

Implementation of National Digital Currencies on the Practical Experience of the Republic of Turkey



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INTRODUCTION

In 2022, the global economic space is seeing dramatic changes in current economic activity and financial instruments, which are used by both small companies and leading corporate giants. Technological progress in the field of digitalization and the emergence of private digital currencies have accelerated the digital transformation of traditional forms of monetary settlement. There is a need for the prompt implementation of an effective financial project that would help achieve the goals of digitalization of financial services and economic activity, expanding access to financial services, and developing innovative technologies.

Along with the growing demand for fast, cheap and transparent online transfers without geographical and time restrictions and the introduction of instant payment systems, the search for forms of application of artificial intelligence, the development of cloud technologies, electronic payment systems, private digital currencies, biometrics, robotization, peer-to-peer P2P networks, the actual is the creation of its own digital currency, independent of the dollar, the only issuer of which are local central banks.

In this research material, the author's goal is to carefully analyze the key characteristics of a modern reserve means of payment - digital (electronic) currencies of the central banks of the Central Bank Digital Currency (CBDC), assess the effectiveness of their emission in the activities of modern financial institutions and study the directions of their influence on the global monetary and payment systems in general and the Republic of Turkey in particular.

BACKGROUND

The study set the task of substantiating the reasons that necessitated the transition to a new format of monetary payments, considering the practical experience of the Republic of Turkey in the implementation of the digital Turkish lira, focusing on the specific features of the introduction of digital currency in the country in question and presenting a predictive scenario for the development of digital currencies in the world.

Based on the open reporting data of the Bank for International Settlements (BIS) for 2021, the Islamic Financial Services Board (IFSB) for 2021 and 2022, the large Spanish bank Banco Bilbao Vizcaya Argentaria (BBVA), the international consulting company Deloitte, studies of large foreign and Russian experts in economics, finance, digital technologies, the author will analyze the advantages and disadvantages of the introduction of digital currencies, as well as assess the potential prospects for the further introduction of digital currencies of central banks.

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According to the 2022 BIS Survey on Central Bank Digital Currencies conducted by Monetary and Economics specialists A. Kosse and I. Mattei, out of 81 central banking institutions surveyed in autumn 2021 working on the planning, piloting, testing process, launch of pilot projects of digital currencies, 9 out of 10 central banks are at the stage of researching digital currencies and plan to issue their own digital currencies in the near future, and more than half have already begun implementing programs to introduce new forms of electronic money settlements. In general, according to BIS experts, 90% of surveyed banking institutions are involved in the launch of central currencies “in one form or another.” According to experts, the key factors motivating the rapid implementation of CBDC are the acquisition of financial stability and the solution of one of the “pain points” of the modern economy - an increase in the current chains of cross-border payments.

BBVA experts call one of the factors stimulating the emergence of digital currencies the functioning of the global economic markets of cryptocurrencies. One of the risks of the development of CBDC experts recognize “a significant increase in the size of digital currencies, which will expand the role of central banking organizations” far beyond their current functions.

Deloitte representatives consider digital currencies a “key link” in transferring the values of innovative digital development in the field of payments and note that as of 2022, most central banks are at various stages of evaluating the possibility of launching their own national digital currencies. Deloitte experts also cite the development of cryptocurrencies as a new asset class and overcoming the consequences of the COVID-19 pandemic as factors in the growth of interest in digital currencies. Deloitte recognizes the largest APAC (Asia-Pacific) cities as leaders in the implementation of CBDC, including Shanghai, Hong Kong, Singapore, Seoul, etc.

O. Freiman gives a pessimistic forecast for the development of the digital currency market, according to which “central bank digital currencies may mean the end of democracy” due to the fact that “the authorities will be able to fully control the finances of their citizens”. Despite the fact that the expert recognizes the ability of digital currencies of central banks to influence the renewal of the national financial infrastructure, the possibility of restricting citizens in the purchase of any goods, services and solutions, the expert considers the development of a new format of monetary settlements to be dangerous.

The negative opinion of a colleague is supported by K.O. Peterson, who believes that a central bank digital currency “could lead to the collapse of most private digital currencies that are not issued by a central bank or monetary authority” (Peterson, et al., 2022). As an example of a private digital currency, which will be under threat with the introduction of CBDC, the expert cites bitcoin. According to K.O. Peterson, the credibility of cryptocurrencies with the introduction of CBDC will be undermined.

The Russian expert O.M. disagrees with the opinion of his colleague. Akimov (Akimov, et al., 2020), who considers central bank digital money to be more flexible and reliable for consumers than private cryptocurrencies. V.U. Petrov notes that the latter have serious “security gaps” (Petrov, et al., 2018).

Cautious views on CBDC are still an unpopular trend in the expert and scientific communities. Most experts are of the opinion about the positive impact of new technologies on the financial and monetary policy of the state and the social well-being of citizens. For example, the first step towards the introduction of a “new global monetary system” (Wang, 2021, pp. 18) is the introduction of a digital currency, Deputy Director of the Institute of Economics and Business Administration at the Normal University of Central China H. Wang (Wang, 2021). The expert also notes the deterrent effect of central bank e-currencies on “American financial hegemony” (Wang, 2021, pp. 18).

The point of view of a colleague is supported by analysts R. Auer, J. Frost, L. Gambacorta, C. Monnet, T. Rice, H.S. Shin (Auer, et al., 2022), emphasizing both the growth of scientific interest and

economic research about digital currencies, and the latest “developments in the field of electronic bank currencies” (Auer, et al., 2022).

L. Tan, X. Liyan (Tan, et al., 2021) cite “the rapid growth of global non-cash transactions” and “the outbreak of COVID-19 in 2020” as key factors driving the industry’s widespread attention to digital currencies. (Tan, Liyan, 2021).

Y. Wang, B.M. Lucy, S.A. Vigne, L. Yarovaya call digital currencies “a barometer for a new era of digital currencies” (Wang, et al., 2022, pp. 1-2), and their Italian colleagues I. Agur, A. Ari, G.D. Ariccia (Agur, et al., 2022), analyzing the features of CBDC implementation, pays special attention to the fact that when developing digital currencies, it is possible to use attributes characteristic of traditional fiat money and cash (Agur, et al., 2022). Experts consider deposits to be the main competitor of digital currencies of central banks.

Turkish specialist P.K Ozili (Ozili, 2022, p. 1) agrees with experts from Italy, who emphasizes that digital currencies have “attributes similar to cash”, and points out the improvement of monetary policy, the increase in efficiency of digital payments, expanding access to innovative financial services.

D.A. Kochergin, A.I. Yangirova (Kochergin, et al., 2019) note two possible forms of issuing central bank digital currencies – for use in retail and wholesale payments. Experts propose to classify digital currencies of various countries based on such key characteristics as the level of anonymity, the method of integration into the monetary system, the method of emission and the principle of mutual settlements.

Russian expert A.A. Sitnik cites the lack of absolute anonymity inherent in their competitors - cryptocurrencies, increased competition with traditional deposits in large systemic banks, insufficient information and financial literacy and the degree of readiness to master new technologies for both ordinary users and implementation managers, as well as high cybersecurity risks. The expert insists that the introduction of central bank digital currencies should be accompanied by a “balanced” (Sitnik, 2020, p. 186) monetary policy that will ensure the stability of the national currency and the country’s monetary system.

The author supports the opinion of foreign and Russian colleagues and experts on the need for thoughtful implementation of CBDC, a careful study of the goals and objectives of implementation that a particular financial institution faces, and large-scale testing activities before the final launch of new currency formats. There is no doubt that the implementation of digital central currencies in a particular country should be accompanied by the development of regulatory legal mechanisms and the support of digital currency by institutional organizations (telecommunication operators, payment platforms, video hosting, integrators, wholesalers and retailers).

FOCUS OF THE ARTICLE

Digital Currencies of our Time:

Background

An active search for relevant forms of funds that can be realized both in domestic markets and for making cross-border payments is due to the global transformations of world financial markets. The ongoing COVID-19 pandemic and the emergence of new mutations of the coronavirus, the stagnation of large industrial production, a sharp decrease in the income of individuals and legal entities, the remote mode of work and professional activity, a long recovery period for both developing countries and remote regions, and for major world powers, falling popularity of traditional paper money due to the spread of new for-

mats of payment for products and services and the expansion of Internet technologies, a sharp increase in oil, gas and commodity prices in the second decade of 2022, “global supply chain failure, high risk of potential geopolitical conflicts demanded fundamental changes in the global financial system. The ability to issue their own digital currency today is becoming a “key element of state sovereignty”, which the world’s leading governments do not plan to shift to the fledgling shoulders of private companies.

Digital currencies and stages of their implementation:

World Experience

The procedure for implementing CBDC in different countries is not identical: from researching the potential of new formats of monetary settlements and discussing the permissibility of issuing original digital currencies by competent advisory councils (Germany) to starting approbation and pilot testing in real economic conditions with a revision of current legislative projects and the development of relevant regulatory frameworks (France, England, Spain, Brazil, Australia, USA, Canada, Japan, India, Hong Kong, Sweden, Norway, Israel, Russia, Georgia, Kazakhstan, Azerbaijan), pilot introduction and active exploitation of central currencies (South Korea, China, Argentina and etc.). The individual names of the new money in different countries are presented below (Table 1).

Interest in digital currencies is under discussion in Brazil, Australia, Norway. The relevance and potential effectiveness of the implementation of CBDC is estimated so highly that even the governments of underdeveloped regions (third world countries) experiencing long-term financial, political, economic and social difficulties (Iraq, Cambodia, Bangladesh, etc.) show open interest in the operation of a new digital currency.

CBDC and practical experience of the Republic of Turkey

The initiatives of The Turkish Republic Central Bank (CBRT) in the implementation of the circulation and issue of its own central currency are especially interesting, and here’s why. Representing, according to IFSB experts, “a key Islamic financial jurisdiction”, along with Indonesia, Kuwait, Bahrain and Bangladesh, the Republic of Turkey is focusing its efforts on creating a comprehensive technological infrastructure that can provide both the convenience of using a new type of currency for all categories of citizens, and the safety and reliability of its operation, as well as the compliance of the implemented technologies with the existing economic, legal and financial requirements of regulatory aspects in the implementation of the digital Turkish lira.

To consolidate efforts in the development of the national digital currency, CBRT in September 2021 draws up an agreement with technological and defense institutions: the TUBITAK Scientific and Technical Research Council of Turkey, Aselsan and Havelsan companies, local research institutions of higher education. In the course of research, experiments and pilot testing of its own digital currency, the Turkish government attracts technology partners, competent engineers and specialists in the field of data, digital technologies, financial experts. To study the legal and regulatory framework of the new format of funds, the advantages and problematic aspects of development, technological requirements and economic aspects of implementation, a “Digital Cooperation Platform in Turkish Lira” is being created, a specialized department of financial innovations is being opened, and the so-called. “road map” to facilitate the introduction of a new format of funds.

Table 1. List of countries approving or testing their own digital currencies, as of August 2022 (BIS Papers, 2022)



Country	The name of the digital currency
China	E-CNY (Electronic Chinese Yuan)
Iran	PayMon
Russia	Digital ruble
Sweden	e-krona
France	Digital Euro
Spain	Digital Euro
Netherlands	DNBCoin
Japan	Digital yen
South Korea	Digital won
Canada	Jasper
South Africa	Khokha
Thailand	Inthanon
Hong Kong	e-HKD
Tunisia	e-Dinar
Senegal	eCFA
Bahamas	Sand Dollar
Venezuela	Petro
Singapore	Ubin
Israel	Digital shekel
India	Digital rupee
Uruguay	e-Peso
Great Britain	Digital pound sterling
Belgium	KBC Coin
USA	Digital dollar
Turkey	Turkcoin
Georgia	Digital lari
Kazakhstan	Digital tenge
Azerbaijan	Electronic manat

As of 2022, a limited pilot test of the digital Turkish lira is underway in the Republic of Turkey (a digital lira pilot program in Turkey began in 2018). Based on the results of the completion of the tests of the first stage at the end of 2022, the results will be summed up and a final decision will be made on the advisability of introducing an alternative payment infrastructure to the traditional one, the potential advantages of the digital Turkish lira and possible restrictions on its active distribution.

SOLUTIONS AND RECOMMENDATIONS

Obstacles to the successful implementation of digital currencies in Turkey may be the conservatism of local residents, low computer and information literacy among residents of remote regions of Turkey, the need to quickly address acute issues of cybersecurity and operational sustainability, the inability to manage large flows of digital currency funds. The authors of the Islamic Financial Services Industry (IFSI) Stability Report 2022 also draw attention to the key role of environmental, social and governance factors (ESG): unprecedented climate change affects all areas of modern life, including the investment and banking climate, formation of investment portfolios of insurance companies.

Being issued in the space of both open and closed networks of distributed registries, a new form of monetary settlements is designed to stimulate the growth of the world's national economies and break the dollar hegemony. For the Republic of Turkey, which today is facing "a high rate of currency depreciation in US dollars", this becomes a particularly important task.

FUTURE RESEARCH DIRECTIONS

It should be noted that the dangerous coronavirus pandemic has increased the vulnerability of the global financial system and created problems for the regulatory framework and cybersecurity. The need to find an effective solution to these problems requires consolidated and prompt actions from the expert and scientific community: the development of large-scale scientific and expert research, which will include studying the opinions of potential users of digital currencies of central banks and real users of existing private cryptocurrencies, formulating ways to overcome obstacles that hinder the introduction of digital currencies of central banks in a particular region, analysis of the specific features of implementation according to geographical, national, economic and social characteristics. The search for an optimal scheme for the introduction of digital currencies, obtaining empirical data on the impact of digital currencies on the cost of issued credit products, the need to conduct regional case studies to study the specifics of the introduction of digital currencies in a particular region/country should be mentioned as necessary for studying the factors of the development of digital currencies.

CONCLUSION

The advantages of the digital Turkish lira are the introduction of the principle of regulatory oversight, a high degree of security due to computer encryption with established criteria for user admission, a digital identity infrastructure and additional levels of confidentiality, accessibility to all categories of users, making fast and secure payments in a remote format using modern means of communication, expanding access to financial services through digitalization and reducing the cost of managing money, solving urgent economic problems (for example, improving the efficiency of monetary policy management, ensuring financial stability and sustainability of the payment system, developing healthy competition in the global market).

The catalysts for inevitable changes are the growing popularity of innovative technologies in all spheres of modern life (from personal to financial and professional), the search for new forms of application of artificial intelligence, the desire of the world's leading governments to reduce the issuance of traditional fiat money, awareness of the significant shortcomings of private and public cryptocurrencies, do not have

a responsible issuer that guarantees the safety and reliability of the issue and circulation of this type of monetary settlements, and are difficult to control by the state. The main result of the implementation of the CBDC should be the creation of a sustainable, innovative and competitive payment system for large industrial enterprises, households and the regional economy.

REFERENCES

- Agur, I., Ari, A., & Ariccia, G. D. (2022). Designing central bank digital currencies. *Journal of Monetary Economics*, 125, 62–79. doi:10.1016/j.jmoneco.2021.05.002
- Akimov, O. M., & Larina, O. I. (2020). Digital money at the present stage: key risks and directions of development. *Finance: Theory and Practice*, 24(4), 18–30.
- Auer, R., Frost, J., Gambacorta, L., Monnet, C., Rice, T., & Shin, H. S. (2022). Central Bank Digital Currencies: Motives, Economic Implications, and the Research Frontier. *Annual Review of Economics*, 14(1), 14. doi:10.1146/annurev-economics-051420-020324
- Kochergin, D. A., & Yangirova, A. I. (2019). Central bank Digital Currencies: Key Characteristics and Directions of Influence on Monetary and Credit and Payment Systems. *Digital Financial Assets*, 23(4), 80–98.
- Ozili, P. K. (2022). Central Bank Digital Currency Research Around the World: A Review of Literature. *Journal of Money Laundering Control*, 2, 1–20.
- Peterson, K. O. (2022). *Central Bank Digital Currency Can Lead to the Collapse of Cryptocurrency*. Social Science Research Network Electronic Journal.
- Petrov, V. U., & Bortsova, A. V. (2018). Cryptocurrency as the newest form of money in the modern economy. *Fundamental Research*, 6, 188–192.
- Sitnik, A. A. (2020). Digital Currencies of Central Banks. *Vector of Legal Science*, 9, 180–186.
- Tan, L., & Liyan, X. (2021). Research on the Development of Digital Currencies under the COVID-19 Epidemic. *Procedia Computer Science*, 187, 89–96. doi:10.1016/j.procs.2021.04.037
- Wang, H. (2021). China Meets Digital Currency: E-CNY and Its Implications for Businesses. *The Law Gazette*, 14, 1–18.
- Wang, Y., Lucey, B. M., Vigne, S. A., & Yarovaya, L. (2022). The Effects of Central Bank Digital Currencies News on Financial Markets. *Technological Forecasting and Social Change*, 180, 180. doi:10.1016/j.techfore.2022.121715

ADDITIONAL READING

- Acquisti, A., Taylor, C., & Wagman, L. (2016). The Economics of Privacy. *Journal of Economic Literature*, 54(2), 442–492. doi:10.1257/jel.54.2.442

- Adrian, T., & Mancini-Griffoli, T. (2021). The Rise of Digital Money. *Annual Review of Financial Economics*, 13(1), 57–77. doi:10.1146/annurev-financial-101620-063859
- Andolfatto, D. (2021). Assessing the Impact of Central Bank Digital Currency on Private Banks. *Economic Journal (London)*, 131(634), 525–540. doi:10.1093/ej/ueaa073
- Atici, G. (2021). Digital and Digitalized Economy in EMs: A Focus on Turkey. In V. Bobek & Q. Chee-Heong (Eds.), *Emerging Markets* (pp. 31–49). IntechOpen. doi:10.5772/intechopen.94494
- Benhabib, J., Schmitt-Grohé, S., & Uribe, M. (2001). Monetary Policy and Multiple Equilibria. *The American Economic Review*, 91(1), 167–186. doi:10.1257/aer.91.1.167
- Fernandez-Villaverde, J., Sanches, D., Schilling, L., & Uhlig, H. (2021). Central Bank Digital Currency: Central Banking for All. *Review of Economic Dynamics*, 2, 225–242. doi:10.1016/j.red.2020.12.004
- Fettahoglu, P., & Sayan, D. (2021). Attitudes of individuals about using cryptocurrencies: Evidence from Turkey. *Journal of Social Sciences*, 20(42), 1122–1146.
- Garratt, R. J., & van Oordt, M. R. C. (2019). Privacy as a Public Good: A Case for Electronic Cash. *Journal of Political Economy*, 129(7), 2157–2180. doi:10.1086/714133
- Kutlu, A., & Guven, A. (2019). From an Emerging Economy Perspective: Central Bank Digital Currency Analysis of Turkey. *Social Science Research Network*, 1-31.
- Yang, J., & Zhou, G. (2022). A study on the influence mechanism of CBDC on monetary policy: An analysis based on e-CNY. *PLoS ONE*, 17(7).

KEY TERMS AND DEFINITIONS

Central Bank Digital Currency (CBDC): A virtual format of the national currency of a certain country, designed to replace physical banknotes and coins, the creation, research and testing of which are carried out by local developers and regulators. The introduction of digital currencies is accompanied by the introduction of roadmaps and the development of pilot implementation schemes.

Electronic Digital Identification: Determination and confirmation of the identity of the user (client) by financial and credit and payment institutions using the latest digital means of communication.

ESG (Environmental, Social, and Corporate Governance): A progressive concept of sustainable development of the company, based on the implementation of the principles of careful attention to natural resources and the environment, high quality corporate and social management.

Islamic Financial Services Board (IFSB): An international organization dealing with the growth, development, control and regulation of the banking and insurance sectors, Islamic capital markets.

Issue of Funds: The process of issuing and circulation of cash and non-cash funds, subject to the control of state financial institutions and departments.

Monetary Policy: The monetary policy of the state, implemented by the central bank of a certain country in order to maintain financial and price stability, regulate the economy by the state.

P2P (Peer-to-Peer): Decentralized computer networks, the main principle of which is the uniform distribution of the load between the peer-to-peer nodes of users.

Pilot Testing of Digital Currencies: The initial stage of creating a prototype of a digital currency platform, accompanied by preliminary studies of the prospects and feasibility of introducing digital

currencies, prepared by special implementation working groups, and the subsequent process of testing the emission of a digital currency.

PS-IPS Instant Payments System Progress Soft (PS-IPS): An innovative mechanism for making a wide range of instant financial transactions, developed by Progress Soft Corporation, which allows financial institutions to make payments between users by any means around the clock without breaks on holidays and weekends.

“Roadmap” for the Regulation of Digital Currencies: A document establishing a specific procedure for regulating the platform of digital currencies in a particular country, the stages of introducing digital currencies and measures of responsibility for possible violations in the use of digital currencies.