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Understanding the use of digital payments in Brazil: An analysis from the perspective of digital divide measures

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Abstract

This paper analyzes the factors that influence the use of digital payments in Brazil from the perspective of digital divide studies. For this purpose, the research uses the microdata of the 2019 edition of a Brazilian nationwide survey named ICT Households Survey. The main findings demonstrate that women, as well as users of low-income social class, were less likely to use digital payments. The results also indicate that although different studies highlight the relevance of mobile phones as a means to promote digital financial inclusion to low-income groups, this paper's findings show that the exclusive use of mobile phones to access the Internet had a negative impact on the use of digital payments. These results demonstrate the need to better understand the implications of the exclusive use of this type of device in harnessing digital financial services in the context of developing countries of the global South.

Keywords: Digital Payment Adoption, Financial Inclusion, Digital Divide, Mobile devices, Digital Skills.

1. Introduction

Access to financial services plays a vital role in tackling social inequalities by fostering countries' poverty reduction and economic growth (Pazarbasioglu et al., 2020; Kim et al., 2018). Although the relationship abovementioned is recognized in the literature, the gap in access to financial services persists, and more than 30% of the world's population remains financially under-served with little access to some of the basic formal financial services, such as credit, payments, savings, and insurance (Demirguc-Kunt et al., 2018).

In this scenario, Information and Communication Technologies (ICT) plays a central role in promoting financial inclusion as digital financial services can expand the delivery of basic financial services, mainly to the low-income population, through innovative solutions using mobile devices, digital payment platforms, and mobile money solutions (Rana et al., 2018; De Albuquerque et al., 2014). Digital financial platforms allow providing financial services more accessible, safe, and convenient to users since mobile phones are more pervasive in the population, even among the poorest.

Although mobile devices' beneficial potential for digital financial inclusion is undeniable, many studies emphasize material access to that devices, denoting that it would be sufficient for the individual to use financial services and achieve the expected benefits (De Albuquerque et al., 2014; Ligon et al., 2019; Patil et al., 2018). In contradiction to this understanding, data from the ICT Household Survey in Brazil show that among the total Internet users (74% of the population), 99% connect to the Internet via mobile devices. It is noteworthy that even among users with less economic power, the use of mobile phones is higher than 90%, thus evidencing universal access to the Internet via mobile devices. At the same time, digital payments – the most basic of the financial services – reach only 9% among users of less economic power and 31% of the middle class (CGI, 2020).

The literature in this field indicates a wide variety of determinants for the use of digital financial services, drivers' factors - such as utility, perceived expectancy, perceived ease of use, perceived usefulness (e.g. Kim et al., 2018; Al-Okaily et al., 2020; Sivathanu, 2019; Alkhowaiter, 2020) - or inhibitors ones, for example, perceived security and privacy, trust and risks (Patil et al., 2017, 2018). This paper contributes to the literature on digital financial inclusion by analyzing the factors that influence the use of digital financial services from the perspective of digital divide studies.

Although the first studies on digital divide focused only on the dimension of material access to the technological artifact (first-order digital divide), the progression of research in this field allowed to broaden the understanding of this phenomenon, highlighting the multiple dimensions of digital divide or digital inequalities (Van Deursen & Van Dijk, 2019; Scheerder et al., 2017). We believe that, just as happens with the digital divide phenomenon, digital financial inclusion is not limited to material access to technological artifacts but also expands to include attitudinal, behavioral, motivational, cognitive aspects (skills), and the use of the technological artifact (second-order digital divide) (Van Dijk & Van Deursen, 2014). Besides, second-order digital divide studies show that Internet use is unevenly distributed based on gender, education, age, geographic area, and social class, factors defined as digital divide determinants (Litt, 2013).

In this paper, we use the microdata of the 2019 edition from the ICT Households Survey in Brazil (CGI, 2020) to investigate digital payment services penetration, an important first point of entry into the formal financial system (Demirguc-Kunt et al., 2018). This investigation proposes the following research question*: How is the use of digital payments influenced by sociodemographic factors, conditions of Internet access, and digital skills of Brazilian Internet users?*

2. Theoretical background

In this paper, we will consider two aspects related to the digital divide that can influence digital payment adoption by the low-income population: material access to the Internet and digital skills.

2.1 Redefining the understanding of material access to the Internet

One of the main pillars of digital divide studies is the dimension of material access to technological artifacts (Van Dijk & Van Deursen, 2014). Although this dimension is closely related to digital inequalities, understanding material access has undergone significant changes over time. After all, this concept of access was initially restricted to the possession of the technological artifact, an essential element in the propagated dichotomy among users with or without access (Dimaggio et al., 2004).

From the expansion of Internet access, the understanding of the digital divide phenomenon demonstrated the existence of digital inequalities related to attitudinal, cognitive, and Internet use aspects, although the dimension of material access is still relevant to qualify the conditions of this access in terms of quality, ubiquity, and mobility (Van Deursen & Van Dijk, 2019).

Since Internet access is no longer restricted to computers, the potential of leapfrogging this access through mobile devices has become a matter of interest to both academia and policymakers. This issue has been the subject of intense debate since some have perceived this leapfrogging effect as beneficial, allowing to quickly and cheaply reduce gaps in Internet access without the need for public policy interventions to deal with the persistent first-order digital divide (Napoli & Obar, 2014). In contrast, others present a critical view of this understanding, arguing that access via mobile devices offers an inferior experience compared to accessing the web via computers (Marler, 2018; Mascheroni & Ólafsson, 2016).

In this debate on access devices, some studies have focused on the clash between mobile and computer devices (Van Deursen & Van Dijk, 2019). Compared to computers, mobile phones offer advantages related to convenience, affordable prices, mobility, continuous use (ubiquity), location-based applications, as well as ease of use for gaming and video streaming (Mossberger et al., 2012). However, such devices have a series of technical limitations, such as memory, processing speed, screen size, limited typing features, characteristics that require additional significant cognitive load by the user (Marler, 2018; Napoli & Obar, 2014).

These limitations in mobile devices' affordances can also entail a reduced level of user engagement, especially in activities that require more immersive use, such as content creation and information search (Napoli & Obar, 2014). In summary, while computational platforms favor the performance of greater

capital-enhancing activities, mobile devices are associated with leisure, entertainment, and personal security activities (Marler, 2018; Pearce & Rice, 2013).

Internet access also depends on the types of devices used for the development of digital skills. Some studies show evidence that access to the Internet exclusively via mobile devices can negatively impact the level of digital skills (Napoli & Obar, 2014; De Araujo & Reinhard, 2019). In contrast, users who connect via mobile devices and via computers tend to expand their digital skills array (Napoli & Obar, 2014). This scenario suggests that the exclusive use of mobile devices for Internet access can restrain the level of digital skills, suggesting the existence of a new type of exclusion or a device divide (Pearce & Rice, 2013).

For this paper, this device dimension for Internet access will be operationalized by segmenting users who use the Internet only via mobile devices (cellphones and smartphones), those who connect only via computers (desktop, laptop, and tablet), as well as multiplatform users who connect using both computers and mobile devices (Pearce & Rice, 2013).

2.2 Digital Skills

Although there are different definitions for digital skills, in this paper, we consider it as "the ability to respond pragmatically and intuitively to challenges and opportunities in exploiting the Internet potential and avoiding frustrations in its use" (Dimaggio et al., 2004, p. 378). This definition focuses on the necessary skills to use the Internet regardless of the technological device used. This concept conceives digital skills considering both technical skills and those related to information search, communication, and online content production (Litt, 2013; Helsper & Eynon, 2013; Ferrari, 2012).

Although the literature presents many proposals to conceptualize digital skills from multiple dimensions (Ferrari, 2012; Helsper & Eynon, 2013), all of them assume the premise of contemplating two groups: technical and content-related skills. Van Dijk and Van Deursen (2014), for example, conceptualized a digital skills framework based on six distinct domains. In the technical skills group, they consider (i) operational and (ii) formal skills; the content-related skills concerns to (iii) informational skills, (iv) communication, (v) content creation, and (vi) strategic are highlighted.

Due to the nature of the indicators of the ICT Households survey, digital skills were measured based on the set of activities performed by the online user. Therefore, it is assumed that online activities' performance implies that the user possesses this specific skill (Helsper & Van Deursen, 2017). Thus, in the context of this paper, digital skills were conceptualized in four distinct domains taken from the initial definition of Van Dijk and Van Deursen (2014):

(i) *Operational* – set of technical and basic skills to operate the Internet regardless of the type of device used for access; (ii) *Informational* – measures the Internet user's ability to carry out the entire process of searching, selecting, and evaluating the identified information; (*iii) Communication* – captures the Internet user's competence to encode and decode messages and, consequently, build, understand, and exchange meanings through Internet applications; (iv) *Content creation*– consist of creative ability, that is, measuring the user's ability to create online content with acceptable levels of quality and publish it properly on the Internet.

2.3 Digital Payment Adoption

Digital payments refer to transactions for payments of goods and services made through technological innovations, such as mobile-phone-enabled solutions, electronic money, and digital payment platforms (Rana et al., 2018; Patil et al., 2018). The growth in the use of mobile devices globally has also contributed to the increase in digital payments provision for the most impoverished population, positively impacting financial inclusion and transforming the way people manage and carry out cash transactions (Patil et al., 2017, 2018; Alkhowaiter, 2020).

Digital payments offer several benefits, such as reducing frictions of cash transactions, increasing transactions' efficiency, increasing money circulation speed, and reducing transaction costs (paying and collecting) (Ligon et al., 2019). In addition to increasing transactions' security and transparency, such

services can provide an important first point of entry into the formal financial system; the switch to digital payments can lead to substantial increases in savings, as well as the substitution of informal for formal savings (Ligon et al., 2019; Demirguc-Kunt et al., 2018). Several developing countries have been using digital payment platforms with success, such as M-PESA in Kenya, Wizzit in South Africa, GCash, and Smart Money in the Philippines. However, even with the mentioned benefits, digital payments' adoption is uneven, and adoption rates are low in some countries (Ligon et al., 2019). For example, in Brazil, less than 1/3 of Internet users use digital payments (CGI, 2020).

Several authors have carried out literature review studies to systematize the main factors that influence the adoption of digital payments by individuals (Alkhowaiter, 2020; Patil et al., 2018, 2017; Kim et al., 2018). According to these papers, there is a predominance of investigations that are based on the main technology acceptance models used in the field of Information Systems (IS), such as TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance and Use of Technology). Based on these theoretical lenses, empirical studies conducted in different countries point out a series of facilitating factors (drivers), stimulating the adoption of digital payments, and factors that act as inhibitors to such adoption. Regarding drivers, we highlight: Performance Expectancy (Al-Okaily et al., 2020; Sivathanu, 2019; Patil et al., 2017); Effort Expectancy and Perceived ease of use (Sivathanu, 2019; Patil et al., 2017); Social Influence (Al-Okaily et al., 2020; Sivathanu, 2019); Perceived usefulness (Patil et al., 2017; Kim et al., 2018); Awareness (Kim et al., 2018); and other factors such as price value, facilitating conditional, hedonic motivation and habit. Regarding inhibitors, the following stand out: perceived security and privacy, trust, and risks (Al-Okaily et al., 2020; Alkhowaiter, 2020; Patil et al., 2017, 2018).

This predominance of analyses using technological acceptance models highlights the concentration on adoption factors based on psychological aspects, such as the user's perception, beliefs, and attitudes towards technology, disregarding other factors related to availability and readiness in the use of digital payments. Conversely, another strand of a few studies has sought to explore other factors related to sociodemographic characteristics (Kim et al., 2018), universal access to the Internet, and digital skills (digital literacy) as antecedents to the use of digital payments (Rana et al., 2018).

In addition, the literature portrays a variety of digital payments' adoption cases in different developing countries of the global South, such as Kenya, the Philippines, South Africa, and India, concentrating in countries in Africa and Asia (Kim et al., 2018; De Albuquerque et al., 2014). This paper explores the adoption of digital payments based on the reality of a Latin American country, specifically Brazil. This country has a higher percentage of internet users in comparison to other developing countries (more than 90% of individuals access the Internet via mobile), but at the same time, it is characterized by a low adoption rate in the use of this type of financial service (CGI, 2020). Besides, there is growing pressure for the use of digital payments services in this country, in a scenario in which the government is offering social benefits to mitigate the negative economic effects of Covid-19 pandemics through digital platforms (Gonzalez et al., 2020). Therefore, in this context it is crucial to understand the factors that affect the use of digital payments in Brazil.

3. Methodological Design

In order to explore the effect of digital inequality measures related to Internet access conditions, digital skills, and sociodemographic inequality on the use of financial services for digital payments among Internet users in Brazil, this investigation used the microdata from the ICT Households survey coordinated by the Regional Center for Studies for the Development of the Information Society (Cetic.br). The microdata of the 2019 edition of the ICT Households survey, published in 2020, was used since they were the most recent data available at the time of this study.

The ICT Households survey is a nationwide survey carried out since 2005 whose objective is to measure the availability, possession, and use of ICT by the Brazilian population aged 10 years and older. This survey's data collection occurs through structured questionnaires, composed of closed questions with

defined answers, and applied in face-to-face interviews with the respondents. The ICT Households survey adopts a rigorous sampling design using the stratified multi-stage cluster sampling procedure selected probabilistically to the size population (CGI, 2020). The decision to use the microdata from the ICT Households survey was based on the wide variety of items that measure conditions of access, skills, and uses of the Internet in Brazil, as well as the representativeness of the sample in relation to the national reality.

As this is a large-scale survey, data includes two units of analysis (households and individuals), as well as several thematic blocks (e.g., computer use, Internet use, electronic commerce, e-government) and sociodemographic characteristics. Tables 1 and 2 summarize the variables used in this paper.

To perform data analysis, the binary logistic regression technique was used (Hair et al., 2009) to capture the Internet access conditions (related to devices used to access the Internet), digital skills, and sociodemographic factors (age, geographic area, social class, and gender) on the use of digital payments.

The first set of variables shown in Table 1 are the sociodemographic factors, that is, the digital exclusion determinants related to personal and positional characteristics. Those variables represent the most commonly cited inequalities in the literature (Scheerder et al., 2017): geographic area, age, socioeconomic status, and gender.

The geographic area (home location) is classified as urban or rural, based on the legislation in force at the time of the Demographic Census. The Cetic.br survey defines cities (municipal headquarters), towns (district headquarters), or even isolated urban areas as urban areas, and other locations that exceed this limit are classified as rural areas. The respondents' age represents only users aged 16 and over due to the focus on financial services. Following respondents' gender, the social class represents the respondents' socioeconomic class concept based on three social classes: AB (higher), C (middle), and DE (lower). Besides the variables considering the device used to access the Internet, the binary dependent variable indicates whether the user has made digital payments in the last three months.

	Variables	**Items/Scale**
Demographic Factors (determinants of digital divide)	Geographic Area	0 = Rural 1 = Urban.
	Age groups	1 = 16 to 24 years old. 2 = 25 to 34 years old. 3 = 35 to 44 years old. 4 = 45 to 59 years old. 5 = 60 years or older.
	Gender	0 = Female. 1 = Male.
	Social Class (*Socioeconomic Status*)	1 = Class AB (higher class) 2 = Class C. (middle class) 3 = Class DE (low-income class).
Device used to access Internet	Desktop	1 = Yes; 0 = No.
	Laptop	1 = Yes; 0 = No.
	Tablet	1 = Yes; 0 = No.
	Mobile phone	1 = Yes; 0 = No.
	Game Console	1 = Yes; 0 = No.
	TV Set	1 = Yes; 0 = No.
Digital Payment	Financial Information, making payments and other financial transactions	1 = Yes; 0 = No.

Source: (CGI, 2020)

Table 1: Variables

Table 2 presents indicators used to operationalize the four digital skills domains (operational, informational, communication, and content creation) used in this investigation. Given that this paper's

interest falls on the skill levels in each of these four dimensions, these measures were operationalized through an indicator representing the sum of the items in each dimension.

Digital Skills Domain	Dichotomous Items
Operational	Downloading films Downloading songs Downloading games Downloading computer software, programs or applications
Informational	Looking up information on products and services Looking up information on health or healthcare services Looking up information on travel and accommodations Job searches or Sending resumes Looking up information in virtual encyclopedia websites such as Wikipedia Looking up information available in government agencies websites
Communication	Sending and receiving e-mails Sending instant messages, such as chatting via Facebook, Skype or Whatsapp Talking to people using programs such as Skype Taking part in social networks sites, such as Facebook, Orkut or Google+ Participating in discussion lists or forums Using microblogs, such as Twitter
Content-Creation	Sharing content on the Internet, such as texts, images or videos Creating or updating blogs, Internet pages or websites Posting personally created texts, images or videos on the Internet

Source: (CGI, 2020)

Table 2: Items used to measure each one of the dimensions of digital skills

4. Presentation and Discussion of Results

In the 2019 edition of the ICT Households survey, 20,536 face-to-face interviews were conducted with individuals from all Brazil regions to obtain a representative sample. Due to the scope of this investigation, selected data met the following criteria: (i) individuals classified as Internet users (13,332 respondents) – i.e., users who reported having used the Internet at least once in the last three months before the interview – and (ii) aged 16 and over. Based on these criteria, the sample adopted is composed of 12,214. To operationalize the statistical techniques, the weighting (sample weight) defined by Cetic.br was used, thereby reducing the sample's inaccuracies and biases.

4.1 Characterization of Brazilian Internet users

The results in Table 3 show a predominance of Internet users from urban areas of the country (>90%). This digital inequality related to the geographic position is highlighted in the literature and results from limitations in the technological infrastructure of rural areas (Scheerder et al., 2017). Results also reinforce age inequality, with a very sharp drop of internet users over the age of 60. Results also show a higher proportion in this sample of Internet users in class C (~ 50%), followed by class AB (~ 27%) and class DE (~24%). Finally, there is a certain balance for the distribution of Internet users by gender, with a slightly higher proportion for women.

Regarding the devices used for Internet access, results show the mobile phone's importance as the main device for accessing the web since this device is used by 99% of Internet users. It should be noted that even segmenting this indicator by the user's social class, mobile phones' use is above 98% even among individuals of the low-income class (class DE), showing a universality in the use of mobile by Brazilian Internet users.

To operationalize Internet access conditions, the combination of devices used for such connection was used, segmenting users among those who connect only via mobile phone; those that connect only via computational devices (desktop, laptop, and tablet); and multiplatform users - who connect both via mobile and computational devices. Figure 1 illustrates the percentage of users in each of these groups. The aggregate data (total) show that more than half of the individuals use the web combining mobile and computational equipment (multiplatform). However, when segmented by economic class, the dynamics of device use is different among socioeconomic strata. In class AB, multiplatform users are predominant (74.4%), while among class DE, the majority of users access exclusively via mobile phone (86.3%).

Although mobile phones are the primary device for connecting to the Internet among Brazilian internet users (99%), their role differs among socioeconomic strata. Among members of the class AB, the mobile phone acts as a *complementary access device* to other equipment (desktops, laptops, tablets), while in the class DE, the mobile phone acts as a *substitute device* for those who do not have the economic conditions to acquire computer equipment (Van Deursen & Van Dijk, 2019). This finding suggests the mobile leapfrogging effect (Mascheroni & Ólafsson, 2016; Napoli & Obar, 2014) in class DE, with the mobile phone acting as the primary way to access the Internet.

Table 4 illustrates the level of digital skills of Brazilian Internet users. The results show a lower level of competence in the domains of operational and informational skills and a higher level of communication skills, suggesting an internet use pattern more related to online social interaction activities. Analyzing the specific items that measure these communication skills, the most frequently used activities involve sending instant messages (such as WhatsApp) (94%) and using social networks (78%). It is worth mentioning that the activities mentioned are the most frequently used in all social classes analyzed.

	2019 (%)
Geographic Area	
Urban	90.6
Rural	9.4
Age Groups	
16 to 24 years old.	22.8
25 to 34 years old.	23.7
35 to 44 years old.	22.4
45 to 59 years old.	22.0
60 years or older.	9.0
Gender	
Male	47.6
Female	52.4
Social Class	
Class AB	26.7
Class C	49.2
Class DE	24.1
Device Used to access Internet	
Desktop	23.5
Laptop	29.6
Tablet	10.5
Mobile phone	99.1
Game Console	8.4
TV Set	35.9

Table 3: Demographic profile of the sample of Brazilian Internet users

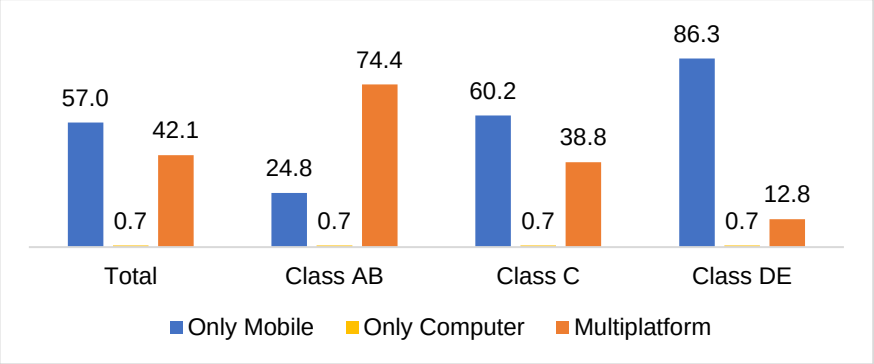

Figure 1: Combination of Internet access devices (%)

Digital Skills Domains	**2019**				
	Items	$\bar{X}$	**Md**	***SD***	***α***

Operational [0-4]	4	1.1	1.0	1.2	0.7
Informational [0-6]	6	2.3	2.0	1.8	0.7
Communication [0-6]	6	3.3	3.0	1.3	0.6
Content-Creation [0-3]	3	1.3	1.0	1.0	0.6

$\bar{X}$= Mean; Md = Median; SD = Standard Deviation; α = Cronbach alfa.

***Table 4**: Digital Skills Level of Brazilian Internet Users (2019)*

Figure 2 illustrates the proportion of financial services' use related to digital payment, considering that this financial service is still restricted to about 1/3 of internet users. When segmented by sociodemographic factors, this rate of use is higher among urban users, in the age group from 25 to 44 years old, among men, and in the higher social class. The results also demonstrate that the use of digital payments has a proportion of 65% in class AB; however, this percentage is approximately 11% in the class DE, showing the relevance of socioeconomic inequalities in the use of digital payment services.

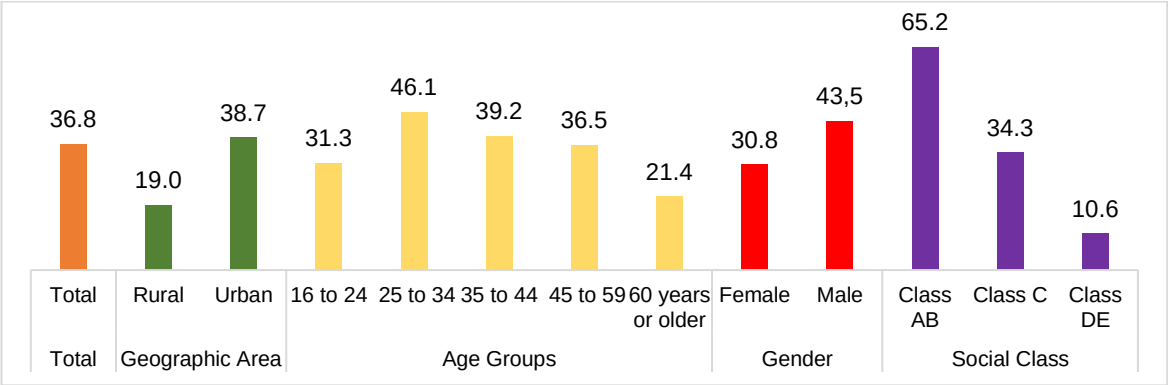

Figure 2: Use of digital payments (percentage)

4.2 Effect of access conditions, skills, and sociodemographic factors on digital payments

To test the relationship between Internet access conditions, digital skills, and sociodemographic factors on digital payments' use, we applied the binary logistic regression using digital payment use as a dependent variable and the other variables as independent (Table 5).

Four models were estimated to assess: (1) isolated effect of sociodemographic factors on the use of digital payments; (2) isolated effect of internet access conditions on the use of digital payments; (3) isolated effect of digital skills on the use of digital payment and the (4) combined effect of the three dimensions on digital payments. Table 5 summarizes these results, presenting the odds ratio measures for each attribute by measuring how much each independent variable influences the likelihood of digital payment use (Hair et al., 2009). Before applying the technique, data were inspected, verifying the lack of multicollinearity problems that would violate the technique's assumptions (VIF<5). Nagelkerke's Pseudo R2 was used to measure of adjustment of the estimated models.

Analyzing the isolated effects of sociodemographic factors on digital payments' use, it is possible to observe that the lower the socioeconomic strata, the lower the chance of using digital payments. Individuals from classes C and DE presented a reduction of 72.7% and 93.8%, respectively, in relation to members of the higher class. Regarding gender, the results also show that the use of digital payments is more associated with men, as this group has a 53.7% increase in the odds to use these services compared to women. These findings are in line with Pazarbasioglu et al. (2020) and Kim et al. (2018), which point out that access to financial services – in this case, digital payments – is lower among the poorest and women.

Analyzing the conditions of Internet access, the results demonstrate that users who connect combining mobile devices' convenience and mobility with the more immersive use provided by computational devices (multiplatform users) are more likely (Odds = 6.445) to use digital payments. Although there is an understanding of the role of mobile devices in providing access to financial services for the most

vulnerable groups (Demirguc-Kunt et al., 2018; Rana et al., 2018), in this study, the propensity to use digital payments was not superior among those who access the Internet exclusively via mobile phone. This suggests that, based on the Brazilian context, the availability of Internet access only through mobile devices has not proved to be sufficient to boost the use of this type of digital financial service. On the other hand, these findings are supported by the digital divide literature, which points out that exclusive access via mobile is negatively related to capital enhancing activities – such as the use of digital financial services – due to the technical limitations of the device, making the user experience more complex and demanding more significant cognitive load from the user (Marler, 2018). These results demonstrate the need to understand better the implications of the exclusive use of this type of device in harnessing digital financial services.

	Model 1	**Model 2**	**Model 3**	**Model 4**
	Odds Ratio	*Odds Ratio*	*Odds Ratio*	*Odds Ratio*
Age	0.983***			1.010***
Gender (ref. Female**)**				
Male	1.537***			1.591***
Geographic Area (ref. Rural)				
Urban	1.335			0.987
Social Class (ref. Class AB)				
Class C (middle class)	0.273***			0.526***
Class DE	0.062***			0.196***
Device to access Internet (ref. Only mobile)				
Only Computer		0.537		0.757
Multiplatform (both computer and mobile)		6.445***		1.903***
Digital Skills				
Operational			1.125**	1.141**
Informational			1.608***	1.423***
Communication			1.603***	1.484***
Content-Creation			1.119**	1.209***
Nagelkerke Pseudo R2	**0.244**	**0.230**	**0.374**	**0.459**

Note: *** p< 1%; ** p<5%

Table 5: Effect of sociodemographic factors, conditions of access, and digital skills in the use of digital payments (odds ratio)

Findings in Table 5 demonstrate the positive effect of digital skills on the use of digital payments. Therefore, the higher the digital skills level, the greater the likelihood to use digital payments. Among the categories of digital skills, the role of information and communication skills has increased by 60% (Odds >1.6) the likelihood to use digital payments, which is the conditioning factor with the most significant effect to explain the use of digital payments, according to Nagelkerke's R2 analysis. This positive relationship between digital skills and digital payments' use is aligned with the digital divide literature, which points out the contribution of skills in the use of online activities that promote beneficial economic, social, personal, and cultural results (Helsper & Van Deursen, 2017).

Additionally, these findings suggest the existence of a knowledge barrier for digital payments use, suggesting that the greater the mastery of digital skills, the greater the likelihood to use this type of financial service. These findings are aligned with Rana et al. (2018), indicating the positive effect of digital literacy in the use of digital financial services. At the same time, it is understood that the highest level of digital competence can contribute to an experience without significant difficulties in the use of digital payment applications and can positively impact the perception of ease of use and expectation of effort, factors widely cited as drivers in the adoption of digital payments (Sivathanu, 2019; Patil et al., 2017).

These results suggest the importance of the material access dimension to digital payment adoption. On the one hand, if mobile phones contributed to the increase in the number of Internet users in Brazil,

reducing the first-order digital divide, on the other hand, the exclusive use of this device negatively affects the adoption of digital payment. Therefore, evidencing the existence of a digital inequality specifically related to the type of device used for Internet access or device divide (De Araujo & Reinhard, 2019). In conclusion, this study contradicts the more optimistic view of the role of mobile in digital financial inclusion, demonstrating that this relationship goes beyond the mere availability of technological resources (mobile phones) but involves other dimensions – such as sociodemographic factors and digital skills – that need to be better considered to understand the factors that influence the use of digital payments.

5. Final Remarks

In terms of theoretical contribution, the findings of this investigation show the relevance of digital divide studies to understand the phenomenon of adopting digital payments, elucidating aspects related to the qualification of material access to the Internet, as well as digital skills, dimensions that are scarcely explored in studies that analyze the adoption and use of digital financial services. In terms of contribution to practice, the findings of this investigation explain the growing relevance of the mobile phone as an Internet access device, but also the challenges that financial institutions (banking or non-banking) have in offering digital financial services. Given the large proportion of users who connect exclusively via mobile, especially between low-income individuals, the findings suggest that financial services should be made available in more friendly and intuitive interfaces, aligned with the specificities of mobile devices, requiring less cognitive load and previous digital skills for the use of such services. One of the main limitations of this study is the analysis in a single cross-section of the data, potentially reducing the understanding of the studied phenomenon's evolution. In this sense, it is recommended that future studies replicate the analysis carried out in this study in a historical series and also considering the effect of data before and after the Covid-19 pandemic.

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