Is the US Dollar Going Digital?

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Interdisciplinary Theory and Concepts

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The use of paper currency and coins are on the decline and digital currency is making its way up as one of the top methods of payment. As technologies are emerging, the US government has a duty to keep up with other countries' tools and innovations, such as China's digital Yuan. The purpose of this research paper is to examine in an interdisciplinary approach if the US Dollar is going digital with a new bank forming to hold digital funds. Mathematics, economics, and philosophy are the three disciplines that will investigate the topic integrating their perspectives, assumptions, concepts, and theories to form our own conclusion of the topic question. The economics discipline's point of view is digital money, and a digital currency bank (CBDC) has the potential to revolutionize financial and banking sectors. The mathematics discipline's outlook is a cryptocurrency, such as Bitcoin, maintains, and verifies transaction data on the blockchain ledger. The philosophy discipline's viewpoint is virtual currencies offer new opportunities for the "unbanked" people. The common ground between the three disciplines is digital currency is not a foreign term or idea anymore, and in fact, it is a secure form of payment option although, it has not replaced the US Dollar, yet. With this type of currency on the rise, Central Bank Digital Currency will be the new bank for regulating virtual funds.

Unlike traditional research approaches, an interdisciplinary approach expands the perspective from one discipline to more than two, allowing for a broader explanation from different fields, and to form a better understanding of the topic or research question. An interdisciplinary approach is important to this research topic because with only one or two disciplines being the source of investigation, a thorough evaluation cannot be completed. With an interdisciplinary approach, the ability to see the full picture from the social side, from the

math side, specifically, how it functions, and from the banking side can be seen without a biased interpretation.

Keywords: Digital currency; CBDC; fiat; US Dollar; blockchain

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Digital Currencies

Digital or virtual currencies are any type of money or disbursements that are only in electronic form. There are two types of networks that digital currencies operate with; centralized and decentralized. Centralized network is defined as a central agency controlling the network. Decentralized network is not controlled by a central agency but distributed by its users. “When currencies are both convertible and decentralized, they are collectively referred to as cryptocurrencies” (Kethineni & Cao, 2020). A cryptocurrency, such as Bitcoin, is one of the widely known protocols that uses the shared and public blockchain to report trades on the ledger. “The mining/validation technique creates a cryptographic link between blocks (transactions) by employing a hash function and a “Proof of Work”” (Sharma, 2021).

The mathematics discipline defines digital currency, also known as cryptocurrencies, as “Protected by sophisticated cryptography much more secure than conventional cryptography’s usage of monetary products and services. Classical hash functions, for instance digital signatures using elliptic curves and SHA256 ECDSA is being used as the search algorithm” (Sharma, 2021). And defines Bitcoin as, “A mathematical method on a network that maintains transaction data and establishes majority consensus among the users. Thus, if the majority of people are being truthful, we’ll receive an accurate result” (Sharma, 2021). With a digital currency like Bitcoin, this protocol can give those who are oversees, the ability to transfer money instantly to their loved ones here in the US.

The philosophy’s discipline think virtual currency presents new openings in an evolving economy. “In the context of emerging economies, blockchain technology offers new opportunities for the two billion “unbanked” people in the world and could serve as an important

leapfrog technology in both monetary applications and digital asset registries" (Swan & Filippi, 2017). Although, this type of currency is known to be subject to illegal activities, "Most perpetrators get involved with cryptocurrency activities using exchanges to launder their money. It is possible to trace a few steps for fund moving, but it would be difficult for regulatory bodies to confirm the identity and final destination of the capital flow" (Lee et al., 2019).

On the economics side, "One benefit associated with digital currencies is their potential to revolutionize the financial and banking sectors. They can also enhance efficiency of payments, lower costs of transactions for both transfers of funds and payments, facilitate transactions and increase participation in the financial system" (Fanusie & Robinson, 2018). But argue that specific information that banks usually require are unknown. "Traditionally, the major financial data are under the control of financial institutions within the reach of public authorities. However, in the use of decentralized cryptocurrency, relative information, such as capital flow, names of users, and usage of the capital are all beyond the knowledge and governance of the state" (Guo, 2022). Lastly, the mathematics discipline says, "This payment diversity is, however, coincidence with the decline of the use of cash as a means of payment due to the COVID-19 pandemic. The wish to avoid coronavirus transmission through bank notes and coins has accelerated a shift from cash to digital transactions" (Syarifuddin & Bakhtiar, 2022).

Issuance of Digital Currency

We now explore the issuance of digital currencies and how other nations are contemplating on producing their own to issue and manage among their citizens. The economics explain, "The market for digital currencies has been evolving rapidly, and in the recent past, digital currencies have become more of the norm and not just the exception" (Huang, 2021). Along with, "Different countries across the world tend to approach the issue of issuance and use

of digital currencies differently depending to a large extent on whether they consider these digital currencies as just an alternative form of currency that compliments the conventional (fiat) currency or as unique form of currency that can be used instead of the conventional (fiat) currency" (Fanusie & Robinson, 2018). The philosophies say, "As part of the increasing complexity of value exchange systems, countries are exploring the possibilities of issuing their own digital currencies, such as the crypto yuan which is expected to be fully backed by the central bank of China" (Mukherjee, 2019). The mathematics have described the rising popularity of digital currency as, "The use of digital currency is increasingly gaining a place among the world's population, so much so that there are 2,486 types of digital currency on record" (Fokri, 2021).

Introducing a CBDC

We begin to talk about introducing a CBDC and what it entails for a nation such as the US. CBDC stands for Central Bank Digital Currency, it is the digital form of a nation's sanction exchange that is also a contention on the central bank, as an alternative of printing money, the central bank issues electronic coins or accounts supported by the full trust and confidence of the government. The reasons a central bank would anticipate on a Central Bank Digital Currency are to guarantee payment elasticity, avoid private sector monopolies in the payment market, and improve fiscal authority. The economics side explains the usage of a Central Bank Digital Currency as, "An efficient medium of exchange, a secure store of value, an alternative unit of account, it can lead to a decrease in the demand for paper currency, CBDC can enhance monetary policy, CBDC can compete with paper money and reduce the cost of producing and managing cash in the economy" (Ozili, 2022).

The philosophies describe the effects of a CBDC as, “First, CBDC would decrease the structural power of banks, since the economic system would be less reliant on the stability of private banking. Second, CBDC could reduce the infrastructural power of banks and thereby help central banks to regain control over their monetary policy” (Larue, Fontan, & Sandberg, 2020). The mathematics describe CBDC as national currency, “The national currency offers the most common usage within a nation, e.g., purchasing and selling goods and services, paying taxes, and saving for retirement” (Wang & Hausken, 2021). And describe CBDC as, “The research on digital currency has gradually changed from its decentralized characteristics to the legal tender which is based on the central bank. It is believed that CBDC is an inevitable trend of the evolution of monetary form in the era of digital economy” (Zou, 2021).

Challenges that a CBDC faces are people could take out too much money from banks at one time by buying CBDCs, initiating a run on banks – impacting their capability to lend and transmitting a surprise to interest rates. CBDCs also have operational dangers since they are susceptible to cyber-attacks and need to be made strong against them. The expectations of CBDCs are privacy, buyer protection, and anti-money laundering principles which need to be made more vigorous before embracing this technology. Finally, there are national security repercussions of a CBDC, it involves new payment system generating externalities that influence day to day lives of people and can endanger the national security objectives of the US.

CBDCs can limit the US’s power to follow cross-border movements and impose sanctions. Eventually, the lack of US leadership and standards background can have geopolitical penalties, especially if China and other countries retain their first-mover advantage in the expansion of CBDCs. US has a duty/responsibility to keep up with other nations’ innovations, technologies, philosophies, and economies or they could be left in the dust and fall behind.

As shown in Figure 1, Brazil, has launched their own digital currency with a central bank digital currency regulating it. China is in the pilot stage of their CBDC development along with Sweden, Ukraine, South Korea, and Thailand. Canada is in the development stage along with Venezuela, South Africa, and France. US is in the research stage along with Chile, Australia, Madagascar, Kenya, Ghana, Tunisia, India, Pakistan, Iran, Turkey, Kazakhstan, Germany, UK, Iceland, New Zealand, Russia, Norway, Indonesia, parts of the Philippines and Papua New Guinea, Kuala Lumpur, and Cambodia. If the US does not make efforts in completing the research process, Brazil and China will be the leading nations with a CBDC. This could become a threat to national security if the US dollar lost its spot as the dominant currency of the world. The US government will do everything in its power to avoid other nations surpassing them.

Common Grounds

"Creating common ground is like building a bridge to span a chasm. The near side is the place of conflicting insights and the lack of common language; the opposite side is the product of the process of integration: the more comprehensive understanding. Unless the interdisciplinarian first builds the bridge of common ground to connect the two sides, the integrative enterprise cannot succeed" (Repko & Szostak, 2021, p.270). We begin to "build a bridge to span a chasm" by identifying common terminology in the disciplines. The mathematical and philosophy disciplines identify this form of money as cryptocurrency or digital assets while the economics refer to it as digital currency. They all are describing the same thing in this sense and the different terms they use point to the definition of virtual currency.

Next, we can form common ground between all disciplines with their assumptions and concepts. All three disciplines state that digital currency is in effect and that it is a form of payment, hence, it is not a foreign term or idea as it was a decade ago, and in fact, it is on the rise

in the economy. Between the economics and philosophies, they both can agree on digital currency having the potential to transform the financial sectors and providing new opportunity for participation in the economy monetarily. All disciplines can also come to an agreement on how digital currencies are progressively expanding, along with advancing quickly, and evidence shows not just in the US but through other nations.

Most Americans already are associated with a bank to hold their funds, even those who use cash the most still have to pull their funds out of their account to use the cash physically, so this is something all disciplines can agree on. Today, most of the same individuals who have a bank account are using Venmo or CashApp to send money to others for exchange of a service or a product because of the simple matter of how easy it is, how fast it is to send it, and transfer over into one's bank account. Digital transactions are popular today along with online shopping especially, Amazon, because of how easy it is to navigate, find the things you want or need, and how anyone can send the items bought anywhere in the US. The direction I am going with these statements is that Americans already are familiar with digital transactions and online shopping, so having a digital currency to conduct those transactions is the trend we are on and are going to be seeing soon in the US.

Conclusion

A more comprehensive understanding is presented here from the three disciplines with reasons to believe that the US dollar is going digital with the information presented from recent scholarly journals and articles. I agree with digital currency and its properties that give humans the ability to have a better life with its conveniency, how there is no discrimination, and how there is equality. It opens doors for those who otherwise would not have doors open. Digital currency is reported to be a secure form of payment with its sophisticated cryptography, and

anyone and everyone can look on the public ledger to see all transactions therefore, it is transparent to all users along with its capabilities of being instantaneous for all transactions. It offers new opportunities for the unbanked individuals to join the economy financially with digital currency. The US will not stand to be left behind in the CBDC race between other nations and must stay ahead of technological innovations while keeping the US exchange as the world's number one reserve currency.

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Figure

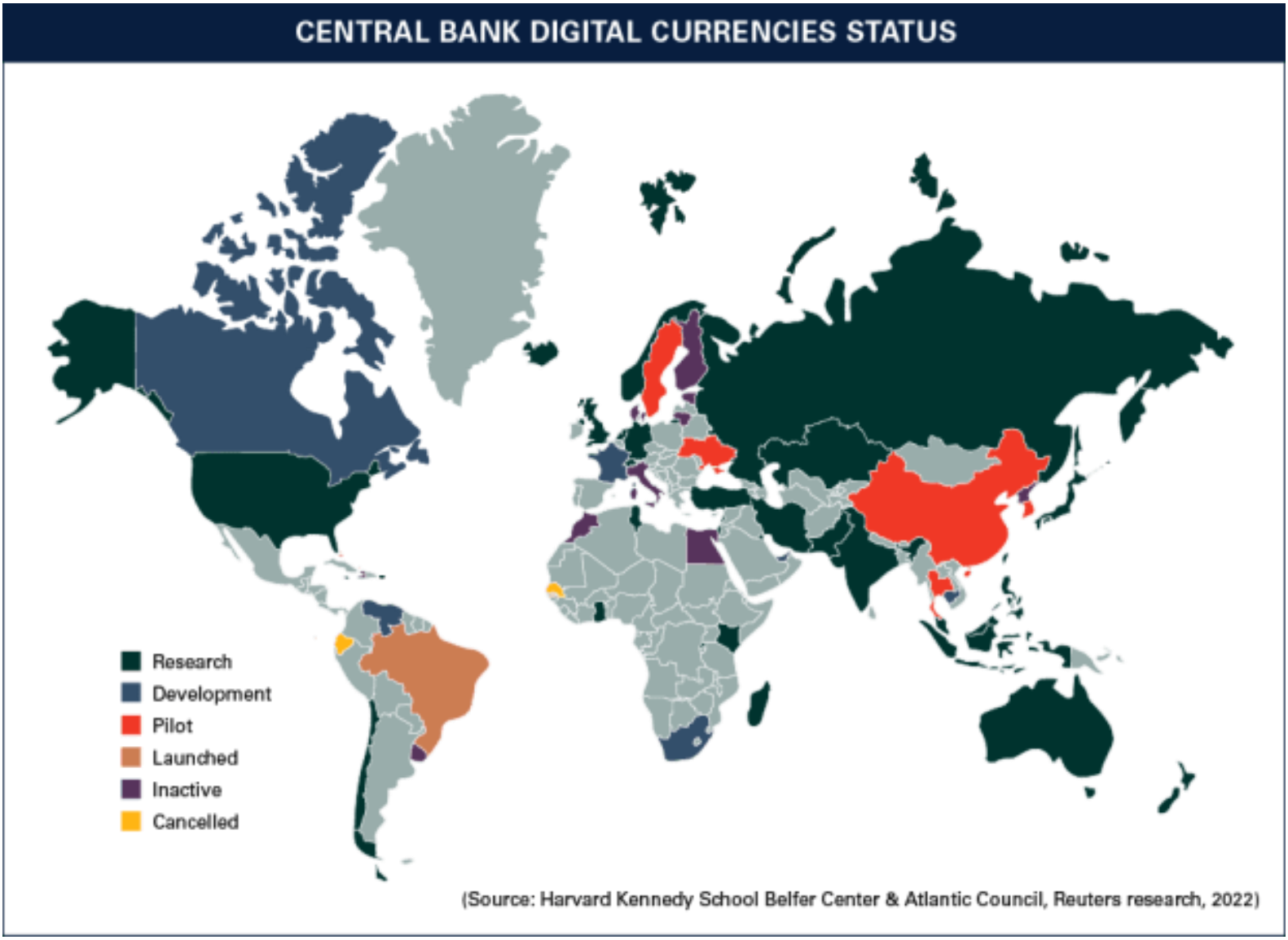

Figure 1: Status on CBDC of Neighboring Nations

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