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Digital complementary currencies and public policies during the COVID-19 pandemic

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Basic income programs have been used worldwide as a tool to mitigate the adverse effects of the COVID-19 pandemic. In Brazil, the implementation of federal emergency basic income initiatives faces a twofold challenge: money distribution logistics and eligibility criteria. This paper analyses the use of digital complementary currencies (DCC) to face these challenges. Complementary currencies have long existed in Brazil as part of community banks. The latter are institutions that operate at the local level and have better information regarding residents' needs. We present the case of Mumbuca E-Dinheiro, a DCC adopted by the municipality of Maricá (RJ), and discuss how this initiative has enabled quick and safe cash distribution aimed at mitigating the effects of the COVID-19 pandemic in Brazil. We suggest that, at present, basic emergency income could be distributed through the E-Dinheiro platform, starting with the municipalities in which it already operates and then expanding to others. Interoperability with other actors in the payment ecosystem and connections with local governments are additional actions to scale up the use of digital complementary currencies to combat the coronavirus crisis.

Keywords: COVID-19; digital complementary currency; social cash transfers; Mumbuca E-Dinheiro; basic emergency income; public policies.

Moedas complementares digitais e políticas públicas durante a crise da COVID-19

Programas de renda básica têm sido utilizados em todo o mundo como uma ferramenta para mitigar os efeitos adversos da crise da COVID-19. No Brasil, a implementação de iniciativas federais de renda básica emergencial (RBE) enfrenta um duplo desafio: a logística de distribuição de dinheiro e os critérios de elegibilidade dos cidadãos. No entanto, iniciativas de moedas complementares existem há muitos anos no Brasil, estando associadas especialmente aos bancos comunitários, os quais operam no nível local e possuem conhecimento mais aprofundado sobre as necessidades dos moradores. Este artigo analisa o uso de moedas digitais complementares no enfrentamento de desafios de distribuição de renda. Apresentamos o caso da moeda complementar digital Mumbuca E-Dinheiro, adotada pelo município de Maricá (RJ). Discutimos como esta iniciativa permitiu a distribuição de renda de forma rápida e segura com o objetivo de mitigar os efeitos da pandemia da COVID-19 no Brasil. Sugerimos que, no momento atual, a RBE poderia ser paga através do E-dinheiro, começando pelos municípios nos quais ele já atua e depois se expandindo para os demais. A interoperabilidade com outros atores do ecossistema de pagamentos e articulações com governos locais são medidas adicionais para dar escala ao uso das moedas complementares digitais no combate à crise do coronavírus.

Palavras-chave: COVID-19; moeda complementar digital; distribuição de renda; Mumbuca E-Dinheiro; renda básica emergencial; políticas públicas.

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Monedas complementarias digitales y políticas públicas durante la crisis de COVID-19

Los programas de ingresos básicos se han utilizado en todo el mundo como una herramienta para mitigar los efectos adversos de la crisis de COVID-19. En Brasil, la implementación de iniciativas federales de ingresos básicos de emergencia enfrenta un doble desafío: la logística de distribución de dinero y los criterios de elegibilidad de los ciudadanos. Las iniciativas monetarias complementarias han existido en Brasil durante muchos años y están asociadas especialmente con bancos comunitarios, instituciones que operan a nivel local y tienen un conocimiento más profundo sobre las necesidades de los residentes. Este artículo examina el uso de monedas complementarias digitales para enfrentar los desafíos de distribución de ingresos. Presentamos el caso de la moneda complementaria digital Mumbuca E-Dinheiro adoptada por el municipio de Maricá (RJ) y discutimos cómo esta iniciativa permitió la distribución de ingresos de manera rápida y segura para mitigar los efectos de la pandemia de COVID-19 en Brasil. Sugerimos que, en el momento actual, los ingresos básicos de emergencia podrían pagarse a través de la plataforma E-Dinheiro, comenzando por los municipios en que esta plataforma ya opera y luego expandiéndose a los demás. La interoperabilidad con otros actores del ecosistema de pagos y los vínculos con los gobiernos locales son medidas adicionales para ampliar el uso de monedas complementarias digitales en la lucha contra la crisis del coronavirus.

Palabras clave: COVID-19; moneda complementaria digital; distribución de ingresos; Mumbuca E-Dinheiro; ingreso básico de emergencia; políticas públicas.

1. INTRODUCTION

The latest coronavirus pandemic has caused numerous outbreaks of crisis that have spread rapidly to nearly all areas of human concern. The most notable part of the problems relates to the health and economic consequences of the crisis and the need for rapid response from the State is a common denominator. Nevertheless, there is a time lag between the formulation and the implementation of public policies that is incompatible with the pressing need to minimize the pandemic's consequences (Hudson, Hunter, & Peckham, 2019; Lotta & Gonzalez, 2020).

Basic income programs have been introduced worldwide aimed at mitigating the effects of the COVID-19 crisis (Jacob & Boyd, 2020; Tomazelli & Fernandes, 2020;). In Brazil, one of the major challenges to these programs has been the logistics of distribution, that is, the process of making the money arrive to the poor, who are those most affected by the crisis (Gonzalez & Cernev, 2020). Questions about how to disburse money without triggering agglomerations or how to identify those outside the 'Cadastro Único' remain open. More broadly, getting programs off the ground and making them available to people, locations or territories remains the biggest challenge (Lotta & Gonzalez, 2020).

In that sense, an initiative that can contribute towards enhancing the implementation of the emergency basic income (EBI) for mitigating the COVID-19 effects involves the complementary currencies (CC), also known as social, alternative or community currencies (in this paper all three terms will mean the same). CC serve specific or predefined communities and are conceived, issued and used by local agents (citizens, non-profit organizations, businesses etc.) in order to complement the national currency system (Diniz, Cernev, Daneluzzi, & Rodrigues, 2018; Meyer & Hudon, 2019). These alternative currencies are often developed to address societal needs that national currencies are not designed for (promoting local development, sustainable behavior, financial inclusion, community social capital, fighting social exclusion etc.) (Amato & Fantacci, 2020; Blanc, 2011; Joachin & Klopfer, 2014; Meyer & Hudon, 2019; Seyfang, 2004).

Digital complementary currencies (DCC) are those that integrate information technologies as a means of facilitating their circulation in the territory in which they operate (Alves, Diniz, Cernev, & Nascimento, 2014) and have three elements: an issuing agent, a digital medium and limited circulation (Diniz, Siqueira, & Van Heck, 2019).

This is the case of the DCC Mumbuca implemented by the Municipality of Maricá / RJ since 2013, being the first originally digital complementary currency in Brazil (Cernev & Proença, 2016). Initially designed to circulate with magnetic cards and point-of-sale devices (POS), Mumbuca enables easy and instant direct monthly transfer of conditional financial resources from the Municipality of Maricá to thousands of beneficiaries included in its assistance program (Alves et al., 2014) and it has improved payment logistics for low-income people.

Mumbuca and dozens of other CC initially based on paper money have become hybrid models of *mobile money* and *mobile payments* with the introduction of the digital platform and application E-Dinheiro developed and managed by the Instituto Banco Palmas and the Brazilian Network of Community Banks (Cernev, 2019; Cernev & Diniz, 2020). Mumbuca E-Dinheiro deserves a closer look when it comes to the implementation of a basic income scheme aimed at mitigating the COVID-19 crisis.

The next sections of this paper are structured as follows: section 2 describes CC and their characteristics, including potential social benefits; section 3 presents the case of DCC Mumbuca E-Dinheiro; section 4 discusses the potential of this initiative to overcome the problems of emergency cash transfers; section 5 discusses how to scale DCC initiatives to tackle the effects of the pandemic and section 6 outlines final considerations of this paper.

2. COMPLEMENTARY CURRENCIES

The monetary system and its associated currencies are a social creation that has been evolving in the course of the history of humanity and is, today, the most accepted trade and payment system worldwide. In this system, the State is the central actor in issuing the currency (Gómez & Demmler, 2018). Although these national (and 'official') currencies are widely accepted and institutionalized, some authors point out several disadvantages such as increases of economic and social disparities, speculation and accumulation, leading to unsustainable consumption patterns (Gómez & Demmler, 2018; Meyer & Hudon, 2019).

In that context emerges the phenomenon of complementary currencies, which act in a complementary manner with official currencies (Alcantara & Dick, 2017). They are new forms of monetary exchange that challenge "[...] the ontology of money and its functions in society, reviving the debate around the role of monetary systems at the service of the common interest [...]" (Meyer & Hudon, 2019, p.1).

The CC concept can be described as a monetary system that supplements official national or transnational currencies (Lietaer, 2001). This form of currency is conceived and issued by citizens, NGOs and companies as well as public administrations (Ingham, 2004; Meyer & Hudon, 2019). This type of currency is, in essence, used to trade goods and services which sometimes are not valued by the market-driven pricing system (Gomez & Helmsing, 2008; Meyer & Hudon, 2019).

The phenomenon is not new and has been observed in several countries for decades. More than 6,000 initiatives using CC have been created around the world (Diniz et al., 2019). These currencies are typically designed to address issues related to fighting social exclusion or promoting local sustainable development (Diniz et al., 2018).

For a long time, CC have been characterized by counter-cyclical behavior. This means that they have tended to be adopted in times of economic crisis when there is unemployment and restricted access to the mainstream financial systems for the most vulnerable population, thereby reducing their rate of adoption when the economic cycle improves (Diniz et al., 2018; Place, Calderon, Stodder, & Wallimann, 2018). However, in the last decade a steady growth has been observed worldwide. In France, for example, the number of such currencies jumped from 5 to 74, from 2010 to 2018, along with money supply and user numbers (Blanc & Lakócai, 2020). The emergence of DCC using blockchain technology, also called cryptocurrencies, suggests that complementary currencies might be entering a new era of consolidation (Uzureau, Furlonger, & Merji, 2019).

2.1 Complementary currencies and social benefits

Several forms of social benefits are being promoted with the use of complementary currencies. Articulations between civil society organizations and local governments have demonstrated the potential of complementary currencies as a way to alleviate social problems. Kobayashi, Miyazaki, and Yoshida (2017) found complementary currencies contributing to promotion of recycling, natural environment protection, civic activity, and other social benefits.

Some illustrative cases can demonstrate the potential of complementary currencies as a tool for social benefits. *Fureai Kippu* (meaning 'ticket for a caring relationship'), is a CC in Japan that provides credit for people, helping elderly people in the community (Diprose, 2020). 'Moeda Verde', in Santa Cruz da Esperança, state of São Paulo, Brazil, is a complementary currency that provides earnings to low-income families as well as educating young people in the benefits of the correct use of solid waste (França, Amato, Gonçalves, & Almeida, 2020).

In times of DCC and cryptocurrencies, projects designed for helping economic recovery after the COVID-19 crisis have started to show up. One example comes from impoverished communities of Mukuru, Kenya, where people who have run out of the country's official money due the epidemiological crises are still having access to basic goods by using *Sarafu*, a blockchain-based complementary currency (Chibwara, 2020).

Despite the great deal of independence from governments, most of the abovementioned examples depend on articulations with public policies. Blanc and Fare (2013), state that relationships between governments and their complementary currencies are complex and ambiguous. In those authors' opinion, local governments may promote payment in complementary currencies for a number of services, as a potentially powerful form of indirect support in the same way that the UK government recognized partnerships between complementary currency initiatives and different levels of government as an alternative to fight against poverty, expand health care assistance, create social bonds, promote environmental care and improve social services in general (Seyfang, 2006).

2.2 Complementary currencies in Brazil

In the Brazilian context, the so-called community development banks have played a leading role in the spread and expansion of the CC model (Diniz, Cernev, & Nascimento, 2016). The first community bank in Brazil, and the most well-known and widely studied, is Banco Palmas, founded in 1998 in the Palmeira neighborhood on the outskirts of city of Fortaleza (Ceará). The bank uses microcredit and the complementary currency 'Palma' as fundamental elements of its operation (Diniz et al., 2016).

Despite the achievements of Banco Palmas and its CC Palma, Diniz et al. (2016) found, alongside community development bank managers, a series of difficulties and problems in the daily use of physical complementary currencies. In that sense, information technology has begun to be considered as an alternative for improving physical CC, aiming to make them digital with the adoption of emerging technologies (Diniz et al., 2016).

In that perspective, Banco Palmas led the initiative to create the Brazilian Network of Community Banks (REDE) that is currently composed of 103 banks following the conceptual theoretical framework of community development banks (Instituto Banco Palmas, 2020). Along with REDE, Banco Palmas also founded the Institute 'E-Dinheiro Brasil' in November 2014 and a digital platform using mobile technology for complementary currencies that works as a digital checking account for complementary currency users and offers a variety of services.

More than just a digitalization of local CCs, E-Dinheiro is seen by leaders of community development banks (CDB) as a social technology to promote the solidarity economy, since it enables the creation of new CDBs and complementary currencies using a local microcomputer (Cernev & Diniz, 2020). Conceptually, E-Dinheiro is a hybrid model of mobile money and mobile payments (Cernev & Diniz, 2020) currently being adopted by 48 community development banks, including Banco Mumbuca, whose DCC Mumbuca will be presented below.

3. MUMBUCA E-DINHEIRO

The CC Mumbuca was released in December 2013, following a municipal regulation approved by the City Council of Maricá, in the State of Rio de Janeiro, Brazil (Faria, 2018). The Banco Comunitário Popular de Maricá (Banco Mumbuca) was hired to manage the operation of the DCC, delivering magnetic cards to beneficiaries and attracting local merchants to accept the Mumbuca card using POS machines (Alves et al., 2014).

Maricá is a location that forms part of the oil exploration area and, as a result, the municipality began receiving the respective royalties. In order to promote the economic development of the region and benefit low-income families, the local government of Maricá decided to create a community bank in the municipality. To that end, it contracted Banco Palmas Institute to start the activities of Banco Mumbuca.

The main idea of the community bank and its CC was to keep the royalties in circulation in the municipality, boosting the region's economy and development (Cernev & Proença, 2016; Cernev, 2019) through the allocation of part of the financial resources from oil royalties to low-income families in the municipality. Accordingly, the local government of Maricá informed the Banco Mumbuca who the active beneficiaries in its assistance programs were, according to their social and economic

situation, and transferred the financial resources to the bank, which, in turn, distributed them to families registered in the program.

After registering at Banco Mumbuca, the beneficiary received a digital account and a magnetic card. The card could be used for payment at several commercial establishments registered in the program. Both families and local business may be benefited, the first by an income increase and the second by sales increase (Alves et al., 2014; Cernev, 2019).

After six months of operation, Banco Mumbuca had engaged 104 local businesses (markets, pharmacies, water and gas distributors, construction stores, among others) and 7,576 beneficiaries of the municipality assistance program, who received R\$ 70.00 per month to spend in the network of accredited business. The monthly amount increased to R\$ 130.00 in July 2017 (Cernev, 2019).

In the first half of 2018, the Municipality of Maricá decided to improve the Mumbuca project by using the E-Dinheiro platform, already adopted by other community banks. With that change, Banco Mumbuca started to manage the project through a digital platform, [...] “from the issuance of the complementary currency to the contractual relationship with the agents involved” (Cernev, 2019, p. 4).

Users started using the E-Dinheiro application for a variety of financial transactions, from payments in local establishments to direct transfers between people. Due to potential restrictions on the use of the mobile app, the free issuance of new magnetic cards (replacing the previous one), always linked to a user account on the E-Dinheiro platform, was maintained as a complement to the application. This new Mumbuca card has NFC (near field communication) technology allowing contactless payments on the smartphone of the registered commercial establishment, eliminating the use of POS devices for transactions (Cernev, 2019). In addition to better usability, from a sanitary point of view, the new technologies have also enabled safer transactions.

With the adoption of E-Dinheiro, any resident of Maricá could open a pre-paid digital account to use Mumbuca as a mean of payment via the E-Dinheiro application. In 2018, the total number of open accounts was close to 23,000 (Banco Mumbuca, 2019). The number of transactions increased 50-fold, encouraging more local merchants to join E-Dinheiro and involving more than 1,300 registered business establishments (Cernev, 2019).

4. EMERGENCY BASIC INCOME AND THE CASE OF MUMBUCA E-DINHEIRO

With the advent of the COVID-19 pandemic, a set of economic measures specifically aims to minimize the financial impacts for the most affected population, especially the low income segment, including the unemployed, small merchants, informal workers and other people who are in a vulnerable situation. Emergency basic income schemes, directing financial resources to citizens have been adopted worldwide (Jacob & Boyd, 2020; Tomazelli & Fernandes, 2020).

In Brazil, the emergency basic income of R\$ 600 per month, announced by the Federal Government and approved by the Congress, must be paid by the Caixa Econômica Federal bank (Caixa) for 3 months. It is estimated that 30 million people are eligible. However, the latest news available reveals that more than 50 million people have already received the first installment of the benefit, which represents about 50% of the country's employed population.

The implementation involves two stages that need to be properly addressed (Gonzalez & Cernev, 2020): register/eligibility analysis and money disbursement logistics. First, it is necessary to register and analyze, even to a minimal extent, the eligibility, that is, the fulfillment of the predefined criteria for benefiting from the assistance. For instance, there are family income caps that must be met: a monthly family income of less than half the minimum wage per capita or three minimum wages in total and a maximum taxable income of R\$ 28,559.70 in 2018. This is a huge challenge, considering that only part of the potential beneficiaries of this emergency financial aid is currently registered in the Federal Government's 'Cadastro Único' database. Many people who are not included in the 'Cadastro Único', whose reference unit is the 'family' – a concept that can be fairly fluid (Ribeiro, 2017) –, are eligible for the emergency benefit. To overcome this challenge, Caixa developed and released a new mobile app (Caixa Auxílio Emergencial) so that people can claim such assistance by self-declaration. A few days later, Caixa launched a second mobile app (Caixa Tem), aimed at facilitating consultation and transactions of emergency resources.

The second stage is the effective disbursement or payment logistics. This is another challenge because, in addition to the limitations of the 'Cadastro Único', not all potential beneficiaries own or use bank accounts (Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess, 2018). According to Bader and Savoya (2013) "[...] the new logistics paradigm of the financial system demands a closer approach to the final customer [...]" (p. 210), and that "[...] approach can be achieved through partnerships with local actors [...]" (Gonzalez, Diniz, & Pozzebon, 2015). It must be noted that there is a difference between access (ownership) of financial services in general and bank accounts in particular (Aker, Boumnijel, McClelland, & Tierney, 2016). For the emergency basic income implemented in Brazil the solution to this challenge was to promote a fast expansion of bank usage, opening bank accounts exclusively at Caixa, to include these people.

Despite Caixa efforts, several problems have arisen. First, emergency resources are taking too long to reach those in need. Second, given the payment strategy adopted, long lines and agglomerations of people were found in bank branches and government agencies, the latter for updating non-valid national identities (CPFs); all this during a critical time when health authorities recommend social distancing. Third, eligibility has been challenged, as some receive unduly while others are not reached by the financial aid (Torrente, 2020).

In view of these problems, Banco Mumbuca underscores the value of complementary digital currencies in facing the effects of COVID-19. The emergency package implemented by the municipality of Maricá included a wide range of measures: temporary extension of the Mumbuca assistance benefit to R\$ 300 for three months; the anticipation of the Christmas bonus for 40 thousand beneficiaries (Prefeitura Municipal de Maricá, 2020a).

All payments have been made using the Mumbuca complementary currency, which has a one-to-one parity with the official Brazilian Real. The use of Mumbuca gains special relevance during the COVID-19 crisis as the transfer of resources and payments between people and local business entities can be done remotely or at least without physical contact, via mobile application or contactless NFC card.

Unlike the Federal Government initiative, municipal payments through DCC have reached out to beneficiaries in a timely fashion and without the need for human agglomeration and additional

risks to public health. The primary reason for this success involves the same dimensions previously described: prior knowledge of the beneficiaries' eligibility (citizens and small business owners), and the availability of an electronic payment instrument for citizens, both as a result of the existence and circulation of the digital complementary currency Mumbuca E-Dinheiro .

It is worth mentioning that Banco Mumbuca also offers microcredit denominated in digital complementary currency, which expands its usefulness since it can be used by people who are not beneficiaries of municipal programs (Cernev, 2019). This is related to the eligibility dimension as it involves a better knowledge of the local economy (Meyer & Hudon, 2019), including an updated database that enables the identification of the most fragile economic agents in this moment of crisis. In fact, Banco Mumbuca, with its experience in programs aimed at assisting families ('bolsa Mumbuca') and individuals ('Programas Gestante', 'Jovem Solidário' and 'Renda Básica de Cidadania') (Prefeitura Municipal de Maricá, 2020b), demonstrates the possibility of introducing a greater diversity of benefits to meet specific economic assistance policies. By going beyond payment systems, Mumbuca is promoting financial inclusion that can be defined as the access and use of financial products and services by the low-income population, generally excluded from the traditional financial system, in order to contribute to their quality of life (Mazumder & Lu, 2015; Roa, 2015; Sela, Gonzalez, & Christopoulos, 2020).

It should be noted that the contribution to cope with eligibility problems stems from proximity to the target audience (Gonzalez, Diniz, & Pozzebon, 2015). Such proximity, intrinsic to the social technology of community banks, is strengthened by the use of DCC, as previously highlighted in the speech by Joaquim Mello (Cernev & Diniz, 2020). In addition, the digital payment system of DCCs contributes to logistics (Bader & Savoya, 2013), and the mechanism of territorial action of DCCs contributes to local development. In essence, DCC, digital by definition, is directly related to logistics, although it also contributes to registration and eligibility.

The current pandemic and its effects represent a strong adverse shock, perhaps the greatest in generations, for all countries. The magnitudes of such shocks are distributed asymmetrically and significantly affect the low-income population. This occurs because precisely this population is the least protected by traditional market mechanisms, such as using accumulated savings or emergency loans (Morduch, 1999). The case of Mumbuca E-Dinheiro shows how the DCC, an integral part of CDB's social technology, can expand financial inclusion in order to contribute to mitigate the negative effects of this crisis for the poorest people, collaborating both in the dimension of eligibility and payment execution (logistics). If this experience of Maricá is replicated to other municipalities, it is possible that there will be greater success in making the emergency basic income reach those who need it.

5. SCALE UP MEASURES

Considering the magnitude of the crisis, government actions need to have the scale required to mitigate the pandemic's negative effects, especially for the low-income population. In the next item, concrete measures will be presented to provide a scale for solutions involving DCC and EBI, starting with those with greater ease of execution: articulating existing solutions, which are already operational and reach the desired target audience, in particular with the E-Dinheiro platform. It is worth mentioning

that the measures consider the two dimensions previously emphasized: registration / eligibility and payment execution / logistics.

5.1 Articulation with the technological and payments ecosystem

Technology is an effective way to scale network services (Diniz & Cernev, 2019). One way to broaden the reach of public solutions to combat the effects of the pandemic is through the adoption of different technologies, supported by different institutions and payment arrangements. However, both the development of new services – such as Caixa's new applications – and the process of adoption and effective use by users can encounter restrictions, requiring considerable time and additional effort to overcome them.

Therefore, what is appropriate at the moment is to articulate existing solutions that are already operational and reach the desired target audience. The technological platform E-Dinheiro, previously described, already serves thousands of low-income people in more than 40 municipalities across the country and is immediately scalable to serve more users, since the system operates in the cloud (cloud computing) using internet connection and mobile apps. In cloud computing, capacity addition or reduction – such as processing and storage – can be accomplished with a few clicks on a web-based dashboard with instant activation. Therefore, a first measure would be to implement the payment of EBI through E-Dinheiro in those municipalities in which the platform already operates, thereby contributing to the improvement of payment logistics at those locations.

A second measure would be to replicate E-Dinheiro to more locations, something that is technologically feasible since a microcomputer enabled in the location is sufficient to operate such a service (Cernev & Diniz, 2020). With the support of the existing CDB methodology and associated with the E-Dinheiro technology, the replication processes would be streamlined.

In addition, the idea of a countrywide solution is precisely anchored in the use of the plurality of existing local institutions (Gonzalez & Cernev, 2020), including local partners that could join the initiative, such as credit agents related to microfinance institutions of various parts of the country. These agents already have contact, experience, and interaction with the lower income population (Gonzalez et al., 2015). To accelerate the process, an alternative could also be to establish partnerships between the CDB network and the association that brings together the microcredit third sector organizations (ABCRED), which has already expressed an interest in collaborating for the implementation of the EBI (Bolzani, 2020).

It is worth mentioning that the measures above would decentralize EBI *modus operandi* in both registration/eligibility and payment execution. Instead of gathering at Caixa's branches, beneficiaries could also rely on CDB teams and credit agents.

A third measure would be to make the E-Dinheiro platform interoperable with other fintechs already consolidated in the market. From a technological point of view, integration would be fairly simple and fast, including, for example, banking services offered by Caixa. Thus, the EBI received on the E-Dinheiro platform could be transferred to user accounts and merchants at other banks or payment institutions. This would allow for bill payments, purchases, and transfers. In other words, digital accounts could be used to improve the payment logistics for emergency resources and their

subsequent use by the citizen, in a complementary and integrated way to the current governmental solution.

The interoperability of E-Dinheiro with other payment services and banks would provide a significant reduction in the time and effort to reach the intended target audience, given that these people already have access to some payment service, not necessarily banking (Gonzalez & Cernev, 2020). In a way, this proposed solution would be similar to the operation of the instant payment system, called PIX, led by the Central Bank of Brazil, which is expected to start operating at the end of 2020.

It would be opportune, at the present moment, to accelerate the implementation of the PIX. In this ecosystem of digital transfers operating around the clock, interoperability between banks and fintechs with more than 500 thousand customers is a central feature. That is, it would be faster and easier to send funds via digital or bank accounts. The beneficiaries, in turn, could also make remote payments or direct transfers between people (P2P), reducing the need to transact with paper money or cards and, therefore, the risk of virus transmission. The challenge would be to accelerate the technological development of the agents involved, fintechs and banks, something that is already part of the daily routine of these organizations.

For the articulation with the technology and payments ecosystem to be effective, these agents would need to integrate the Federal Government's strategy to combat the effects of the pandemic, complementing it on several fronts, preferably with the articulation of local governments. Several institutions and payment arrangements have already volunteered to support, some free of charge, emergency initiatives (UOL Debate, 2020), including the managers of Rede and E-Dinheiro.

5.2. Articulation with local governments

A second front of action aiming at scaling the EBI transfer through DCC initiatives is based on the establishment of articulations with local governments. This relationship with different subnational governments can be established in three main areas: (i) support/technical support for complementary digital currency initiatives; (ii) the integration of these digital currencies with public services; and (iii) the establishment of regulation (legal framework) at the subnational level (Blanc & Fare, 2013).

In the first aspect, the assistance and support mentioned above could be achieved through, for example, agreements establishing the payment (totally or partially) of employees' salary and payment of general expenses in DCC. Local governments could also offer facilities and equipment to disseminate information and create networks, among other initiatives (Blanc & Fare, 2013).

As for the second aspect, the integration of complementary currencies in public policies, it is based on the recognition of the potential of these schemes as instruments to achieve certain objectives of the local government. These objectives can be categorized as social, environmental, and economic. Considering the case of emergency EBI in Brazil, E-Dinheiro and other complementary currencies can be used by local governments to distribute financial aid to a specific audience (people in a situation of vulnerability, low-income families or other target audience) or provide credit for paying specific goods or services, such as taxes and local products (Blanc & Fare, 2013). Barmes and Boait (2020) state that a fundamental characteristic for the success of complementary currencies is that local governments accept them, at least in part, for tax payments. These initiatives can contribute to the use of DCC on a larger scale. In addition, this proximity to the CDB may yield other indirect benefits, such as the

incentive to local trade, if the fiduciary currency is converted into local currency (DCC), exactly what happens in the case of Mumbuca E-Dinheiro.

The third aspect involves the establishment of a regulatory framework for these currencies, legally recognizing their role through statutes, laws and decrees or even giving them a special treatment in terms of taxes (Blanc & Fare, 2013). In Brazil, although the Central Bank published a legal note PGBC-5927/2011 (Banco Central do Brasil [BACEN], 2011) configuring the legality of complementary currencies, there is still no specific legislation or regulation. The complementary bill 93/2007, for the creation of the National Segment of Popular and Solidarity Finances, expands the possibilities of community development banks, including the competence to issue complementary currency, but it has been in process in the House of Representatives for more than 12 years. This lack of a legal basis for complementary currencies and the community development banks that issue them compromises the system, leaving them in a gray area, without legal security or recognition, discouraging their adoption by local governments (Blanc & Fare, 2013).

That is precisely why the case of Mumbuca E-Dinheiro stands out; unlike other complementary currencies linked to REDE, it has a specific regulation defined by the municipality of Maricá (Municipal Solidarity Economy Program) that legalizes and institutionalizes the use of DCC as an effective instrument of public policy in the municipality (Município de Maricá, 2013).

6. FINAL REMARKS

The current COVID-19 pandemic poses health and economic challenges for governments at all levels. Given the magnitude of the crisis, multiple policies will have to be implemented to alleviate the negative effects of the crisis. The idea of a solution for the whole country is precisely to use the plurality of existing local institutions, including community development banks, but also cooperatives, microfinance institutions, fintechs and other organizations operating at the local level. Furthermore, technology is fundamental for leveraging policy effects during and in the aftermath of the crisis.

Basic income policies during the pandemic face the challenge of making cash transfers in an agile and effective way and DCC greatly facilitate payment logistics. The case of Mumbuca E-Dinheiro demonstrates how the use of these resources, along with community development banks infrastructure and social technology can address some of these challenges by better knowing how to identify and analyze those who are eligible and by being able to quickly and safely disburse resources.

Some concrete measures to scale up the DCC mechanisms would involve paying EBI through E-Dinheiro in the municipalities in which the latter already operates. Another measure would be the replication of E-Dinheiro to other municipalities and interoperability with other actors in the payment ecosystem. In addition, articulations with local governments are important for the expansion of the DCC in combating the crisis, whose effects on the economy might go far beyond the time period portrayed by the epidemiological curve.

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