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MUMBUCA E-DINHEIRO AND THE CHALLENGES OF A REQUIREMENTS, CODES AND DATA DIGITAL COMMUNITY CURRENCY GOVERNANCE

Luiz Arthur S. Faria*, Fernando G. Severo**, Henrique L. Cukierman***, Eduardo H. Diniz****

**Fundação Getúlio Vargas and Universidade Federal do Rio de Janeiro, Brazil, luizart@gmail.com*

***Universidade Federal do Rio de Janeiro, Brazil, severo@cos.ufrj.br*

****Universidade Federal do Rio de Janeiro, Brazil, hcukier@cos.ufrj.br*

*****Fundação Getúlio Vargas, Brazil, eduardo.diniz@fgv.br*

ABSTRACT

This paper discusses the governance process of digital complementary currencies (DCCs). Our reflections are based on contributions from fields such as the anthropology of economy and currencies, especially from the perspective of monetary plurality and governance of commons, and also on concepts developed in the field of Science and Technology Studies (STS). The research effort accompanies the material changes of the Mumbuca DCC (Maricá, Rio de Janeiro, Brazil), connected to the Brazilian Network of Community Development Banks (CDBs), which has accumulated more than one hundred experiences since 1998. We use three different approaches to investigate the Mumbuca digital platform: the processes related to the requirements of the digital platforms adopted, the tensions concerning its closed architecture model and finally the currency circulation data - now digital, and relatively traceable. The paper explores the impossibility to dissociate, on the one hand, the 'social practices' enunciated by the communities related to the local currency proposals (and connected to the idea of money as a commons) and, on the other, the materialities present in digitalization processes. Finally, calling for a sociotechnical approach, it outlines some of the challenges faced by the CDBs Network, towards treating the DCC as a commons.

KEYWORDS

Digital community currencies; Social currencies; Commons; Governance.

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1. INTRODUCTION: A PREHISTORY OF MUMBUCA E-DINHEIRO

This paper discusses the governance processes of the digital complementary currency (DCC) Mumbuca E-dinheiro, currently the greatest Brazilian experience in solidarity economy and basic income (in terms of the volume of financial resources involved). Precisely, the paper analyses three points: the processes related to the requirements of the digital platform, the tensions concerning its closed architecture model and finally the currency circulation data. In this sense, the paper contributes to an increasingly important topic concerning community currencies, the DCCs governance (DINIZ, SIQUEIRA, VAN HECK, 2019).

Before discussing the Mumbuca network in this article, we should examine the concepts of monetary plurality and common resources (commons). In the field of economic anthropology, Hart and Ortiz (2014, p. 466) report that Karl Polanyi and Marcel Mauss attribute multiple meanings to money. Mauss states that: freedom, justice and the person can only be understood in the midst of specific monetary arrangements, which give us our several social identities.

Polanyi, on the other hand, associates all-purpose money to modern societies and special purpose money to the "ancient societies in which different objects are used for different uses of currency" (DISSAUX; FARE, 2017, p. 8, [our translation]).

However, according to those authors, one of the limitations of the Polanyian approach is "to consider that modern societies do not know the special purpose money". To overcome that limitation, Dissaux and Fare (2017) adhere to the idea of monetary plurality, both in the sense of "differentiated monetary uses" (ZELIZER, 2005 [our translation]) and that of the "existence of various forms and currencies such as associative currencies" (DISSAUX; FARE, 2017, p. 9 [our translation]). According to that approach, the idea that currencies are made by states is [...] contradicted by many studies of proliferating monetary instruments produced by other bodies […]. (HART; ORTIZ, 2014, p. 473)

That is the context in which we trace the experiences of Community Development Banks (CDBs) in Brazil, especially the Mumbuca 'E-dinheiro' (meaning in Portuguese, both "e-money" and "it is money") issued by the People's Community Bank of Maricá (Banco Popular Comunitário de Maricá - Banco Mumbuca), the Mumbuca Bank (60 km from Rio de Janeiro) . Within the context of monetary plurality, some authors give support to a possible relationship between the Brazilian experience and the commons category (HUDON; MEYER, 2016), a set of institutional practices [...], which responds to the principle whereby a more or less broad group engages itself in a collective activity that produces tangible or intangible goods, available to commoners or a larger community, according to democratic rules of self-organization (LAVAL, 2016 apud DISSAUX; FARE, 2017, p. 2, [our translation])

Fare and Dissaux (2017, p. 13) also consider that if the commons category does not naturally exist, the social practices established around a resource are those which allows it to be instituted as commons. In order to contribute to this debate, it is important to establish a dialogue with the field of Science and Technology Studies (STS). STS approach helps us to show that the social practices as enunciated by the Brazilian proposals (and connected to the idea of currency as a commons) and the materiality present in digitalization processes (where different nonhuman actors are in play) are indissociable. In the STS field, here we emphasize an Actor Network Theory approach, specially concerning: attention to categories which emerges from the field (just as autonomy, mediation and economic democracy emerged among CDBs (FARIA, 2018)) and sociotechnical approach, meaning that "the constructions of sciences and technologies [are analyzed] as phenomena in which the 'social' and the 'technical' are inseparably intertwined in a seamless network" (Marques, 2003, p. 678)[1].

Such observations are important for any investigation of Brazilian Community Development Banks' (CDBs), whose rules establish that local currencies and national currency (Real) have fixed parity. The CDBs invention has gained relative scale since its first experience, Palmas Bank (Fortaleza, Ceará, in 1998), and currently is spread over more than 100 (one hundred) experiences. The CDBs experience are connected to categories such as the autonomy of a community (for example, in relation to technologies, companies or governments) (FARIA, 2018). In this sense, it is important to highlight the way that autonomy manifests itself intertwined with the materiality inherent to the digitalization processes by which those relationships have been articulated. An example is the case of the Mumbuca digital social currency, which we will prioritize in this paper. It started to be implemented in 2013, when Washington Luiz Cardoso Siqueira (Washington Quaquá, the Mayor of Maricá, a city in the state of Rio de Janeiro) and his Secretary of Human Rights visited the Palmas Bank (the first Brazilian CDB, founded in Fortaleza, Ceará towards

the end of the 1990's). After hearing about a case of theft of Palmas community currency during their visit, the Secretary decided to propose the use of magnetic cards in order to meet the Mayor's demand to implement a social currency in Maricá. The autonomy and mediation practices of Palmas Bank (which we will show later on) faced a hitherto unknown artifact: the magnetic card reading machines hired from Vale Shop, a private business. Joaquim Melo, director of Palmas CDB, hired to coordinate the implementation of Mumbuca in Maricá, was uncomfortable with the fact that poor communities (where the CDBs are located) did not have the technology for developing their own "little machines" (as he called the machines used to read Mumbuca cards).

Through the Mumbuca Currency, around two million Reais circulated per month from 2015 until 2019, in projects financed by oil royalties (Maricá is the Brazilian city that receives the most resources from this source), which makes Mumbuca the Brazilian community currency with the greatest volume of circulation. In order to observe and analyze the currency circulation, we collected data from 2015 until 2019, including semi structured interviews and materials provided by the Mumbuca CDB, as well as other CDBs and the Brazilian CDBs Network, besides accessing the Mumbuca E-dinheiro system administrative interface (2018-2019). We used also ethnographic research (which generated field notes), with immersive observations about Mumbuca Bank (at Maricá, from 2015 to 2016), and we organized 3 "hackathons" (meetings where information technologies were discussed with CDBs, in 2018).

The network of cards and card–reading machines was established between 2013 and 2017 to administer a social benefit payment to 14,000 families, earning approximately R$ 100 per month. Since then, the program has been progressively transformed into a basic income initiative[2]. The stabilization of that electronic infrastructure occurred despite initial evidence of traders' distrust of local politicians (FARIA, 2018) and based on the spread of magnetic card-use by populations of the Brazilian urban peripheries. In parallel with the Maricá scenario, Palmas Bank experimented with other possibilities for digitalizing its currency (DINIZ; CERNET; ALBUQUERQUE, 2013). In the most promising of them, a small company from Brasilia, headed by João Bosco and Marcos Sarres (coming from financial and IT markets, respectively (BOSCO, 2016)) planned to create an electronic payment platform for the periphery (BOSCO, 2016). According to Bosco (2016), two coincidences crossed his path: the 'revolution' of the Brazilian electronic payments law, which would have broken the monopoly of the big financial entities of financial services in Brazil and, in 2014, the partnership with Palmas Bank, something unplanned by those who "had never heard of social currencies or community banks" (BOSCO, 2016).

Bosco "knocked on Palmas Bank's door", offering a partnership: 2% of all business transactions (BOSCO, 2016) made on the platform called E-dinheiro would be charged to local commerce associated with the CDB and split between MoneyCloud[3] and each community bank - 1% would pay the company (for application development, monitoring, and support) and 1% would be used by the CDB which the merchant was linked to. In addition, any withdrawal – in other words, any operation where a trader or resident exchanged E-dinheiro for Reais – would also be taxed at 1%, which would accrue to the bank. The local digital circulation of the currency would thus present slight but significant differences from its paper version: for example, it would allow CDBs to dream of financial autonomy, previously impossible considering the Brazilian legal scenario.

In 2018, Mumbuca changed its infrastructure, sticking to E-dinheiro, for which the initial protagonist was a mobile app: ValeShop leaves, MoneyCloud enters; the magnetic card goes out, the E-dinheiro platform comes in. In the next sections we will address the implications of adopting that platform, firstly in terms of its requirements and uses and afterwards, its development and source-code and finally in a perspective that discusses the privacy of the data circulating there.

2. THE FLAVORS OF TECHNOLOGY. OR, REQUIREMENTS AND USE: FROM CARD CULTURE TO APP IMPROVEMENTS

In the field of software engineering, the importance of the requirements-gathering phase with the client goes without saying, so that the developers can turn such requirements into a program that works on a computer, notebook, smartphone, or tablet. The distinction between functional requirements (the main features of the software) and nonfunctional ones (such as ease of use, different data access permissions, software license type, or number of concurrent accesses the system must support) is also well known. If we look at the experience of the Mumbuca DCC from this point of view, we can begin by stating that the initial solution, the one of the magnetic card, was a 'shelf product', a ready-made solution, and therefore with little aptitude for modifications ordered by the client. It is worth

highlighting two points here: one of them, the Mumbuca currency feature, incorporated into ValeShop card, which allowed only 'one spin' of the currency; in other words, after beneficiaries receive their monthly credit in Mumbucas, when the currency passed into the hands of the first trader (in general pharmacies and small markets), it was automatically converted into Reals (the national currency in Brazil). That requirement, which greatly limited the circulation of the local currency, even when compared to other currencies in the CDB Network, was due to a City Hall fear rather than to a technological limitation (MELO NETO SEGUNDO, 2016b).

Another point from Mumbuca's first phase that deserves mention was the consequence of the currency's materiality, in this case a magnetic card (a requirement established by the City Hall). Such a solution proved itself adequate for the beneficiaries, mostly elderly (less than 30% of them under the age of 35). A 'card culture' circulates among them (MELO NETO SEGUNDO, 2016b), meaning that the beneficiaries declared themselves to be accustomed to dealing with magnetic cards, but not with smartphones, for financial services (FARIA, 2018). That is to say, even in the low income group, the population had got used to the handling that artifact (the card): in terms of software engineering, the solution had good usability (ease of use). However, when asked about a possible technological change (from card to smartphone), users of what was then the 'Mumbuca card' were clearly uneasy (FARIA, 2018). That evidence seems to have been captured by the Mumbuca Bank and the Maricá City Hall in the ValeShop card transition to the E-dinheiro platform in 2018: besides the E-dinheiro app, available for smartphones in the CDB Network, Mumbuca E-dinheiro came into circulation coupled with a card, allowing for a smooth transition for the uneasy beneficiaries.

While in Maricá we observed that the need for a card was a requirement incorporated to the product, in the CDB Network itself we collected evidence of important challenges in the process of gathering requirements for the E-dinheiro platform. Such evidence suggests that E-dinheiro has been perceived by some members of the CDB Network as stemming from a unilateral will, as verbalized by one of the community banks (Hosana Gomes's report (2015), from Preventório CDB, in Niterói - RJ). The platform was not perceived by the elderly as easy to use: "this is damn difficult", said Sônia Faria (2015), also from Preventório Bank; "we couldn't feel the flavor of that [E-dinheiro] technology yet", stated João Manoel Santos (2018) from Terra Bank (Vitória -ES).

Thus, here we map at least two challenges to the CDB Network: the first, to overcome older people's difficulty in handling the E-dinheiro app on smartphones (including users from community banks themselves); the second, to include a large portion of those working in community banks in the ongoing process of defining the platform's requirements. Such challenges should not be treated merely as 'technical details' of digitalizing Brazilian social currencies, but as sociotechnical challenges that put in jeopardy the practices/principles of the CDBs in the search for the so-called economic democracies (FARIA, 2018). It seems fundamental to consider who is included or excluded from the construction of artifacts, in this case, the software itself.

In this section, we are looking at a part of that process, namely, defining the software requirements or, in other words, its features and characteristics. As we have already highlighted, the requirements include not only software functionalities but also features like access permissions and license types. On the one hand, it is worth noting that the Palmas CDB seems to have inherited the platform's administrative access profiles; accesses that other CDBs did not have (maybe because of Palmas's pioneer performance of an E-dinheiro prototype). The use of E-dinheiro in practical terms has been characterized by the fact that some features are enabled only for global administrative users - a relatively widespread concentration of power in the world of Information and Communications Technology (ICT), but apparently a new situation in the world of the CDBs Network. Moreover, the translation of the E-dinheiro prototype (conducted by the Palmas Bank in Fortaleza-CE) to E-dinheiro as a platform for the entire CDB Network, imposed new situations. As highlighted by Callon (1986, p. 18-19), in what he calls a sociology of translation, "the notion of translation emphasizes the continuity of the displacements and transformations which occur in this story: displacements of goals and interests, and also, displacements of devices, human beings (…). To translate is to displace (…). Translation is the mechanism by which the social and natural worlds progressively take form". In our case, the mentioned translation means that a single bank account at the Caixa Econômica Federal (Federal Savings Bank) starts to back all the digital social currencies of the Network. One consequence of that situation was the need for validation by the Palmas Bank for some of the transactions between users and CDBs (such as the feature to recharge prepaid mobile phones with social currency).

That scenario could have been modified (and still can) if less centralized management strategies had been considered earlier in the process, as alternatives to the E-dinheiro options – like operating with software running on a single server, maintained until today for the entire CDB Network. That situation, which may not be problematical for those not yet familiar with source-codes and databases, like the majority of CDBs, in our understanding has posed risks to CDB practices since its beginning, especially to their autonomy (in relation to the E-dinheiro technology and to MoneyCloud) and, therefore, to the autonomy of the territories where they are located. Given the diagnosis that "the community is impoverished by losing its local savings" (QUEM..., 2014), throughout their history CDBs have been indicating ways of getting out of poverty (such as microcredit and social currency) by means of autonomous choices in the field of the so-called solidarity economy, even considering mediations with governments, and without denying the role of the state. We note that the autonomy of each bank is relatively modified by the type of digitalization which is operationally dependent on Palmas Bank (albeit partially) and on MoneyCloud.

In this section, we have emphasized the sociotechnical framework when considering who was included in the definition of E-dinheiro requirements (Palmas Bank and MoneyCloud, for example) and who was relatively excluded of it (other CDBs, like Preventório Bank and Terra Bank), aligned with concerns expressed by the CDBs themselves at the Hackathon Solidarity 2018 for a more intensive opening of the platform (FARIA, 2018), and also aligned with the CDB practices related to economic democracy and autonomy. Such a standpoint also points to another dimension which we will take into account in the next section: the E-dinheiro source-codes.

3. "I GIVE YOU NOTHING." OR, THE SOFTWARE DEVELOPMENT AND THE CODE: BETWEEN THE FREE UTOPIA AND THE PROPRIETARY MEDIATION

Scene 1: The First MumbucHacka

Saturday, January 2018, Maricá -RJ. Almost 30 people meet at Mumbuca Bank – community bank workers, researchers and young people interested in understanding and proposing solutions for challenges to the establishment of E-dinheiro in Maricá. João Bosco and E-dinheiro's software development team, from Brasilia, are connected to the meeting. The first attempt to connect Brasília and Maricá via Skype failed: the audio wasn't that great. While trying to fix the technical problems, someone suggests a connection using WhatsApp: a Bluetooth portable speaker pops up. This solution works: the call via WhatsApp provisionally stabilizes a connection between the collective in Maricá with Brasilia. João Bosco is sorry, because the programmers had to leave due to the delay. Maricá collective doubts are enunciated: what technologies are used in the software? How are the improvements being implemented? Bosco clarifies that the demands are given to MoneyCloud by Palmas Bank, and implemented according to the priorities and resources available. Someone asks "what could you give us so that the collective in Maricá could enter the network and also collaborate?": "Nothing, absolutely nothing", said Bosco. Someone in Maricá whispers: "So the hackathon is over… ". Bosco keeps justifying: it is necessary to keep the source code safe, which can only be assured by the confidentiality of the software developments – after all, it is a software to control money. Someone from Maricá problematizes: there are several studies which prove that, because there is no confidentiality in the code, open softwares are safer than proprietary ones. In the evaluation circle at the end of the event Joaquim Melo understands that, for the first time, an 'open E-dinheiro' was discussed.

Scene 2: The Second MumbucHacka

6 a.m., Saturday, May 2018, Rio de Janeiro. André goes to the bus stop to catch a ride with a Federal University (UFRJ) group. Sympathetic to the hacker world, he decides to attend the II MumbucaHacka in Maricá, a hackathon in support of the Mumbuca, a 'social' electronic currency ('What could that be?', he wondered). At 8:30 a.m., André stands side by side with local businessman selling handcrafted items, food, organic juices, all paid for using the E-dinheiro app. At 9:30 a.m., Joaquim Melo inaugurates the new Mumbuca Bank branch in Cordeirinho, a Maricá neighbourhood, and starts the event. André sees a sign "Credit with zero interest" and becomes intrigued: someone explains that everything will be financed by a Mumbuca circulation fee. When he sees the table with four heads of department from the city government, he immediately turns around and goes for a stroll outside the auditorium. He opens an account and gets a credit of 10 Mumbucas. He asks the attendant if the software code is on GitHub for download. "Yes, you can use it, just download E-dinheiro from Playstore", he said. "No, no, I mean the source code". "Oh, I don't know about that". He buys a juice and snack and pays with E-dinheiro. André becomes bothered by the lack of some functionalities such as paying

without internet. He goes back to the auditorium, and sees that the government secretaries are gone. Victor, his colleague from UFRJ who had invited him to the event is presenting a dark screen slide show and the source code related to the developing of a map of the circulation data of the Mumbuca currency. He sits down, relieved and thinks: "finally my world".

Those scenes approach, through a situated standpoint, the controversies of E-dinheiro's software source code governance. This section is mostly based on experiences from two MumbucHackas, inspired by the dynamics of 'hacker marathons' (hackathons), where programmers and the community bank searched for improvements in the Mumbuca digital currency. It is noteworthy in such scenes that different worlds collide: one being that of the small IT company stuck in the property software business model; another world constituted by the CDBs realities, focused on the support for local manufacturers and for a solidarity economy; and the open software world, permeated by the notion of individual freedom and a certain aversion to politics and central governments.

At the crossroads of those worlds – incorporated here by MoneyCloud, the CDBs Network and programmers sympathetic towards the open software movement –, we find the controversy concerning the governance of the source code developed for the Brazilian community banks' digital platform. In this software dimension, it is important to think about who would be able to have access to its instructions, the source code. Such (lack of) access permissions to the software 'recipe' (i.e. the source code) is materialized by a license, which may be closer to an open/free software (where anyone trained in the programming language used can read the 'recipe') or to a closed/proprietary one (the case where the 'recipe' is retained by those who made the software). In our study case, E-dinheiro was initially developed by MoneyCloud, and its license was proprietary; at the end of 2016, after negotiations with MoneyCloud, the CDBs Network announced the software purchase (FARIA, 2018), however, the appropriation by the Network as well as the management of its source code are still surrounded by controversy.

At this point it is useful to resume the concept of commons, in order to address what we would call the utopia of currencies and softwares as commons. Dissaux and Fare (2017) enunciated the utopia of currencies as a commons: "[the] development of common monetary goods can be the result of multiple territorial levels of decision-making (from the more territorialized to global ones), combining equally diverse organizations and partnerships (private, public, community, etc.), supposing, and perhaps favoring – a capacity of strong auto-organized, citizen participation. […] Through associative currency, non-stated based sovereignty forms arise based on civil society groups. Those groups [...] do not aim to dethrone the national monetary sovereignty, but actually to complete it in different territorial scales. […] The challenge is, therefore, to relearn to live together, and the commons is the relevant means for that. The currency should be the first of these commons to be constructed." (DISSAUX; FARE, 2017, p. 20-23, [our translation]).

On one side, entities of the open software world (such as software development and use communities, as well as their own source codes) can be thought of as shared goods with rules of access and use, and that dialogues with the idea of community resource management. So, the implementation of a currency as a software brings with it the establishment of a development community of the source code (another good to be managed), whereby the software license can make the shared management easier or harder.

Perhaps it might be that management, the software development community of E-dinheiro, where we can find the biggest challenge to the CDBs Network. During our research, the CDBs usually appeared to be relatively distant from both open source softwares as well as from their business models, unlike others actors also connected to a solidarity economy in Brazil, like some software producers groups. Even the distinction between source codes (the 'cake recipe' as it were) and the software being executed in a device ("a cake being prepared in a certain oven") presented itself as non-trivial for the community banks researched by this article. Fundamental questions that emerge from the development of a software, like who can contribute with the code, who can define which contributions will or will not be incorporated to the version to be distributed, or who can have access to the source code, are not part of the bank's daily routine. The surprise with the 'proprietary E-dinheiro', shown by some of the other actors in the Brazilian social financial scene (such as Pedro Jatobá and Heloísa Primavera (FARIA, 2018)), contrasted with the CDBs Network 'pragmatic mediation' with MoneyCloud. That mediation allowed the CDBs Network to use a digital platform, delegating the code's governance however, to a company from outside of both the solidarity economy and the open software circles.

We propose that initially the discussion of E-dinheiro licensing was of relatively small importance for the main actors of the CDBs Network. On the one hand, it happened because of the opportunity represented by MoneyCloud, and on the other, because those actors were not equipped (instrumentalized) with necessary practices and reflections regarding software and its licenses. However, from the moment those discussions were placed – for example, by Primavera, Jatobá and also in the first MumbucHacka –, new mediations and translations became possible, bringing up new stabilizations. In other words, the closed business model anchored partially by a supposed lack of security in open software (according to MoneyCloud's narrative) gained new governance possibilities connected to what we called the software-as-a-commons utopia. That process started to place on the CDBs agenda, for example, a more participative governance of the code, formerly, retained by MoneyCloud and hardly discussed by the CDBs Network at all. Those possibilities, more connected to CDBs practices related to the themes of autonomy and democratic economy, may expand this ecosystem (without excluding the programmers from MoneyCloud) for example, including young participants from the innovation and technology experiences linked to the community banks themselves (like the PalmasLab experience, connected to Palmas Bank), solidarity economy cooperatives that develop open softwares, and also university students that support the process.

This subject, of establishing an E-dinheiro source code governance involving collectives beyond their own original programmers (MoneyCloud) – in which a distributed transaction storage system using blockchain technology may also be evaluated[4] – was debated between the CDBs Network and the Information and Society Laboratory, from Rio de Janeiro University (LabIS/UFRJ[5]), but it was not prioritized. However, LabIS (where the authors collaborate) proposed and organized (with the CDBs Network) the first MumbucHacka (the partnership's pioneer action) in January 2018, focusing on analyzing the circulation data from Mumbuca. That action considered the possibility of tracking the money, and discussed the mutual understanding of the need for increased transparency and reliability in the CDBs experiences. That will be the subject of the next section.

4. DISCOVERING / BUILDING DATA. OR, PRIVACY AND THE DATA: DREAMING OF TRANSPARENCY PANELS

The importance of measuring social currency data from the CDBs Network and quantifying the increasing use of E-dinheiro could be noticed, for example, in June 2016: a post from Joaquim Melo in the Facebook network informed that the platform registered 7,048 operations, the circulation of R$ 428,879.83, 1,752 users, 133 associated traders, and 20 cities using E-dinheiro (MELO NETO SEGUNDO, 2016a).

During the first MumbucHacka, even before the introduction of E-dinheiro in Maricá, the concentrated use of the currency (at that time, the ValeShop card) was discussed, analyzing the low mobility between the top 10 local businesses using Mumbuca. In the second MumbucHacka (April, 2018), Joaquim Melo announced that the beginning of circulation of Mumbuca in the E-dinheiro platform had leaved Mumbuca Bank with a total of R$ 33,000.00 between February and May of 2018 - due to the taxes allowed by the Brazilian electronic payment legislation[6]). The excitement marked the advent of the CDB financial sustainability dream, while a poster announced microcredit for local entrepreneurs with zero interest, funded exclusively with resources acquired from the circulation of Mumbuca through E-dinheiro (after five years of circulation via card). The credit concession was finally taking shape in Mumbuca Bank and incorporating a conversation circle methodology (the "cirandas") – open meetings with the population. That was good news, but it also increased the importance of a transparent discussion about the currency circulation data and the amount of money collected monthly by Mumbuca Bank.

After the second MumbucHacka, LabIS produced a preliminary report with an initial examination of Mumbuca E-dinheiro data from January to July 2018. It was debated not only with Mumbuca CDB, but also with the CDBs Network during a hackathon in the Solidários 2018 meeting (September 2018, held in Fortaleza, Ceará[7]). The report proposed some potentially useful metrics for CDBs, public authorities and communities using the electronic social currency: for example, the percentage of Mumbucas leaving the network (when people change it for Reals), or the amount of Mumbucas in circulation. In the preliminary report the graphs were grouped in sections in order to make it easier to understand and visualize what in the future could be […] a community bank's 'transparency panel'.

The following panels were proposed: 'Age', indicating the age distribution among beneficiaries and other users; 'Business and Beneficiaries dispersal', identifying locations per neighborhood; 'Deposits', highlighting the total volume and monthly averages of deposits related to the city's programs and those voluntarily performed by residents

(the Mumbuca beginning to circulate); 'CDB fund and Mumbucas leaving the network', describing graphically the monthly evolution of operations such as purchases in local businesses, bill payments and exchanges of Mumbucas for Reais (Mumbuca circulation beginning and ending); and 'Mumbuca Stock', comparing monthly withdrawals and deposits in Mumbucas. In addition, a version of the report restricted to the CDB proposed the following visualization panels aimed for internal management of the community bank: Relative Withdrawal and social currency circulation, Consumption and Savings (including monthly monitoring of the residents' balances) and Sales concentration (allowing for a visualization of the local traders that sold the biggest volumes of Mumbucas, and the ones that registered the biggest number of sales).

The community bank's electronic currency traceability, even though it is stored in a centralized database, allows us to think up ways to translate the CDB transparency. Whereas prior to the 'digital age' it was materialized, for example, in the form of sheets stuck on the walls of the community banks (as we could see in Preventório Bank), now it could be translated to community banks' digital transparency portals. On the one hand, that could support CDBs in their management and, on the other, democratize access to information about the currency's circulation, not only for the community but also for the different levels of public authority. Another important point is that the materiality also acts in data governance, both opening possibilities and adding limitations: some of the panels' graphs were not able to be fully interpreted because the data studied was accessible only through the administrative interface of E-dinheiro. In the future such questions can be mitigated through mediation with the developers of E-dinheiro, focusing on expanding this 'ecosystem' (at least to the CDBs Network), in the sense of more data openness as, for example, with an application program interface (API) that allows for more flexible queries to the database. Anyway, we can say that the process of monitoring the social electronic currency's circulation translated the words of Cukierman (2018), for whom, with the digitalization process, one can think in "other looks on poverty and the informality", with the data exposed in a more friendly way for the CDBs, the public authorities and the users of the social currency.

As we have seen in regard to requirements/use (second section) and source code/development (third section), the data governance implies attention to what we could call 'social practices': which panels are relevant? Which would become available only to the CDBs? Which would become available to the City Hall and to the local community as well? Furthermore, the data governance must equally pay attention to what we are calling 'the process materialities': for example, which instruments are available for the transparency panel to connect with the database that stores all the digital currency information? On demand reports? Administrative interface? APIs?

Such definitions and mediations dialogue with the search for economic democracy, which is so important to the CDBs (FARIA, 2018): although questioning the traditional financial system was already on the agenda of the community banks (a structure that implied mobilization and community participation), the digitalization process added challenges regarding how to handle information technologies intertwined with democratic practices. One of the perspectives, highlighted in this section, is the access to the data, to the information about the circulation of the currency (now registered and tracked in databases). During this research, we observed that this access could be more decentralized, including specially the communities were E-dinheiro DCC circulates.

5. CONCLUSION

The E-dinheiro platform experience in the CDBs network accomplishes two goals: it conforms new payment markets, both locally and nationally. Possibly the greatest difference these markets present is the enhanced traceability of the financial movements and the relatively easier reprogramming of their rules. We have shown here that different digitalizations embed distinctive values, cultures and practices, and redistribute both facilities and difficulties - one of the latter being the problems elderly people in Brazil have with handling smartphones for financial services. On that topic, it is worth highlighting the challenge to be overcome, namely, that of translating the "flavors of these technologies [E-dinheiro]" (SANTOS, 2018) for everyone who deals with community banks and is not familiar with source codes and databases. Unless the ICT world and its categories (like software - proprietary or open - and databases - centralized or decentralized) is incorporated to the CDBs' world (and understood by CDBs themselves), people involved in these experiences will not have any other option than to delegate tasks like data administration and software development to specialists. That is a problematic situation for a movement (the Brazilian CDB Network) that considers autonomy and economic democracy as important practices that should circulate along with its currencies.

Our research indicates a first point of emphasis, valid for the aspect of the digital platform requirements as much as for the source code and also for the data produced by the digital social currencies traces: that point is the need to promote dynamics such as those organized in the Solidarity Hackathons and the MumbucHackas, which we call 'Crafting Money Workshops'. Such workshops propose: to denaturalize the concept of currency, pointing to the possibilities of 'financial plurality'; and to discuss the advent of ICTs as important actors in alternative currency networks. In the Brazilian case, those workshops contribute significantly to support the CDBs Network in regard to the possibilities of what we could call appropriation or taking control of the new ICTs tools by the Network, or, in other words, the possibilities of advancing the process of sociotechnical mediation. That support makes it possible to strengthen community governance of Mumbuca E-dinheiro DCC, and E-dinheiro platform as a whole (moving towards the idea of "DCC as a commons"), for example including the CDBs as protagonists in their own project, designing their own requirements, data analysis and even source codes.

If in the beginning of the digitalization process, Palmas Bank and the CDBs Network seem to have been poorly guided by reflections and practices concerning software and their licenses, gradually both software and licenses have become part of their everyday life. An indication of the progress of understanding different digitalization processes and their effects was the recent issuing of the E-dinheiro Brazil card by the CDBs Network. As shown, the cards are artifacts reasonably disseminated for financial practices, even for poorer populations (especially in the urban outskirts of Brazil), and considered much more reliable than smartphones in the case of elderly people. We believe that a greater involvement of the CDBs in project requirements decision via processes like Solidarity Hackathons can provide other gains, not only for Mumbuca, in Maricá, but also for the whole CDBs Network.

The idea of Mumbuca E-dinheiro as a commons, concerning precisely the inclusion of the local communities in the process, is also connected to a testimony of the local CDB president, which highlights the importance of workshops to explain the apps functionalities and the possibilities that arise from using the app. "We were able to establish ties, whereby they [beneficiaries] started to understand the Bank's operation better." (SCIAMMARELLA, 2018, [our translation])

To continually improve the local community understanding of E-dinheiro is also important for the now traceable currency circulation analysis. For example, among the commercial establishments in Maricá, the social currency 'recirculation' practice is still merely incipient: the practice of quickly exchanging the local currency for Reals is disseminated (at least considering the top 15 stores that most accepted Mumbuca at the beginning of 2019). A hypothesis is that the period that Mumbuca circulated only via card (2014-2018), when that exchange was automatic, may have left habits in the local commercial practices - from 2018 on, the local trading businesses could, for example, pay their workers, suppliers, bills or even offer change in Mumbucas. In that regard, data analysis suggests that campaigns and workshops are needed to better explain the possibilities offered by the new digital platform to the local business network.

The organization of dynamics such as hackathons and workshops is connected with the concept of "DCC as a commons", once it is related to the engagement of the commoners in a collective activity (LAVAL, 2016 apud DISSAUX; FARE, 2017, p. 2). Organizing these processes in a task which is connected to practices of CDBs, such as autonomy and mediation practices, translated into a new (digitalized) scenario. In the one hand, the digitalization process had effects, for example in the financial autonomy of the CDBs. If we compare a version of digitalization offered by the Vale Shop card in Maricá with the E-dinheiro/MoneyCloud (and later with E-dinheiro owned by the CDBs), it can be seen that in the last version the resource retention is greater in the region: if Mumbuca/Vale Shop implied a 3% evasion of the community resources (paid to the card administrator in each purchase in the local business), the Mumbuca/E-dinheiro model presented an evasion reduction as it was limited to the maintenance costs of the platform – lower costs, because E-dinheiro is now owned by the CDBs Network. The current social currency digitalization is enabling the CDBs to acquire greater autonomy in relation to public entities. That is the case with Maricá, where, in a short period of time, the currency circulation resulted in the consolidation of an autonomous community fund detached from the City Hall budget. Therefore, the importance of digital transparency of CDBs is even greater. That greater 'financial autonomy' appears in the responses of a survey administered to the CDBs (FARIA, 2018) as an important change brought about by the digitalization via E-dinheiro – it was mentioned alongside the necessity for technology appropriation by the banks.

On the other hand, we would also like to highlight the category of mediation, a term utilized by Joaquim Melo to designate possible negotiations between the CDBs Network and other relevant actors (FARIA, 2018) (putting aside ideals, doctrines and purified utopias), and its connections with the source code dimensions discussed in this paper. The history of Brazilian CDBs is full of mediations (not all of them successful) that have made it possible for different types of local businesses, micro companies (such as ValeShop and MoneyCloud), phone companies, insurance companies, community associations etc. to coexist in a financial system. On the topic of digitalization processes, the first CDBs Network project included actors such as Palmas Bank, Caixa Econômica Federal, Mastercard and Vivo, and brought in unsatisfactory results for the Palmas Bank. It also brought with it the perception on the part of BACEN (the Brazilian Central Bank) that "closed platforms [...] would not survive and should not be encouraged" (DINIZ, 2013, p. 15). In both the Maricá and E-dinheiro cases, the negotiations with MoneyCloud established what was, perhaps, the most important mediation. The opportunity the company offered of digitalization of the CDBs social currencies started as a prototype at Palmas Bank and later spread to the whole CDBs network without, however, the expected return on investment (ROI) - from the point of view of MoneyCloud (FARIA, 2018). The crisis that threatened E-dinheiro's continuity was solved after the CDBs Network acquired the software, with resources mostly from the Brazilian Development Bank (BNDES). The purchase of E-dinheiro may be considered as an achievement for the CDBs Network as it made the social currencies more robust, now translated to the electronic payment method supported by BACEN legislation. Palmas Bank's evaluation, claiming that E-dinheiro was the possible mediation for the moment in which MoneyCloud entered its network, is that the partnership yielded important results – and we agree with this analysis.

However, considering possible negotiations between the utopia of DCC as a commons and the utopia of software as a commons, the improvement (or maybe even (re)doing) of the development community of E-dinheiro is an ongoing challenge. In the light of what we called 'instrumentalization' of the CDBs Network (concerning ICTs), its dialogue with projects that allow for different digitalizations can open concrete possibilities. For example, digitalization processes more connected to notions of solidarity economy and open software, such as social cryptocurrency projects (DINIZ et. Al, 2018). In that sense, a possible opening of E-dinheiro source code could connect the community banks with Brazilian software production collectives (MoneyCloud, PalmasLab, free software cooperatives, hackathon, etc.), which could, in turn, contribute with E-dinheiro.

We believe that in this paper, inspired by the pioneer work of Palmas Bank, adopted by the city of Maricá (RJ), we have pointed out how new mediations and autonomies are present in the digitalization processes of social currencies. Additionally, the paper shows that the challenge of improving the governance mechanisms of the digital currencies (concerning their requirements, data and source code) is perhaps "currently the more complex question" (MELO NETO SEGUNDO, 2018) for the CDBs Network as a whole. Finally, we call attention for a sociotechnical approach, in order to emphasize the indissociability between, on the one hand, the 'social practices' enunciated by the local communities or the CDBs Network community and, on the other, the materialities present in its community currencies digitalization processes.

Finally, regarding economic democracy, it is important to point out that the Brazilian Constitution states that "all power emanates from the people who exert it by means of elected representatives or directly" (sole paragraph, art.1º). The history of Brazilian Community Banks shows that democratic practices include not only disputing institutionalized politics power but also community mobilization in the sense of currency management as common goods. In addition we would argue that a fundamental dimension of economic democracy circulates through the code lines of the software installed in the MoneyCloud computers, which centralize the CDBs banks database; economic democracy could also circulate in the access of the young people from the PalmasLab team to those codes and databases. The sociotechnical arenas where the 'commons' are built ("le faire commun" (DISSAUX; FARE, 2017)) are also under dispute. The recent reports on the CDBs clearly show that every mediation, every translation that adds a new element to this network (whether they are a city's government, a company, a university, a card, a cellphone or a software) implies new (re)distributions of power.

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ENDNOTES

[1] To deepen the STS and socio-technical approaches (which are not the subject of this paper), please see classic works, such as Callon (1986) and Latour (1998). For more recent studies, see for example Mackenzie (2009) and Muniesa (2015).

[2] See more at https://www.independent.co.uk/news/world/americas/brazil-marica-universal-basic-income-money-social-currency-a9190226.html or https://basicincometoday.com/the-history-of-basic-income-in-brazil-and-how-the-city-of-marica-points-the-way-forward/ Consulted on: May 01, 2020.

[3] The enterprise originally was MadeApp, which developed the MoneyClip app (software used to implement the dIgital currency E-dinheiro). Afterwards, the owners opened the MoneyClip enterprise, which finally became MoneyCloud. For simplification, we use MoneyCloud here.

[4] For possibilities related to blockchain technology (and its governance) and community currencies, see for example Diniz, Cernev, Daneluzzi, Rodrigues (2018) and Diniz, Siqueira, Van Heck (2019).

[5] The authors lead or collaborate with LabIS. See more at https://is.cos.ufrj.br/labis/ . Consulted on: July 30, 2019.

[6] The Brazilian federal legislation (law 12865/2013) established that non-financial institutions (not formally recognized as banks, like CDBs) could manage electronic payment methods, and could be legally remunerated for this work.

[7] See more at http://bancossolidarios.global/. Consulted on: July 28, 2019.