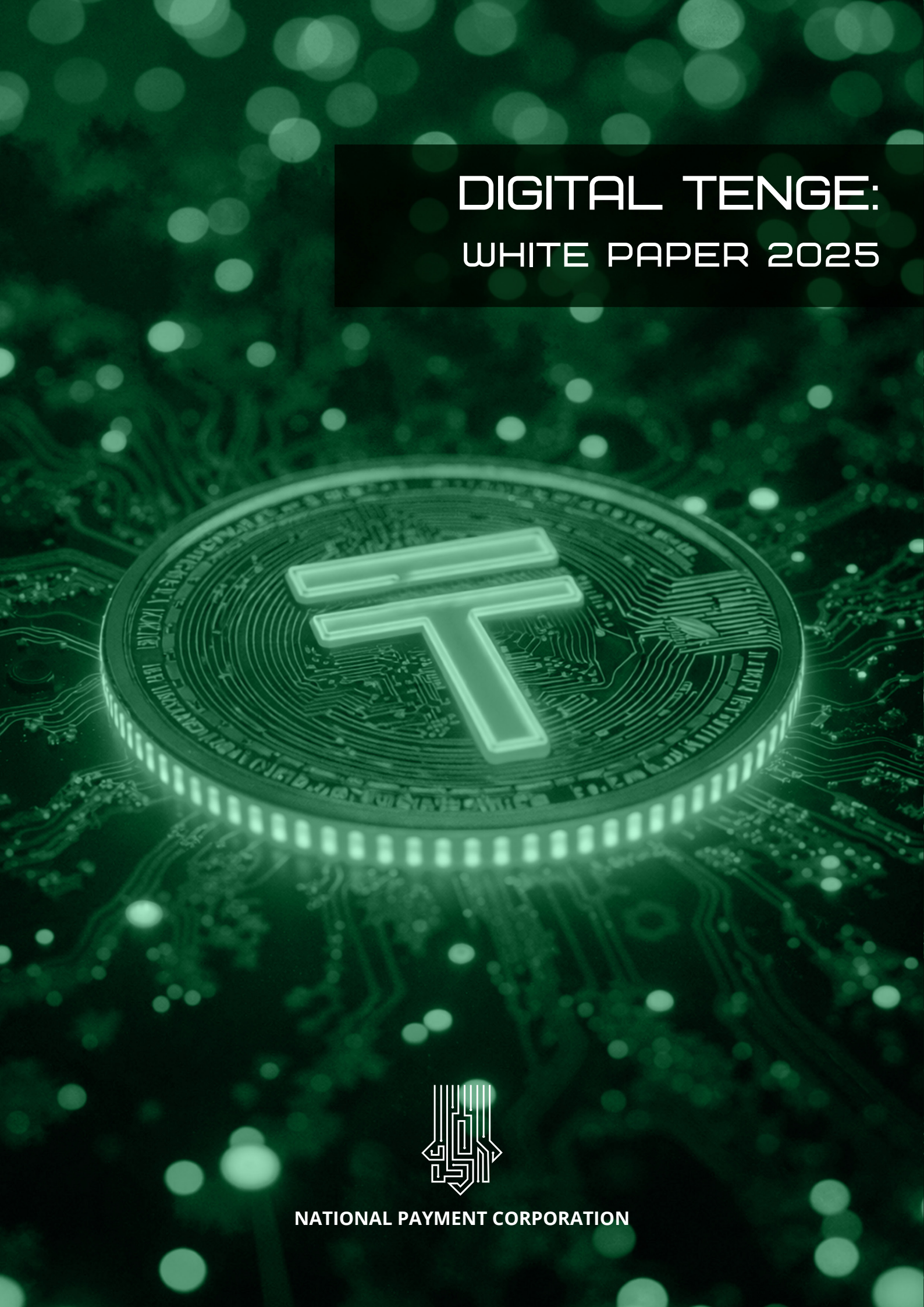
DIGITAL TENGE:
WHITE PAPER 2025



NATIONAL PAYMENT CORPORATION

OPENING STATEMENT

Kazakhstan has developed a mature digital financial environment. Non-cash payments account for over 87% of all transactions, public services are provided through banking and digital channels, and the main processes of interaction between citizens, businesses and the state have been transferred to a digital format.

In these conditions, the National Bank of Kazakhstan is developing the National Digital Financial Infrastructure (NDFI) - a set of basic platforms for payments, identification, data exchange, and settlements. Instant payments, national card processing, open interfaces, remote identification and anti-fraud services form a single environment in which financial transactions become cheaper, more transparent and more reliable.
The Digital Tenge is one of the key elements of this infrastructure. It functions as a supplement to cash and non-cash money, rather than a replacement for them. The use of the Digital Tenge is entirely voluntary for citizens and businesses. Its main advantage is its programmability: with the use of the Digital Tenge, conditions for the use of funds can be set, control can be automated, and end-to-end traceability of transactions in required segments can be easily ensured.

In addition to that, the Digital Tenge platform was originally designed with confidentiality and banking secrecy requirements in mind. The platform ensures the protection of personal data and commercial information in full compliance with the law.

Currently, the Digital Tenge is effectively used in practical scenarios of government spending – from public procurement to subsidies – ensuring transparency, speed and targeted use of public funds. In accordance with the President's decrees, this mechanism is to be scaled up to all types of government payments. At the same time, cross-border settlements are being developed, where the Digital Tenge is used to reduce the time, cost and operational risks of international payments.

Further work will be focused on expanding the range of participants, integrating with other components of the National Digital Financial Infrastructure, and expanding application scenarios.

Timur Suleimenov,
Chairman of the National Bank of Kazakhstan

EXPERTS OPINION

Kazakhstan's development of the Digital Tenge demonstrates how central bank digital currencies (CBDCs) can serve as institutional and infrastructural innovations rather than simply new payment tools. The National Bank of Kazakhstan (NBK) has positioned the Digital Tenge within a broader digital public infrastructure (DPI) strategy, aligning monetary innovation with national digital transformation objectives.

A key feature of this model is organizational segmentation. By separating issuance and operational responsibilities between the NBK and the National Payment Corporation of Kazakhstan (NPCK), Kazakhstan has maintained regulatory control while enabling operational flexibility. This structure minimizes bureaucratic inertia, supports experimentation, and attracts specialized expertise—factors often missing in traditional central bank innovation efforts.

Equally important is NPCK's adaptive experimentation strategy. Instead of locking in fixed functionality, Kazakhstan has treated the Digital Tenge as an evolving policy instrument. Initial retail payment pilots have expanded toward state-linked applications, including targeted social transfers, infrastructure financing, and digital VAT mechanisms. This progression highlights a growing emphasis on programmability and fiscal integration.

Overall, Kazakhstan's experience suggests that the primary value of CBDCs lies not in replacing cash, but in enhancing public-sector capabilities. For countries exploring CBDCs, thoughtful institutional design and experimentation frameworks may be just as important as the underlying technology.

Pinar Ozcan, Professor of Entrepreneurship and Innovation, Academic Director of the Oxford Entrepreneurship Centre and the Oxford Future of Finance and Technology (Fintech) Initiative.

Over the past year, Kazakhstan has made meaningful and measurable progress in the development of the Digital Tenge, moving from ambition to practical capability and broader adoption of the Digital Tenge in the wider market. The achievements of 2025 represent not only significant results in terms of technology readiness, institutional maturity, and ecosystem participation, but also create a strong foundation for the next stage of Kazakhstan's digital transformation journey. These achievements continue to define a path for many central banks around the world to follow in their digital transformation journey.

The further development of a national digital currency remains an inherently complex and strategic undertaking. Realising the full potential of the Digital Tenge will require a comprehensive and forward-looking regulatory framework, continued strengthening of the core technological platform ensuring resilience and scalability, and the development of a sustainable ecosystem that brings together government institutions, financial market participants, technology partners, and society at large. Experience both in Kazakhstan and internationally confirms that success in this domain depends on three key factors: open and transparent engagement with the market, a consistent and progressive regulatory approach, and a firm commitment to continuous technological innovation.

As the project transitions toward industrial-scale operation, the focus will increasingly shift to deepening real-economy integration, enhancing public trust, ensuring interoperability, and supporting new business and social use cases. This next phase will demand intensified collaboration, innovative thinking, and readiness to adopt new operating models that support Kazakhstan's broader digital economy ambitions.

It has been a privilege to continue to contribute to this journey - from consulting project lead in the early days to later advising the chairman - working alongside highly capable and committed teams who have helped shape the Digital Tenge into a credible, strategic national asset. With the foundations now firmly established, Kazakhstan is well positioned not only to operate its national digital currency effectively, but to define regional leadership in digital finance and sovereign digital infrastructure in the years ahead.

John Velissarios,
Founder of Otranto Ltd.

The introduction of the Digital Tenge is a new stage in the development of the financial and budgetary system and a practical digitalisation tool, the implementation of which is aimed at increasing the transparency of settlements, strengthening the manageability of financial flows and forming a modern infrastructure for the targeted use of funds.

A key practical element of this approach was the "Digital VAT" pilot scenario. Its implementation demonstrated a fundamentally new level of tax administration, in which control over the movement of funds is carried out automatically with the use of the built-in logic of the Digital Tenge. Marked tax funds ensure their targeted use, minimise the risk of abuse and eliminates the human factor from control procedures.
The next step in this direction was to expand the use of the "Digital VAT" scenario as part of a pilot project in the field of public procurement. As a result, a fundamentally new model for settlements under public contracts is created: now payments, tax obligations and supporting documents can operate within a single digital environment. This creates conditions for an unprecedented level of transparency, accountability and efficiency in the use of budget funds. Overall, the Digital Tenge should be considered as a strategic tool for transforming the financial system and capable of setting a new standard for interaction between the state, business and the financial sector, and also as a foundation for the further development of the digital economy.

Kadyr Ismagulov,
Director of the Audit Department
of the State Revenue Committee
of the Ministry of Finance
of the Republic of Kazakhstan

GLOSSARY

AML/CFT	anti-money laundering/countering the financing of terrorism
API	application programming interface
CB	central bank
CBDC	central bank digital currency
DevOps	development+operations
DvP	delivery-versus-payment
DLT	distributed ledger technology
DT	digital tenge
ECB	European Central Bank
e-CNY	digital yuan
e-HKD	digital Hong Kong dollar
EI	electronic invoice
EIIS	electronic invoice information system
ERP	enterprise resource planning
ESG	environmental, social, and governance
EU	European Union
GO	government organization
HKMA	Hong Kong Monetary Authority
HSBC	Hongkong and Shanghai Banking Corporation
HSM	hardware security modules
I	individual
IS	information system
IFAIS	“Identification of farm animals” information system
KYC	know your customer
LE	legal entity
LPM	limited production mode
MFK	Ministry of Finances of the Republic of Kazakhstan
NBK	National Bank of the Republic of Kazakhstan
NDFI	National Digital Financial Infrastructure
NFC	near-field communication

NPCK	National Payment Corporation of the National Bank of the Republic of Kazakhstan
PBoC	People's Bank of China
PBM	purpose bound money
PRC	People's Republic of China
PSP	payment service provider
PvP	payment-versus-payment
QR-code	quick response code
RB	remote banking
RTGS	real-time gross settlement
SIM	subscriber identity module
SRD	State Revenue Department (regional division of the State Revenue Committee)
SRC	State Revenue Committee
SSIS	state subsidy information system
STB	second-tier bank
UTXO	unspent transaction output
VAT	value-added tax

CONTENTS

INTRODUCTION

The history of the Digital Tenge project has gone through key stages of development - from initial research in 2021 to the launch of the platform into limited production mode (LPM) in 2023 and the start of pilot projects for payments involving the state in 2024. Over the past few years, the National Bank of the Republic of Kazakhstan (NBK) and the "National Payment Corporation of the National Bank of the Republic of Kazakhstan" joint-stock company (NPCK), together with financial market participants, technology partners and involved government organisations (GO) have created a technologically sustainable platform for the central bank digital currency (CBDC) to confirm its functional advantages in a number of pilot projects and to begin the gradual expansion of the digital tenge (DT) ecosystem .

In 2025, the main directions of work were transitioning from isolated pilot projects and limited scenarios to full integration of the DT platform into the national payment infrastructure, scaling up the use of the DT in payments involving the state, and preparing for the start of industrial-grade production mode of the DT platform. Moreover, the research on using CBDC for cross-border payments and the development of several retail scenarios was carried out.

Obtained results demonstrate the great potential of the DT as one of the fundamental elements of Kazakhstan's National Digital Financial Infrastructure (NDFI). In addition to that, technological and operational viability of the DT platform was proved, thus confirming its readiness for industrial-grade production operation. Other directions of work in 2025 were enhancing the DT platform's programmability functions and analyzing possible applications of the DT-based smart contracts. According to the results, the DT platform can be utilized for all types of government spending within the framework of the Head of State's decrees. The Roadmap with further actions is planned to be presented in April 2026.

This document contains the results of work on the Digital Tenge project conducted in 2025. Provided information covers the topics of scaling state payment scenarios, improving related business processes and creating regulation for the DT platform. This document also presents the experience gained during pilot projects and open questions combined with further evolution of the DT ecosystem and key conclusions formed during two years of the LPM phase.

OVERVIEW OF RELATED CBDC STUDIES

Digital Hong Kong dollar (e-HKD)

In 2023, the Hong Kong Monetary Authority (HKMA) launched the e-HKD Pilot Programme to explore the possibilities of introducing a retail digital Hong Kong dollar (e-HKD) [1]. In March 2024, the HKMA launched the second phase of the pilot programme (e-HKD Pilot Programme Phase 2; later - Project e-HKD+), to expand the scope of its research. As part of this project, the HKMA studied not only retail CBDC, but also other forms of digital money (including tokenised deposits).

The programme includes 11 groups of participants from different sectors that are exploring three main areas:

1. Settlements with the use of tokenised assets to ensure instant settlements between market participants without clearing intermediaries;

2. Programmability of digital money to automate purpose-bound payments with the use of smart contracts;

3. Offline payments to ensure the availability of digital money in case of no network connection.

The HKMA carried out studies related to a private form of digital money issued by commercial banks and known as "tokenized deposits". As part of a pilot project, commercial banks (Hongkong and Shanghai Banking Corporation (HSBC), Hang Seng Bank and DBS) tested a model in which traditional bank deposits are represented in the form of tokens on a platform based on distributed ledger technology (DLT). This model provides instant settlement of transactions and the ability to interact with tokenised assets while keeping deposits on the balance sheet of the issuing bank. For instance, HSBC and Hang Seng Bank tested the issuance of tokenised deposits for transactions related to tokenised assets. The use of the DLT platform enabled atomic settlement, the simultaneous exchange of assets and money, which can reduce the settlement period from two business days (T+2) to less than one business day (T+0) and greatly reduce operational risks.

DBS Bank explored the use of tokenised deposits for programmable payments in the area of environmental, social and corporate governance (ESG): digital coupons could only be spent on environmentally friendly goods and services. Such solutions were implemented without the involvement of the central bank (CB),thus confirming the potential of private tokenised money as a flexible tool in the digital finance ecosystem.

One of the key areas of focus for the second phase of the e-HKD pilot programme was testing the capabilities of programmable payments via introducing the concept of purpose-bound money (PBM). This technology embedded the conditions for using the digital currency into the digital currency itself; such funds could only be spent for predetermined purposes, at a specific time, or when specific conditions were met.

This idea was implemented using self-executing automated contracts (also known as "smart contracts") hosted on the distributed e-HKD platform. Such contracts were able to set following transaction parameters in advance:

- who can spend these funds;
- what these funds can be spent on (for example, paying for a ticket, but not transferring them to another person);
- when these funds become available for using (for example, after a certain date or upon the occurrence of a specific event).

The practical implementation was carried out as a part of a pilot project by Hang Seng Bank in collaboration with other HKMA participants. In particular, several of the following scenarios were tested:

- vouchers and subsidies with a specific purpose (i.e., government or corporate payments in e-HKD) that could only be spent at certain retail outlets or for buying specific goods and services (such as educational programmes, transportation, and medical services);
- Digital coupons to stimulate local business and tourism: these PBM tokens were valid for a limited period and within a specified region;
- conditional payments: payment in PBM was made automatically upon fulfilment of certain conditions (e.g., after delivery of goods or services).

Thus, e-HKD with its programmability feature creates an infrastructure for smart and transparent transactions with minimized role of intermediaries and verified payment destination. This opens up new opportunities for:

- budgetary and social payments with targeted spending;
- business-to-business processes with automated contract execution;
- fintech services that can integrate PBM into retail and corporate products.

Technological foundation

HKMA projects used a two-tier architecture: the CB is a sole issuer of e-HKD, and commercial banks implement the application layer of smart contracts. This approach maintained a balance between innovation and financial stability and avoided direct duplication of banking sector functions by the CB. At the same time, tests were also conducted on the use of e-HKD for retail and interbank payment scenarios. For example, Standard Chartered Bank used e-HKD in tokenized bond settlements and demonstrated the potential of national digital currency of being used by retail investors in digital capital markets, while Hang Seng Bank and Visa explored the use of e-HKD for targeted payments and subsidies by integrating the CBDC into the infrastructure of international payment networks.

Another research (done by China Mobile, Ant Group, Giesecke+Devrient, HSBC) was dedicated to the implementation of offline payments with e-HKD transactions carried out via SIM cards and hardware wallets without access to the Internet.

Brief summary of the work done by the HKMA

After the second phase of the CBDC project, the HKMA noted that tokenised deposits are a technologically mature and flexible instrument that can be implemented in the short term without issuing retail CBDCs. e-HKD also retains its importance as a universal payment mechanism to ensure trust and compatibility between different platforms and banks. The coexistence of CBDC and tokenised deposits is seen as the optimal model for the future monetary ecosystem.

Digital yuan (e-CNY)

The work done by the People's Bank of China (PBoC) can be considered as one of the most notable examples of the CBDC introduction and development. According to a report by the State Council of the People's Republic of China (PRC), by the end of September 2025, the total volume of e-CNY reached 14.2 trillion yuan (approximately 2 trillion United States dollars), and the total number of transactions in e-CNY reached 3.32 billion [2]. The following results of the PBC's work on the implementation of CBDC are also worth noting:

- The number of personal wallets in the official e-CNY app has reached 225 million;
- The pilot project area has been significantly expanded: the programme now covers 26 districts in 17 provinces and administrative regions of China.
- A new institutional structure has been created: the PBoC has organised a 'dual-centre' model for managing e-CNY with an international operations centre in Shanghai for cross-border transactions and an operations and management centre in Beijing for domestic payments.

e-CNY is not only used in pilot test areas, but also in retail scenarios, public services, state-related payments, transportation services, etc. According to media reports, the model has moved into the "preliminary ecosystem" stage [3].

The PBoC continues to expand its network of banking operators and involve representatives from the commercial sector; there is also development of the digital yuan infrastructure to ensure the stability of the e-CNY platform, to guarantee required level of liquidity, and to expand user coverage. The establishment of an international operations centre in Shanghai demonstrates the PBoC's intentions to focus on cross-border payments and to ensure the interoperability of the digital yuan with other jurisdictions.

Brief summary of the work done by the PBoC

The digital yuan started as a pilot project, and now it is massively used in numerous different spheres. e-CNY is one of the first examples of successfully scaled up retail CBDC. The large number of wallets and transactions shows that the national digital currency can compete with existing electronic payment systems. The existence of two control centres, the involvement of a large number of operators and massive regional coverage demonstrate the successful organisation of the digital yuan infrastructure on a national scale. The experience of the PBoC shows that the launch of a CBDC is an infrastructure project that requires both technological work and the development of institutional mechanisms.

Digital euro

In July 2025, the European Central Bank (ECB) published its third report on the progress of studying the possibility of introducing a digital euro. In particular, significant progress was made on the draft 'rulebook' for the digital euro: this set of uniform rules, standards and procedures will regulate the use of the digital euro throughout the European Union (EU) [4].

In addition, an innovative testing platform with 70 participants (banks, fintech services and payment service providers, PSP) was launched. The main purpose of launching this platform was to test scenarios for using the digital euro and its technical functions. At the same time, tests and experiments to improve the backend infrastructure of the digital euro platform were also launched. The ECB and market participants are also exploring real-life payment scenarios including conditional payments and different mechanisms of interacting with merchants, PSPs and end users. In addition, consultations and feedback collection from market participants were conducted to consider the needs of different groups for the digital euro designing process. The process of selecting platform and infrastructure component providers is also continuing: the selection procedure is planned to be completed by the end of 2025.

At the end of October 2025, following the completion of the preparatory phase, the Governing Council of the ECB announced the next stage of studies consisting of technical works and pilot projects. The ECB also emphasises the flexibility of the utilised approach: they regularly synchronise with the legislative process and are ready for adjustments. The first tests, the creation of a technological platform, and the study of potential technological partners and standards demonstrated that building the digital euro infrastructure has started: all these actions are the first steps on the path from concept to the creation of a real payment system.

Ensuring financial inclusion and user-oriented approach are the top priorities for the ECB. The launch of the test platform and systematic feedback collection attracts banks, fintech organisations, entrepreneurs, consumer associations and various segments of the population to the project. The chosen approach demonstrates that the ECB is developing the digital euro not simply as a technological platform, but as a convenient and accessible tool for everyone. In addition, the infrastructure is also being standardized: the "rulebook" for the digital euro will ensure uniform rules and procedures for all EU jurisdictions and for all categories of participants (PSPs, entrepreneurs and citizens).

Brief summary of the work done by the ECB

The ECB's strategy is based on a phased and gradual approach: firstly, preliminary infrastructure was created, secondly, pilot projects are being conducted to create the necessary regulatory framework, and only after these actions possible launch of the platform can be discussed. This approach reduces risks and enables collecting feedback from participants at every stage of the project to adjust the design of the digital euro in real time. According to the decision of the ECB's Governing Council, in case of the relevant legislation being adopted in 2026, pilot transactions in the digital euro could start as early as mid-2027, and the first issuance could happen in 2029. Development costs are estimated at approximately €1.3 billion before the first issuance followed by approximately €320 million per year to maintain the platform and ecosystem [5].

Digital yen

The Bank of Japan has been conducting research and pilot projects on the introduction of CBDC for several years. In July 2025, a report called "Central Bank Digital Currency Experiments: Progress on the Pilot Programme (May 2025)" was published. It presented key technological and operational areas of work: implementation of a two-tier architecture through commercial banks, offline payments, scalability and interoperability [6].

Recently, the Bank of Japan has also expanded its pilot programme to study the introduction of a digital yen involving at least 60 organisations (including commercial banks and fintech companies) to evaluate existing technologies and possible use-cases [7]. The context of the Japanese payment market is also important: the share of non-cash payments in consumer transactions increased by more than 10% between 2023 and 2024 reaching 42.8% [8].

The Bank of Japan organised working groups to study on the possibility of introducing CBDC in Japan by conducting research in following areas in 2025:

- Architecture and technology: the Bank of Japan is testing a two-tier architecture model in which the Bank of Japan is responsible for issuing and redeeming digital yen while commercial banks provide services for end users and conduct transactions.
- Confidentiality and data protection: the Bank of Japan considers the issue of confidentiality as the most crucial one. The digital yen platform must ensure user privacy at the same level as a cash. However, the Bank of Japan and supervisory authorities must have the minimum information necessary to detect violations. In particular, tiered privacy architectures are being considered: small-value transactions should be conducted with maximum privacy while large-value transactions are subject to stricter checks.
- Centralisation/decentralisation: the Bank of Japan is exploring centralised and decentralised approaches including solutions based on permissioned DLT networks, public blockchains, and hybrid architectures. The Bank of Japan has not yet announced its final position on the use of distributed ledgers due to ongoing studies related to the existing limitations of this technology (scalability, privacy and consensus management).

- Offline payments: the Bank of Japan continues to test approaches to payments without Internet access. In particular, various solutions for peer-to-peer transactions between devices (including hardware wallets with NFC) are considered for further studies. Additionally, the limit on the amount of offline transactions is being determined to minimise the risk of double spending, and synchronisation mechanisms for offline wallets are being analyzed to ensure correct updating after offline transaction. The Bank of Japan is considering the implementation of offline payments as a mandatory component of its CBDC system especially for regions with unstable coverage.

- Integration and compatibility: one of the directions of work is dedicated to studying possible interaction between the CBDC and tokenised assets. As part of this work, the implementation of payments in the "delivery versus payment" (DvP) mode is tested; there are also other experiments conducted in cooperation with digital asset platforms (Progmat) and exchanges (Japan Exchange Group).

- Regulatory and legal aspects: key problems in existing legislation have been identified; adaptation of the law on currency and payment services is needed.

Brief summary of the work done by the Bank of Japan

The experience of the Bank of Japan shows that the launch of CBDC in the jurisdiction with a developed banking sector and a large number of financial intermediaries is only possible after thorough consideration of both technological and institutional aspects. The ongoing pilot project demonstrates a steadily increasing level of technological readiness, but no official decision on the launch of the digital yen has yet been made. In 2026, it is planned to start testing scenarios with real users within a retail technological sandbox.

The architecture chosen by the Bank of Japan involves commercial banks and allows them to retain their key role thus minimizing the risk of "digital bank runs". The Bank of Japan also states that the successful introduction of CBDC depends not only on technical implementation, but also on public demand. Currently, the majority of the population does not demonstrate a need for national digital currency.

Interoperability and international cooperation are also critical for the digital yen project due to the fact that Japan is involved in international projects dedicated to the use of tokenising assets and digital money. The Bank of Japan considers the CBDC to be a tool capable of improving the efficiency of settlements for tokenised financial instruments given that the infrastructures are compatible.

Overall, the Bank of Japan considers their CBDC as an element of future economic infrastructure rather than a separate technological solution. The digital yen project is focused on developing and testing preliminary infrastructure, but not on launching CBDC as soon as possible. In order to make a decision regarding the launch of the digital yen, it is needed to resolve issues related to ensuring trust between all participants, commercial banks' role, and reserve mechanisms. It is also necessary to define the legal status of the CBDC, to determine the responsibilities of participating banks and to develop regulatory standards and personal data protection requirements adapted to the new digital environment. The Bank of Japan is actively working with relevant ministries and government organisations (GO) to complete these tasks.

BRIEF HISTORY OF THE DIGITAL TENGE PROJECT

2021: start of research

The study on the national digital currency in the Republic of Kazakhstan began in 2021: at that moment, the NBK was focused on studying international experience, proving feasibility of introducing a CBDC in Kazakhstan, and analyzing potential technological solutions. The objectives of the potential introduction of a CBDC in Kazakhstan were also defined in 2021:

- to ensure the further development of national financial and payment systems;
- to increase financial inclusion;
- to enhance the competitiveness of the financial sector;
- to create a technological platform for further digitalisation of the national payment system;
- to ensure the continuous operation of the national payment system;
- to improve the efficiency of payments involving the state.

At this stage, the main aspects of the DT design were also determined:

- the DT is a retail digital currency (i.e., accessible to a wide range of users);
- the DT is based on a hybrid infrastructure (DLT platform with elements of centralisation);
- the DT uses token-based approach: each transaction means changing the owner of "units of value" (tokens);
- the DT relies on two-tier architecture: the services for end users are provided by second-tier banks (STBs).

Additionally, the basic principles of the DT development were introduced in 2021:

1. the DT should not undermine monetary and financial stability of Kazakhstan;
2. the DT is not a replacement for existing forms of money, but a supplement to them;
3. the DT should improve payment efficiency and promote innovation.

In addition to aforementioned conceptual questions, there were synthetic tests of the DT platform prototype in a closed environment. Based on these experiments, the feasibility of implementing a retail CBDC based on a DLT platform was experimentally confirmed, key life cycle scenarios (from issuance to circulation) were tested, and fundamentally new properties of the CBDC (offline payments and token-level programmability) were studied.

2022: expansion of studies and decision on phased implementation of the DT

In 2022, the scope of the DT-related studies was expanded to include a number of areas: "Technology" (to assess the technological feasibility of the DT properties for achieving implementation goals and objectives), "Economics" (to assess potential benefits and risks of the DT implementation), "Ecosystem" (to assess market readiness to use the DT), "Operating Model" (to analyse possible ways of interacting between platform participants) and "Regulation" (to prepare preliminary legal regulation for the DT). In order to assess the need to implement the DT in a systematic and balanced way, a Decision-making framework was developed. It used the information from all directions of works mentioned above and also took into account the recommendations of leading international financial organisations.

Another important milestone was a survey of potential platform users. The data obtained via the survey was used for economic modelling to define the economic design of the DT. As a result of this study, the option of the DT without interest bearing (cash-like CBDC) was selected as the safest for financial stability. Moreover, the possible economic impact of introducing national digital currency in the medium and long term was evaluated.

There were also tests of an enhanced prototype of the DT platform in an isolated circuit with a limited number of real participants (both individuals (I) and legal entities (LE)). These tests confirmed the platform's capabilities of conducting operations with conventional and programmable tokens in real conditions. Additionally, the first integration with external participants was carried out, and the first smart contracts were implemented on the DT platform.

Based on the results, the NBK made a strategic decision to implement the DT in three phases by the end of 2025.

2023: start of the LPM operation

The year of 2023 was a turning point for the Digital Tenge project: the project transitioned from experimentation to the actual implementation of the national digital currency. The first phase of implementation was successfully completed with the launch of the platform in the LPM. Both functional and non-functional characteristics of the DT platform were significantly improved.

One of the most notable achievements of this year was the implementation of a pilot project for digital vouchers for school meals. It was implemented jointly with the administration of Almaty and "QazPost" JSC. This scenario tested the use of programmable payments in the DT for the first time in history. It demonstrated efficient targeted use of state funds ensuring that they were used strictly for their intended purpose and without intermediaries, misuses or delays.

Another significant event was the launch of the world's first bank cards linked to the DT account. These cards were issued in partnership with international payment systems and four commercial banks. The implemented solution demonstrated seamless integration of the national digital currency with the traditional financial infrastructure.

There were also testings of innovative scenarios (including those proposed by market participants) in an experimental environment. These experiments were focused on assessing the DT's potential in the field of integration with decentralised finances, and on testing retail smart contracts and cross-border payments.

2024: expanding functionality and deepening scenarios

In 2024, the Digital Tenge project moved into its second phase of implementation. The main focus was on introducing the DT into payments involving the state and making the necessary adjustments to the DT platform. As part of this work, two programmability archetypes were developed ("Marking" archetype enables a payment with a specific purpose, "Holding" archetype enables a payment upon the occurrence of a specific event or the fulfilment of a specific condition). These archetypes were used to implement five following scenarios:

1. "Targeted use of the National Fund" ("Marking" archetype);
2. "Medium road repairs" ("Marking" archetype);
3. "Purchase of farm animals" ("Holding" archetype);
4. "Investment subsidies from the Ministry of Agriculture" (also known as "Investment subsidies for purchasing agricultural equipment on a lease basis"; "Holding" archetype);
5. "Digital VAT" ("Marking" archetype).

In addition to launching the above pilot scenarios and working on the DT platform's functional improvement, the number of project participants was significantly increased. There was also research on additional areas of the DT application (cross-border payments, automating retail payments, etc.). Finally, an improved version of the regulatory and legal framework for the DT circulation was prepared to provide required legal support for industrial-grade operation.

In 2024, the Digital Tenge project is also highly praised by international organisations. The International Monetary Fund calls Kazakhstan "the most advanced country" among the countries of the Middle East and Central Asia in its report, and Currency Research awards the project a prize in the "Leadership in Digital Currencies Adoption" category.

2025: Preparing for industrial-grade operation

In 2025, the Digital Tenge project completed preparations for a full-scale launch into industrial-grade operation. Previously launched scenarios were scaled up, and other areas of the DT application were explored. In addition, a comprehensive regulatory framework was developed for the full-fledged use of the DT as the third form of national currency.

SINCE THE PLATFORM LAUNCH IN LPM

336,6 B
DTs issued for circulation

265
opened digital accounts

61 233
conducted transactions

DT PLATFORM PARTICIPANTS

Issuer and operator of the DT platform

Treasury Committee of the Ministry of Finance of the Republic of Kazakhstan

HALYK BANK, Eurasian Bank, Altyn Bank, forte, centercredit, QazPost, NURBANK, Development Bank of Kazakhstan

IN 2025, WORK WAS CARRIED OUT IN THE FOLLOWING AREAS

Development of a comprehensive regulatory framework for the circulation of the DT

- The NBK **is the sole issuer of digital tenge** (Digital Tenge is an obligation of the NBK)
- **The digital account agreement should be signed by the customer and by the bank** that provides services for the customer

Scaling up launched state payment scenarios and technological untegration with the systems of the Ministry of Finance of the Republic of Kazakhstan and industry-specific goverment agencies

Research and development of new scenarios (commercial smart contacts, cross-border payments, etc.)

The DT platform is ready to be launched in industrial-grade operation mode

THE DIGITAL TENGE AS ONE OF THE KEY ELEMENTS OF THE NATIONAL BANK OF KAZAKHSTAN'S STRATEGY

The current state of the payment market in Kazakhstan

The payment market of Kazakhstan is demonstrating steady and dynamic growth in digital transactions. By the end of 2024, the share of non-cash transactions in the total volume of transactions reached about **87%** reflecting a profound transformation in user behaviour and a systemic shift in the economy towards electronic payment methods.

The total number of non-cash transactions amounted to approximately **12.8 billion**, and the volume reached **166.1 trillion** tenge. The year-over-year growth in transaction volume was **+13.4%**, while the volume grew by **+17%** supporting sustainable momentum and expanding digital connectivity. This growth was also driven by the increasing number of active users of remote banking services, which currently stand at approximately **24.8 million**.

One of the drivers of market development has been the widespread and consistent implementation of remote identification tools (e-KYC). This has significantly accelerated remote customer service processes. Banks are using biometric solutions, automated liveness checks, and electronic identity verification procedures providing clients with convenient access to financial services without the need for an in-person visit. At the same time, the NBK and involved GAs are developing regulatory standards that ensure a balance between customer convenience, identification reliability, and information and cybersecurity requirements.

Furthermore, Kazakhstan continues **to actively implement Open API mechanisms and develop the Open Banking concept**. The state digital transformation program and industry projects for 2023–2025 envisage API standardization, increased compatibility of key services, and an expanded range of digital financial services. Pilot projects and integrations enable banks and fintech companies to securely exchange data on clients, their products, and requests, but only with the consent of the service consumer. This creates a unified digital ecosystem and creates the conditions for the emergence and development of new services and business models. All these initiatives are being implemented gradually, but they are already having a significant impact on accelerating processes and improving the quality of digital services.

In 2024-2025, Kazakhstan continued to expand its national payment infrastructure. The NPCK is implementing key infrastructure projects aimed at increasing the speed, reliability, and accessibility of payments within the framework of the NBK's policy.

These include the **Interbank Mobile Payment System** and **the Interbank QR Payment Service**, which was officially launched on September 30, 2025. These solutions accelerate and simplify settlement processes between banks, standardize payment mechanisms, and expand access to modern digital tools for the public and businesses.

At the same time, the NBK acts as a systemic driver for the development of the payment industry, shaping the regulatory architecture and ensuring the strategic management of infrastructure processes. The NBK develops regulatory requirements, monitors the security and stability of payment systems, creates methodological standards for market participants, and supports the implementation of innovations through pilot projects and technological initiatives. At the same time, through the NPCK, the regulator ensures the implementation of key national services, enabling the creation of a centralized, compatible, and reliable ecosystem for all market participants. This governance model strengthens trust in the national payment system and ensures its sustainable development.

The ongoing digitalization of payment instruments improves financial inclusion, simplifies the connection of previously unreached population groups, reduces transaction costs, and increases the transparency of financial flows. Digital services enable small and micro businesses to more quickly integrate into formal payment mechanisms, and government and social programs to interact more effectively with the payment infrastructure.

With the rapid growth of digital and non-cash transactions, financial transaction security is becoming a priority. To enhance customer protection, prevent fraud, and ensure the stability of the payment ecosystem, **the establishment of the Anti-Fraud Center** at the NPCK has become a key milestone since 2024. This centralized platform for exchanging data on suspicious transactions, fraudulent attempts, and counterparty activity enables the timely blocking of transfers, suspension of transactions, and reporting of information to law enforcement agencies. Currently, the system already has approximately **250 participants**, and the volume of fraudulent transactions blocked promptly has reached 3 **billion tenge**.

In mid-2025, a phased modernization of the Anti-Fraud Center's technical platform began. Specifically, session-based behavioral analytics was introduced, which will allow not only for responding to already registered suspicious transactions but also for predicting potentially fraudulent activity based on anomalies in customer behavior. This approach improves monitoring efficiency, reduces the rate of false positives, and strengthens the preventative component of the security system. Combined with the technological and institutional transformations already implemented, this creates the conditions for sustainable, secure, and large-scale growth of digital payments in Kazakhstan.

Digital tenge as a logical continuation of the transformation of the National Digital Financial Infrastructure

In recent years, the NBK has been consistently building a modern national payment infrastructure that integrates several key "layers": a national card switch, a fast payment and transfer system, a nationwide Open API platform, a centralized Anti-Fraud Center, and updated interbank settlement systems. The NBK acts as a driver for the development of the payments industry by creating a reliable, technologically sovereign, and innovation-friendly foundation upon which market participants can build their own products and services, while simultaneously strengthening Kazakhstan's national sovereignty in the face of an increasingly complex geopolitical environment and the growing interdependence of financial infrastructures.

The DT is being integrated into this strategy not as a stand-alone experiment, but as a logical continuation of the transformation already underway. While previous National Digital Financial Infrastructure (NDFI) projects were primarily aimed at increasing the speed, accessibility, and security of existing forms of money (cash and non-cash), the DT adds a new, qualitative element: a tokenized form of CB's money, designed from the ground up to operate in a digital environment and integrate with next-generation infrastructures (tokenized assets, digital ledgers, smart contracts), and poses no risks to the financial system due to the absence of interest bearing.

However, the DT does not replace bank accounts, payment cards, or quick payments. It should be considered as an additional payment layer that:

- relies on existing components of the NDFI payment infrastructure (identification, Anti-Fraud Center, Open Banking initiatives, real time gross settlement, (RTGS));
- provides new properties for CB's money - programmability, expanded targeting capabilities, and transparent control of funds' movement within the framework of rules that are clear to the money owner in advance
- creates a unified "trust anchor" for the further development of the digital currency and tokenized assets ecosystem in tenge.

A practical example of such a "layer" is scenarios for transactions involving objects subject to mandatory state registration (for example, real estate). Currently, large non-cash payments between individuals and businesses for purchase and sale transactions are processed through banking mechanisms and are subject to standard financial monitoring and anti-fraud procedures, based primarily on limits and standard rules. In the DT model, payment for a transaction can be initiated not by an arbitrary transfer, but based on a "reference event" in government information systems (IS) - e.g, signing the contract and registering purchase and the contract in the relevant ledger. A machine-readable agreement (i.e., a smart contract) generated on the government services portal contains the transaction identifier and its parameters; the DT platform holds the amount in the parties' digital accounts and makes the final settlement only after receiving the event of ownership transfer from the relevant government IS.

Thus, oversight of the legality and validity of a transaction is shifting to the responsibility of government services (verification of rights, encumbrances, taxes, etc.), and financial monitoring relies not only on banking mechanisms but also on the fact of transaction registration in government ISs. On the one hand, this allows large targeted payments to be exempted from strict flat limits, and on the other, it strengthens monitoring of suspicious transactions by linking a specific payment flow with the legal basis of a specific transaction.

This approach is focused on avoiding infrastructure fragmentation: the DT should be as part of a unified architecture in which all elements (the national card switch, fast payments, Open Banking initiatives, Anti-Fraud Center, and the DT platform) complement each other. For banks and fintech organizations, this means connecting to the DT platform uses the familiar logic of interaction with the NDFI through standardized interfaces, common security and risk management requirements, and unified monitoring and reporting principles.

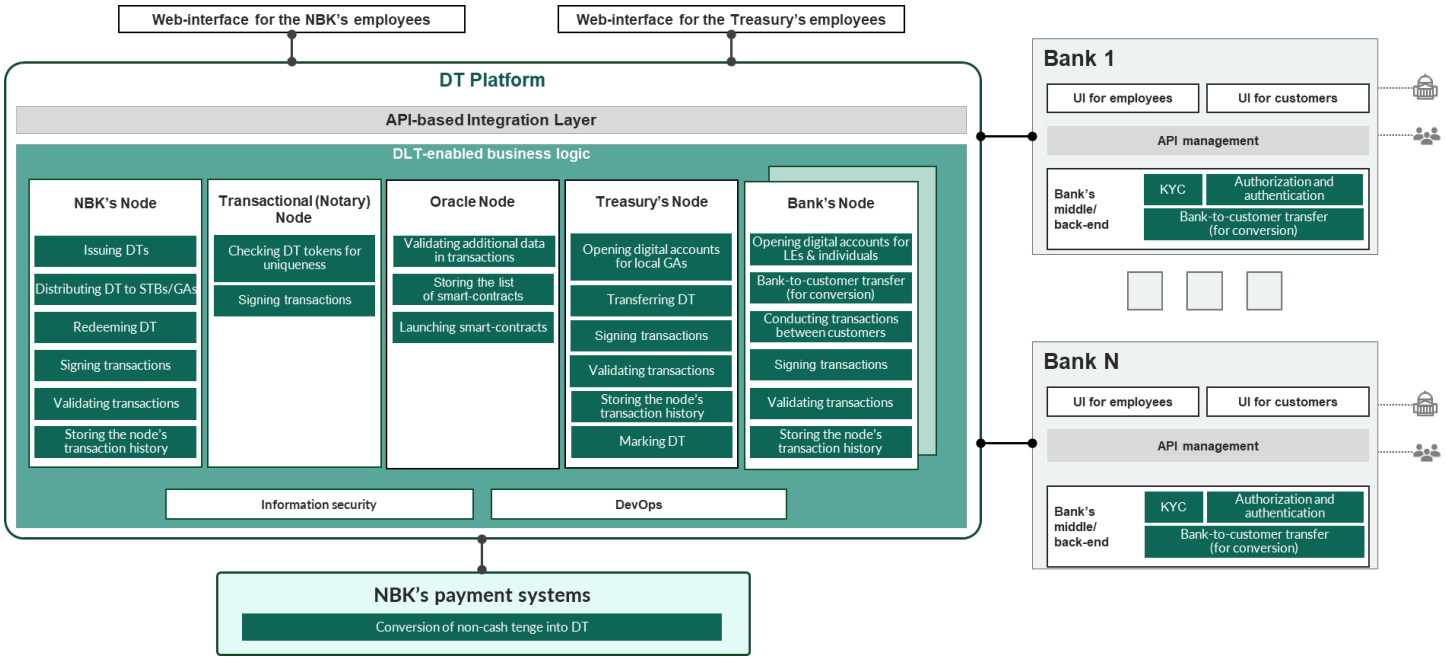
From an institutional perspective, the "Digital Tenge" project builds on the NDFI's established practice of long-term interaction with market participants and government agencies. As part of the development of the Data Processing and Integration Center, working group formats, joint testing, pilot projects, and gradual scaling were developed. Rules for collecting, storing, exchanging, and processing data were established, ensuring that sensitive information is not transferred to commercial players while providing them with all the statuses and parameters necessary for decision-making in a standardized form. These institutional and technological developments are directly scalable in the case of the "Digital Tenge" project through pilot projects with banks, fintech organizations, and government customers. The NDFI is building an ecosystem of intermediaries and users, gradually preparing the infrastructure, processes, and regulatory practices for the commercial use of the digital tenge.

Finally, the DT is an important element in the further evolution of the NDFI's role from the operator of individual payment systems to the operator of a comprehensive digital platform supporting both traditional payment services and new digital asset formats and programmable transactions. The current focus on payments involving the state and cross-border settlements is driven by the need for a phased and controlled implementation. However, as the platform develops, the participant ecosystem expands, and practical experience accumulates, a gradual transition to other promising digital currency application scenarios is anticipated, creating additional value for the market and the economy as a whole.

THE DIGITAL TENGE'S TECHNOLOGICAL PLATFORM

The DT technology platform in 2025 is an updated version of the platform presented in 2024. Below is a high-level description of the technology platform, highlighting the improved modules.

Figure 1. Architecture of the DT platform in 2025



Key participants of the DT platform:

- The NBK approves requests for the issuance/repayment of DT, performs general monitoring of the platform and automatically verifies the uniqueness of the tokens involved in transactions.;

- STBs provide individuals and legal entities with access to the DT platform and the capacity to open a DA through mobile applications, carry out identification (KYC) and onboarding of clients, participate in the generation of keys for the client's digital signature, sign their requests to the DT platform using a bank electronic digital signature , verify the digital signatures of the DT platform, initiate transactions on the DT platform, and initiate conversion at the "STB-NBK" level, perform conversion at the "client-STB" level, interact with international payment systems to ensure interoperability;

- The State Revenue Committee (SRC) of the MFK is responsible for operating the Treasury's Node. It provides GAs with access to the DT platform and the ability to open a digital account, perform the transfer of the DT into non-cash funds, sign and validate transactions involving GAs, and also store the transaction history with the participation of the GA. By using the services of the SRC, GAs and LE under local executive bodies can mark the DTs for targeted use, and also utilize an enhanced programmability archetype called "Holding".

- Is and LEs open digital accounts through STB mobile applications and use the DT to make payments and transfers.

Due to the decentralized architecture model, all components of the DT platform can be divided into two categories: **nodes** and **services**.

Node is a component of a distributed ledger network that performs certain functions.

Service is a third-party mechanism that is not part of the ledger itself, but is necessary for the interaction of the DT platform and other systems.

- Nodes of financial organizations: these are nodes of the STB, NBK and the Treasury which verify the validity of transactions (verification of signatures, equality of the sum of inputs and outputs of transactions, etc.) and store transaction history. STB nodes open digital accounts for individuals and legal entities, and the Treasury node handles the GA. STB nodes make transfers between clients and banks, Treasury's infrastructure is capable of making transfers both between the GA itself and between GA and I and LEs on the STB nodes. The node of NBK performs the issue of DT to the STB node and redemption of DT as part of a cashless funds' conversion transaction to the DT. All such nodes have the technical capability to use "Holding" programmability archetype, and the Treasury's node is also capable of marking and "additional marking" the DTs;

- Transactional (notary) node: transactional (notary) node does not validate the transaction itself and does not have full access to the transaction data. Its main task is to check for a single use of the token on the network using DLT based on the unspent transaction output (UTXO) model;

- Oracle Node: this network service provides smart contracts on the DT platform with information from the outside. It is the bridge between the DT platform and the outside world, expanding the possibilities of using smart contracts that require information outside the ledger: from the weather forecast to information about the arrival of goods at the warehouse. Oracles themselves are not a source of data - they only request and verify external sources, and then transfer the received information to a smart contract. In 2025, the Oracle Node was significantly improved to integrate with external government databases;

- Integration layer of the API: it is intended for interaction with participants and organization of exchange within the framework of the DT platform. As part of the 2025 work, the introduction of new modules (automated web-workstations for employees of the NBK and the SRC) was carried out using the integration layer.

USE-CASES OF THE DIGITAL TENGE

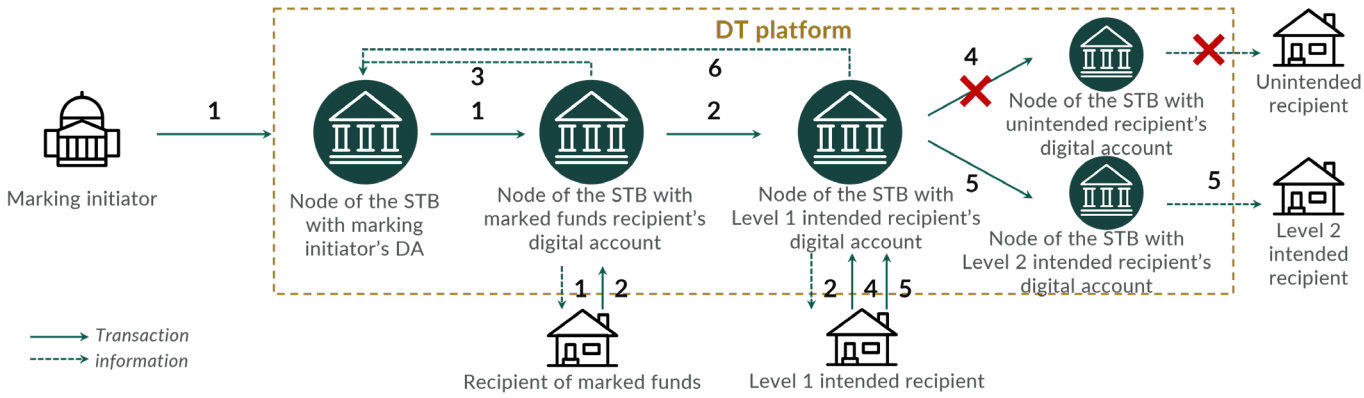
In 2025, the implementation of the 2024 pilot scenarios continued, and new scenarios were launched. The functionality of the DT platform was also enhanced within the "Marking" and "Holding" programmability archetypes. These improvements expand the range of operations on the platform and enable additional use-cases for the DT. A description of the DT platform's programmability archetypes is provided below.

"Marking" archetype - Marking with a public address (or a list of public addresses)

When conducting a marking transaction, the marking initiator specifies a list of public addresses of the intended recipients who can be recipients of the marked funds at each marking level.

The marking conditions are stored on the node of the marking initiator and transmitted to the nodes of the intended recipients during transactions between them. Information about transactions with marked tokens is transmitted to the node of the marking initiator for traceability. Below is a diagram of the "Marking" mechanism with a description of the steps:

Figure 2. Scheme of interaction of participants within the framework of the "Public address marking" subarchetype



Description of steps:

1. Initiation of marking: the funds are transferred to the digital account of the marking recipient for marking. When marking, the initiator of the marking indicates the depth of the marking and the limits for each marking level.

2. The recipient of marked funds initiates the transfer of the marked funds to the Level 1 intended recipient. Level 1 intended recipient receives marked funds.

3. The transaction data is transmitted to the node of the bank with the digital account of marking initiator to enable tracking the marked DTs.

4. Level 1 intended recipient initiates the transfer of marked funds to unintended recipients. This transaction is not possible, the marked funds remain on the account of Level 1 intended recipient.

5. Level 1 intended recipient initiates the transfer of the marked funds to Level 2 intended recipient. Level 2 intended recipient receives unmarked funds.

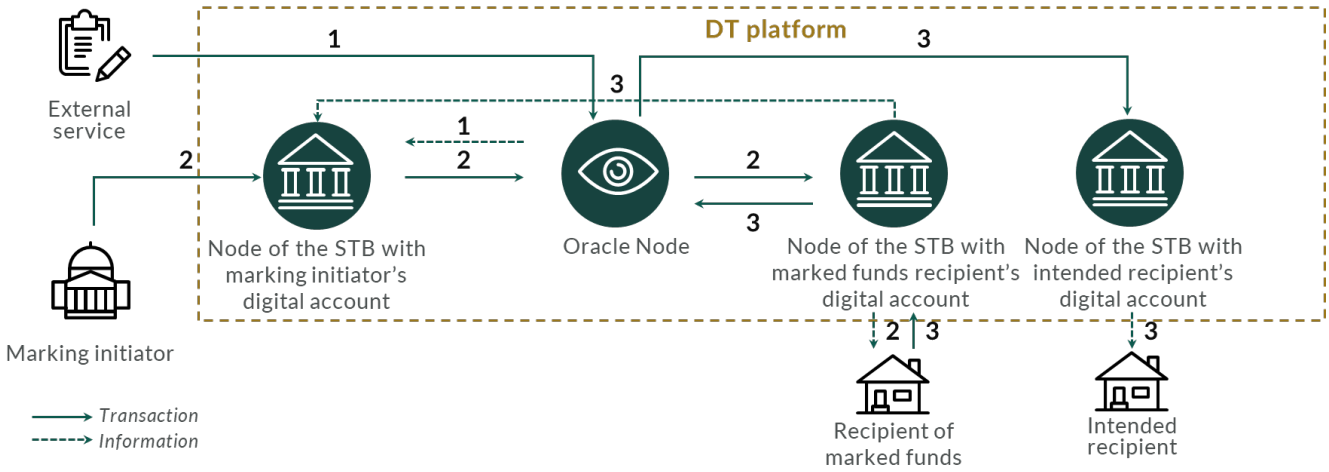
6. The transaction data is transmitted to the node of the bank with the digital account of marking initiator to enable tracking marked DTs.

"Marking" archetype - Marking with a parameter

Previously, the marking parameter is registered on the Oracle node - a list of contracts under which settlements are made between clients. The parameter contains information about the contract number, the sender, the recipient, the maximum amount of transfer of the marked DT, the maximum amount of DTs that can be converted into non-cash/cash money, and the duration of the marking.

Transactions with tokens marked with the parameter pass through the Oracle Node. It monitors compliance with the registered terms of the agreement, particularly controls dynamically the amounts available for transfer to marked DT and that can be converted into non-cash/cash money. Information about transactions with tokens marked with the parameter is transmitted to the marking initiator node and the Oracle Node for traceability. Below is a diagram of the mechanism of such marking with a description of the steps:

Figure 3. Scheme of interaction of participants within the framework of the "Marking with a parameter" subarchetype



Description of steps:

1. An external service outside the DT platform sends a request to register a marking parameter on the Oracle node specifying the contracts within the framework of which transactions between clients can be made. Information about the parameter is sent to the bank with marking the initiator's digital account.

2. Marking initiator sends a request for marking funds that indicates the registered marking parameter, which is confirmed by the Oracle Node. The recipient of marked funds receives the marked funds.

3. The recipient of marked funds initiates a transaction with the marked tokens and indicates the contract under which these transactions are performed. The funds are transferred to the intended recipient's digital account under the agreement after confirmation by the Oracle Node. The transaction data is transmitted to the node of the bank with marking initiator's digital account and to the Oracle Node to enable tracking the marked DTs.

The "Marking" programmability archetype now possesses the capability of "additional marking" of tokens within a single project: the functionality to mark tokens of different issues using an existing parameter (instead of creating a new separate parameter for each token issue) was introduced in 2025. This ensures information consolidation and allows token owners to see the "transaction tree" of different token issues for a specific project in a unified form.

"Marking" archetype - Marking with a "VAT" parameter

When a taxpayer registers (issues) an electronic invoice (EI), the services of the SRC transmit the EI data (EI ID, information about the sender and recipient, the amount of the payment without VAT, the amount of VAT) to the Oracle Node. When making a payment for the EI, customers specify the EI ID and make the payment using tokens. If the client has only standard tokens, then at the time of the transaction the tokens are marked with "VAT", the amount of the payment without "VAT" marking remains in the form of standard tokens. If the client already has marked "VAT" tokens, then he uses the already marked ones to pay the VAT amount to another client (one payment resolves the issue of taking VAT as a credit). In case of insufficient number of the "VAT" marked tokens, additional marking is performed in the transaction. The recipient always receives part of the standard tokens and part of the "VAT" marked tokens as part of the EI payment. The customers can only spend "VAT" marked tokens to settle accounts with other customers via an EI or to pay taxes to the appropriate authority. The "VAT" marked tokens have no expiration date and become standard only upon transfer to the tax authority. Below is a diagram of the mechanism of such marking with a description of the steps:

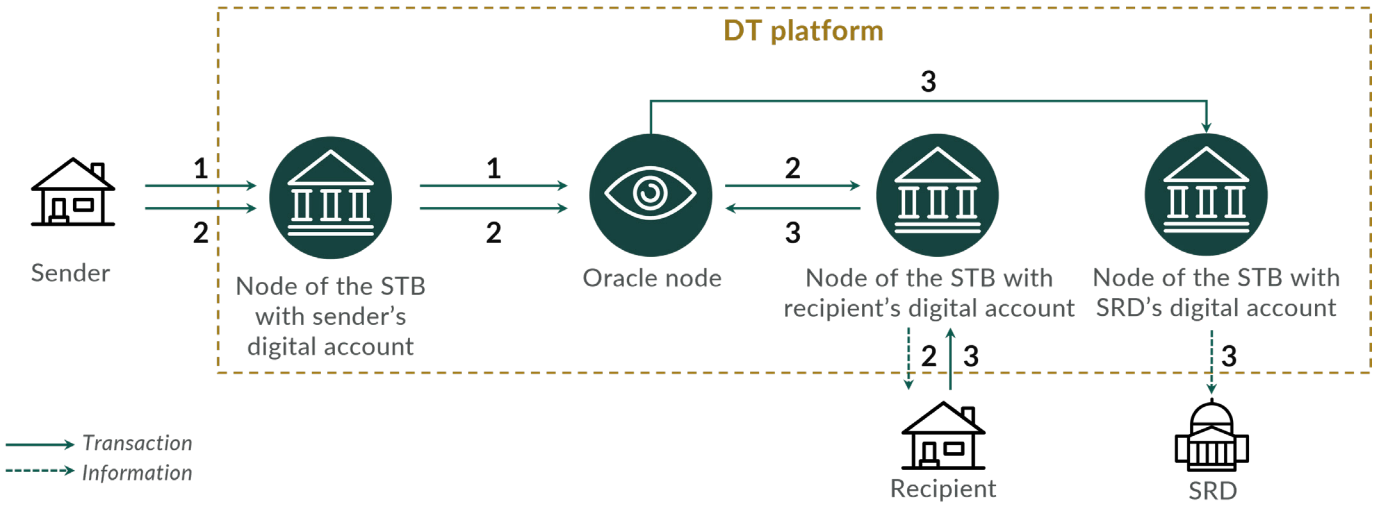
Description of steps:

1. The sender sends a request through the STB's channels to receive the EI's data. The Oracle Node provides the data.

2. The sender initiates a VAT transaction using the EI. The Oracle Node verifies that the transaction data matches the EI's data. The recipient receives standard tokens (the main payment portion) and "VAT" marked tokens in accordance with the EI's data.

3. The recipient sends a request to transfer "VAT" marked tokens to the local State Revenue Department (SRD), which is verified by the Oracle Node. During the VAT transfer transaction to the SRD, the marking is removed, and the SRD receives standard tokens.

Figure 4. Scheme of interaction of participants within the framework of the "VAT" archetype



During 2025, in parallel with the continuation of the pilot scenario according to the above-described scheme, work was carried out jointly with the SRC to develop new scenario: options for initiating payments by EI or contract were expanded and direct integration between the participating ISs was completed to reduce the number of manual operations and increase end-to-end automation of the process.

In the updated version of the scenario, when a taxpayer participating in the pilot transfers funds from their digital account to a supplier's digital account, the registration number of the corresponding EI or the contract number (for example, when transferring an advance payment) is indicated in the payment document. Payment documents are generated automatically in the taxpayer's accounting system, in the EIIS, or through the remote banking (RB) interfaces of the STB. When the payment is processed, the DT platform marks the exact amount of the DT with the "VAT" parameter, thus restricting the use of this amount exclusively for VAT payment—either in a subsequent payment linked to the EI to another VAT payer or when transferring VAT to the SRC.

“Holding” archetype

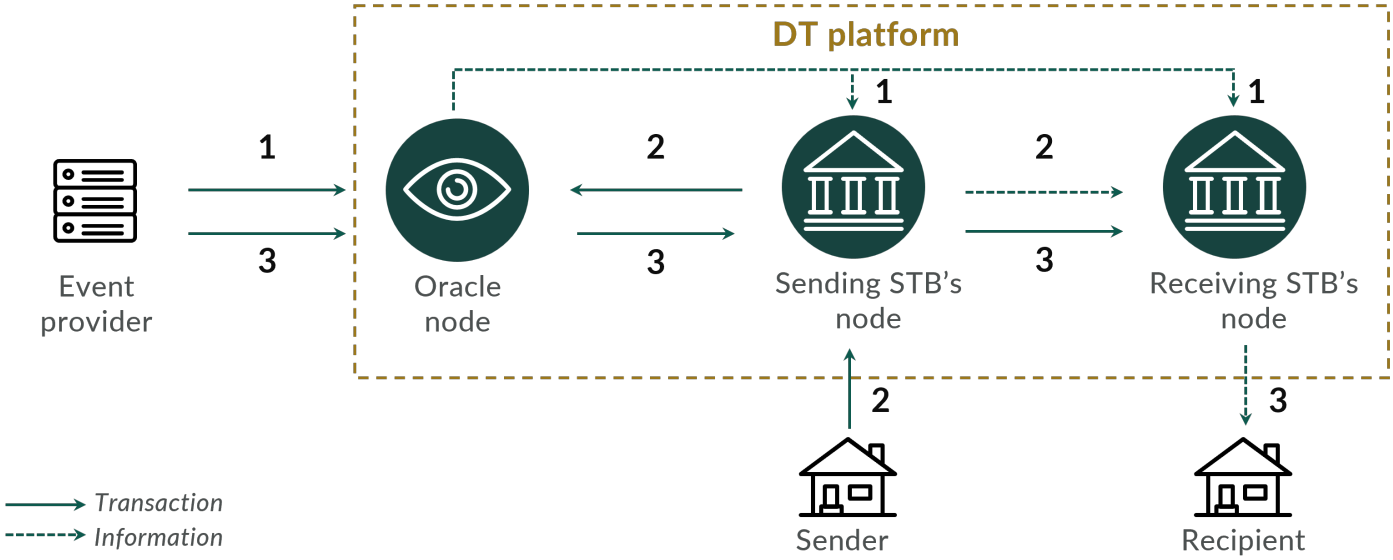
The preliminary event is registered on the Oracle Node: it includes the information about the sender, recipient, amount, time of holding validity and the type of holding (for a single transaction or infinite). The holding process is performed on the sender’s digital account, whereby tokens are held at the time of the transaction and the sender cannot spend the held funds until the holding time expires or an event occurs. Upon receipt of information about the event from the Oracle Node, the disbursement of funds is initiated, i.e., transfer of funds to the recipient, which is possible only upon receipt of the approval of the Oracle Node.

If the holding was infinite, the “hold” parameter is transferred to the remaining amount, and when the event occurs again, the Oracle Node initiates another “unholding”, until the amount of funds held is exhausted or the holding period expires.

If a holding was registered under one transaction, no re-holding is allowed, even if the holding was not for the full amount. In case of “unholding” for partial amount, the balance is returned to the sender. In this case, the Oracle Node acts as a controller, i.e. it is impossible to conduct holding and “unholding” transactions without confirmation from the Oracle Node.

Below is a diagram of the holding mechanism with a description of the steps:

Figure 5. Scheme of interaction between participants within the archetype “Holding”



Description of steps:

1. Event provider sends a request to register the event to the Oracle Node. The nodes of the sending bank and the receiving bank receive information about the event.

2. Sender initiates request to hold funds with the registered event identifier. The holding is performed on the sender's digital account with confirmation from the Oracle Node. Information about the holding is received by the node of the receiving bank.

3. The event provider recognizes that an event has occurred, the conditions of which are registered on the Oracle Node, and sends a request to the Oracle node to stop holding the funds. The funds are transferred from the sender's digital account to the recipient's one.

The mechanisms for the "Holding" programmability archetype were improved in 2025. Following the implementation of individual scenarios in 2024, it was determined that holding conditions needed to be extended to amounts returned as "change". Therefore, a corresponding mechanism for deep customization of "holding" parameters was created enabling more flexible configuration of the "Holding" programmability archetype.

Statistics of implemented scenarios

Table 1 presents the scenarios implemented between 2024 and 2025 with summary information regarding participants and their activities.

Table 1. Scenarios implemented in 2024-2025.

Scenarios	Period of realization	Programmability archetype	Participants
"Targeted use of the National Fund" sections of the Dostyk-Moyynty and Taldykorgan-Usharal railway lines)	Jun 2024 - Dec 2025	Marking (by a list of public addresses and a parameter)	14 LEs
"State investment for the acqusition of agricultural machinery and equipment under leasing agreements"	Dec 2024	Encumbrance	2 LEs
"Purchase of farm animals" (under the "Auyl-Amanaty" state lending program)	Dec 2024 - Mar 2025	Encumbrance	2 LEs 15 individuals
"Medium road repair" (2 projects in the Atyrau and Pavlodar regions)	Implementation continues in 2026	Marking (by a list of public addresses and a parameter)	22 LEs
"Digital VAT"	Implementation continues in 2026	Marking by "VAT" parameter	4 LEs
"Targeted use of funds by the Kazakhstan Football Federation" (financing football clubs)	Implementation continues in 2026	Marking by a parameter	22 LEs
"Procurement by the NBK"	Implementation continues in 2026	Marking by a parameter	15 LEs
"Loans under entrepreneur state support programs" (in cooperation with Damu Development Fund)	Nov 2025 - Dec 2025	Marking by a parameter	4 LEs

A total of 336.6 billion DTs were issued and over 1,000 transactions were conducted under these eight scenarios. Information on the practical benefits of each scenario is also provided below.

"Targeted use of the National Fund", "Medium road repairs," "Targeted use of funds by the Kazakhstan Football Federation", "Procurement by the NBK" and "Loans under entrepreneurship state support programs" scenarios

"Targeted use of the National Fund", "Medium road repairs," "Targeted use of funds by the Kazakhstan Football Federation", "Procurement by the NBK" and "Loans under entrepreneurship state support programs" scenarios share a common goal: to ensure the targeted use of funds through supply chain transparency. Therefore, they utilize the "Marking" programmability archetype (marking by public addresses and parameters based on the contract ledger) as a basic tool for monitoring on the DT platform.

Marking defines spending conditions, which are received by the DT platform as machine-readable parameters from trusted external sources. The DT platform acts as a payment instrument with defined terms of use, so marked funds can only be used within the route defined by these parameters. The quality and completeness of the route directly depend on the data and processes in external ISs that provide rules and references for smart contracts.

Conclusions on the results of pilot projects and conditions for scaling up

- The "Marking" programmability archetype has proven its applicability as a tool for targeted control: under given rules, funds circulate only within the permitted route;
- Detailing the transaction chain down to Level 3-4 intended suppliers is practically achievable; further depth is technologically possible, but reference external data and a clearly defined and unified methodology are required;
- The key factor in achieving results is the quality and completeness of external sources (registers of contracts, obligations, counterparties; nomenclature of goods, works and services, etc.): without reference data, the route for the marked DTs cannot work properly.
- Scaling up requires a unified methodology: tracking depth, legal criteria for "end-user" (a supplier that will provide the necessary goods, works, or services in exchange for state funds and without subcontractors), rules for rerouting and verification of supplier contribution
- Scaling up is also impossible without establishing legal and organizational foundations: requirements for disclosing data of participants in the transaction chain, distribution of responsibility between participants in the scenario, access regulations, and information security rules.
- A unified model for managing marking parameters is also necessary for scalability (who should approve the rules of marking, who should publish the data on transactions, how changes should be made, what are exceptions, how exceptions should be handled, etc).

“State investment for the acquisition of agricultural machinery and equipment under leasing agreements” and “Purchase of farm animals” scenarios

Within the framework of these scenarios and via using the “Holding” programmability archetype, **2 units** of agricultural machinery were purchased and **12 loans** were issued for the acquisition of **287 heads** of farm animals.

As noted previously, the DT platform does not independently set spending conditions or generate events that can be used for unholding funds. For the “Holding” programmability archetype to function, the DT platform must receive notifications of an event from trusted external sources. For this reason, integration with the ISs of the Ministry of Agriculture of the Republic of Kazakhstan was implemented within the specified scenarios. In particular, the DT platform was connected to the State Subsidy Information System (SSIS) and the “Identification of farm animals” information system (IFAIS). These scenarios were chosen for the pilot projects due to the availability of existing ISs in the industry that record confirmed events (subsidy/leasing registration, animal registration and identification, etc.). The availability of such information systems allowed these events to be used as the basis for holding and subsequent unholding of the DT within the specified conditions.

Conclusions on the results of pilot projects and conditions for scaling up

- The “Holding” programmability archetype has proven its applicability as a target control tool: funds were released from holding only when the stipulated conditions were met. This increased the efficiency of using public funds.
- It is practically achievable to build an end-to-end link between an application for state funds, “Holding” programmability archetype, event from the industry-specific IS, release of funds and final transfer of state funds. The DT platform brings the value of the payment automation upon an event and the reduction of the risk of misuse
- A key factor in achieving results is the availability of industry-specific ISs (SSIS, IFAIS, etc.) as sources of confirmed events. The integration with such data sources reduces number of manual operations and errors. In the absence of such ISs or their unsatisfactory performance, the “Holding” programmability archetype and the scenarios built on it become a labor-intensive and highly inefficient manual process.
- Scaling up requires digitalization of all stages of the business process: elimination of paper certificates and manual data transfer to confirm an event, digital validation of transaction parameters and guaranteed relevance of data at the time of transaction.
- Scaling up is impossible without implementing control mechanisms in industry-specific ISs: supplier and cost evaluation (price scoring), processing of transaction parameter changes, anti-fraud mechanisms, etc. The presence of such mechanisms enables proactive control of spending (i.e., before payment is made);
- Centralized accounting of obligations under state budget programs and lending (issuance/control/repayment) is required: this is a condition for transparency, preventing double financing and improving the quality of budget planning;
- Scaling up is also impossible without establishing legal and organizational foundations: requirements for disclosing data of participants in the transaction chain, distribution of responsibility between participants in the scenario, access regulations, and information security rules.
- From technological point of view, scaling up requires a unified integration approach (including the development of the external part of the Oracle Node, Smart Bridge, the ability of the STBs to integrate the DT-based services into RB mechanisms, and the creation of secure channels for budget administrators), It would dramatically reduce the cost and timeframe for connecting new scenarios.

“Digital VAT”

The “Digital VAT” scenario is based on the use of the “Marking” programmability archetype with a special “VAT” parameter. It ensures targeted and programmable handling of value added tax (VAT). As part of the 2024 pilot project, LEs conducted transactions on the DT platform with respect to specific EIs. Part of every transferred sum was automatically marked with the “VAT” parameter. The DTs marked with this parameter could only be used by the recipient for following purposes:

- to be sent as built-in VAT part to the next supplier with respect to specific EI, or
- to be paid as a VAT to the state.

In 2024, this scenario was implemented using manual data exchange through existing channels of interaction between the DT platform operator and the SRC of the Ministry of Finance of the Republic of Kazakhstan (MFK). At this stage, the fundamental feasibility of marking the DTs with “VAT” parameter and its practical value for market participants was confirmed. In 2025, direct integration of the DT platform with the SRC’s IS was completed resulting in the scenario being transformed into an end-to-end process:

1. The scenario starts in ERP accounting systems (e.g., 1C) on the taxpayer side;
2. An EI is registered via the SRC’s IS;
3. The data regarding the EI is sent to the DT platform;
4. The payment with the use of the DT is confirmed via RB mechanisms;
5. The payment status is sent back from the DT platform to the SRC’s IS.

A key feature of the “Digital VAT” scenario is an architecture in which each participant continues to work in their familiar system, and each IS possesses only part of the data and implements only its own controls. The table below contains the summary of the scenario’s advantages compared to the previous status quo.

Table 2. The advantages of the "Digital VAT" scenario

Participant	Before	After
SRC	Desk audits were conducted via comparing issued EIs and actual payments according to taxpayers' bank statements; Decisions on VAT refunds were made manually; Increased risks of human error and corruption factors.	All EIs are linked to the payments in the DT; SRC receives reliable payment status in near real time mode; Decision on VAT refunds can be made automatically; Controls for EI adjustments and reversal transactions are built directly into the SRC's IS.
Taxpayer's accountant	Taxpayer's accountant worked in the ERP system with subsequent uploading of payment orders to the bank; Taxpayer's accountant controlled issued EIs and their payment statuses manually; There is a need to compare bank statements with contracts and source documents in ERP.	Taxpayer's accountant still works in the familiar ERP system; Taxpayer's accountant initiates payment directly via the link with the contract or issued EI, no need for manual control. Payment status is automatically and seamlessly linked to specific contract's documents; Taxpayer's accountant uses RB only to confirm th payment already linked to a specific contract's document.
STB	There is a need to implement numerous specialised integrations with various taxpayers' ERP systems; STB's actions vary greatly due to different ERP versions and its customizability (no single logic/ procedure); STB should allocate resources to maintain and support such integrations.	STB interacts only with the unified payment message received from the DT platform; ERP, EIIS and the DT platform are linked together via the same logic and procedures; STB can focus on its key functions: payment control, compliance, transaction confirmation, and the customer interface for RB. The complexity of integrations and operating costs are greatly reduced.

The 'Digital VAT' scenario demonstrated the practical value of programmable money linked to primary documents for exporters and other market participants at the initial stage. The DT marking mechanism not only speeds up VAT refunds to participating exporters, but also guarantees the "impenetrability" of the tax circuit (i.e., 100% of VAT were paid to the state).

Conclusions on the results of pilot-projects and conditions for scaling up

- The created link between EI, programmable payment and payment status proved its effectiveness. It creates a comprehensive digital trail for VAT and reduces the number of manual checks.
- The architecture proved its capability of solving the tasks of all participants without making radical changes to existing processes thus creating the foundation for the industrial implementation of the "Digital VAT" scenario.
- A critical condition for further scaling is the integration connectivity of all involved ISs (taxpayer accounting systems, EIIS, banking ISs and the DT platform) and unique identifiers to match documents and payments.
- An additional effect is the motivation of participants to reveal their supply chain due to the logic of VAT crediting. As a result, participants (LEs) had less audits related to VAT refunds due to the transparency of the process.

Cross-border payments

In 2025, several pilot projects on using CBDCs for cross-border payments were conducted. In particular, two types of scenarios were tested: bilateral communication between two CBDC platforms and integration with a multi-CBDC platform. In both cases, preliminary research and methodological work were carried out; there were also synthetic tests in an isolated environment. These scenarios were tested in cooperation with the STBs and CBs of the participating jurisdictions. The results obtained indicate the great potential of using CBDC for cross-border payments, but the need for further research in a number of areas to mitigate/prevent risks should not be underestimated.

Conclusions on the results of pilot projects and conditions for scaling up

- Cross-border payments using CBDCs are technologically feasible even in the absence of a fully-fledged industrial platform, since the basic mechanisms of cross-platform interaction and settlements can be implemented at early stages of CBDC development.
- The main values of cross-border payments using CBDCs are reduced number of intermediaries, potentially high speed of settlement (T+0), possibility of implementing innovative settlement mechanisms (e.g., in "payment-versus-payment" mode, PvP), and institutional neutrality that ensures the functioning of cross-border settlements regardless of external geopolitical restrictions and other factors.
- In order to further develop CBDC-based cross-border payments, a number of issues related to regulatory and legal support (differences in the legal regulation of national digital currencies in different jurisdictions, distribution of powers and responsibilities among participants to combat money laundering and terrorist financing (AML/CFT), personal data protection and banking secrecy, etc.) must be resolved. Some methodological questions (providing liquidity, exchange rate formation, final settlement mechanisms, etc.) should also be considered.

- It is also worth noting the importance of close cooperation with STBs for the fastest and most effective testing and implementation of cross-border payments.

Promising scenarios

The development of the DT platform implies transitioning from pilot projects to industrial-grade production operation. This process creates new opportunities for different scenarios being implemented, and these scenarios can significantly expand the functionality of the national payment infrastructure. These include commercial smart contracts, offline payments, and integrations of the DT with tokenised assets platforms.

Commercial smart contracts

Unlike traditional contracts, smart contracts enable the automation of financial obligations based on predefined and formalised conditions thus minimising operational risks and reducing transaction costs. Using the DT platform in such scenarios creates a link between the fulfilment of contractual obligations and the transfer of funds. In particular, such scenarios include the above-mentioned PvP and DvP settlement scenarios: they may be in demand in the supply chain, investment projects, securities transactions, etc.

The DT platform's functionality can be utilized to create automated escrow accounts with national digital currency and capabilities to execute transactions when certain conditions or obligations are met. The "Safe Deal" scenario may be mentioned as an example of such smart contracts: this scenario is currently under development to automate various types of contractual relationships involving the exchange of property or services for cash on the DT platform.

The development of such scenarios depends on a number of factors, but the most important ones are a comprehensive regulatory framework for the DT platform, a clearly defined legal status of the national digital currency, integration with reference databases, and the interest from market participants. The NPCK is working in all of the above areas to ensure the comprehensive development of the DT ecosystem.

Offline payments

The ability to make payments in the DT without Internet access is important for expanding financial accessibility. This functionality is critical for both remote regions and emergency scenarios that cause temporary disconnections. Offline payments also bring the user experience of the DT closer to that of cash while retaining the advantages of the digital form of the national currency.

At the technological level, offline payments in the DT are based on the use of special digital accounts with specific accounting and limiting mechanisms. In terms of their functionality and structure, these accounts are similar to "cold wallets": tokens for offline payments are stored on a smartphone or other device, and transactions are carried out using QR-codes and NFC.

Offline payments in the DT are implemented as a "delayed online payment": the DT tokens stored on a device can be used within a chain of transactions of a certain length, but after that the transaction participant's device must be connected to the Internet to update the general ledger and to transfer offline transaction data to banks. In 2022, offline payments in the DT were tested: the DT tokens could be used in a transaction chain of up to 15 participants before the user needed to connect to the network.

Industrial operation of offline payments with the use of the DT is possible, but there should be market participants' interest in such functionality and implemented technological and methodological measures to minimise the risks of 'double spending', to provide required level of AML/CFT and to resolve other legal issues.

Integration with tokenised assets platforms

The integration of the DT platform with tokenised assets creates the foundation for a brand new segment of the financial market with settlements and accounting for asset rights being carried out in a single digital environment. Tokenized assets may include financial instruments, real estate, commodity assets, claims, and other property and contractual rights.

Using the DT as a settlement asset in transactions with tokenised instruments ensures instant settlement, and its finality. It also reduces settlement risks and simplifies the architecture of related processes. At the architectural level, the DT platform enables fastest possible integration with tokenized assets platforms due to the tokenised nature of the DT itself. This was confirmed during the experiments of issuing the DT-backed stablecoins that were carried out in the DT platform's experimental environment in 2023.

For the systematic development of such services, it is necessary to create appropriate regulatory and legal support, to resolve several methodological issues related to the rules of tokenized assets circulation, and to organize close collaboration with market participants. It is important to note that in such scenarios the DT should be considered not as an independent product, but as a basic settlement layer that ensures the reliability and predictability of transactions.

KEY FINDINGS FROM THE ANALYSIS OF PILOT PROJECTS

All pilot projects conducted on the DT platform were focused on testing key technological and organisational hypotheses regarding the introduction of CBDC. Obtained results showed that there are numerous previously unknown benefits of using a national digital currency in various cases. Additionally, a number of key conclusions related to the use of the DT were made:

1. **The introduction of the DT cannot fix systemic problems.**

   The DT itself does not eliminate the root causes of non-targeted expenditures (incorrect planning, unpredicted changes in prices, law violations, etc.), but it can be efficient if there are transparent processes and rules to which programmable payments can be linked. The implementation of the DT-based mechanisms should be carried out in parallel with the adjustment of business processes, methodological work and other processes.

2. **Programmability-based scenarios should use high-quality data and trusted sources for confirmation.**

   The results of using the DT platform's programmability are closely related to the availability and quality of reference databases used to provide confirming events/documents (e.g., proof of receiving goods or services, details of suppliers' activity, information of specific contracts' conditions, etc.). Without such data sources, any technological control becomes merely a formality.

3. **The rules and methodology should be the first priority, technology should be considered after them.**

   Consistent approach is needed: the principles of using the DT (e.g., how to mark/unmark funds, what are the scope and volume of marked funds, are there any exceptions, etc.) should be created first, and only after that related business logic and integrations can be implemented on the DT platform. Deviating from this approach in the context of industrial-grade operation of the DT can lead to numerous critical problems.

4. **The maximum effect of using the DT platform is achieved via real-time monitoring, not via post-factum reporting.**

   The main value of using the DT is in the capability of controlling the link between contractual obligations, related documents, events (e.g., delivery of goods) and payment in real time. This requires synchronisation of data across the entire chain using end-to-end identifiers and integration with related ISs (EIIS, GOs' accounting systems, STBs' ISs, etc.).

5. **The balance between control and benefits for participants greatly increases the attractiveness of scenarios for market participants.**

   Further development of the DT ecosystem requires incentives for businesses and banks: faster payment-related procedures and settlements, reduced number of regulatory checks, less time required for returning funds in case of errors, access to state support measures in case of transparent use of funds, etc. Without clear benefits for participants, their interest in using the DT remains low.

6. Conducting small-scale pilot projects greatly reduces risks and enables flexible adjusting of business processes.

Conducting pilot projects in an isolated or limited environment is needed to identify limitations in technology, data, and processes without imposing additional risks. Moreover, this approach enables efficient enhancement of methodologies and integrations for further scaling up. It is important to mention, however, that the experience gained from pilot projects must be studied by all parties involved in order to use the DT efficiently and to avoid mistakes during scaling up.

7. The early involvement of industry-related GOs and the existence of a clear legal status are of critical importance.

Early involvement of representatives from industry-specific GOs and clearly defined legal status of the DT is crucial for any pilot project related to the use of national digital currency: these factors enable efficient division of responsibilities among all participants and formalisation of adjusted business processes. Moreover, the combination of these aspects is needed to create methodological recommendations for the use of the DT as quickly as possible and to promptly amend rules of business processes. As a result, these factors positively affect the speed and degree of the DT adoption by market participants and GOs.

OPEN QUESTIONS AND AREAS FOR FURTHER DEVELOPMENT

The NBK is consistently and gradually exploring the implementation of the CBDC Kazakhstan via different methods - from analytical studies to pilot projects and the launch of the DT platform in LPM.

The most important issue for the development of the DT platform is **determining the regulatory status of the DT**. During the LPM phase, existing regulatory mechanisms were utilized: the DT was legally defined as electronic money issued by the NBK, and it was an obligation of the NBK to the holder of funds. This decision enabled carrying out pilot projects to test hypotheses and scenarios, but it is necessary to provide a solid legal foundation of the DT for full-scale industrial-grade operation. An important milestone in resolving this issue was achieved in January 2026: newly adopted version of the Law of the Republic of Kazakhstan "On Banks and Banking Activities in the Republic of Kazakhstan" defined the DT as a new form of national currency and authorized the NBK to determine the procedures for the circulation and use of DT. Further work in this direction will be focused on introducing rules and standards for the use of DT in regulatory and legal acts: it will include creation of accounting rules for the DT, definition of conditions for disclosure of information on transactions with marked funds, and developing requirements for ISs that provides data on confirming events/documents for the DT platform.

Another area for further work will be **improving the technological maturity of the platform**. In particular, it is necessary to ensure continuous and stable functioning of the DT platform, to continue work on enhancing performance and operational observability, and to standardise the processes of updating and supporting the platform.

Ensuring industrial-level information security is also of great importance. This direction of work includes creating practical models for managing and restoring end-user keys (including the use of hardware security modules, HSM), preparing plans for emergency cases (such as bank licence revocation), implementing mechanisms to ensure users' access to their funds in such cases, studying possible ways of non-custodial key storage for specific scenarios (e.g., offline payments), and using other components of the NDFI to restore users' access to their funds without possibility of unlawful withdrawal. The questions of information security were started during the LPM phase, and this work will be continued for the launch of the industrial-grade DT platform.

For the further development of the national digital currency ecosystem, it is necessary to ensure **market readiness for the use of DT in cooperation with STBs**. This means not only carrying out technical integrations, but also embedding the DT into the STBs' business processes, customer products, and accounting procedures. There are several prominent results in this field, but greater involvement of market participants is needed for the launch of the DT platform in industrial-grade production mode.

Due to the increasing number of scenarios for using the DT platform for state payments, it is critically important to ensure **the availability of reference data sources for using the DT platform's programmability**. There is an increasing demand for the ISs that can provide high-quality data on confirming events/documents. As an example of work in this direction, the integration of the DT platform with the EIIS and other state databases can be mentioned.

In addition, **commercialization of the DT platform's capabilities by STBs** should be studied. The introduction of national digital currency can dramatically change existing banks' income flows: the classic model of earning on liquidity (interest income) is being transformed due to the fact that the DT is an obligation of the NBK. Imposing fees on the use of the DT-based services also requires additional research due to infrastructural significance of the DT platform. Specialised pilot projects and studies focused on finding commercially viable scenarios for all participants should be carried out to find optimal pricing models. There is ongoing research of the question of the DT platform commercialization: in particular, the "Safe Deal" scenario is currently being implemented. This scenario will automate contractual relationships and create a fundamentally new source of income for market participants.

Finally, the next logical step in the development of the Digital Tenge project will be **the operationalization of the DT platform as one of the key components of the NDFI**. The DT should become a technologically and regulatorily stable payment mechanism, and the main application of it should be determined by the social and economic benefits derived from its programmability (targeted and conditional payments, automation of reporting, reduction of operational risks by eliminating intermediaries, ensuring transparency in the execution of contractual relationships, etc.).

PLANS FOR 2026

The analysis of the LPM phase of 2024–2025 confirmed that the national digital currency can serve as the technological basis for the introduction of programmable payments into budget processes. The DT platform is capable of ensuring that the state funds are transferred according to predefined conditions. The major positive effects of using the DT platform are achieved via the use of programmability and creating connections between payment, payment rules, and confirming events and/or documents.

In 2026, pilot projects on the use of the DT platform for budget spending will be continued. To complete the tasks set by the Government of the Republic of Kazakhstan for introducing the DT into budget processes, the NPCK is focusing on creating template mechanisms for the DT platform's smart-contracts for replication in various payment scenarios involving the state.

The programmability archetype called **"Holding"** has already demonstrated its maturity as an event-based payment mechanism for public services (subsidies, conditional lending, etc.).

The DT platform can link budget funds to a confirming event (e.g., transfer of equipment or re-registration of animals) and automatically execute payment if there are relevant industry-specific ISs capable of generating validated events and documents. This reduces the risk of misuse, decreases the proportion of manual operations, and increases the manageability and transparency of payments.

The **"Digital VAT"** scenario proved to be in demand on the market and demonstrated the practical value of linking programmable money with confirming documents. Further development of this scenario will be aimed at creating an end-to-end integrated system (including the SRC's accounting ISs, the DT platform's banking channels and notification services), adding new ISs with confirming events/documents, and forming rules for different types of payment (prepayment, partial payment, adjustments, returns, etc). Completing these tasks will make the scenario both efficient for the state and convenient for market participants.

The programmability archetype called **"Marking"** has proven its potential as a basic tool for monitoring the intended use of funds and transparency of the supply chain. However, it also requires comprehensive development. Unified rulebook (with determined depth of monitoring and definition of the "end recipient"), trusted reference data sources and event registries, legal enforcement of data disclosure requirements are needed for further scaling up.

The results of the pilot projects have shaped the outline of further work in 2026: introducing the DT into the sphere of state payments will continue. Due to the maturity of the DT platform, one of the key directions of work will be the transition from pilot projects to full-fledged integrated solutions. It will be achieved through data standardisation, creation of a suitable regulatory framework with all methodological aspects covered, and the development of a sustainable operating model for managing DT.

CONCLUSION

In 2025, the Digital Tenge project cemented its role as one of the key elements of Kazakhstan's NDFI and demonstrated its ability to scale up in preparation for industrial-grade production operation. Over the course of the year, the DT platform demonstrated maturity in both technological and operational terms: a number of functional and non-functional parameters of the platform itself have been improved, scenarios aimed at increasing the efficiency and transparency of payments involving the state have been implemented, and new pilot projects in the field of retail and cross-border payments are being developed. All these processes are being conducted with regard to the experience gained during the limited production mode phase and the best international practices regarding development of CBDC.

The further development of the national digital currency is still a complicated task. To unlock the full potential of the CBDC in Kazakhstan, it is necessary to create a comprehensive regulatory framework, ensure the scalability and continuous operation of the CBDC platform, and form a sustainable ecosystem with the participation of GOs and market participants.

The experience of Kazakhstan and other countries demonstrates that the successful implementation of a CBDC is only possible through a combination of open interaction with the market, a consistent and progressive regulatory approach, and a willingness to continuously upgrade technology.

2025 was a year of remarkable results for the Digital Tenge project. Moreover, in 2025, a foundation for the transition to the next stage of DT development (industrial-grade production operation) was created. This transition will require intensified cooperation with market participants and GOs, innovative thinking, and readiness to implement new models of work in the digital economy.

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