

This is the pre-publication version of the paper published on the book *Societies and Cities in the Age of Instant Access*.

Final paper reference:

de Souza e Silva, A. (2007). Cell phones and places: The use of mobile technologies in Brazil. In: H. Miller, (Ed.), *Societies and cities in the age of instant access* (pp. 295-310). Dordrecht, The Netherlands: Springer.

Cell phones and places: The use of mobile technologies in Brazil

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19.1 Introduction

Mobile phones are increasingly pervasive technologies in contemporary society.

Worldwide cell phones have largely surpassed the number of PCs,¹ and appear to be surpassing the popularity of TV sets (Rice & Katz, 2003, p. 598). However, it is not possible to define a monolithic global cell phone culture. The mobile interface is used significantly differently in distinct parts of the world, depending on cultural, social, and economic local specificities. Even within specific countries and regions, there are substantial differences in the use of technology as a result of many factors, including age, culture, socioeconomic distribution, and instruction level. The use we make of technology does not depend solely on the technology per se, but is intrinsically connected to how the technology is culturally embedded in social practices.

This paper is an early exploration of the reasons for the exponential growth and social uses of mobile technologies in Brazil, a developing country, with wide-ranging social and economic diversity. This study aims at contextualizing three research questions to the Brazilian situation: (1) how do low income communities appropriate technology in unusual ways based on price policies and technology availability? (2) To what degree does the increasingly pervasiveness of cell phones transform them into social collective technologies? (3) How the initial idea of the digital divide should be redefined when cell phones replace not only landlines, but also personal computers?

With the goal of answering the above-mentioned questions, this article is

structured in two main parts. The first two questions are addressed with a comparison between low income² and high-income population³ use of cell phones in Brazil. It looks at how cell phone usage is shaped by the availability of technology, focusing on two factors that promoted cell phone growth: poor landline infrastructure and the emergence of pre-paid phones. It also gives an overview of the mobile services available in the country for the high-income populations, which are similar to those services offered in developed countries, such as the United States, Finland and Sweden. The second part re-contextualizes Manuel Castells (1999) concept of the dual city, exploring how cell phones as pervasive information and communication technologies (ICTs) in today's metropolises might actually help to bridge the digital divide, by allowing those who could not afford a personal computer access to the Internet. Throughout the paper, the study also briefly maps social use of cell phones in Brazil to those of other developing regions, such as South America and Africa.

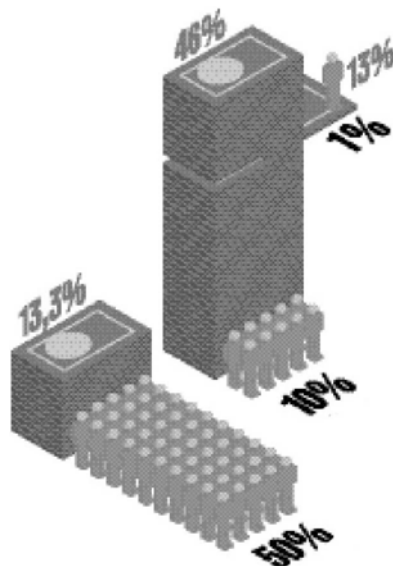
The relevance of studying the relationships between Brazilian society and mobile technologies are drawn from several facts. First, Brazil experienced one of the fastest cell phone growth rates in the world in 2005 in terms of absolute numbers (31.4%, representing a total of 20.6 million new mobile phones) (Teleco, 2006d).⁴ Second, the country is the biggest cell phone market in Latin America, with 86.2 million cell phones as of the end of 2005 (46.58% penetration rate) (Teleco, 2006b). However, these numbers lack meaning without understanding how the social-economic diversity in the country entails different cell phone usage.

Broadly, this paper contributes to the ongoing studies on social uses of mobile technologies by analyzing (1) how cell phones can be used as collective media, in opposition to most scholarly works to date that have studied cell phones as

private communication technologies, suggesting that mobile phones withdraw users from the physical space in which they are (e.g. Plant,2001; Gergen, 2002), and (2) how technology usage varies depending on socioeconomic status, and geographic position of its users.

19.2 Signs of the economic divide: Mobile phone usage and availability among low-income population

Brazil is well known for being one of the countries in the world with the greatest socioeconomic differences.⁵ A report from the Brazilian Institute of Applied Economic Research (IPEA, 2005, p. 52) shows that 10% of the population owns 46% of the country's overall income, while 50% hold only 13.3% of this amount. Moreover, only 1% of population (around 1.7 million people) detains the same amount of 50% of the population: roughly 13% of the country's overall income. These economic differences influence the diverse use of communication technologies across the country, specifically of mobile telephones (Figure 19.1).

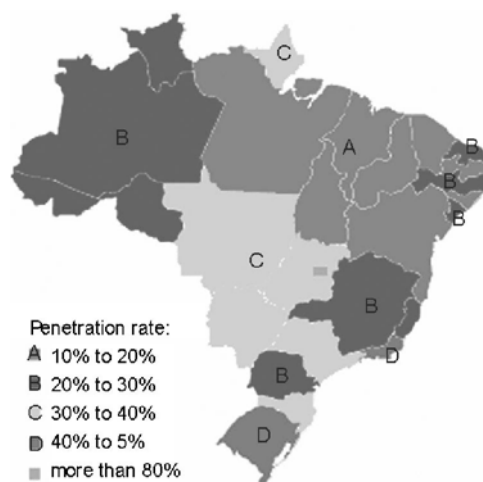


19.2.1 The role of technology and economic policies in cell phone growth

19.2.1.1 Poor landline infrastructure

One of the main reasons for cell phone growth in Brazil, as well as in other countries in Latin America, is the poor landline infrastructure. The same is true for many regions in Africa, where mobile phones could penetrate where fixed phone cables could not reach (The Economist, 2005). Recent data from the Brazilian National Telecommunications Agency (Anatel) shows that there was almost no growth in fixed telephones during 2004 (Teleco, 2006a). While there were almost 20 million new cell phones, the number of newly installed landlines was roughly 400,000. In September 2003 Anatel announced that the number of cell phones surpassed the number of fixed landlines (Anatel, 2003).⁶

Looking at a cell phone penetration rate map across regions in Brazil (Figure 19.2), it is clear where the lack of landlines influenced the growth of mobile phones. As it will be demonstrated later in this article, it is no surprise that the South and Southwest regions of Brazil,⁷ as the country's richest economic regions, already have high cell phone penetration rate. However, it is interesting to observe the density of cell phones in the Central-West region of Brazil (Mato Grosso, Goiás, and Mato Grosso do Sul states) as among the highest in the nation (30–40%). Similarly, in 2004 cell phone ownership grew more in the center of Brazil, where the landline infrastructure is still precarious⁸ (Teleco, 2005b).



At this point it is worth noting that mapping data by state creates a problem of regionalization – it homogenizes data within the boundaries of a single state, occluding the intra-state differences due to social class, urbanity, ethnicity, and education. As has been mentioned, there is no way to define a general Brazilian cell phone culture, since economic differences within the country are huge, and the use of technology varies with different socioeconomic statuses. The same applies to each federation state, none of which are homogeneous units. Nevertheless, it is possible to map in Brazil regions with no previous ICT infrastructure, such as the Center-West, and how this lack of infrastructure influences the development of other types of ICT, such as cell phones. As is discussed below, these regions can be represented by whole states, or by social enclaves within big cities, like the favelas (Brazilian slums).

According to journalist Andrés Velázquez (2002), “the deficient infrastructure and the difficulties imposed by geography make the cell phone the only option in many regions [of Latin America]” (¶4). In Brazil, until approximately 1999, fixed phones were scarce and used to take years to be installed. In 1998, the Brazilian Telecommunications Agency (Telebrás) was privatized, increasing the number of fixed phones and decreasing the installation waiting time and price. Nowadays, one has to wait approximately 10 days and pay an installation fee of roughly 100 reais⁹ (45 USD) to have a fixed phone installed. However, maintaining a landline is still expensive for a large amount of the population. Subsequently, 40% of the population that earns up to 10 minimum salaries a month (1620 USD) do not have telephones at all (Teleco, 2005d). Moreover, among the population that earns up to one minimum salary¹⁰ a month (162 USD), that is, 50% of the country’s population, only 18.8% have a fixed phone at home.

Having a fixed phone means paying a monthly subscription of 42 reais a month

(around 19 USD), which represents 13% of the Brazilian minimum salary, plus additional minutes spoken on the phone. Therefore, even in regions where landlines are more available, such as the South and Southeast cell phones represent less expensive options for communication. As of 2004, according to the Brazilian Institute of Geography and Statistics (IBGE/PNAD), the percentage of homes with only cell phones is already larger than the percentage of homes with only fixed lines among the population that earns up to 10 minimum salaries a month (Teleco, 2005d).

19.2.1.2 The rise of pre-paid phones

Mobile phones were commercially released in Brazil in 1990. At that time, Brazilian state-run operator, Telebrás, “demanded from subscribers a guarantee deposit of 20,000 USD just to enable a phone line” (Siqueira, 2001). Moreover, each new phone line could be acquired for an average price of 2,300 USD. Surprisingly, even under these conditions the operator managed to sell two thousand subscriptions only in Rio de Janeiro, the first city in Brazil to have a cellular network. With Telebrás privatization in 1998 the number of available lines (fixed and mobile) increased and prices decreased. However, the “killer-app” for mobile phones in Brazil was the release of pre-paid phones in the same year.

With pre-paid phones, it is possible to buy a phone card and use it until it is empty. However, even when the card is empty, the user can still receive calls – although he/she is not able to place a call. Consequently many users, with not enough money to pay for their calls, use mobile phones as a type of “free phone”: a device to receive calls, and to be available for others, even if they are not able to call anybody. As a result, cell phones are generally used to receive calls, but if

one needs to make a call, the cheaper option is to look for a public phone.

Because pre-paid phones eliminated the need to pay a monthly subscription and users can therefore control their costs, this type of phones became widely available in the country. As of December 2005, pre-paid phones represent almost 81% of the total number of mobile phones in Brazil (Teleco, 2006d). However, although the pre-paid cellular phone is still a cheaper option for the low-income population when compared to landlines, this does not mean that mobile phones are inexpensive for most of the people. In a country where more than 50% of the population earns up to 162 USD a month (a minimum salary), buying a cell phone requires a significant amount of their budget. As an example, Nokia's and Motorola's websites,¹¹ the main cell phone producers in the country (Teleco, 2006b), do not offer a single device for less than 126 USD, which is barely the earnings of a whole month for the majority of the population. This price policy influences social uses of the mobile technology.

19.2.2 Social usages: On some consequences of technology development and price policies

It is possible to define 3 main social consequences of the high price of cell phone devices and calls: (1) cell phones are mostly used for voice communication and for "emergency calls", as opposed to the dominant use of text communication and Internet in places such as Norway, Finland, and Japan (Ling, 2002; Puro, 2002; Ito, Okabe, & Matsuda, 2005), (2) a general concern with cell phone theft, and especially with the cloning of cell phones, and (3) cell phone sharing in low income communities.

Having the state-of-the art cell phone device is also induced by cell phone companies, when advertising, for example, that a phone which originally costs

1229 reais (550 USD) can be purchased in 10 payments with no interests.¹² As a consequence, some users who earn up to 500 reais a month (225 USD) purchase phones that cost in average 400 USD (personal communication, October 18, 2005). However, most of these phones have pre-paid services and users keep cell phones for emergencies, since having a long conversation on the mobile would quickly use their monthly pre-paid cards. Using other cell phone features such as Internet connection and Short Message Service (SMS) also represent extra-costs and are generally outside the scope of the average cell phone user.

With the high price of the device and the service, it is no surprise that concerns about cell phone theft have been frequent on the media (Diário Popular, 2005; Imirante, 2006), and services like cell phone insurance became popular. Global System for Mobile Communication (GSM)¹³ technology, now dominant in the whole world, has in fact motivated cell phone theft, according to a law project from the Brazilian government from 2005.¹⁴ GSM phones work with SIM cards which can be removed from the device and replaced with another one, therefore disconnecting the phone and the information which it carries. Also in 2005 some operators announced the intention to create a new integrated system against cell phone theft, which would block the robbed cell phone, not allowing the same device to be re-activated in another state with a different operator (Correio do Estado, 2005).

One of the main purposes of cell phone theft is to use it as a model for a cloned one. Cloned cell phones use the same number of an already existing subscriber. The new device (generally stolen) is re-programmed so that it works as the same line of the original subscriber and call costs also go into the main subscriber's account. According to Anatel (Ucel, 2005) between January and August 2005

there were 7,380 new complaints about cloned phones. However, these numbers do not show the reality of this type of fraud, since many users do not realize they are being victimized.

Cell phone theft and cloned phones are a direct consequence of the socioeconomic inequalities in Brazil. These inequalities become evident when comparing different regions of the country (e.g. Center-West and North vs. South and Southeast), as previously demonstrated, but they are also apparent within states, especially in big metropolises such as Rio de Janeiro and São Paulo. In urban spaces, this inequality is visible through the growth of favelas. Favelas, especially in Rio de Janeiro, have the peculiar characteristic of being constructed on hills embedded in the wealthiest areas of the city. For example, Rocinha, the biggest favela in Latin America, is rooted in the rich neighborhood of São Conrado.

Although situated within the same urban area as the wealthier neighborhoods, favelas generally lack basic infrastructure, such as electricity, water, gas, and phone lines. Therefore, the development of informal connections is common, through which citizens acquire the services for free using clandestine wiring. Something similar happens with the telephone. Private landlines have never been widespread in regions of low income population. However, even pay phones are rare. Cell phones, in this context, filled in for the lack of private landlines and public phones through an informal appropriation of the technology. Frequently these cloned phones – used for free – are not private phones (as generally cell phones are regarded), but become collective phones used by the community. Types of clandestine connections for telecommunications in the favelas are called “diretão”, which means roughly a straight call (which the user does not pay for). To this extent, we can affirm that mobile phones in Brazil are also used as social

and collective technologies.

19.3 High-income population: Access to the same services and same behavior patterns as in the “developed” world?

A very different situation can be found not very far from the favelas, but within a different population. For the majority of the high income population, the cell phone generally represents the third or fourth phone and the second or third computer. The IBGE/PNAD (2004) survey mentions that 90% of the population that earns more than 20 minimum salaries a month (3240 USD) has both fixed and cell phones (Teleco, 2005d). Cell phone usage within the high income populations living in Rio de Janeiro and São Paulo, for example, can be easily compared to usages in other developed countries, such as the United States, Japan, and Finland. Four examples will make this point: (1) the use of cell phones as remote control; (2) the emergence of third generation (3G)¹⁵ cellular phones, (3) the use of Wireless Application Protocol (WAP)¹⁶ technology to access entertainment and news via the mobile Internet, and (4) location-based mobile games.

Recently Mitsubishi, Nokia and the Brazilian company Compera announced the commercial release of services already popular in countries like Japan and Finland: the use of the cell phone as a remote control (Ditolvo, 2005). The service will allow users to send commands via SMS in order to turn on and off the security alarm, lights, and air conditioning in their homes from wherever place in the world. In order to subscribe to it, users need to pay a fee of 15,000 reais (6700 USD). Moreover, one of the two cell phone models that can be used for the

service (Nokia 6681) costs 2200 reais (1000 USD) and developers admit that the target audience are the 7 million richest people in the country, mostly residents in Rio de Janeiro and São Paulo.

Vivo, the larger operator in the country, is widely announcing the commercial release of third generation (3G) cell phones. The service was initially expected for April 2005, however the company is waiting for radio spectrum to be released by the National Telecommunications Agency (Muniz, 2005). Vivo plans to offer the same 3G services available in any other country, such as high-speed Internet connection, music download, live-TV and video streaming. However, despite the massive advertisement campaign, the user who wants to enjoy high speed Internet connection in their cell phone needs to buy one out of two devices enable to work with the service. One is the Motorola E815 and the other is Samsung Evolution, both costing from 1500 to 2000 reais (670–900 USD).

Another sector that is being developed by journalistic companies in Brazil, such as Abril, Selig, Terra Mobile, Folha de São Paulo, and Estado de São Paulo, is the production of news and entertainment services, such as music and videos for mobile phones (Ferreira, 2005, p. 126). Among popular services are soccer news, the download of soccer short videos, chat services, and traffic information, most of them accessed via WAP, the mobile Internet (Ferreira, 2005, p. 131). However, although some predict that this type of services will become popular in the country from 2007 on, current users still represent only 2% of cell phone subscribers (Ferreira, 2005, p. 135).

Finally, some cell phones already include location awareness,¹⁷ opening the possibilities for the development of location-based services and games. Location-based games are popular in countries such as Sweden and Japan. Alien Revolt¹⁸ is

the first type of these games commercially launched in Rio de Janeiro, Brazil, in May 2005 by the company M1nd Corporation and the operator Oi. The game uses Java-enabled cell phones with location-awareness to transform the city into a battlefield. The game's goal involves virtually "shooting" other players with the cell phone who are within a specific radius in the city space. Moreover, players are able to see and fight with virtual alien creatures nearby represented on the radar of their cell phone screen. However, the game has not become popular yet. According to one of the game developers (personal communication, June 2006), the game had a maximum of 6000 subscribers – in a city with 13 million cell phone users (Teleco, 2005c). Still not all of them would connect to the game at the same time. In a big city such as Rio de Janeiro, the reduced number of players in a multiplayer game becomes a problem, since there are large uninhabited game areas. The solution found by the game developers was the creation of virtual alien creatures, with which users could interact even if there were no other players logged in.

When asked about possible reasons for the low number of subscribers, he (personal communication, December 2005) pointed two: price and technology. As of January 2006, Alien Revolt only works on five types of cell phones from Nokia. Both cell phones and the prices for using the GPRS¹⁹ Internet connection while playing the game are relatively expensive for the average user. Moreover, the GPRS bandwidth is too limited to play the game in the Java interface. Acknowledging the limitations of the game, Alien Revolt is now being developed in a simpler SMS version, which will be available in more phone models and will be less expensive for the user.

All these examples show that although high-end services are available, or at least in developmental phase, they still target a very small portion of the

population, providing evidence that even within the high-income population, cell phones are still mostly used for voice communication. Moreover, it is important to keep in mind that when we look at the usage of these high-end services, we are talking about less than 1% of the population.

19.4 Are cell phones redefining the digital divide? Considerations about the use of mobile technologies among low income population

A general belief is that mobile phones, not personal computers, are the technologies that will help to bridge the digital divide in developing countries in the future (LaFraniere, 2005; Markoff, 2006). The concept of the digital divide has been originally conceived in the context of the United States and applied to Internet access via desktop computers. The “divide” referred to the “haves” and “havenots”: with and without access to information (Rice & Katz, 2003; Katz & Aspden, 1998; Cooper & Kimmelman, 2001). While countries like the United States and the United Kingdom have more than half of their population connected to the Internet via desktop PCs, in Brazil this rate is only about 10%, and the whole continent of Africa does not reach 2% of Internet users via PCs (ITU, 2005).

Manuel Castells (1999) created the concept of the dual city to think about this unequal distribution and access to ICT in big metropolises. The dual city is defined as “an urban system socially and spatially polarized between high value-making groups and functions on the one hand and devalued social groups and downgraded spaces on the other hand” (Castells, 1999, p. 27). For Castells (1999), the power of information technologies enhances and deepens features present in the social structure and in power relationships of the dual city. The case becomes apparent when taking into consideration urban structures like the

previously mentioned favelas in Rio de Janeiro, where two populations occupying adjacent urban areas are deeply disconnected due to the restricted access to communication infrastructure from the low income population. Within this context, the favelas become almost distinct segregated neighborhoods, having an autonomous existence inside the major city.

Castells (1999, p.30) also refers to the space of flows as the dominant spatial logic of the network society, characterized by the simultaneous concentration and decentralization of people and activities connected by ICT. The space of flows, as the material organization of time-sharing social practices in the dual city, “links up *valued* spaces at the same time that it separates and isolates *devalued* spaces in the inner city where low-income communities remain trapped” (Castells, 1999, p.31). Within this context, ICT have generally being analyzed as increasing the digital divide.

Nevertheless, cell phone growth rates worldwide, especially in developing countries indicate that it will be mobile technologies, not the fixed desktop PC, which will bring access to the Internet and to information to people who currently do not have it. Cell phones are much more inexpensive than laptops and handheld computers, and therefore affordable for a larger number of users. Furthermore, while PCs are accessed only from specific places (except for laptops), mobile phones can be used anywhere (where there is a signal).

Even when there is no Internet access involved, just by connecting previously disconnected regions in the developing world cell phones are already noted for accelerating the economy and fostering small businesses (LaFraniere, 2005). However, increasingly cell phones have more computational capabilities, including Internet access, a fact that makes this relationship even stronger, because mobile phones are easier to carry. We have seen that services such as

3G, location awareness and WAP are indeed available in Brazil, but they do not reach most of the population because they are still relatively expensive. It is a matter of time, however, to be able to embed these services as regular functions of the cell phone also in developing countries, transforming them not only in the main telephone access point, but also in the primary Internet connection.

Although affirming that ICTs currently increase the digital divide, Castells (1999, p. 36) proposed six developmental policy initiatives that might help the interaction between information technology and urban social reform. Today it is clear that much of this gap is already being fulfilled by mobile technologies, not by personal computers.

At this point, it is valuable to re-contextualize some of Castells' proposals originally conceived to think about the integration between computers and low-income communities to a mobile technologies framework. I will focus at three of the six initiatives. The first one concerns the "necessary spurring of entrepreneurialism and small business among low-income communities' residents" (Castells, 1999, p. 36). This tendency is already underway in Brazil, Africa and many other countries in Latin America. For example, in Africa, in many places, which do not have electricity and fixed telephone service, small businesses and private salespersons use cell phones as ways to improve their sales (LaFranieri, 2005). Also similar to Brazil, frequently cell phones are used as public pay phones in regions where no other service is available. Gilbert Nkuli, deputy-managing director of Congo operations for Vodacom Group, one of Africa's biggest mobile operators, tells that in Congo "One man uses it [a cell phone] as a public pay phone. Those who want to climb to his platform and use his phone pay him for the privilege" (LaFranieri, 2005).

The second initiative “refers to the expansion of telework not from home but from community telecenters” (Castells, 1999, p. 36). We have seen that in many favelas (slums) in Rio de Janeiro, people use mobile phones as public phones that serve the community. Because many do not have telephones at home, the “public” cell phone becomes the primary connection technology to the community and might well be used by community members for teleworking.

Another initiative is related to emphasizing “the potential of information technology for improving the educational chances of poor populations” (Castells, 1999, p. 37). A project with this goal is underway at the Massachusetts Institute of Technology (MIT), led by Nicholas Negroponte. Their 100-dollar laptop project²⁰ aims at developing a fully functional portable computer costing less than one hundred USD. Such computer will be sold to governments in developing nations such as Brazil, India, China, and Argentina, with the goal of helping learning and integration of the new generation in the information society. The laptops will come with built-in wireless data connection and, according to Negroponte (2006), will benefit from peer-to-peer network and possible low-cost connections to the backbone of the Internet. Nicholas Negroponte (2006) emphasizes the importance of mobility when justifying the construction of the 100-dollar portable laptop, instead of a desktop computer, to help educating children in developing countries. Portable computers allow children to bring them home, also engaging the family in schoolwork and access to information.

As a response to Negroponte’s project, which employs the Linux operational system, Microsoft announced what they consider a less expensive alternative to a laptop: transform the cellular phone into a computer by connecting it to a TV and

a keyboard (Markoff, 2006). This is possible because cell phones nowadays already have computational capabilities.²¹ Proposing the cell phone as the technology to bridge the divide, Microsoft is relying on the high cell phone growth rates in the world, foreseeing that mobile phones will in fact be already pervasive technologies. In Brazil, while most cell phone devices still do not have computational capabilities, Philips is negotiating with mobile phone producers for the release of a device for less than 20 USD, directly targeting the low income population (O Globo, 2005).

Considering Mark Weiser's (1996) theory of ubiquitous computing, which divided the history of computers in three main waves – mainframes, personal computers, and ubiquitous computing – it is worth noting that many countries in sub-Saharan Africa, as well as in Latin America, simply skipped the personal computer wave, jumping straight into the mobile (ubiquitous) technologies era. In 2004 (ITU, 2005) the African continent, for example, had close to 100 million total telephone subscribers, 76 million of which were mobile subscribers.

19.5 Conclusions

The numbers related to cell phones distribution in Brazil cannot be taken for granted without a deeper analysis. For a superficial observer, they seem impressive: 80 million cell phone subscribers and the fifth market in the world. However, a recent report from the Brazilian Atlas of Telecommunication (Ordoñez, 2006) attested that 43% of Brazilian counties still do not have mobile telephone service. It is therefore irrelevant to look at raw numbers without understanding how cell phones users are geographically distributed in the country, as well how mobile phones are differently used by the population according to their socioeconomic status. Interestingly, it seems that it is exactly

when people cannot afford available services and devices that unusual appropriation of technology occurs.

Two general lessons can be taken from this preliminary analysis of the use of mobile phones in Brazil. The first one takes into consideration how low income populations appropriate technologies in unusual ways, depending on pricing policies and technology availability. It is widely accepted that technologies both construct and are constructed by historical, social, and cultural contexts (Ito, Okabe, & Matsuda, 2005; Wellman, 1999; Bijker & Law, 1992; Callon, 1986; Hine, 2000; Suchman, 1987). However, studying how populations with limited access to technology find ways of re-purposing its usage, especially in using it as a means of promoting sociability and communication among the community, gives us additional insights on how interfaces are culturally defined. Some examples mentioned in this article are (1) the favela dwellers who share a phone among community members, transforming an originally “private” technology into a shared one, (2) the use of pre-paid phones as a “free” phone, and (3) the cloning of cell phones.

Following a tendency underway in Asia and Scandinavia where cell phones are regarded as collective technologies (Kasesniemi & Rautiainen, 2002; Ling, 2004; Rheingold, 2002), the mobile phone in Brazil is also becoming a collective communication medium, but in a very different way. What is possible to observe is the transformation of a device that has been frequently regarded as a “private” medium, belonging to a single person, into a public phone, as is the case of the sharing of cell phones in the favelas. Similarly, while pre-paid cell phones have been created as ways that operators could charge more for the spoken minute, users transform it in a type of free phone: using cell phones to receive calls, and public phones to make calls, therefore avoiding having to buy a new phone card.

The second lesson concerns how the initial idea of the digital divide should be redefined when cell phones not only replace landlines, but also personal computers. As demonstrated in this article, there are strong interrelations between mobile technologies, information access (the “digital divide”), and the potential for progressive social/economic change. Within this context, it is imperative to rethink inequalities of information/communication access because (1) low-income users are “skipping” the desktop computer “phase” and (2) access is increasingly through mobile, rather than fixed devices.

Although the signs of the digital divide worldwide are still very strong,²² it is interesting to realize that while the developed world still has 8 times the Internet user penetration rate of the developing world, this ratio decreases to 4 times when it comes to the comparison of mobile phone numbers (ITU, 2005). With mobile technology devices replacing telephone landlines and desktop computers, how should the original idea of the digital divide be redefined?

Perhaps Manuel Castells’ (1999) belief in the dual-city, in which ICTs increase the disconnection between high and low income populations needs a new perspective, since low-income populations now indeed have access to (mobile) technology: they just use them differently. Having in mind that mobile technologies will probably bring to the developing world a type of social communication never experienced with fixed telephones or the fixed Internet, it is important to understand how ICT can positively impact society and not only exclude people from it.

Notes:

¹ According to the International Telecommunication Union (ITU, 2005), in 2004 there were 770,641 million personal computers vs. 1,751,940 billion cell phones

in the world.

² According to the Brazilian Institute of Applied Economic Research (IPEA, 2005), low income population in Brazil earn up to one minimum salary a month (roughly 162 USD).

³ Still according to IPEA (2005), this group represents 10% of the population that earns above 670 USD a month.

⁴ Brazilian new cell phone additions have been only surpassed by China (76 million), Russia (61 million) and India (28 million) (Teleco, 2006d).

⁵ A recent report from (IPEA, 2005, p. 60) attested that considering the Gini index of 130 countries in terms of income distribution Brazil is barely the last one, just in front of Serra Leoa, in Africa.

⁶ Cell phones exceeding landline numbers is a general tendency globally, and in the context of Latin America, it took longer to Brazil to accomplish what happened at least 4 years earlier in other countries with poorer landline infrastructure. In Paraguay and Venezuela, for example, this inversion occurred as early as 1998. Paraguay is unique in terms of cell phone numbers, for the country has since 2002, at least five times more cell phones than landlines (Teleco, 2006c; 2005).

⁷ Southeast region includes the states of Rio de Janeiro, São Paulo, Minas Gerais and Espírito Santo. The South is composed by Rio Grande do Sul, Santa Catarina, and Paraná states.

⁸ Cell phone growth in 2004 was 99.1% in Tocantins, 58.9% in Mato Grosso, and 54.7% in Mato Grosso do Sul.

⁹ The Brazilian currency is the Real (or Reais) which as of June 2006 is worth 0.44 USD.

¹⁰ The minimum salary was created in Brazil in 1936 by President Getóelio Vargas. At its inception, the minimum salary was supposed to cover the basic monthly needs of a 4-person family (food and housing).

¹¹ Nokia phones can be found at:

<http://nokia.submarino.com.br/nokia/technology.asp?vCel=1&Tecn=1> and

Motorola phones at <http://shop->

[br.motorola.com/site/content/produtos/celular_default.asp](http://shop-br.motorola.com/site/content/produtos/celular_default.asp)

¹² See Motorola website at: <http://shop->

[br.motorola.com/site/content/produtos/celular_default.asp](http://shop-br.motorola.com/site/content/produtos/celular_default.asp)

¹³ GSM, Global System for Mobile Communication, “originally known as Group Special Mobile, is a second generation digital cellular system developed in Europe and used in the majority of the world. Initially developed to the range of 900 MHz, GSM had afterwards a version adopted to 1800 and 1900 MHz.”

Retrieved May 12, 2006, from

<http://www.teleco.com.br/glossario.asp?termo=GSM>.

¹⁴ <http://www.camara.gov.br/sileg/integras/329717.htm>

¹⁵ 3G (Third Generation Cellular Telephony) also stands for UMTS (Universal Mobile Telecommunication System). “UTMS allows many more applications to be introduced to a worldwide base of users and provides a vital link between today’s multiple GSM systems and IMT–2000. The new network also addresses the growing demand of mobile and Internet applications. UMTS increases transmission speed to 2 Mbps per mobile user and establishes a global roaming standard.” Source: International Engineering Consortium. Retrieved November 28, 2005, from <http://www.iec.org/online/tutorials/umts/topic01.html>

¹⁶ WAP stands for Wireless Application Protocol. Using WAP, content can be

delivered over the Internet to most current wireless networks, including the networks with General Packet Radio Service (GPRS) and 3G.

¹⁷ There are two different ways by which the cell phone can be aware of its position. One is accomplished by cellular positioning, which indicates the device location through the triangulation of radio waves detected by the cell phone in relation to the transmission towers. Another much more accurate way uses GPS systems embedded in the phone.

¹⁸ <http://www.alienrevolt.com>

¹⁹ GPRS, General Packet Radio Service, is a “system that can be implemented as a layer over GSM systems. GPRS allows data services without the need of establishing a connection. It is considered an intermediary step (2,5G) to the third generation of cellular systems (3G).” Retrieved December 17, 2003, from <http://www.teleco.com.br/glossario.asp?termo=GPRS>.

²⁰ <http://laptop.media.mit.edu/>

²¹ A report from NTT DoCoMo (June2004) states that today’s FOMA CPU processing speed is comparable to personal computers from eight years ago running Windows 95.

²² See ITU statistics: <http://www.itu.int/ITU-D/ict/statistics/ict/index.html>

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