Central Bank Digital Currency

A short story about how CBDC will change the future of payments

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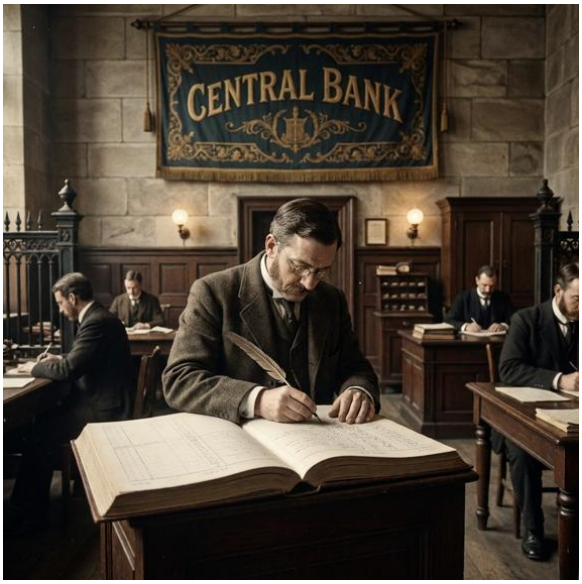
A little history

The concept of central banks in a country is not that old. The world's first central bank was the Riksbank in Sweden, which was established in 1668. Central Bank of Norway was established as late as 1816. Initially, most central banks were owned by private individuals, often private banks. Now most central banks are owned by the state. The central bank in the United States, the FED, is still privately owned, but the US president is the only authority to appoint the central bank governor and the board, and thus has a certain amount of control. The state is the one who can collect taxes, which helps to ensure that the risk of the central bank going bankrupt is almost zero. Money issued by the central bank (cash) is considered credit risk-free, unlike bank account money issued by private banks or stablecoins issued by a private company.



Before central banks were established, private banks and companies issued money. The first paper money in the world, in China, was issued by the emperor around the year 1100. Eventually, trading companies were allowed to issue paper money in China if they had gold, silver or coins equivalent to the value of the paper money they made. This mechanism was exported to Europe and eventually the United States. In the United States, before the Civil War in 1861, there were as many as 8,000 different dollar bills in circulation from a large number of private banks. The banks were allowed to print their own dollar bills if there were gold and silver in the bank for the value of the bills. As in China 600 years earlier, several banks printed more bills than they had value for. When rumours spread about this, the value of a dollar bill from bank A was suddenly less than a dollar bill from bank B. Some banks went bankrupt and the bills became worthless. After the Civil War, it was decided that only the central bank could print money. A dollar must be worth a dollar. This is called the "Singleness of money" and is an important part of today's discussion about **C**entral **B**ank **D**igital **C**urrency.

Today's digital money in the form of bank account money is issued by private banks. The money is issued when a customer gets a loan. We won't go into detail here; the principle is called "fractional reserve banking". If you have the money in a deposit account in a bank that goes bankrupt, your money is lost, which is why most countries have a deposit guarantee scheme. Therefore, there is a certain credit risk in having the money we all use today, bank account money.

When customers in bank A pay customers in bank B, the payment always goes via the central bank in domestic payments. Bank B does not trust that bank A can settle for them, which is why the central bank has taken on the role of independent guarantor in our digital world. In the USA, it is the so-called "Automatic Clearing House" that has taken on that role. In cross-border payments, the central banks are not involved, but a network of correspondent banks and deposits in each other's banks (Nostro/Vostro accounts).

In summary, issuing money was something private companies/banks did before central banks were established. Then it was the central banks that were given a monopoly on printing money. Over the last 70-80 years, the pendulum has swung back towards private money in the form of bank account deposits. With CBDC, the pendulum swings back in favour of the central bank.

A little politics

Today's payment infrastructure is based on a technical architecture from around 1950 when digitalization began. Back then, it was common for bank employees to sit behind the counter and manually register each payment on a terminal. The terminal was connected to a computer that stored each transaction with account numbers from and-to-and amounts in a database. Initially, data was stored on magnetic tape. At regular intervals, a few times a day, transaction data was read into a computer program that updated the accounts and the transaction was completed. This is still the most commonly used mechanism for payments in 2026, and in Norway these "batches" are carried out every 2 hours during office hours. Banks have improved their routines somewhat. Bank employees behind the counter have been replaced by "do it yourself" via mobile banking and online banking via the internet. New digital services have been launched. Computer programs have been updated, instant payments have been introduced and standardization makes payments globally easier. In the West, it is mostly the private banks that have invested in and been responsible for innovation in the payment market. Central banks have contributed little, but are still important in payment settlements between banks that increase trust, singleness of money, and liquidity in periods of stress. Over the past 20 years, central banks in the West have increasingly meant that innovation in payment infrastructure is moving too slowly. An estimated 70-80% of banks' income comes from lending/mortgage, and the motivation to invest in better payments is therefore limited. Private banks are like other companies, management wants profits and shareholders want returns. Nothing wrong with that. But a secure and efficient payment infrastructure is a crucial social good and possibly someone's social responsibility.

For example, Central Bank of Norway wrote in its 2020 Financial Infrastructure Report about payments ".... there is still a need for improvements. We will consider whether Central bank of Norway should expand its operational role ...."

Around 2015, the discussion about central Bank Digital Currency (CBDC) gained some momentum. China started its e-CNY project in 2014 and Central Bank of Norway started its project in 2016. In the following years, most central banks in the world were getting started. In 2019, Facebook launched the “Libra” project, a new form of tokenized money and payments that can be used by all of its 2.5 billion users, both private and corporate. This gave impetus to central banks who feared less control for both the central bank and private banks. The Libra project changed its name to Diem and was shut down after a few years. But central banks had picked up the pace.

Geopolitics

It is increasingly being claimed that currency and payments have become a weapon. Russia has had its money frozen after the full-scale innovation on Ukraine and is being kept out of the international payment infrastructure. Iran, Venezuela and a number of other countries are also sanctioned by the West. China, India, Brazil and other BRICS countries want to limit using the USD when they trade with each other. CBDC money uses a completely different technology and architecture and can therefore bypass the Western payment infrastructure with SWIFT and correspondent banks. This may have been a reason why China, Russia, India and Brazil have come a long way in their work with CBDC and are now conducting an increasing proportion of their cross-border payments with CBDC.

China

We start with China, which has come the furthest in its work on CBDC. Introducing new technology is always a multi-phase process and can be briefly summarized as follows: 1) learning and testing the technology 2) mature knowledge of what the technology can bring 3) fully exploiting the technology. While the EU is in phase 1, China is well into phase 2.

The project started in 2014, which is one of the first in the world. The project is led by China's central bank, the People's Bank of China (PBOC). In 2016, Deputy Governor Fan Yifei wrote that the development of e-CNY is the best way to exploit new technology, reduce the cost of payments, increase the use of central bank money and create new innovation in the payment market - a development that the central bank should lead. In 2017, the political leadership approved the issuance of e-CNY and cooperate with private companies such as Alibaba (Ant Group), Tencent (WeChat), Huawei, JD.com and UnionPay. In 2020, the first pilots were launched into the market, limited to a limited number of individuals and limited to Shenzhen, Suzhou, Chengdu and Xiong'an. Since then, the pilot has been expanded month by month. In connection with the 2022 Winter Olympics in China, foreigners were also given the opportunity to test e-CNY while traveling and in kiosks. Early participants included Starbucks and McDonald's.

Now in 2026, there are more than 230 million individuals who have an e-CNY wallet in addition to tens of millions of businesses. e-CNY wallet can be downloaded from Google Play and Apple Store. More than 3.3 billion transactions have been carried out for more than 2,000 billion Euros. The number of banks and businesses participating has expanded dramatically and cross-border payments are increasingly being used with e-CNY. China already had one of the world's most user-friendly payment services led by AliPay and WeChatPay. Despite this, e-CNY is gaining market share. e-CNY is a legal tender in the regions where it has been introduced. On January 1, 2026, e-CNY was reclassified by the authorities from “digital cash” to “digital deposits” in line with account money from private banks. At that time, users also received interest on holdings in e-CNY where a bank is the custodian. This means that the bank can also record the deposit on its balance sheet and use it as a basis for lending, just as deposits with bank account money.

The technology has some similarities to Blockchain/DLT (Distributed Ledger Technology). The money is not in purely tokenized forms; it is a shared chain of transactions developed and controlled by the PBOC. With the large number of payments per second (e-CNY is designed for 300,000), it requires completely different principles of consensus and finality than in standard DLT. Nevertheless, the infrastructure is compatible with innovative services built in Blockchain/DLT. Payments can be both online and completely offline where neither the payer nor the payee is online. Offline uses secure storage in new SIM cards and NFT technology for contactless payment. In order to use e-CNY, you must have a bank account in a Chinese bank for transfers to and from the e-CNY wallet, but the plan is to make the use independent of Chinese banks so that foreigners can use e-CNY more easily. The PBOC has also tested special money in the form of PBM (Purpose Bound Money) where the special money can only be used for transportation such as buses, trains, planes and bicycle rentals. The PBOC also claims that there is a certain form of anonymity for payments of small amounts. There is a cap/maximum limit of between 1,500 and almost 70,000 Euros on how much e-CNY can be stored in the wallet, depending on how you identify yourself. Users who are only identified by their mobile phone number get a low cap, while users with public digital identities get a high cap.

EU

The EU started the project "Digital Euro" (D€) as late as 2021, a CBDC for individuals and companies in Euros. The advantage of being late is that you can gain experience from others. Decision-making processes in the EU are still relatively long with many countries and different “local” challenges.

The Digital Euro is largely a political project where a large majority, but by no means all, of politicians in the EU Commission and Parliament have a desire to reduce dependence on American payment solutions such as MasterCard, VISA, Paypal, ApplePay, GooglePay and others. The Digital Euro is the most comprehensive way to succeed in this. The ECB, the European Central Bank, has worked hard and well on the project in recent years.

The "Pontes" project will go into production in September 2026. Pontes is so-called wholesale CBDC, which means payments between banks and central banks. The ECB issues government bonds that banks can buy and pay with tokenized central bank reserves. The Pontes project uses a DLT technology based on Hyperledger Fabric, an open source technology. This gives the ECB broader experience with such technology in production. Pontes will be part of a larger wholesale project called Appia that will be launched in 2027. The plan is for the Digital Euro for private and regular businesses to be launched in production in 2029. Before that, there will be some pilot projects to gain experience, the first of which is planned for the end of 2027. Some countries have made an early start, such as Italy, where the central bank is issuing a limited number of CBDCs, central bank employees are given the opportunity to load wallets and around 30 shops near the central bank are accepting CBDCs as payment.

Here are some important features of the Digital Euro (D€):

The plan is for this “Digital Euro” to be **legal tender** (mandatory means of payment) throughout the Euro area. This means that anyone who wants to will be able to use this money (like cash) and anyone who runs a shop of any kind must be able to accept D€ as payment, like cash. The ECB has repeatedly stated that D€ is a social good and should be usable by everyone. This could mean many changes in payment terminals in both online and physical stores. At the same time, banks must facilitate transfers from bank accounts to D€ wallets and back.

It is also a prerequisite that **two layers of distribution** should continue as for cash today. The central bank issues the money and banks and PSPs (Payment Service Providers) distribute it to the market. This gives banks and PSPs a key role in the future payment market. But they will also be required to invest in necessary changes. Banks and PSPs will also be responsible for money laundering (AML) and "know your customer". It will probably also be a requirement that you have an account in a bank before you can get a D€ wallet.

The plan is that D€ will be for both **online payments** where both the payer and the payee are online, and **offline payments** where the payer and recipient are close to each other and neither of them is online. Offline can replace cash during periods of crisis and Europe is without electricity and/or internet. Offline payments should also be possible anonymously up to a certain limit, possibly a few hundred euros.

A **maximum limit/cap** is planned for how much D€ a user can have in their wallet. The limit has not been set yet, but 3,000 Euros is often mentioned. If you receive a payment for more than the limit, the excess will automatically be transferred to your bank account. If you try to pay more than what is in the wallet, the bank will automatically top up the wallet so that the transaction goes without stopping. The ECB calls this waterfall and reverse waterfall. The main purpose is to prevent banks from losing too much deposit and thus reducing their ability to provide credit to society. The EU has also proposed that companies cannot have a balance in their D€ wallet and must send the D€ money directly to the bank immediately. The latter could be a problem.

Anonymity and privacy are among the features most often mentioned as criticism of the Digital Euro. The fear is that the central bank will be able to monitor all payments and, in the worst case, stop payments or freeze the digital money if they find something “they don’t like.” Banks today have the opportunity and obligation for bank account money, money in a deposit account. They have the obligation to ensure the anti-money laundering directive, stop and even freeze funds they believe violate laws and regulations. The central bank will not have that role and has no interest in monitoring people's privacy. They may be interested in payment statistics to contribute to financial stability, but not with information about each individual person.

A person can have **several D€ wallets** and a D€ wallet could be **owned by more than one person**. A D€ wallet will probably be linked to one, and only one, bank so that money can be moved between bank accounts and D€ wallets seamlessly. If the person has accounts in several banks, it will therefore be necessary to have several D€ wallets, one for each bank. China has experienced this as, as of summer 2026, 2.2 billion e-CNY wallets have been opened, for "only" 230 million people and a few tens of millions of companies.

The **D€ account number should be unique to the user**, like a mobile phone number. This makes it possible to move customer relationships to another bank, without having to change account numbers.

Payments can be programmable. This makes it very flexible and enables entirely new services and new innovations in the payment market. This allows banks, PSPs and businesses to innovate. It is important to be aware that this does not mean that the central bank will be able to set restrictions on people's use of their own money. In Blockchain technology, what are called smart contracts are used to make payments programmable. Smart contracts are small data applications that can be installed in many places (distributed) in the infrastructure and contain elements of business logic. However, with distributed applications, the attack surface for those who engage in hacking and cyber-attacks also increases, and data security must be strengthened.

The D€ provides increased freedom of choice. The ECB will continue to issue cash, for those who want to continue paying with cash. Account money that most of us use today will dominate in the future. In addition, Stablecoin, crypto and other means of payment will work.

D€ entails reduced costs for payments. The ECB plans for it to cost less to pay with D€ than with other means of payment, both for the payer and the payee.

The timetable from now until the planned launch in 2029 is very short. The rulebook will be approved in 2026. The rulebook is crucial and describes how D€ will work.

The first pilot will be launched at the end of 2027. It is expected that the experiences from the pilot will yield useful experience. The first pilot will end at the end of 2028. Then the D€ will be politically decided. Pilot version 2 in autumn 2028? New experience and changes to the rulebook before launch into production in autumn 2029.

While all this is happening, banks will improve their front-end and back-end systems, shops and companies will change systems and routines, public authorities will adapt processes and systems and many will undergo training. A lot will be done in a very short time and the consequences could be major.

Brazil

Brazil is a large country, geographically almost as large as all of Europe, with 213 million inhabitants. Brazil is part of the BRICS countries mentioned earlier along with China, India, Russia and a handful of other countries with large populations. Brazil has long been a leader in the American continent when it comes to digital payment infrastructure, perhaps with the exception of Canada.

The Central Bank of Brazil launched the PIX system in 2020. It is worth spending a few lines on PIX here because this is perhaps precisely what the European central banks have been missing. The project is largely financed by the Central Bank of Brazil, with good participation from the rest of the financial market. This is an efficient system for instant payments and has brought Brazil among the leading countries in the world in terms of payments and which has also led to a lot of good innovation. Nobel Prize winner Paul Krugman has even referred to PIX as the money of the future. PIX has taken large market shares from VISA, MasterCard and cash and is now the dominant form of payment both in stores and between businesses. Even small shops in squares and kiosks accept PIX payments with a QR code. As the infrastructure is operated by the central bank, in-store payments are normally free, while payments between businesses cost from zero to 0.33% depending on the size. You need to have a bank account and a mobile number or email. More than 160 million are registered with PIX. Marcia Garcia, a professor at the Pontifical Catholic University, told France24 that this is the most successful project for the poor in Brazil. PIX is used by 93% of adults in Brazil and has led to many who previously did not have a bank account now having one.

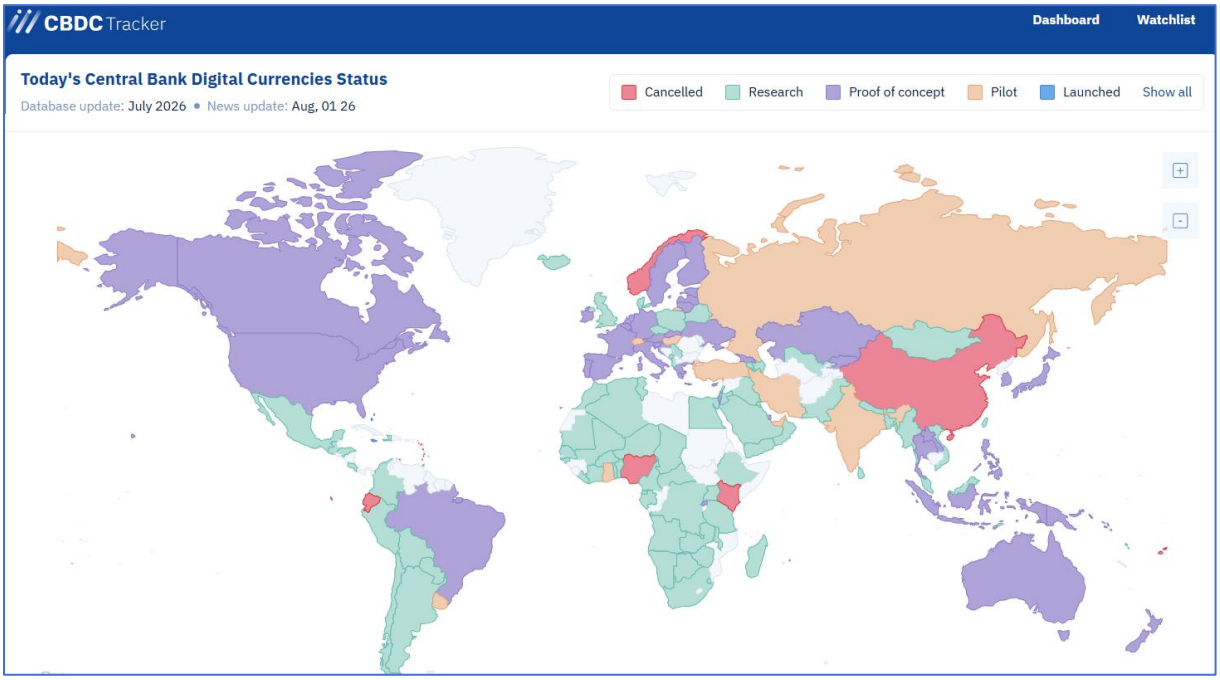
The project for CBDC is called DREX. The project started in 2020 and already in 2021, the guidelines for a CBDC were clear. In 2023, the central bank started a pilot project to test a pure Blockchain technology called Hyperledger Besu. They tested programmable payments because Besu can run smart contracts based on EVM (Ethereum Virtual Machine), they tested a relatively large number of different use cases. The experience with a standard DLT technology was not so good. Among other things, it was expensive to operate and privacy was a challenge. The central bank is now continuing the project without Hyperledger Besu and is now based on more traditional technology. Now in 2026 they are working on launching a limited rollout to banks and financial institutions where both payments and loans will be possible in DREX. DREX also has the ability to archive collateral for loans, and work is underway on tokenizing other assets such as shares and securities. With the success of PIX, one can ask why the central bank is spending energy on a CBDC. The answer to the central bank is the desire to be able to offer an infrastructure with programmable payments as Blockchain/DLT technology makes possible.

Cross-border payments.

PIX can be used by Brazilians for payments outside Brazil. PIX has agreements on cross-border payments with 65 contracting parties, also in Europe. In addition, Brazil is involved in several innovative projects for cross-border payments, such as the NEXUS project led by the BIS. Countries such as Peru, Colombia, Argentina, Bolivia, Paraguay, Venezuela and Ecuador are involved in joint technology development, such as PagBrasil and EBANX. The BIS developed the mbridge project for cross-border payments together with China and a few other countries. China was responsible for the technology that Brazil is now further developing. Brazil and other countries in South America are also working on joint regulation of crypto and anti-money laundering.

Rest of the world

Most countries in the world have projects for CBDC. It would be too extensive to go into all of them in this document, so a brief summary is in order at the end.



There are many so-called CBDC Trackers and above is one from https://cbdctracker.org/ from August 5, 2026. What they have in common is that none is particularly well updated. For example, Norway is shown as canceled, which is wrong. Central Bank of Norway wrote in its December 2025 report that it is NOT relevant now with CBDC in Norway. The central bank promised politicians in the parlament an update at the end of 2025, this was the conclusion. But the project continues, albeit to a limited extent. In the USA, the White House has banned the central bank from working further with CBDC, yet the USA is listed as a "Proff of conecpt", which is not true. Some banks in the USA participate in BIS-led projects because tokenization of assets, including money, is of great interest to the financial markets.

The BRICS countrys

have one thing in common, that they have come a long way. China and Brazil have already been mentioned. India and Russia have also come a long way. In recent years, Russia has announced that the launch will come "next year", but the CBDC has still not been officially launched. India has come a long way and launched its "Digital Rupee" in 2022 issued by the central bank of India. The Digital Rupee is a legal tender. Payments are free and there is no interest. Payments based on QR codes and P2P/P2M bypass bank accounts. India already has a good payment infrastructure with UPI and digital identity with Aadhaar. The BRICS+ country Iran also launched its CBDC in 2022, but so far only values of around 250,000 Euros have been issued.

Countries with poor financial infrastructure have an easier time launching CBDC than advanced countries. Firstly, there is not much to lose if the project encounters some problems. Secondly, these countries have great motivation to make everyday life better for their citizens. The Bahamas launched the “Sand Dollar” in 2020, Nigeria launched the “eNaira” in 2021 and Jamaica launched the “JAM-DEX” in 2022. None of these have been particularly successful, but the projects continue. Island states often have problems with a large number of islands that are sparsely populated, few bank branches and are largely based on cash in both their own and other currencies.

In Asia, most countries have come a long way in their work. South Korea is now launching (September 2026) its next phase where 9 of the largest banks and 500,000 private customers will participate in testing tokenized bank deposits in combination with wholesale CBDC from the central bank. Hong Kong has opened up to Chinese e-CNY in addition to its own CBDC in Hong Kong dollars. Singapore has worked long and well with both CBDC and Stablecoin. Thailand has participated in several cross-border CBDC projects led by the BIS in addition to its own “digital baht” which is still in its early stages. Cambodia was very early in 2020 with its Bakong project, which is not a pure CBDC; but a quasi-solution together with a large number of banks. Japan and Australia have also made progress in their projects.

The Middle East is also well underway. The UAE is working on its "Digital Dirham" project for retail CBDC. The plan was to roll out this year, 2026, but there seem to be delays. The UAE has participated in several tests of cross-border payments in CBDC with China and Saudi Arabia (project Aber) and they were part of the BIS project mbridge. Bahrain and Qatar also have projects, but have not progressed as far.

On the African continent, there is also a lot of work happening. Nigeria is mentioned. Several of the countries have people working in Europe and other developed countries and sending money back to their families. Such payments are slow and expensive in today's banking infrastructure. These countries have an extra motivation to come up with something better. Therefore, most countries in Africa have CBDC projects in one phase or another.

The next few years

This document started with a bit of history and politics. Money and payment infrastructure are and will remain a matter of politics. The future is likely to be characterized by multiple forms of money and means of payment. Private money in the form of bank account money, stablecoins and tokenized bank deposits. Public money in the form of cash and CBDC. In addition, a number of means of payment in the form of crypto and other assets. The ability to move private money to public money in crises has been a guarantor of the “singleness of money”. With less and less cash in circulation, CBDC could become an important instrument for financial stability for governments in the future. As CBDC becomes a legal tender and thus gains significant momentum, CBDC will also become an important part of the future payment infrastructure.

The trend of tokenizing assets is set to escalate. Many long value chains such as payments, trading of listed securities and trading of real estate have been developed over time and are largely ripe for renovation in the digital age we are in. New forms of money and infrastructure for value transfer with tokenization will set new requirements for public involvement in the future.

Interoperability will be a key word for the money of the future. Both with regard to cross-border payments with the diversity of different "local" CBDC projects, different means of payment, different technologies and between different asset classes. Some believe that unified ledgers, finternet and shared ledger are the way to go, but with billions of different assets, billions of people and billions of transactions per second, different technologies will probably have to work together towards a common future.

Explanation of some words and expressions.

CBDC (Central Bank Digital Currency) is called Digitale Sentralbankpenger (DSP) in Norwegian. This is digital money issued by the central bank in the country's currency. The central bank is the guarantor that the money retains its value now and in the future. The purchasing power of money is normally reduced by inflation every year. 100 Euro will remain 100 Euro forever, this creates trust.

Retail CBDC is digital central bank money intended for individuals and businesses, as cash is today.

Wholesale CBDC is money intended for banks and financial institutions, as central bank reserves are today.

BIS stands for Bank for International Settlements and is an organization headquartered in Basel, Switzerland. BIS is owned by around 60 central banks globally and is often called the central bank of central banks. BIS is responsible, among other things, for the Basel regulations that set rules for banks' capital adequacy. BIS also has a unit called the BIS Innovation Hub that contributes with technological projects for central banks and banks worldwide.

Tokenized bank deposits are deposits in a bank. The difference between regular deposits and tokenized deposits is that the money is in tokenized form in a wallet, often based on Blockchain or DLT technology. The bank holds/is custody of the tokenized deposit for the customer and ensures transfer to and from a regular bank account.

Legal tender is a statutory right to pay with this means of payment. In Norway, this is authorized by the Central Bank Act, Section 3-5 (1). Shops are not allowed to refuse to accept payment in this means of payment, in Norway this applies to cash (coins and banknotes issued by Norges Bank). However, there are some exceptions, such as for large amounts and sales from an automatic machine.

About Finansit in brief

Finansit is a consulting company with accumulated expertise and experience from the development of advanced IT systems for banks and finance in Europe since 1990. Since 2015, much of the activity has revolved around Blockchain and tokenized assets in projects for large companies, private banks and central banks.

Finansit has written a similar report to this one about Stablecoin, which can be found here.