not accessible to individuals and public administrations and small economic operators, who are always at a disadvantage (Sartor, 2017: 1).

Surveillance is another risk pointed out by the literature (Timan, Galic & Koops, 2017; Zuboff, 2015; Mhalla, 2019). Technologies make it possible to monitor public authorities and private actors. Hardware and software record human behaviour traces, allowing various data relating to the same person to be extracted from different

places and added to their profiles. The nudging in turn (Thaler & Sunstein, 2008), fosters individuals with certain types of interests. IT use information from people and assess their behaviour, according to criteria possibly unknown to them, and make decisions that affect them. As human action takes place in IT-based environments, it is influenced and can be governed by IT (Sartor, 2017).

It is also possible to use information recorded in computer systems to distinguish and discriminate individuals, classifying them in stereotypes without considering their real identity. One can also consider a person's characteristics in a derogatory way, which may imply different treatment concerning individuals, employment, access to business, and social opportunities. In other words, it also contributes to social problems, as it reinforces inequalities and structural prejudices by perpetuating gender inequalities by threatening jobs (Dormoy & El Khatib, 2019). Thus, there are positive and negative consequences of digital transformation.

In the context of academic discussions, there is a conceptual transition from the vision of digital divide to that of digital inequality, to which the present text is affiliated. According to the OECD, the term digital divides "refers to the gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. The digital divide reflects differences among and within countries" (OECD, 2001: 5).

Thus, the digital divide allows to segment society in a binary way, that is, who has (haves) or who does not (haves-not) access to the new ICTs. It is, therefore, a technological gap whose manifestation can occur on the scale of the individual, the home or the company and the territory (neighbourhoods, cities, regions, or countries).

Dupuy, when dealing with the digital divide, states that "It is the dynamic development of NICTs (and not just the Internet) that creates the divide between those who appropriate the latest technologies and those who do not" (Dupuy, 2007: 19). It is the set of technologies that produce exclusion and not just the Internet.

Discussions have recently moved on to another perspective, which decouples access inequality from digital inequality. Stiakakis, Kariotellis and Vlachopoulou, point out that the digital divide manifests itself internally to the population that has access to the Internet, either in relation to the material conditions that result in differences in terms of quality of access and cost of the connection, or in relation to the skills that each must use this new form of communication (Stiakakis, Kariotellis & Vlachopoulou, 2009: 48)

Such transformations are one of the pillars of global society and, despite reaching all countries indistinctly, they do not spread internally through the same conditions. There is a profound difference in access and use of IT when looking at developed and developing countries. In these, access to information and communication technologies are exclusive, insofar as they reproduce the previous economic patterns, that

is, IT is established on a social basis with profound differences, whether in relation to access to networks that favour the expansion of system, which are not evenly distributed across space, especially in cities, either through access to objects capable of promoting connectivity.

It is evident that new technologies and digital inclusion are important as mechanisms to foster development (Friedrich & Philippi, 2020). So, it is necessary to reflect on the new dimension of inequality in developing countries, more specifically, on how this new dimension of exclusion occurs, that is, the digital divide.

### **Digital divide data and indicators in Brazil**

We examine official information and studies carried out on Brazilian IT's usage and social inequality to this goal. This data assembling offered a description, which presents the results collected by the research instituted. According to a survey carried out by The Network Readiness Index (NRI), a important global indices proceeding impact of information and communication technology (ICT) throughout the world, Brazil ranks 59<sup>th</sup> in a ranking of 121 countries in terms of internet access conditions – including among the ten countries in the world with a most significant number of disconnected populations (Portulands Institute, 2020).

According to a United Nations index, Brazil ranks 54<sup>th</sup> in terms of countries providing electronic government. The Survey assesses the development status of the digital government of United Nations Member States, ranking countries to each other. It measures the digital government's effectiveness in providing public services and identifies digital development patterns and performance patterns (UNCTAD, 2021).

The overview pointed by United Nations shows Brazil at the group "Very high" in e-government. Nevertheless, regarding global analysis, Brazil lost degrees in comparison of last report, hold in 2018, when it was ranked 44<sup>th</sup> in terms of e-government. The same happened relating e-participation, that was before at 12<sup>th</sup> country, and in 2020 appeared only at 18<sup>th</sup>.

The digital divide proposes to denominate disparities access of individuals in information technologies. Report of the United Nations Conference on Trade and Development – UNCTAD details that half of the world population does not have access to the internet. According to the report's data, the USA and China concentrated digital's economy, while the rest of the world consume the products produced by big companies. Though digital revolution has fetched countless benefits, these only remained for a small number of individuals (UNCTAD, 2021).

According UNCTAD report, in developing countries, significant differences between rural and urban areas and men and women remain. The reports conclude that the digital revolution will positively transform developing nations if digital resources personify accessible manner to all masses (UNCTAD, 2021). UNCTAD's report

shows also that the digital divide amid developed and developing remains elevated and constitutes a constant challenge for development (UNCTAD, 2021).

The 2021 Report focused in digital data flows and disclosure data core as evolving new digital technologies, as artificial intelligence (AI), blockchain, Internet of Things (IoT), cloud computing and other Internet-based services (UNCTAD). The report shows the relevance of a well development of these technologies, which affects digital divide. Nevertheless, specifies studies are missing in Brazil about it. Besides, the purpose of the present research leads analysing geodemographic and intersectional data of digital technology.

### Intersectional and geodemographic data to digital inequality

The panoramic prospect of inequality is relevant, but insufficient. It is impossible to include all developing countries in the same category and hence conclude the need for minorities' attention. Inequality is due to economic, social, and political issues, and the particularities of individuals such as their race, ethnicity, gender, social class, together with their place of residence and work, accept a significant impact on the identification of the inequality. That is, intersectional and geodemographic considerations are necessary to assess the exclusion framework.

For intersectionality, we adopt Helena Hirata's definition. She considers intersectionality as the interdependence of power, race, gender, and class relations (Hirata, 2014). Thus, we argue that examining digital divide must be done by paying attention to the connective relationship between gender, class and besides, the issue of territorial space where exclusion occurs is relevant, whether in rural or urban areas and in which region of the country and its relationship with economic and social characteristics. Hence for an adequate assessment of the status of digital divide in Brazil and possible indications of instruments to be used, it is necessary to examine more specific digital accessibility elements and social inequality.

### General data of access and use of internet in Brazil

As Brazilian specific research, Household Information Technology Research, carried out by the Regional Centre for Studies for the Development of the Information Society (CETIC), brings data on Brazilians' consumption and digital accessibility. To enable comparison of its results, CETIC follows methodological specifics standards and indicators. The study adopts the guidelines of the multisectoral initiative Partnership on Measuring ICT for Development, headed by the International Telecommunications Union (ITU). The main reference for the indicators is the manual for Measuring ICT Access and Use by Households and Individuals of the International Telecommunication Union (ITU).

The survey's units of analysis are households and individuals 10 years of age or older. The sampling plan uses information from the Demographic Census and the National Household Sample Survey (PNAD) or the most recent Continuous National Household Sample Survey (PNADC) available, conducted by the Brazilian Institute of Geography and Statistics (IBGE). Interviews were conducted in person, in households located in urban and rural areas. The survey results are stratified and conglomerated at various stages depending on the fields of interest for the dissemination of results.

The 2019 report –hold before Covid pandemic– reveals that 126.9 million people used the internet in 2018, with an increasing number from 67% to 70% Brazilians accessing the network from the last report. The urban sphere points out that 74% of people are connected to the internet, while 49% in the rural area. Concerning social class,<sup>2</sup> 48% of classes D and E connect, which corresponds to 46.5 million households with access. The cellphone represents a significant way of connection: 97% of the people who connect to the internet in the country use this device, while the number who consume by computer is 43%.

In rural areas, 77% of Internet consumers use the internet via cellphones, while only 20% by computer. Due to a lack of structure, 43% of rural schools do not have access to the internet. Still, 44% of the interviews in rural areas reveal that the reason to not access is due to the lack of possibility.

In the rural area, the percentage of women using the internet (41.95%) is higher than men. There are also differences between the rural and urban areas regarding the unavailability of services due to not using the internet (12.9% in the rural area, and 1.7% in the urban area) (IBGE, 2018).

Concerning socio-economic aspects, the research reveals that almost all people in classes A (92%) and B (91%) consume the internet, a number detached from those in classes D and E, whose number was less than half (48%). There was growth in access in recent years, from 30% in 2015 to 48% in 2018, representing an increase of 24.6 million internet users in the period. However, individuals in the DE classes use the internet less and mostly through cell phones, which shows disparities with B and C (CGI.br/NIC, 2019). In 2018, regarding the educational aspect, 95% of people with higher education access the internet. In turn, only 57% of those who completed only elementary education utilise the service. The data also shows issues related to the network access infrastructure, notably concerning inequalities between the country's most remote regions, which affects an individual's consumption (CGI.br/NIC.br, 2019).

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2. In Brazil, there are two criteria for assessing social class. The Social Class by the New Brazil Criterion (ABEP) is more used, as it uses household characteristics to differentiate the population (comfort, education level of people). IBGE uses the criterion by minimum wage bands, which is more straightforward and is divided from class A (highest) to class E (lowest) (Rodrigo, 2020).

The Annual Continuous Household Sample Survey of the Brazilian Institute of Geography and Statistics – IBGE Points out that while 80.1% of the urban population use the internet, the number in the rural area is 41%.<sup>3</sup> Although it is said that there was an increase from one year to another (from 33% to 41%), it is a timid growth considering, as it represents half the value of people connected in the urban environment (IBGE, 2018).

The indicators of the study shows the reasons given by people for not using the internet. The numbers indicate the internet price in 60 out of 100% of the interviewees in the urban area and 65 in the rural area.

The use of broadband also varies when examining the states of the federation. Less people reported using broadband in the North region (only 44%). Other regions ranked 57% at Northeast, 69% South, 66% southeast, and 57% centre-west.

The Center changed the methodology in the year 2020. Due to the onset of the Covid pandemic, face-to-face collection was restricted. An internationally recommended best practice was to replace face-to-face collection with telephone collection (CATI). The effective sample was conducted with 3,979 respondent households and a 7% response rate on telephone interview data collection. Face-to-face interviews were conducted, with an effective sample of 1,611 respondent households, that had a 72% rate response. Summary, the sample was smaller, which brought larger margins of error.

The report shows a very unstable collection scenario due to the socioeconomic impacts of the pandemic. However, according to CETIC, the difference in the social class profile of the sample remains, even after the corrections and weighting strategies adopted.

Nevertheless, the Center's main results shows an increase of household's access, reaching 83% of Brazil's population. Another positive result lie on fixed broadband, that had become the main type of internet connection (69%.) There is also more households with a computer (45%) in the country. Regarding internet use, it was observed an increase in the proportion of users (81%). The total number of internet users in Brazil reached 152 million. Summary, the new report shows a growing aspect of internet use by Brazilian population, including rural area.

Comparison between years displays other differences. The research observed important access increase in terms of classes. If in the last report, hold in 2018, people on class C that used internet reached 76%, in 2020 the number increased to 91%. Classes D/E went from 40% to 64%, a very significant increase. There was also a greater

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3. According to the report, the methodology uses “information from the Demographic Census and the National Household Sample Survey; both carried out by the Brazilian Institute of Geography and Statistics (IBGE). The interviews are conducted in person, in households in urban and rural areas (from 2009)”. More information at CETIC, 2019a.



increase in fixed broadband in DE class homes, from 62% to 69%. In addition, nine out of ten providers made fiber optic available. The graphic below shows the results' difference between 2019 and 2021 report.

The number of homes with computers also increased, particularly in urban areas (50%). The percentage for rural area has remained low, with only 17% of the rural population using the Internet via computer. Nevertheless, there was a significant increase of internet use in rural areas, that was 49% of households in 2018 and in 2020 the number scored 67%.

Summarizing, the 81% total of internet use - raw - in 2020 are distributed as follows. Regarding area, 83% of urban population and 70% of rural; regarding gender, 77% male and 85% female; regarding color/race white (81%), black (80%), brown (83%); regarding education level, higher 96%, middle 92% and elementary 73%; regarding age group 50% of the population over 60 years old uses internet. Finally, social classes, class A (99%); B (97%); C (85%); D/E (67%). Devices used, the majority with 99% cellphone.

### Correlation between access, use, gender, region, and education

Aside from comparing data on Internet use and access over the years, which previously disclose important changes, correlations can also be established among the variables indicated for the examination. Specifically, the relationship between class, with region, gender, type of use and access. The purpose here, indeed, is to verify whether by extracting specific data from the combination of these variables it is possible to identify less apparent results.

The overall raw numbers shows an improvement, but disparities in access remain. The higher proportion of access can be defined in the higher classes, with more education and younger people.

There is a relationship between the type of means used and the amount of income regarding family income. For families whose income is one to two minimum wages,<sup>4</sup> the majority use exclusively cell phones and only 17% of the computer. In families earning more than ten minimum wages, computer use rises to 31%, with the percentage of cell phones and computers being 80%. Concerning social classes, in a population whose family income is up to a minimum wage, 78% use only their cell phones, and 19% use computers and cell phones to access the internet (IBGE, 2018).

According to a study carried out by the Institute for Applied Economic Research – IPEA, published in June 2019, the lack of access to the internet repeats adversities that already exist in the socio-economic sphere. IPEA highlights the relationship between

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4. Brazil's minimum wage in January 2020 is R\$ 1,039, an amount of approximately US\$ 250.00 (depending on the exchange rate).

the cognitive aspects of individuals and access. The highly educated have the largest access to the internet and, at the same time, possess the most significant aggregate index of practices, in other words, those with greater understanding availability for the digital world (IPEA, 2019).

Therefore, in addition to the data relating to digital accessibility itself, it is necessary to examine reports that deal with inequality in the offline world. Thus, the following data showed dealing with illiteracy and social inequalities in the offline world. The purpose is to examine the correlation and similarity between the specific results of digital divide with Brazilian social inequality.

IBGE data on education, study and sex, schooling rate, and illiteracy rate reveal 11.3 million illiterates in Brazil. Regarding illiteracy in Brazil, the rate in 2015 was 8.3% for men and 7.7% for women. The distribution of people aged 25 and over, by age, gender according to groups of years of study in Brazil, also reveals a similarity in gender. Regarding the illiteracy rate by region, the numbers reveal much higher illiterates in the North and Northeast states of the federation. While in several north-eastern states, the index was between 12.9 to 17.2% of the illiterate population, in the south, the average was between 2.5% and 5.0% (Gazeta do Povo, 2019).<sup>5</sup>

Annual Continuous Household Sample Survey (IBGE, 2018) reveals the persistence of inequalities previously mentioned regarding regional, gender, colour, and race issues. While women are more educated than men, whites have higher education levels than blacks or browns, just as the North and Northeast regions have a significantly higher illiteracy rate than the Central and South regions. Access to education in the south is 53.6% of the population, while the number is 38.9% in the Northeast. The number of whites who have access to education is 55.8%, while blacks and browns 40.3% (IBGE, 2019a). Illiteracy still reaches 10.3% of older white people, while the number is 27.5% of blacks and browns. Besides, although there has been an improvement in illiteracy in Brazil, more than half of the population aged 25 and over has not completed primary and compulsory education and has not completed high school. In the Northeast, this percentage of people who have not completed high school reaches 61.1% (IBGE, 2019a).

Therefore, the data indicates a similarity between the data collected on statistics from the digital universe with the analogue universe.

### **Analysis of the results: What the data reveal about the profile of the digital divide in Brazil**

It is possible point out two approaches to studies on digital inequalities. The first, behavioural and individual (Dimaggio & Garip, 2012), and the second, which un-

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5. "Taxa de analfabetismo no Brasil", Gazeta do Povo, 8 Marh 2019, available at <https://bit.ly/3jsKCyK>.

derstands that the root of inequalities is structural and systemic (Sampson, 2017). The first is based on the first level inequalities, seeking to emphasise improving access and, the second focuses on social structures such as gender, ethnicity, and social condition. Such a perspective, therefore, shows that there is a distinction between a black woman who lives in an economically homogeneous neighbourhood and with adequate infrastructure from one who lives in a neighbourhood, although similar, where there is widespread use of technologies by women (Helsper, 2019).

Behavioural and individual studies would be insufficient for this reason. Thus, the author argues for a multi-level approach. Otherwise, only inequalities are reached at the first level, proposing access mechanisms that will not bring substantial accessibility. Therefore, it is necessary to go beyond individual aspects and observe social and structural issues together with them, that is, intersectional and geodemographic (Helsper, 2019).

The present work is in line with that indicated by the author, emphasizing the data's intersectional and geodemographic aspects. The examination of the studied data provides essential information about the digital divide. It identifies a specific picture of inequality: indicators geographic region, urban and rural region, race, ethnicity, gender, age, social, class, and form of use of IT. Regarding digital divide in Brazil, the IPEA notes that, as a rule, socio-economic categorizations are associated with digital content consumption or practices (IPEA, 2019).

As can be seen, Brazil has grown on the internet, from 70% to 81% of Brazilian households connected between 2018 and 2020. However, access to IT does not occur in a uniform and homogeneous manner in Brazil. The average number of accesses hides relevant inequality. Though almost all people with higher education consume the internet, the percentage of those who have primary education is lower. In this regard, the data on social inequality revealed that although the number of illiteracies in Brazil has decreased, more than half of the population has not primary basic education.

Thus, it is possible to state a digital elite in Brazil, which corresponds to classes A, B, and C. They use cell phones for access, but they also have broadband at home, which places them in the first digital access level. Additionally, they have more education, allowing more substantial access to the amenities offered over the internet. The majority are white. Gender distinction is noticed by internet access but only when comparing type of access (cell phone or computer). Thus, gender distinction can be identified at this point.

The incidence of using cell phones in these areas is not irrelevant. Studies on digital inequalities examine distinction concerning the benefits underuse of IT. Those who traditionally have fewer social benefits are also less likely to have high quality connected, which show distinction in the quality of consumption of these services, even where there is access. Therefore, it is necessary to divide the potential access,

where infrastructure is available to access the devices, from the adequate access that deals with the possession and personal use of the devices (Helsper, 2019).

As explained by Marta Arretche, the online mode's more frequent use is related to broadband, allowing greater exploitation of the network, promoting more possibilities for jobs, economic activities, and civic engagement. On the other hand, when it comes to mobile access such as smartphones, dial-up access, or even internet access in public places, engagement is more limited. The quality of the use changes because of that and implies consequences for consumption, thus modifying an initial view that only the increased use of the internet corresponds, in fact, to greater accessibility.

In 2021 report, the comparison between cell phone usage and other variables is interesting. 90% of the D/E class use the internet exclusively over the cell phone; people with elementary school level this average is 81%; population from the Northeast (72%); North (65%) and Midwest (53%); 62% of women, while 52% of men; color: 48% white; 65% black and 60% mixed race.

It is not difficult to deduce that the use of internet exclusively through cell phones reveals economic inequalities. Therefore, the result of the use of cell phones indicates the digital inequality precisely demarcated in the country. The population at northern and northeastern regions, and people of classes D and E, have major incidence in only using cell phones to access internet. In addition, specific use also reinforces class and gender inequality. A relevant point, given that the raw data show a higher percentage of women accessing the internet than men. In summary, there is a higher incidence of internet use by women, but not in same conditions.

The data above also allows a profile of the Brazilian digital exclusion to be drawn. It is a less favoured class "D and E," rural area, or more remote regions, mainly in the north and in the country's northeast region. Besides, in rural areas and northeast regions, a significant portion does not use the internet due to the high price or the lack of infrastructure. Regarding the economic and social aspects, they are less educated, have a fundamental level, but not a higher level. There is a higher incidence of brown or black people, and a more significant number when paying attention to gender.

Moreover, as it turned out, broadband availability is distributed unevenly in the Brazilian territory, which led Marta Arretche to consider that "patterns of access close to Germany and India" coexist in the country. That is why the author points out that digital technologies have not eliminated barriers in access and development (Arretche, 2019).

Indeed, studies have already pointed out the relationship between digital and social inequality (Schiefler, Cristóvam & Sousa, 2020). Likewise, historically economically, socially, and culturally disadvantaged people have less access to the digital universe. The reasons for such disparities are to be found in matters relating to households, the individuals themselves, or in resources and status associated with them in society (Helsper, 2019).

Examining the indices presented on digital accessibility, it is correct to conclude the existence of two forms of territorial inequality, which separates the urban from the rural and divides the country's regions. The economic barrier has its highest index in the north-eastern and northern and rates. However, in these areas, the leading cause is the lack of service provision or the service's value to be provided. On the other hand, in more affluent regions, it is possible to observe that the lack of digital networks results from the individual's own choice (Arretche, 2019).

Thus, this shows that internet users can be divided into first-class users, who have an offer and use broadband and use it domestically, and second-class users who use the internet through more limited means. According to the literature, the primary condition of being in the first class is to use broadband at home. In other words, internet access does not depend solely on the individual condition and potential. Its location, the territory, has relevance and matters in internet access (Arretche, 2019).

It is not by chance that Tomás Wissenbach points out that the examination of the differences between the federative units shows the existence of a digit which found totter extent in the states with the highest income, such as São Paulo. The author also explains that "the decision to offer services, such as broadband, for example, seems to be more influenced by the average income of each jurisdiction (Wissenbach, 2019). The digital elite incidence is higher in states like São Paulo, Rio de Janeiro, and lower in northern states, such as Pará.

However, as IPEA (2019) reasonably considers the relationship between digital elites has deeper aspects, as it shows that they are structured by symbolic capitals, which have their very rationality and a specific field, reflecting on a social distinction. On symbolic systems, Pierre Bourdieu listed them as instruments to legitimise domination. The ruling classes are favoured. They disseminate social practices, which enable them to realise the power. Such symbols are tools of social integration, and they allow a consensus to be established on the social world, thus contributing to the reproduction of the social order. The power is invisible and exercised when individuals do not want or are unaware of it (Bourdieu, 2000).

Instead of collaborating in development in the country, it can be inferred that the digital transformation is corroborating the maintenance of inequalities, not only of class but also of ethnicities, regions, and education. The reality of revolution 4.0 is creating a digital elite with access, almost globally depending on the region, and social exclusion of half of the rural population, in the northern primary's, of basic education. In short, symbolic power is exercised through digital systems.

## **Legal propositions and public policies**

The examination of the inequality indexes revealed a digital elite's existence, with most second-class Brazilian users at the access level, as they utilise tools with limited

capacities to enjoy the amenities and services that the online universe provides. For this reason, digital geography in Brazil is marked by stratification, coinciding geographically, and in income. Therefore, the author argues that such results should be engaged into account when distributing Internet use access in the country.

That highlights the need to promote policies focused on these inequalities. It is necessary to integrate different legal measures (data protection, security, electronic commerce, electronic documents) and public policies (addressing economic, political, social issues, educational issues), as well as the involvement of different actors (legislators, administrative authorities, technical experts, civil society) to guarantee the opportunities (Wissenbach, 2019).

Due to the fast evolution of technologies, predicting details by the law is impossible. However, this does not exclude the possibility of regulation (Sartor, 2017). As Marcus Duwell (2017) explains, jurists must examine the normative work to be developed in the environment of new technologies, including, for this purpose, the content, and institutions of human rights, which requires that effects be drawn up in this sense.

Therefore, given the existing picture of a digital elite and the exclusion of a majority from digital accessibility, the State's role in digital world is to guarantee access to the digital world for all. In this context, as Juan Corvalán warns, this is not a mere adaptation to the digital experience, but the promotion of the fundamental right to relate in the digital world and create an environment of technological preparation, which is decisive in the development of inclusive technology (Corvalán, 2017).

Hence, universal, and integral accessibility to the digital world must be considered a fundamental right. The defence of digital inclusion as a fundamental right in the Brazilian legal system is not new. In 2011, an Amendment to the Constitution (06/2011) proposal was presented, aiming to insert internet access among sole approved, but shelved due to the legislature's end.

In 2013, a survey conducted at the Faculty of Law of the University of São Paulo proposed that digital inclusion should be considered a fundamental right. At the time, the reasons outlined were that citizens would be able to access through access to the digital universe, pointing out that more than 80% of Brazilians did not have access to the internet. The study emphasised promoting specific public policies, mindful of economic exclusion, that is, people who cannot afford to buy a computer would suffer digital inclusion (USP, 2013).

When the study was conducted, the historical exclusion was mentioned, which would correspond to the group formed by black women like those who would suffer the most. It is currently clear that, although there has been a significant change in the number of people who access the internet, digital inequalities remain and are not related only to individual issues, but also geographic ones. Even though there was a university defence for considering digital inclusion as a fundamental right, its standardization is not yet a reality.

In 2014, with the Marco Civil da Internet, Law no. 12,965/2014, which establishes principles, guarantees, rights, and duties for the use of the Internet in Brazil, expressly highlighted in article 7 that: “Access to the internet is essential to the exercise of citizenship”. Among the rights guaranteed to users are, in item IV, the non-suspension of the internet connection, except for a direct debit resulting from its use; and in item V, maintaining the contracted quality of the internet connection. They are standards. Therefore, that reinforces the right to digital accessibility and seeks to protect IT use quality by users.

Following this intelligence, Bill n. 3883/2019, pending in the Federal Senate, aims to amend Law 12,965/2014 and Law 9,472, of 16 July 1997, which provides for telecommunications services, the creation, and operation of a regulatory body, and others institutional aspects. With the text, which alters art. 7 of Law 12.965/2014, it is proposed to ensure “users with continuous and free access to digital public services considered essential, including service plans with deductibles. It allows the Fund’s resources for the Universalization of Telecommunications Services (Fust) to be used to finance public policies for digital inclusion, for the massification of access to services of collective interest provided in a private regime, and for access to digital public services considered essential.

However, they do not indicate what digital public services goods would be considered essential, which should be defined by a specific regulation. The bill also alters art. 3 of Law 9.998/1997 to establish a Fund for the Universalization of Telecommunication Services (FUST) with the purpose of “covering a portion of the cost attributable to the fulfilment of the obligations for the universalization of telecommunication services provided in a single regime that cannot be recovered with exploration efficiency of services, as well as financing public policies aimed at promoting digital inclusion, in addition to mass access to services of collective interest provided in a private regime and subsidizing access to public services considered essential.

The bill’s initial basis is based on access to information, considered as a fundamental right, in Article 5, XXXIII, of the Federal Constitution, which guarantees all citizens the right to receive information of public interest from public bodies. The project itself clarifies that the fundamental right to access information was regulated by Law 12.527/2011,<sup>6</sup> which made collective information of interest on the internet mandatory. Digital divide is pointed out in the project, with the information that 90% of the connected people are from classes A and B.

Otherwise, there was no examination of the indexes brought by IBGE, which,

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6. According to Eneida Desiree Salgado and Tarso Cabral Violin, “The objectives of the Law are three-fold: 1. the right to truth and memory and the documents of the dictatorship; 2. the fight against patrimonialism and personalism in Public Administration; and 3. the social control of legal entities under private law that receives public funds” (Salgado & Violin, 2015).

together with those of IPEA, also shed light on Brazil's digital divide. The project intends to ensure continuous and free access to public services considered essential and extend to service plans with franchises, which will not be able to discount the volume of data contracted by users. At this point, it aims not to discount data deductibles, such a service is provided for the use of mobile internet, by cell phone. However, as seen in the research results, the most relevant policy measure in the Brazilian case does not lie in mobiles, but the insertion of instruments so that excluded geographic and social layers can enjoy the domestic broadband internet.

Report from the ICT Households still reveals the absence of full internet online use by cell phones, as there are still relevant limitations concerning the implementation of activities that require a greater traffic capacity, which highlights the need to offer mobile networks with an accessible price to certain layers, or even free internet in certain situations. Also, the government needs to adapt to electronic sites so that the mobile device views them. The ICT Electronic Government Survey was clear in showing that less than half of city halls provided mobile versions of their pages. Therefore, initiatives focused on cell phones must be adopted.

As noted, the bill focuses on the spread of services considered essential and guarantees the universality of public digital services. It is a measure that brings progress and a political measure that, if implemented, can reduce the digital divide. However, it is insufficient, as the country's focus should be digital accessibility as universal for all services provided, whether public or private. To allow or guarantee only a portion of services and still only by cellular data more significantly more significant distinction between those who are considered first-class and those who are second class. That may imply an increase in the digital elite, which already exists in Brazil and results, as seen, not only from access to the internet but mainly from the way it uses the internet.

Some say, like Vinton Cerf, that internet access is not a human right. He argues, therefore, that the best way to characterise human rights is to identify the results of what one tries to guarantee. According to him, internet access would serve to guarantee freedom of expression and access to information, but that such rights would not necessarily depend on this medium.<sup>7</sup> Although the article was written in 2012, it is not difficult to contradict that, since then, it is clear that access to the internet does not only bring these to guarantees but is the essential means for exercising an individual's citizenship in a digital society. Consider the paradigmatic case of the conversion from face-to-face education to distance education, due to the Covid-19 pandemic - a clear demonstration that access to the internet is, in itself, a right. Moreover, the fact of being a right that allows access to other rights does not remove its substantive

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7. Vinton Cerf, "Internet access is not a human right", 4 January 2012, available at <https://nyti.ms/3FWWAkK>.



autonomy. After all, there are no rights that are more common than the connection between rights. Education is hardly accomplished without health or mobility, but health and mobility are still fundamental due to their instrumental character.

Nevertheless, internet access is already considered a human right. In 2016, the United Nations published regulations on the inclusion of digital accessibility in the list of human rights (CETIC, 2019a). The 2030 agenda for sustainable development contemplates universal access to information as one of the pillars. In 2015 the Dynamic Coalition for Internet Rights and Principles published the Internet Charter of Rights and Principles (Sartor, 2017). The values set out in the Charter are freedom, dignity, and equality. This understanding reinforced academics to consider digital accessibility as a universal right.

Scholars also defend accessibility as a human right. For Giovanni Sartor, the right to access the internet is an essential aspect of freedom; and the right to access the internet is an essential aspect of freedom. According to him, blocking a person's access to the internet represents a serious interference with freedom, which also affects private life and communication, as well as participation in politics and culture. The author explains that the Charter of Human Rights and Principles for the Internet requires governments to respect the right to access the internet and to protect and fulfil that right, supporting it through measures aimed at guaranteeing the quality of service and freedom of choice of software and hardware systems to overcome the digital divide (Sartor, 2017).

Alain Kiyindou (2019) ponders about human accessibility, which corresponds to the freedom for all to access digital resources. The law must be universal, which means adapt the tool and infrastructure to each category of a person without distinction. Tim Berners-Lee and Harry Halpin (2012) start from the perception that each growth in technology and the advent of a new one increases the disparity between those who have access and those who do not. Still, they clarify that defining what comes to be a natural right is a human decision, which demonstrates the possibility of including digital accessibility as a fundamental right.

Thus, given that full digital access is already considered a human right, it must be accepted in the Brazilian legal system as a fundamental right. The Constitution states that Brazil must choose human rights as a preference in art. 4, III. In addition to universalism, the Constitution accepted the indivisibility and interdependence of human rights, ratifying treaties on civil, political, cultural, and economic issues. Also, there is a filtering of the law, which provides that the other norms of the order must be compatible with the system of protection of human rights.

This filtering aims, among others, to choose the interpretation according to the human rights of a specific norm, and to demand that public policies put as effective human rights that were established in the Constitution. The second paragraph of art. 5 of the Constitution establishes that fundamental rights are not exhaustive. New

rights may be incorporated into the legal system, with support for its consideration as a human right. Therefore, as a universal human rights category, digital accessibility can be accepted as a fundamental right with immediate applicability.

The legal nature of the fundamental right to complete and universal digital accessibility must be considered globally. As Daniel Wunder Hachem (2019) states, all fundamental rights have entirely the features that would, in theory, be allocated in a specific dimension. The fundamental right to digital accessibility must be considered a right that directs a duty of abstention to the Public Power, that imposes on the State the promotion of factual and normative services and that has transindividual and individual ownership.

With the consideration of digital accessibility as a fundamental right, the State has the duty to provide adequate material conditions to that people enjoy the right (Hachem, 2013). According to Daniel Wunder Hachem's doctrine, the Brazilian legal system recognizes the fundamental right to an effective administrative protection. Arguably, the right can be inferred from a systematic interpretation of the Brazilian constitutional framework (art. 5, §§1 and 2, and art. 37, caput) and can be interpreted as the citizen's right to receive from the Public Administration, an effective protection of his rights. This right should be understood as the right to receive from the Public Administration an effective protection of his rights, which authorizes the adoption of all the appropriate administrative techniques and procedures to do so. Besides the conventionalization of administrative law, establishes that the human rights agreements and guarantees could be incorporated into Brazilian internal legislation (Hachem, 2021).

Hence, the right to effective administrative protection imposes on the Public Administration the priority duty to create material and legal conditions to satisfy social fundamental rights in their entirety. Consequently, through a systematic analysis of the Brazilian Constitution, it is possible to affirm that in order to guarantee access to this right, the government must propose ways to provide access to all citizens, whose right can be administratively requested in order to see it realized.

Thus, following Brazilian singularities and deficiencies policies should be promoted. Barbosa da Silva, Ziviani & Ghezzi (2019) argue that it is necessary to consider the variety of internal configurations and the differences between groups by their frequency of utilization. Hence, access policies should consider differences, in addition to inequalities.

Digital accessibility is transversal, as the challenges posed are technological, legislative, social, and political (Kiyindou, 2019). Therefore, policies focused on implementing tools that provide substantial access to the digital universe are extremely important, which must be attentive to all the singularities of what access represents, together with the Brazilian social reality.

First, it must be considered that accessibility is not limited to making internet

networks available. It includes digital literacy, digital education, and the development and maintenance of access regarding digital education is essential to consider the situation of digital divide in Brazil. The study identified a deficit in access to a specific layer of the population (northern region, rural areas). Nevertheless, digital education first passes through literacy. In Brazil, as seen, the number of illiterates is extensive, with more than half of the population over 25 years having only primary school, which addresses the necessary attention with digital accessibility. Furthermore, in Brazil, there is a higher incidence of illiterate blacks and browns.

Tim Berners-Lee and Harry Halpin (2012) pointed out the proposal for uniting education rights with digital accessibility to boost the development of those in a situation of social exclusion. In the same sense, Tomás Wissenbach, in a study on the use of the internet in the city of São Paulo, considers that the imposition of promoting policies that consider territorial diversity and that are efficient in a given community has the purpose of equalizing the opportunities between different social groups and avoid reproducing a dimension of exclusion (Wissenbach, 2019).

Besides, digital accessibility is not limited to the issue of Internet penetration rate or ICT, but is expanding for use and exploitation, which makes the digital divide a more significant threat (Randrianasolo-Rakotobe & Ledjou, 2019). Therefore, finally, educational measures must also be taken to promote specialised education in the digital universe, focusing on specific training in this field. The Francophone Report states that efforts must be made to achieve gender equality, recognizing initiatives to develop, train, and network in this field, developing as innovation and coding contests explicitly aimed at a public (Kiyindou, 2019).

In the Brazilian case, given the results identified in the present research, it is understood that special attention should be paid to the less favoured classes, in the northern region, in the rural area, blacks, people who have little education. Also, considering the world immersion in the algorithmic system, it is essential to establish educational policies for its management. That is, preparatory courses in this sense, specialised in computer science, and oriented to the country's general culture, as a way to preserve the national culture (Villani, 2019). In this sense, it is also necessary to note that most people working in the area of information technology are men and whites must also be observed when including specific policies that aim to strengthen access to learning in these areas for blacks and women (Villani, 2019).

Accessibility also implies ensuring adequate infrastructure. This can only be done through state intervention, especially in developing countries. This perspective implies a view contrary to the idea of merely subsidiary action by the State (Gabardo, 2014). To invest in fixed and mobile high-speed networks and can form the basis of the digital economy and has repercussions on the development of new uses of IT for development. In this sense, Kiyindou (2019) considers that it is necessary to enrich the digital development approach to include more complex dimensions, which deal

with equipment and other variables such as costs and energy capacity. In short, digital infrastructure is an essential ingredient that drives technological innovation and improved productivity.

The maintenance of exclusion situations ends up restricting the opportunity for action by individuals, even though there is a greater number of people who access the internet and have virtual environments at their disposal. The quality of use, experience, speed, place of use, and how it is used are all factors that impact how to use information technologies, limiting the use and opportunities that internet offers, notably for those most vulnerable (Wissenbach, 2019). These are all elements that must be considered in the search for reducing the digital divide in Brazil.

Thus, the results demonstrate that the availability of Internet access depends on an adequate infrastructure, yet the cost of access is the major problem identified. Hence, it is fundamental to prioritize proper investments in order to address the problem in accordance with the realities and peculiarities of the country. Creating applications for a portion of the population that doesn't use the Internet is useless. Public policies cannot be detached from reality. Policy choices must be promoted with attention to the Brazilian singularities, seeking to tackle the access issues of the social strata and classes that effectively necessitate it.

Regarding internet access as an autonomous fundamental right of immediate applicability brings relevant consequences, since, as of its establishment, it becomes an obligation of the State to ensure the access to this commodity.

Concerning the obstacles involved internet access, policy choices must be considered a very relevant factor. The lack of concern with public policies aimed at the Brazilian reality is a great potential in the backlash against the problem of digital inequality. An example can be seen regarding the application created by the government during the Covid pandemic which was installed to obtain emergency aid.

To ensure the desired agility of the process, the government clarified that the application would have a simplified format and would be free, and that those who meet the requirements would receive the amounts directly into their accounts within 48 hours after the effective registration. The main problem was the lack of attention to the reality of Brazil's digital inequality. The solution given by the government did not reach a large part of the population group that needed the aid, who either don't have access to the internet or have difficulties to access the application.

Thus, the problem in Brazil regarding digital inequality, which is well-demarkated, does not depend only on infrastructure solutions (Viana, 2021). Although it is an important issue, political choices are more determinant. It is imperative that public policies be taken to address the Brazilian reality, in order to not only guarantee access to those who cannot afford it, but also to promote actions that guarantee this access. The conception as a fundamental right already has sufficient normative support, whether for a guarantee of access by judicial or administrative means. There-

fore, politicians and administration can and should use the governmental structure to reduce inequality, focusing on the Brazilian reality and not only in government digital transformation.

### Final considerations

Benefits and harms accompany revolution 4.0. Among the negative points is digital divide. The study of reports and research on the reality of digital accessibility in Brazil revealed a digital elite in the country, with almost integral internet access. These are classes that use the cell phone but have broadband at home, corresponding to the first digital access level. They are better educated and access the facilities offered by the internet more substantially. On the other hand, the digitally excluded picture corresponds to the D and E classes, from rural areas, and/or more distant regions, from the northern and northeast regions of the country. They access IT through mobile networks, with an equivalence regarding the economic and social aspects.

In summary, this is the Brazilian panorama of digital reality. In the legal field, digital accessibility is already considered a human right and can be considered a fundamental right in Brazil. The study concludes that the insertion of universal and integral digital accessibility as a fundamental right that has immediate applicability implies the promotion of specific policies for the insertion of the law in the community and brings guarantees to the least favoured citizens. Accessibility must be considered a good of collective interest, which requires adequate infrastructure and specific training. The development of access infrastructure emerges as a matter of social justice, constituting economic development. Specific training in digital education is an imperative, focuses on minorities. These instruments, however, depend on political positions.

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## Funding


This work was carried out under the auspices of CAPES/PRINT - Project SENSED (Space, Society and Development) and Conselho Nacional de Desenvolvimento Científico e Tecnológico do Brasil.


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