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THE DIGITAL EXCLUSION AND THE COMMITMENT TO THE SUSTAINABLE DEVELOPMENT GOALS IN BRAZIL

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ABSTRACT

The current technological and informational context has led to the virtualization of relationships, and engagement and interactions between people are increasingly strengthened in the digital sphere, a fact accentuated by the pandemic caused by the new coronavirus (SARS-CoV-2). In this context, the problem of digital exclusion is presented, a phenomenon that makes it impossible for an individual to participate in a network society on an equitable and democratic basis, and that can lead to social exclusion. A correlation between literature findings from the last two decades (2000 – 2021) indicates that the digital exclusion could compromise the achievement of the "Sustainable Development Goals in Brazil" proposed for the United Nations 2030 Agenda Brazil (2022).

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INTRODUCTION

The digital exclusion is a phenomenon of multiple variables, caused by different factors that involve issues related to: infrastructure and lack of internet access (Grossi *et al.*, 2013; Wang *et al.*, 2021); age (Sorj and Guedes, 2005; Rebelo, 2016; Gallistl *et al.*, 2020); gender (Berrío-Zapata *et al.*, 2020); health (Cruz-Cunha *et al.*, 2014; Greer *et al.*, 2019); digital and literacy skills and information (De Campos Pinheiro, 2014; Belluzzo, 2014, 2017); spatial, geographic and socio-spatial (Dupuy, 2008; Bernardes, 2010; Coral, 2015; Rosa, 2017); social inequality (Raad, 2006; Saleminck, 2016; Kanashiro, 2021); accessibility and people with impairments (PWD) (Berrío-Zapata *et al.*, 2020b); racial (Sorj and Guedes, 2005); Democracy (Chiaretto, 2005; Marques, 2014); Education (general) (Amorim, 2003; Leão *et al.*, 2009; Pozzer, 2017; Da Silva Albuquerque *et al.*, 2021); Education (topics in management, pedagogy, remote learning, school inclusion, school library) (Ehlert and Bassani, 2013; Godoi e Silva *et al.*, 2017; Marcon, 2020; Sonogo, Da Silva and Behar, 2021); Digital transformation (De Moura *et al.*, 2021); among other topics of intersection with the digital exclusion. This phenomenon poses serious problems to social issues, as it can restrict access and equitable and democratic participation in networks, in addition to compromising the appropriation of content and the development of individuals as a whole and, finally, leading to social exclusion and

vice versa. It is not a new phenomenon, and several problems and actions were pointed out, over time showing the way to deal with this adversity. However, with the outbreak of the pandemic caused by the new coronavirus (SARS-CoV-2), which causes Covid-19, previous problems have worsened and new problems have emerged, in addition to those concerning the context of social isolation. The current global context involves Digital Transformation and Innovation and accelerated engagement through digital media. Some individuals were already excluded before the period of social isolation due to lack of resources and internet access, a fact that was mitigated, on many occasions, with the use of the internet at work, at friends and relatives' homes or even at school. It so happens that, with social distancing measures, these individuals were practically excluded from everything, since most interactions took place, at least in the first year of the pandemic, practically in the digital realm. In reflection on this issue, Da Silva (2021) assures that the digital exclusion makes it impossible for the individual to actively participate in life. This work is part of the literature review of the author's doctoral thesis.

The objectives of this work were: 1st) to identify the concepts of digital exclusion, to bring an understanding of the subject; 2nd) seek evidence in the literature to, through a correlation, point out that the digital exclusion could compromise the "Sustainable Development Goals in Brazil" proposed for the 2030 Agenda of the United Nations

Brazil (2022). Therefore, a narrative literature review was carried out, whose scope involved a time frame from 2000 to 2021. This period was chosen for a better understanding of the development of the digital exclusion over time.

LITERATURE REVIEW

Around the 2000s, considered the Internet boom, the world was experiencing the paradigm of globalization, enhanced by the use of the web and Information and Communication Technologies (ICTs). ICTs influenced the American economy and, consequently, the world, so that one of the great benefits was the reduction of borders between countries, allowing the expansion of services and commercial relations (Mattos, 2003). Despite this, in that capitalist context, ICTs were already seen as a synergistic and excluding element of individuals. In Brazil, digital inclusion was predominantly observed in urbanized areas, favoring the white population, with a high degree of inclusion of Asian people and workers contributing to social security. In terms of geography, the Federal District (DF) was a region that was more included in relation to economically inferior regions (Mattos, 2003). Information, as a raw material, began to permeate collective processes from the perspective of the logic of networks (Castells, 1999).

relationships between them and their intersections. Thus, based on these aspects, one can perform network analyses, particularly considering the resource flows, relationships and patterns of realization of their feedback loops, whether self-reinforcing or self-balancing, both collaborative and conflictive.

Network participation in today's society can be compromised in different ways by the digital exclusion. A synthesis of concepts and considerations about the digital exclusion, selected within the time frame from 2020 to 2021, is presented in the form of a transcript in table 01. The temporal grouping of concepts allows a temporal and panoramic look at the different nuances of the theme in different contexts, technological and social. Of all the characteristics pointed out in the literature, we draw attention to the issue of infrastructure. As Sorj and Guedes (2005) pointed out, the structural question is a primitive measure to assess the digital exclusion. Far from wanting to cause any opposition to the authors, it is necessary to consider that the infrastructural issue is, perhaps, one of the most important in the scope of digital exclusion, because without the minimum possible structure the individual is a non-existent being in the digital context. And if it is non-existent, perhaps the studies must start and focus, then, on issues prior to digitization, social issues outside the digital environment, and only later to consider the points concerning the network society.

Table 1. Transcripts of concepts and considerations about the digital exclusion

AUTHORS	CONCEPTS
Lucas (2002, p.159)	[...] socioeconomic difference between individuals, families, companies and geographic regions, resulting from inequality in the access and use of information technologies, represented by the Internet.
Pires (2002, p.6)	The digital exclusion is represented by the large number of people without access to the most diverse information technologies, the internet and without access to the services it provides.
Dos Santos (2003, p.1)	[...] digital exclusion is a legitimate form of social exclusion. [...] it can be seen from different angles, either because they don't have a computer, or because they don't know how to use it (know how to read) or because they lack a minimum knowledge to manipulate the technology with which they live on a daily basis day.
Almeida et al. (2005, p.56)	[...] state in which an individual is deprived of the use of information technologies, either due to insufficient means of access, lack of knowledge or lack of interest. The digital exclusion does not refer to a simple phenomenon, limited to the universe of those included and excluded, a real polarity that sometimes masks its multiple aspects. The reason is simple: the opposition between access and non-access is a reasonable generalization when it comes to public services or traditional Intermediate consumption goods.
Sorj e Guedes (2005, p.103)	Digital exclusion constitutes one of the dimensions of social exclusion and has as content the electronically mediated relationships, which characterize it.
Bernarndes (2010, p.146)	The digital exclusion – lack or limited access to digital technologies or digital discrimination – based on the inability to use ICTs – increase the risk of social exclusion.
Ragnedda and Ruiu (2016, p.106)	[...] digital exclusion/inclusion is a complex and multifaceted phenomenon, that is, it goes far beyond providing computers with internet access to certain social actors.
Knop (2017, p.39)	[...] the issue of digital exclusion has been highlighted in several discussions, being its entirety the issue of unequal distribution of resources, access, understanding and use with regard to such technologies.
Knop (2017, p.40)	[...] the digital exclusion is also associated with other exclusions: social, cultural, political. [...] such exclusion removes the possibility for individuals to fully participate in this new world.
Fadanelli and Porto (2020, p.40)	[...] the aspects that involve the digital exclusion go beyond mere access to the internet or traditional electronic mechanisms, such as computers or cell phones, as they encompass several technical, social and geographical factors.
Da Silva (2021, p.463)	
Tavares and De Souza Vieira (2021, p.283)	

Source: Elaborated by the authors (2022)

Because of the possibility of multilateral communication, digital networks have quantitatively and qualitatively increased interpersonal relationships, which has led to the virtualization of these relationships, as understood by Hjarvard (2012), for whom the media must not be separated from culture, since they merge and become one, as an integral part of the most diverse institutions. Mance (2012) carried out a chronological analysis of the network concept from the perspective of several authors, ranging from Leonhard Euler (1736), with graph theory, to Matilde Luna (2003), who is dedicated to the study of collaboration networks institutional, it is understood that networks are sets established between cells, individuals, social institutions or any other group of people or elements that relate to each other for reasons of affinity and mutual interests, extrapolating different spaces: family, work and social. It is clear the fundamental role of socioconstructivist interactions in the establishment of bonds and strengthening of socioconstructivist relationships. For Mance (2012, p. 13),

A network comprises actors that maintain relationships with each other in specific situations, in ties that can be graphically mapped, allowing the identification of subgroups, the

It is worth mentioning the study Wang *et al.* (2021), for whom infrastructure needs to be considered as an aspect of urban development, and must be the responsibility of the government, due to its importance and relevance in promoting digital inclusion. Smartphones can be seen as important equipment in the development of digital inclusion policies and projects. As an example, the work of Banks (2013) stands out, in which the cell phone was used in an action to combat poverty in a community in Africa that did not have internet. The cell phone or GSM modem was connected to a laptop used for sending messages. Currently, the smartphone allows the use of various media or applications for exchanging messages, among which WhatsApp stands out, considered the main social media used by teachers (Celestino *et al.*, 2019), which has assumed a for various business initiatives in the context of the pandemic (Celestino and Valente, 2021). Currently, the presence of cell phones on such a large scale is probably due to the facilities that cell phones bring to cultural and technological contexts, and also, in part, to the financial issue, since there are cell phones that are much cheaper than microcomputers, as attested by the Gender Equality Report (Sey and Hafkin, 2019). Table 02 presents a summary of the works selected for analysis related to the selected objectives of the 2030 Agenda (United Nations Brazil, 2022).

Table 2. Summary of selected works

AUTHORS	SYNTHESIS
Mattos (2003)	The paradigm of the time was globalization, influenced by recent transformations brought about by ICTs and the American economy. ICTs were seen as an integrating element in socioeconomic and cultural terms, but from the point of view of digital exclusion, under capitalism, they were considered asymmetric and excluding elements, and insufficient to promote social equality. In Brazil, income and wealth inequality predominated.
Cysne et al. (2005)	Globalization has caused several problems. A logistic regression analysis of PNAD data (2005) showed that the three major variables correlated with Internet access were: per capita household income classes (23.116%), the existence of a microcomputer in the household (23.072%) and years of study (19.752%). Digital was linked to the lack of structure, racial issues, age (more excluded children) and income.
Sorj and Guedes (2005)	A survey was applied with 3000 interviews (1.2 million people) in low-income communities in Rio de Janeiro, to understand the dynamics of digital exclusion in such sectors. The digital exclusion increases in proportion to age; the higher the educational level, the lower the exclusion; blacks constituted the largest group of digital exclusion; workplace seen as a factor that mitigates the digital exclusion.
Sorj and Remold (2005)	Survey to analyze ICTs in the favelas of Rio de Janeiro (RJ). Access to computers in favelas was greater than in northern or northeastern regions of Brazil. ICTs are fundamental for accessing the labor market; technological investment must be associated with teacher training; the fundamental telecenters for digital inclusion policies and research on the subject must be quantitative and qualitative.
Bernardes (2010)	The digital exclusion was seen as one of the dimensions of social exclusion, and it can affect any area. There are two main faces of the problem: structural and relational. The site may have the necessary structure, but the individual may not have access due to lack of economic potential. The digital exclusion is a process and not a product. The individual who has resources but does not know how to use them has a precarious inclusion.
De Souza (2010)	Context of the imagnetic society, smartphones and digital convergence in terms of social relations. Conducted interviews to understand the social function of photography. Convergence mediated by cell phones was already taking place within the scope of social insertion and digital photography presented a social function.
Ehlert and Bassani (2013)	Review of the indicators of the Management Committee of Internet Brazil (CGI-BR), such as the research by ICT Education (2010), ICT Households and Companies (2010) and ICT Children (2010). Teachers, despite previous contact with digital technologies, needed training for the use of ICTs. The school served as a point of digital inclusion as it allowed students to access the Internet, who could exercise their citizenship.
Grossi et al. (2013)	They analyzed the Gini coefficient, which measures inequality. The authors presented 22 projects with a focus on digital inclusion that included several actions, among which, solving structural issues for Internet access, availability of the possibility of financing computers, creation of telecenters, and education and professional training programs through software free. Some initiatives were punctual with rural and fishing communities.
Cruz-Cunha et al. (2014)	They discussed the relevance of the electronic market in the mediation between users and health services, through the implementation of an electronic market for health services with an emphasis on individuals with special needs such as the elderly or people with temporary disabilities. E-commerce in health was considered important, but it came up against the dependence of the elderly and the inability to use digital technologies.
Marques (2014)	They examined the influence of the digital exclusion, presented different concepts and their relationship with online democracy. They identified that the digital exclusion (also characterized as digital exclusions, despite not being considered by the author himself) is treated along two main lines: that it is a governmental and state problem and that it will be normalized over time. He stated that the digital exclusion depends on the context and that it will not be solved only with public policies.
De Campos Pinheiro (2014)	A survey was applied to young technical-level students between 14 and 24 years old, in order to assess information competence and the use of digital technologies in information retrieval and in strengthening communication. Of the 300 responses, they identified that the majority (72%) had computers with Internet access at home, that 43% used the first pages of Google to retrieve information and the most used program was Microsoft Word (51%).
Godoi et al. (2017)	Reflective narrative interviews were carried out to analyze the digital inclusion and exclusion of teachers through a virtual learning environment (VLE). Digital media complement each other and are not exclusive. The digital exclusion was perceived by the low adherence of teachers due to the lack of obligation. In addition, factors such as the constant emergence of platforms and bureaucratization were considered. of access.
Knop (2017)	An action research with a qualitative approach was carried out to assess the potential of short-term projects in enabling young people for their digital inclusion. The main challenges of the digital exclusion were economic and social factors; lack of structure, such as few or computers of low quality; in addition to the difficulty of access. Digital inequalities are considered a reflection of social inequalities.
Greer et al. (2019)	They analyzed the digital exclusion in mental health services, through interviews with 20 service users. The review presented by the authors pointed out that individuals with mental health problems are more digitally excluded than people without such problems, due to a socialization issue. The three main problems that drive the digital exclusion are: lack of knowledge, limiting personal circumstances and barriers imposed by mental illness itself.
Kwiatkowska and Skórzewska-Amberg (2019)	They analyzed the extent of the digital exclusion in Poland in relation to the European Union (EU). Elderly people aged 75 and over are entitled to medication, special food and free medical devices, but they face bureaucratic difficulties in digital registration and access, requiring the support of third parties. In addition, they are individuals in a situation of isolation, which enhances the digital exclusion for this group of individuals.
Faure et al. (2020)	They used a life course analytical approach to identify the difficulties of using digital technologies in three different aspects: educational, professional and personal, through the application of 85 semi-structured interviews. They concluded that the lack of autonomy caused by issues such as low educational level, low financial conditions, lack of interest or living in remote regions leads to digital exclusion.
Kalenda and Kowaliková (2020)	They provided 20 tablets with Internet access for a period of 1 year, for children and family members in situations of social vulnerability. They applied a survey to analyze the digital exclusion from a socioecological perspective. They also sought to reflect the role of individuals who work in digital inclusion actions. The Internet was used by most participants, but the need for training was identified to perform tasks such as developing a curriculum, seeking medical and educational information.
Dos Santos et al. (2020)	They analyzed the impacts of the Internet on education. There has been an increase in Internet availability throughout Brazil in recent years, with migration from fixed to mobile Internet. They addressed the second level digital exclusion and pointed out that there was a worsening of the digital exclusion from the beginning of the Covid-19 pandemic, despite the migration of classes to remote teaching.
Tavares and De Souza Vieira (2021)	They carried out a deductive study with indirect documentation in the research on how the digital exclusion relates to the exercise of participatory citizenship. Digital technologies did not solve the problems of social exclusion, but brought a new form of social exclusion, the digital one. They suggested the creation and development of public policies to combat social inequalities and technical limitations of any nature; strengthening participatory citizenship in a network.

Source: research prepared by the authors (2022)

DISCUSSION

Selected works: In a temporal grouping of the works presented in table 02, we identified that: 1) from 2002 to 2006, the paradigm of a new economy based on globalization, the development of ICTs and the emergence of the network society emerged. There was a scarcity of literature, and digital inclusion was studied with a quantitative predominance, considering the possession of computers and internet access as inclusion factors; there were conceptual discussions and studies on software, as well as lives in support of educational and digital inclusion policies 2) from 2007 to 2011, studies continued on inclusion policies, geographic space and digital technologies as cultural expression; 3) from 2012 to 2016, the concept was expanded to large-scale structural issues, considering that a certain region could be more excluded in relation to another; 4) from 2017 to 2021, the paradigms of digital transformation and innovation emerged, accelerated by the context of social isolation caused by the Covid-19 pandemic, and research began to be developed focusing on the individual characteristics of groups of people. It is noteworthy that education is an intersection theme that was present at all times of the proposed time frame.

Correlation of the literature with the selected objectives of the 2030 Agenda: As it was seen in the course of the research, the digital exclusion is correlated with several social issues. With this in mind, it is necessary to consider and pay attention to the impacts that digital exclusion can cause on the expectations of the UN 2030 Agenda with regard to the Sustainable Development Goals in Brazil (United Nations Brazil, 2022), among which the following stand out.

Health and well-being (objective 3): Individuals without financial means; individuals such as the elderly or those with mental health and socialization problems can also compromise the goals of equitable access to health, indicating that it is necessary to solve primary problems, as in the case of skills or social integration. This is exacerbated against the backdrop of exponential growth in Telehealth services (Celestino and Valente, 2021). The lack of skills for the use of ICTs, as in the case of the elderly, whether for any reason, or concerning the physical condition inherent to age, or lack of literacy for the use of digital technologies, suppresses the autonomy of the elderly individual, who needs contribution to be able to use ICTs (Cruz-Cunha *et al.*, 2014; Kwiatkowska and Skórzewska-Amberg, 2019). Another group affected by health issues are individuals with mental health problems, who have a tendency to socially isolate themselves (Greer *et al.*, 2019), which can further worsen their health condition, as seen in a study by International Association of Applied Psychology (IAAP, 2020), carried out in the context of the pandemic.

Quality education (objective 4): To think about an equitable education, it is first necessary to consider the need to include individuals digitally, as the trend towards remote learning after the pandemic has gained strength, and individuals with structural or intrapersonal difficulties may have compromised learning, which can have an impact on their insertion in the job market. In addition, individuals with the potential to develop autonomous studies will certainly end up compromised. The outbreak of the pandemic accelerated the process of digitization in different sectors. In Education, remote teaching was adopted as an emergency measure in Brazil (Dos Santos *et al.*, 2020), and many teachers were forced to use ICTs to teach classes. This highlighted a problem that has been pointed out in the literature for several years, which is the lack of teacher preparation and training for the use of ICTs in the educational field (Grossi *et al.*, 2013; Ehlert and Bassani, 2013).

Gender equality (objective 5): Social and political participation are closely related to the issue of digital inclusion. As seen, women tend to be less included and have more difficulties with employment (Berrío-Zapata *et al.*, 2020). However, on the other hand, in Latin American countries with high potential for technological development, a change of scenery is already noticeable, indicating that differences are being reduced in the issue of internet access and

technical development (Sey and Hafkin, 2019). Thus, it is necessary that there is awareness and a change in the thinking of companies and the entire labor market, allowing, in the offers of vacancies, equal conditions of dispute, which must occur by skills and not by gender, thus reducing the stigmas of a patriarchal society and contributing to the change of collective thinking.

Decent work and economic growth (objective 8): As it was seen in the review, over these 20 years information and media skills (CoInfo) were considered factors related to employability and professional growth. The use of ICTs was seen as an element of inequality and social exclusion at the height of globalization (Mattos, 2003). About two decades later, the issue of competencies related to the professional and economic scope leaves no doubt about the need for lifelong learning, with a focus on digital autonomy (Faure, Vendramin and Schurman, 2020; Kalenda and Kowalikowá, 2020). In the current context, digitally included individuals expand the possibilities of their personal and professional development, through education mediated by digital technologies, acquiring skills, knowledge and developing new skills when oriented towards this (De Campos Pinheiro, 2014). An in-depth study on CoInfo can be seen in the work of Belluzzo (2007, 2014).

Industry, innovation and infrastructure (objective 9): the main goals are related to promoting access to ICTs. As seen, there was a demand for broadband services, but it came up against the economic issue, disfavoring digital inclusion and access at affordable prices. This is perhaps one of the most important aspects to be considered in the entire context of digital inclusion and the reduction of inequalities.

For Sorj and Guedes (2005, p. 103),

To measure the digital exclusion, however, the number of computer owners or people with access to the Internet is too primitive a measure, since several other factors must be considered: the time available and the quality of access decisively affect the use of the Internet; information and communication technologies (hereinafter we will use the term telematics) are very dynamic and require constant updates of hardwares, softwares and access systems, which require regular investment on the part of the user in order not to become obsolete; its potential for use depends on the user's ability to read and interpret the information (in the case of the Internet) and by their social network (in the case of e-mail).

The literature has shown that research on the digital exclusion started to consider factors other than infrastructure, however, we believe that this point must not be forgotten. In agreement with Grossi *et al.* (2013), Cultri and Bazilio (2021) and Wang *et al.* (2021) infrastructure is essential in the development of digital inclusion policies and projects. Therefore, as practically the entire context of current society takes place in a network, as seen in Castells (1999), Van Dijk (2006), Mance (2012) and Thompson (2008, 2018), an individual who is not connected or integrated, certainly fails to participate equitably and democratically in the information society. Therefore, currently, although "primitive", for Sorj and Guedes (2005), we consider the number of individuals with Internet connection an important variable in the study of the digital exclusion.

Reducing inequalities (Objective 10): Item 10.2 — "By 2030, empower and promote the social, economic and political inclusion of all, regardless of age, gender, disability, race, ethnicity, origin, religion, economic or other status" — can be viewed from the point of view of In view of this article, as the main objective (after solving structural and access issues) of combating digital exclusion, since inequality, mainly socioeconomic, causes a domino effect, which affects and correlates with practically all the variables identified in the literature. For this discussion, it is worth citing Gomes *et al.* (2020, p. 70), for whom

[...] currently, being connected means greater access to education tools, job opportunities, culture, professional and

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