

CHANGES IN THE LOW INCOME CLASSES CELL PHONE MARKET

Leonardo Abreu, D.Sc

ESPM - Escola Superior de Propaganda e Marketing

e-mail: lmarques@espm.br

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1. Context

In 1983 came the first cell phone approved by the FCC (*Federal Communications Commission*), Motorola's DynaTAC 8000X - which together with the company Ameritech began commercial use of cellular telephony in the United States and worldwide. Brazil's entry into the cell phone era took place seven years later, in November 1990. From this date until January 2018 passed 667 to 236.2 millions of mobile accesses. An impressive growth trajectory a technology that is present in many sectors of society. "The cell phone has reached the corners of the country sometimes, even before that local populations had running water or sanitation basic". (Dias et al, 2002). In August 2003, the number of mobile phone users exceeded those of fixed telephony. According to data from January 2018 of ANATEL, Brazil has national average density of 113 lines per 100 inhabitants. More than one mobile access per person, the Federal District being the most densely populated state with 126 accesses per 100 inhabitants. Even the lowest density of 79 accesses per 100 people, observed in the state of Maranhão, is a remarkable amount that demonstrates the penetration force of this technology in Brazilian society, even though there are cases of more than one access per citizen. Although many computer democratization projects, p ode be said that the popularity of an information and communication technology happened, in fact, with cell phone instead of microcomputer is. Unlike the computers of low-income families, where all its members share the same equipment, the cell phones were effectively the technology that came closest of the concept of " personal computer ", or by individual ownership, as

the portability and even its good processing power and access to tools such as social networks, but exclusive of computers. In addition, the high popularization of the cell phone also enabled and leveraged businesses of the lower income population, improving prospects for gain in the informal economy of self-employed persons.

2. Changes in time

After eight years of the publication of the author's thesis titled " A Study on Usability of Cellular Phones with Popular Class Users Based on Ergonomic Criteria, " the political, economic, and technological changes that have taken place in the country and in the world have influenced how we use our cell phones. During this period, it can be seen that popular classes users feel more the economic consequences both positive and negative. Despite these variations, the cell phone continues to play a prominent role not only in the lives of low-income users, but as in the lives of all users, regardless of social class.

"Not surprisingly, the HCI field has been closely linked to Moore's law. At its inception, HCI was primarily concerned with the only large group of people who had access to technology-office workers. This type of user had very clearly defined tasks and goals that they were trying to achieve on fairly limited *hardware*. As Moore's Law resulted in a computer technology that escaped from corporations, HCI also turned to welcome household use, and see how people have focused on completing less well- defined tasks. Today, HCI has expanded to look at social applications and even unpredictable of technology. It is tempting to believe that the only result of Moore's law is more and more cheap technology so that we

can use it more in our lives. However, another side effect is that, for the first time, computer technology is accessible to those living in developing countries. They may not have a home, a regular job or even access to electricity, but they own and use a cellphone. " (Marsden, 2010)

In Brazil, the mobile device achieved a mass and capillarity across the country, much due to the success of prepaid plans, which had rapid growth since its inception. In June 1998, when it was launched, prepaid services accounted for only 15% of the subscriber base. A year later it was almost 50% of users. According to ANATEL (National Telecommunications Agency) data, in February 2008, reached the mark of 100 million prepaid in Brazil and the percentage of prepaid plans reached its peak of 83% in 2009. In the following years, it reduced its percentage of participation in the total of the mobile accesses until reaching January of 2018 with 62%.

3. Mobile and development

According to researcher Leonard Waverman (2005), London Business School in developing countries, low income group, each increase of 10% in teledensity there is an increase of 0.59% of GDP.

It can be said that the popularization of technology came in a more comprehensive and democratizing way by the cell phone than by the computer. Was also for mobile technology that the government has developed Internet connection projects in public schools in areas with lack of infrastructure communication structure with the use of mobile data networks. The popularization of the cell phone also enabled and leveraged businesses of the lower income population, increasing the participation in the informal economy of self-employed people.

4. Omnipresence and Convergence

The cell phone technology, because of its high portability feature, can be categorized as "*Ubiquitous Technology*", that is, possibility to be present everywhere. The term, which may also have as a synonym to "*Pervasive Technology*" expression was initially coined by Mark Weiser, in the 70s, when he was scientific director of *PARC (Palo Alto Research Center)*.

According to the author in the low-income business area, CK Prahalad (2005), it is wrong to "assume that consumers in poor countries will not be interested in

functional features such as the music player. Since they cannot afford such specific devices - an iPod, a PC, a PlayStation - they may want more of their mobile phones. " It turns out that the functionalities of the devices are already being perceived as much as their appearance, which is still believed to be one of the most determining factors for the purchase decision. Survey conducted by Data Popular Institute (EBC, 2015) indicated that slum dwellers in Brazil are more connected with the technological means than the inhabitants of the asphalt.

5. Popularization of smartphones

Many consider that the history of smartphones begins on January 9, 2007 when Steve Jobs took the stage and announced that he was presenting what would be the third revolution provided by Apple. The first, in 1984, would be the Macintosh, which began the era of personal computers. The second would be the iPod, a digital player that changed the logic of the entire music market. And the third, the iPhone, which was announced by Jobs as the device in which Apple reinvented the cell phone. In fact, the speech was a harbinger of a new era for mobile phones. The mobile phone market, once dominated by companies like Nokia, Motorola and Blackberry, has begun to change dramatically to the point where these technology giants have lost virtually everything they had achieved in the mobile handset market. In the following years, the three companies would try to match the success of the iPhone, but would not succeed. Like other successful products, Jobs reported, even before presenting the product, that one of the great highlights of the iPhone would be its revolutionary user interface. Essentially this represented a new experience with the user. A question that Apple understood before other cell phone manufacturers such as Nokia. Do not just perform the function of connecting or saving a contact as efficiently as possible, as Nokia handsets do very well. It was important to go beyond the cold and objective Finnish thought of the biggest cellphone maker of the time, who, despite a lot of research investment, did not see or did not want to see this question latent in users. This pleasant experience of use is defined by Hancock et al. (2005), with the term hedonomy, a mixture of Greek prefix "hedo" that means pleasure with ergonomics and its usability parameters. However, not only the handset, but also every ecosystem created was vitally important to the success of the iPhone and later Android phones.

Smartphones can be considered the best *zeitgeist* expression (German word meaning spirit of the time)

of the current times. The Economist magazine published an article in February 2015 titled " *Planet of Phones*". According to the publication the estimate is that by 2020 about 80% of the adult population of the planet smartphone.

6. Conclusions

Throughout the 28 years of cell phone presence in Brazil, it has been observed that this technology has revolutionized not only the way we communicate, but also the way we live. Prepaid plans have enabled low-income citizens to have access to information and communication technology that has been and continues to be very impacting in their lives both personally and professionally. Design concepts based on Human-Centered Design, with a more holistic view, allow to create products and services that meet the real needs of users, especially of popular classes.

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