

ANNUAL REPORT ON THE DEVELOPMENT OF **NATIONAL DIGITAL FINANCIAL INFRASTRUCTURE**

Digital
tenge



Antifraud center



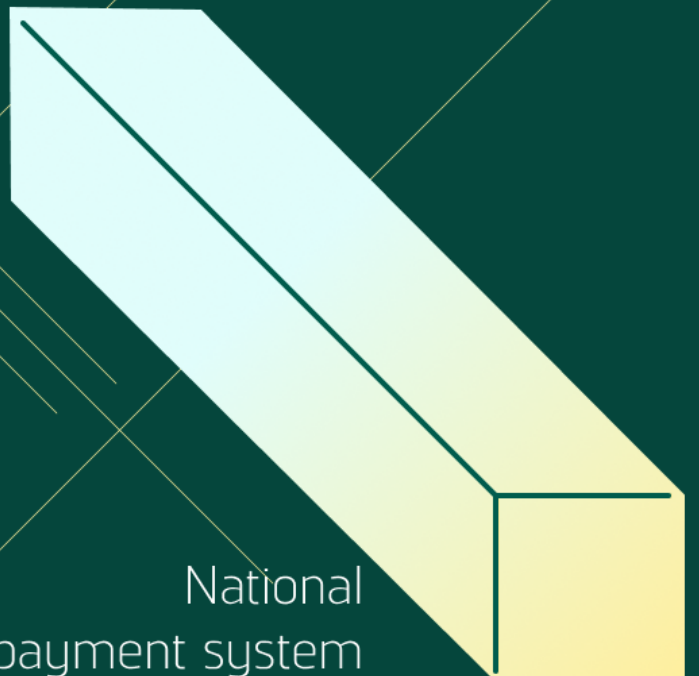
Open API



Digital
identification



National
payment system



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Opening speech



Kazakhstan has demonstrated significant progress in the digitalization of financial services. 86.7% of the country's total payment turnover is processed through the National Bank's systems. More than 85.8% of all payments in the country are made in non-cash form.

The market is changing rapidly and, against the backdrop of global challenges, the National Bank continues to introduce innovative solutions and increase the competitiveness of the financial market.

When building the NDFI, we set the needs of the market, the interests of citizens and the resilience of the system to global challenges as a key priority. That is why a single integrated platform is needed that will ensure security, speed and convenience of payments, and will also comply with the principles of equal opportunities and equal access for all participants, which is called "by design".

The creation of the National Digital Financial Infrastructure includes the development of a reliable retail payment system that ensures smooth and secure transactions; a trust infrastructure that guarantees data protection and user identification; and secure data exchange to transfer information between different entities in the financial system to ensure security.

Our goal is to create a sustainable and secure financial infrastructure that will contribute to the economic development of Kazakhstan.

Timur Suleimenov

Chairman of the National Bank of Kazakhstan

Expert opinions



Cristina Doros

Senior Vice President and Regional Manager at Visa in Ukraine, Georgia, CIS and South-East Europe.

As we begin the year 2025, we are excited to continue our collaboration with the National Payment Corporation of Kazakhstan. Their commitment to innovation and progress has been instrumental in enhancing the efficiency and security of the financial industry in the country.

Last year, we had a strong and successful partnership, culminating in the implementation of the Interbank Payment Card System in accordance with regulatory requirements. We also supported numerous initiatives, including our partnership with the Central Asia Fintech Summit, which has been instrumental in driving innovation and growth in this sector. Together with the National Bank of Kazakhstan, we have produced a white paper to examine the evolution of digital public infrastructure (DPI) in Kazakhstan. Additionally, our joint media projects aim to foster a vibrant fintech community in the country. We are confident that our joint efforts will further enhance the digital financial landscape and create new opportunities for growth and development. We look forward to achieving even greater milestones in the coming year, driving innovation and growth in this sector.



John Velissarios

Founder of Otranto Ltd.

Over the past year, the Digital Tenge project has made significant progress in integrating the national digital currency into the real economy. As this third form of central bank money expands its scope of application, its impact is becoming evident in all areas of government and commercial activity, as well as in the daily lives of citizens. The project not only demonstrates the potential of a general-purpose digital currency, but also represents an important step towards the digitalization of Kazakhstan. The scenarios implemented to date are just the beginning, and new opportunities are constantly emerging, each bringing extremely positive results.

The Digital Tenge project is a benchmark for innovation in financial systems on a global scale. Its rapid deployment across a wide range of areas underscores the strategic vision of the project, the dedication of the team implementing it, and the collective willingness of the government and market participants to embrace transformational change. As we move along this path, new uses for the digital tenge promise to further strengthen Kazakhstan's position as a regional economic hub and a pioneer in digital transformation.

Expert opinions



Sanzhar Zhamalov

Director General of Kazakhstan and Central Asia

NPCK is our reliable partner, setting trends in the development of a modern, secure and innovative digital payment system in Kazakhstan.

In 2024, we successfully implemented many joint projects aimed at improving the security and convenience of financial transactions, such as the launch of the Interbank Payment Card System, the first card in the Digital Tenge of the Eurasian Bank, providing expert support for the Instant Payment System and Open Banking project, as well as participating as a general sponsor in the

Central Asian Fintech Summit, a major regional fintech event that brought together over 4,000 participants.

Together with NPCK, we launched the Mastercard fintech lab at ALMAU University, where we organized a series of educational events Mastercard Academy and the Girls4Tech program, and published reports on the development of fintech and digital asset markets in the region.

We are confident that our partnership will continue to bring significant benefits to the country's economy.



Anton Mussin

Managing Director of Axellec IT company

Within the framework of the Digital Tenge project, in 2024, complex integration tasks were solved, including improving the platform architecture and implementing new use cases. Axellec is a technology partner of the National Payment Corporation of the National Bank of the Republic of Kazakhstan.

We have made every effort to optimize technologies to ensure scalability, security and readiness of the digital tenge for the future challenges of the financial market of Kazakhstan.

Among the plans for the next year: developing the functionality of the digital tenge platform for cross-border payments, scaling existing and launching new scenarios with state financing and, of course, connecting new participants to the platform. We have no doubt that our joint work will ultimately help the economy of Kazakhstan not only maintain its leadership in the region, but also be at the top on the world stage!

Abbreviations and terms

- ABS - automated banking system
- JSC – Joint-Stock Company
- STB – second-tier banks
- BIS - Bank for International Settlements
- ECCB - Eastern Caribbean Central Bank
- SSIS - state subsidy information system
- GO - government organization
- IFA - “Identification of farm animals” information system
- ISEI- information system of electronic invoices
- SRC - State Revenue Committee
- MA - Ministry of Agriculture
- NBK – National Bank of the Republic of Kazakhstan
- VAT – value-added tax
- NPCK - National Payment Corporation
- AML/CFT - anti-money laundering and combating the financing of terrorism
- PSP - payment service provider
- SEC - socio-entrepreneurial corporation
- FC - farming company
- DPR - Department of public revenues
- DA - Department of Agriculture
- I - individual
- CB – central bank
- CBDC - digital currency of central banks
- DT – digital tenge
- EI – electronic invoice
- EDS - electronic digital signature
- LE – legal entity
- API - Application programming interface
- DevOps - Development+Operations, methodology of automation of technological processes of software assembly, customization and deployment
- DvP - Delivery-versus-payment, delivery versus payment transaction
- DLT - Distributed ledger technology, blockchain technology
- KYC - Know your customer, customer identification procedure
- NFC - Near-field communication, short-range wireless data transmission technology
- PBM - Purpose bound money, target-driven money



Glossary

- POS - Point of sale, electronic software and hardware device for accepting payment cards for payment
- PvP - Payment-versus-payment, transaction in the “payment versus payment” mode
- R&D - Research and development, experimental study
- RTGS - Real-time gross settlement
- QR-code - Quick Response code
- UTXO - Unspent transaction output, withdrawal of unspent transactions, i.e., the balance of cryptocurrency that the user receives from each transaction
- UI - User’s interface

Introduction

Kazakhstan is demonstrating considerable progress in the digitalization of financial services, creating a solid foundation for further economic development. Today, **89,5%** of the total payment cycle of the country is processed through the systems of the National Bank, and the share of non-cash payments exceeds **85.8%**. These indicators emphasize the high level of digital technology penetration in the financial sector and the country's readiness to implement contemporary solutions.

However, the financial services market **continues to change rapidly**, driven by global challenges such as cyber threats, increasing competition and the need for greater financial inclusion. In these circumstances, the National Bank of Kazakhstan emphasizes the introduction of innovative solutions aimed at strengthening the competitiveness of the financial market and adapting to the changing needs of citizens and businesses.

The **National digital financial infrastructure (NDFI)** is a response to global and local challenges, ensuring Kazakhstan's transition to a new level of financial ecosystem. The development of the National Digital Financial Infrastructure is a strategically important task for Kazakhstan. The integration of the NDFI will ensure:

- **Improving the competitiveness of the financial market.**
- **Eliminating duplicative processes and reducing transaction costs.**
- **Access to innovative financial services for a wide range of market participants.**

The key priority in establishing the National Digital Financial Infrastructure is to focus on the needs of the market, the interests of citizens and to ensure the system's resilience to global challenges. NDFI should become a **single integrated platform that guarantees security, speed and convenience of settlements**. An important principle in the design of the system is the observance of equal opportunities and equal access for all financial market participants.

NSFI development covers three key areas:

- **Reliable retail payment system**, providing uninterrupted and secure transactions for citizens and businesses in interbank payments and money transfers in tenge, transactions using the national digital currency;
- **Digital services**, providing biometric identification of clients of financial and payment organizations and management of digital consents.
- **Secure data exchange**, providing a secure environment for the exchange of information between payment service providers over open program interfaces, as well as for the exchange of data between participants on fraudulent payment transactions

The purpose of this report is to provide a comprehensive **report of achievements and results** in the area of establishment and development of the National Digital Financial Infrastructure in Kazakhstan for 2024, as well as to **outline priority areas and strategic goals for the next year**.

Introduction

The main direction of NDFI development in 2024 was the creation of **new elements of payment infrastructure**. The implementation of the interbank payment card system, the implementation of the Open API interbank payment and transfer system, and the launch of the Anti-Fraud Center laid the foundation for enhancing financial inclusion, ensuring security and national sovereignty of financial transactions. These initiatives not only build user confidence, but also **stimulate the development of innovative services**, contributing to Kazakhstan's economic growth and global competitiveness.

In addition, considerable attention was paid to the development of existing infrastructure. Every day more than **350,000 transactions** pass through the payment infrastructure of the NBK, in the first nine months of 2024 more than **1,000 trillion KZT** was processed through the systems of the National Bank, the average daily volume of transactions amounted to an impressive **5.9 trillion KZT**. The digital identification tools process more than **2.5 million identifications per month**, empowering market participants to interact securely and transparently, creating new standards of security.

No less important was the **implementation of innovative technologies**. The second phase of the implementation of the digital tenge opened new horizons for the use of digital currency in government and programmable payments, and provided a basis for its large-scale implementation into the national economy.

The National digital financial infrastructure is not just a technological tool, but a **strategic project that shapes the future of Kazakhstan's economy**. It allows the country to move confidently towards building a flexible, sustainable and competitive financial system capable of meeting the challenges of the digital age.



PREREQUISITES

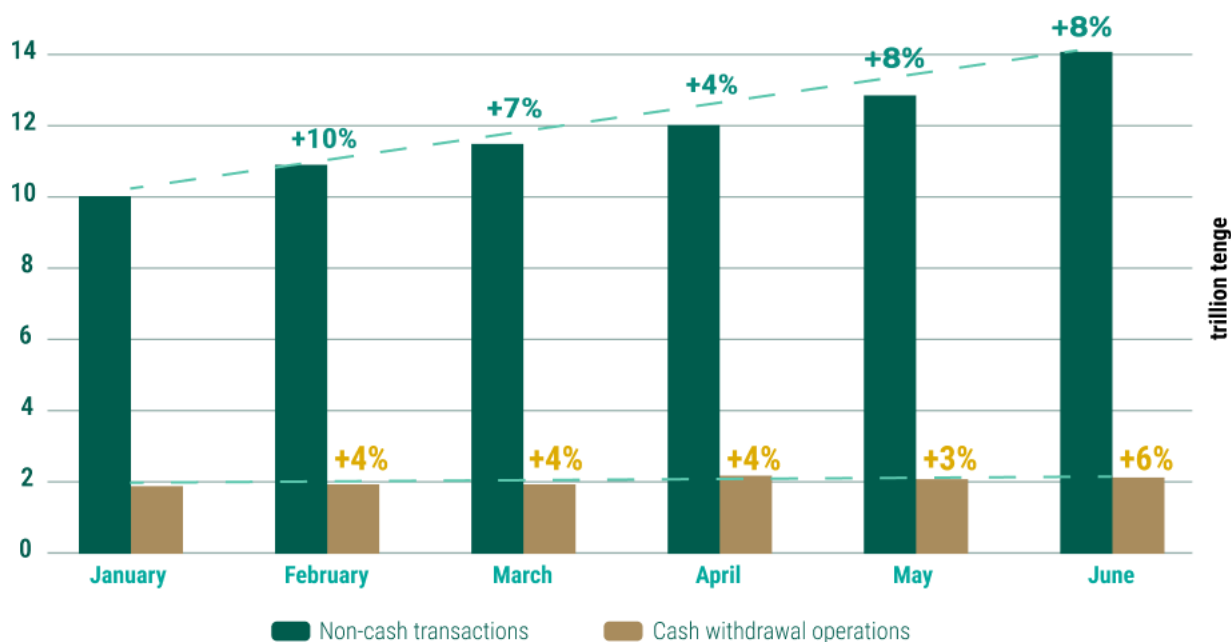
FOR THE DEVELOPMENT
OF THE NATIONAL DIGITAL
FINANCIAL INFRASTRUCTURE

Prerequisites for the development of the National Digital Financial Infrastructure

One of the key indicators of the digitalization of the financial system is the vigorous growth of non-cash transactions. In 2024, the number of active payment cards increased by 8%, suggesting a high level of public confidence in financial technologies. While the share of non-cash transactions exceeded 85%, demonstrating the willingness of users to switch to more convenient and modern payment methods. This growth is indicative of the efforts to develop payment system infrastructure and popularize digital services among the population.

In the first half of 2024, an average of 154 non-cash transactions amounting to KZT 1.9 mln were conducted using each active payment card.

Fig. 1. Increase in the number of payment cards

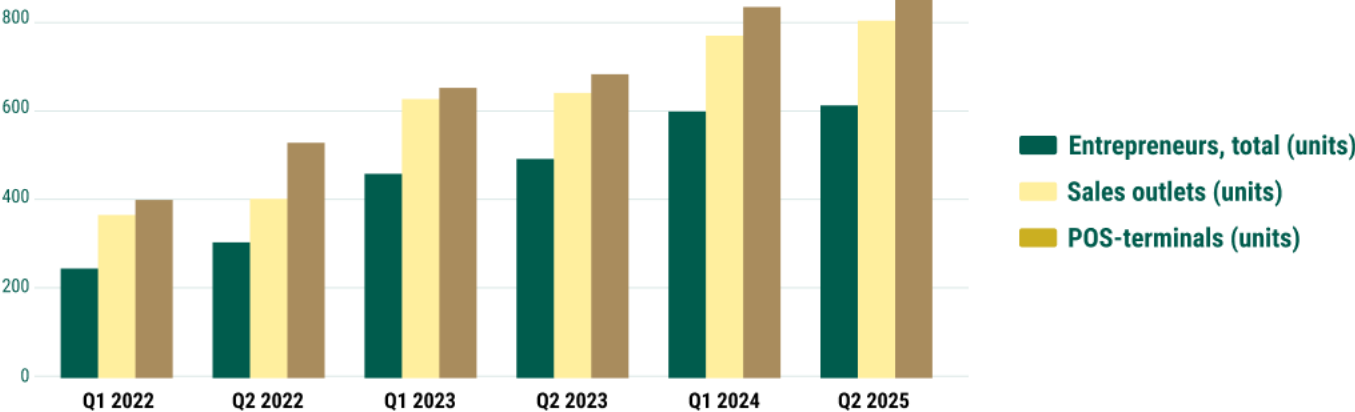


For the first half of 2024, there is an 8% increase in the total number of payment cards* used, to 39.3 million units (compared to the same figures for 2023).

There has been a significant growth in POS terminals in 2024 which indicates a natural expansion of the infrastructure of non-cash payments. This year, their number has grown by 24.6% to 1.16 million devices. This development contributes to increasing the ease of use of electronic payments for both businesses and consumers. POS terminal infrastructure has become an important tool to stimulate the digital economy, especially in SMEs, which contributes to the overall growth of financial inclusion.

The number of devices to pay for goods and services is also increasing. In the first half of 2024, there is a 24.6% growth in POS terminals (total number of 1.16 million units).

Fig. 2. Increase in the number of POS terminals



Upon that, as of July 01, 2024, the number of ATMs designed only for cash withdrawal decreased by 15.2%, amounting to 4.5 thousand units.

Though, modern identification technologies also play a key role in ensuring the security and accessibility of financial services. Kazakhstan actively uses the e-KYC system, which allows customers to open accounts via mobile applications. To this date, 80% of new bank accounts are opened using these technologies. This significantly speeds up the process of new customer registration and reduces transaction costs, and improves the user experience by building trust in digital financial services.

Widespread use of online banking

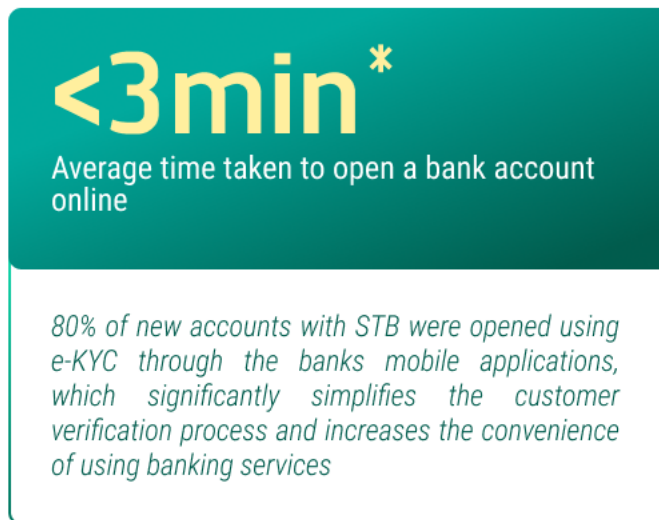
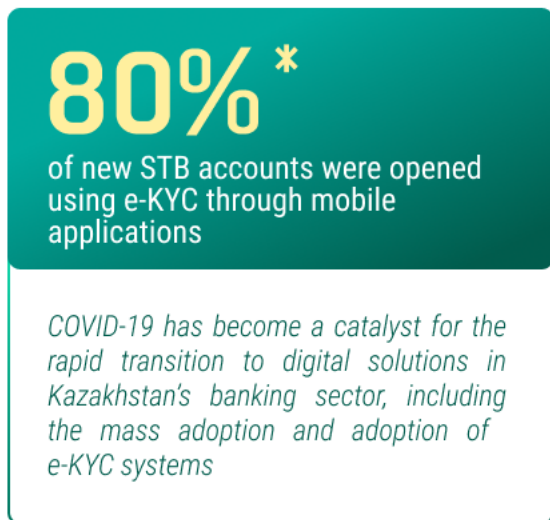
70%
of economically active populations use mobile banking

More than 70% of the adult populations of Kazakhstan actively uses mobile applications of banks for financial transactions

23,3m
Number of active users of mobile banking applications

Number of active users of mobile banking applications in Kazakhstan has grown 4.6 times in 5 years, exceeding 23.3 million users

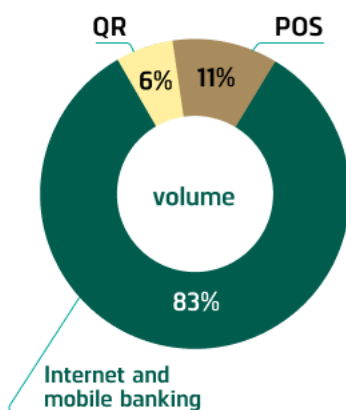
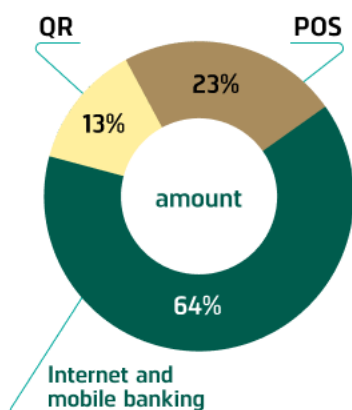
Implementation of electronic identification systems



*According to a joint study with Rise Research and partners

85,8%

In the first half of 2024, the share of non-cash payments in Kazakhstan amounted to more than 85% of the total volume of transactions, which demonstrates a significant transition of the population to non-cash payments.



Internet and mobile banking dominate the category of non-cash payments and transfers, accounting for 90% of the total non-cash payment volume

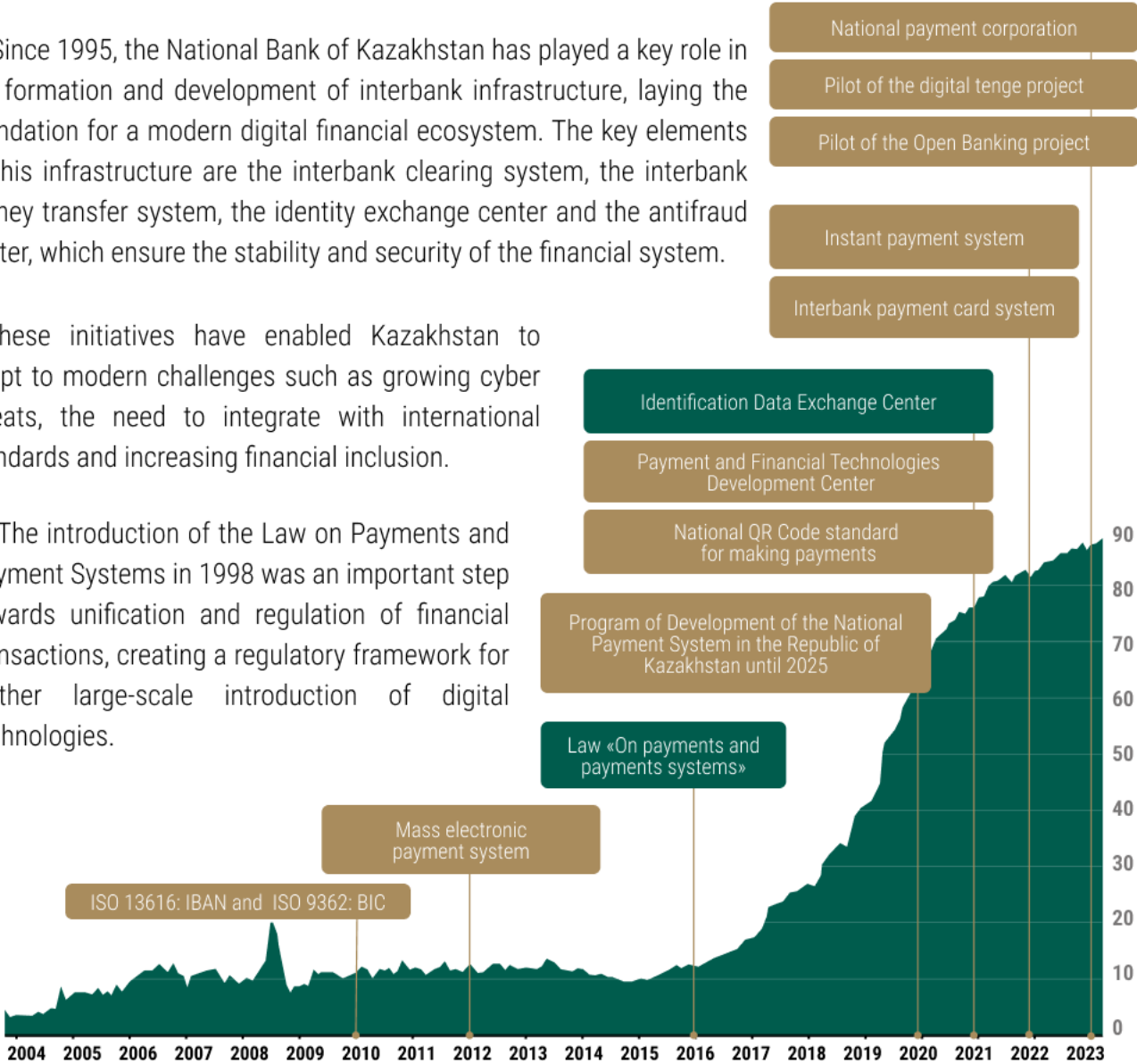
Long-term efforts of the state

The common efforts of the government and market participants allowed Kazakhstan to become one of the leaders in terms of growth rates of financial digitalization in Central Asia. Today, the established infrastructure stimulates the development of innovative services, strengthens the competitiveness of the financial market and lays the foundation for long-term sustainability and integration of Kazakhstan into the global digital economy.

Since 1995, the National Bank of Kazakhstan has played a key role in the formation and development of interbank infrastructure, laying the foundation for a modern digital financial ecosystem. The key elements of this infrastructure are the interbank clearing system, the interbank money transfer system, the identity exchange center and the antifraud center, which ensure the stability and security of the financial system.

These initiatives have enabled Kazakhstan to adapt to modern challenges such as growing cyber threats, the need to integrate with international standards and increasing financial inclusion.

The introduction of the Law on Payments and Payment Systems in 1998 was an important step towards unification and regulation of financial transactions, creating a regulatory framework for further large-scale introduction of digital technologies.



% share of non-cash payments in the economy (2004-2023)

The systems of the National Bank of Kazakhstan are essential to the processing the country's financial transactions, providing a high level of reliability and efficiency. These systems account for 89.5% of the country's total payment turnover, which confirms their central place in the national financial infrastructure.

Every day more than 350,000 transactions pass through the infrastructure of the National Payment Corporation, and in the first nine months of 2024 more than 1,000 trillion KZT was processed through the National Bank's systems, average daily transaction volume amounted to an impressive 5.9 trillion KZT. This demonstrates the systems' ability to handle high loads and ensure continuity of operations, and emphasizes their scale and importance in maintaining the stability of economic processes.








89,5% of the country's payment turnover passes through the NBK systems

5,9 trillion KZT per day

>1000 trillion KZT was processed for 9 months of 2024

350.000 transactions per day

The high level of maturity of the payment system of Kazakhstan, its ability to adapt to modern challenges and support the economic development of the country became possible due to the active participation of the financial market. Banks, fintech companies and other participants of the system make a significant contribution to its development by introducing innovative solutions, adapting to shifts and providing modern financial services for citizens and businesses.

Role of the state:	Role of market participants:
 Establishing a regulatory framework that supports digitalization and market regulation.	 Second-tier banks and fintech companies are actively investing in the development of mobile apps and their own digital platforms.
 Development of basic components of interbank infrastructure, such as interbank clearing system, interbank money transfer system, biometric identification systems.	 The private sector is expanding the digital finance ecosystem by creating additional services based on government platforms.
 Implementation of the Anti-Fraud Center	 Users are actively adapting to digital solutions, which drives the development of financial technology.
 Implementation of national standards (EMVCO)	

The digitalization of financial services through the increased availability and convenience of electronic payments and online financial instruments is also contributing to the development of other industries, such as retail, logistics.

The mobile apps are evolving from banking tools to multifunctional platforms that integrate banking, payments, investments and social functions, which creates a unified digital space, blurring the boundaries between fintech, e-commerce and government technologies.

Financial and non-financial services are becoming an integral part of the digital ecosystem. The interbank connectivity is expanding, including data sharing and security. It now involves fintech companies, e-commerce platforms and government institutions.

Ecosystem inside the application



Category	Item	Icon 1	Icon 2	Icon 3	Icon 4
E-comm	1P E-grocery*	✓		⌚	
	3P marketplace*	✓	✓	✓	⌚
	Delivery	✓	✓	✓	⌚
Travel	Air tickets	✓	✓	✓	✓
	Railway tickets	✓	✓	✓	✓
	Tour package	✓		⊘	⊘
Payments	QR payments	✓	✓	✓	⌚
	P2p payments	✓	✓	✓	✓
	Proprietary payment network	✓	✓	✓	⊘
	Settlement of accounts	✓	✓	✓	✓
GovTech	Filing and payment of taxes	✓	✓	✓	✓
	Digital documents	✓	✓	✓	✓
	Registration of new business	✓	✓	✓	⊘
Others	Insurance	⊘	✓	✓	✓
	Investment	⊘	✓	✓	⌚
	Tickets and events	⊘	✓	✓	⊘
	Advertisement	✓	⊘	⊘	⊘

58%

Cumulative average annual growth rate of e-commerce market volumes

4,3x

growth in the number of e-commerce transactions, 2019-2023

1,5x

growth of the average receipt, 2019-2023 in e-commerce (28,551 KZT in 2023)

The e-commerce market is showing steady growth, with a 58% compound annual growth rate and a 4.3-fold increase in the number of transactions between 2019 and 2023, while the average check has increased 1.5-fold. These indicators bear evidence to the significant contribution of digital financial technologies to the transformation of Kazakhstan's economy.

This dynamic points to a profound transformation of the banking industry, where mobile banking is becoming pivotal in integrating everyday services and improving overall digital efficiency.

As a consequence, the modern development of the banking industry is accompanied by a blurring of boundaries between financial and non-financial sectors of the economy. This requires the creation of new elements of interbank infrastructure capable of supporting and promoting cross-industry interaction. Kazakhstan is actively responding to these challenges by introducing initiatives aimed at adapting to changing user needs and new technological challenges.

Thus, the National Bank implements elements of financial infrastructure on the basis of JSC "NPC": interbank payment card system, Open API platform, Digital Tenge platform and National Antifraud Center as elements of the National Digital Financial Infrastructure.

The National Digital Financial Infrastructure (NDFI) is a key response to global and local challenges, ensuring Kazakhstan's transition to a new level of financial ecosystem. Its development is a strategically important task aimed at increasing the competitiveness of the financial market, reducing transaction costs and providing innovative financial services for a wide range of participants.

NDFI establishes a platform for integrated interaction between financial institutions, government agencies and other sectors of the economy. It covers several key areas:



Ensuring smooth and secure transactions in interbank payments and transfers in tenge, as well as transactions using the national digital currency;



Carrying out of biometric identification of financial organizations' clients and digital consent management;



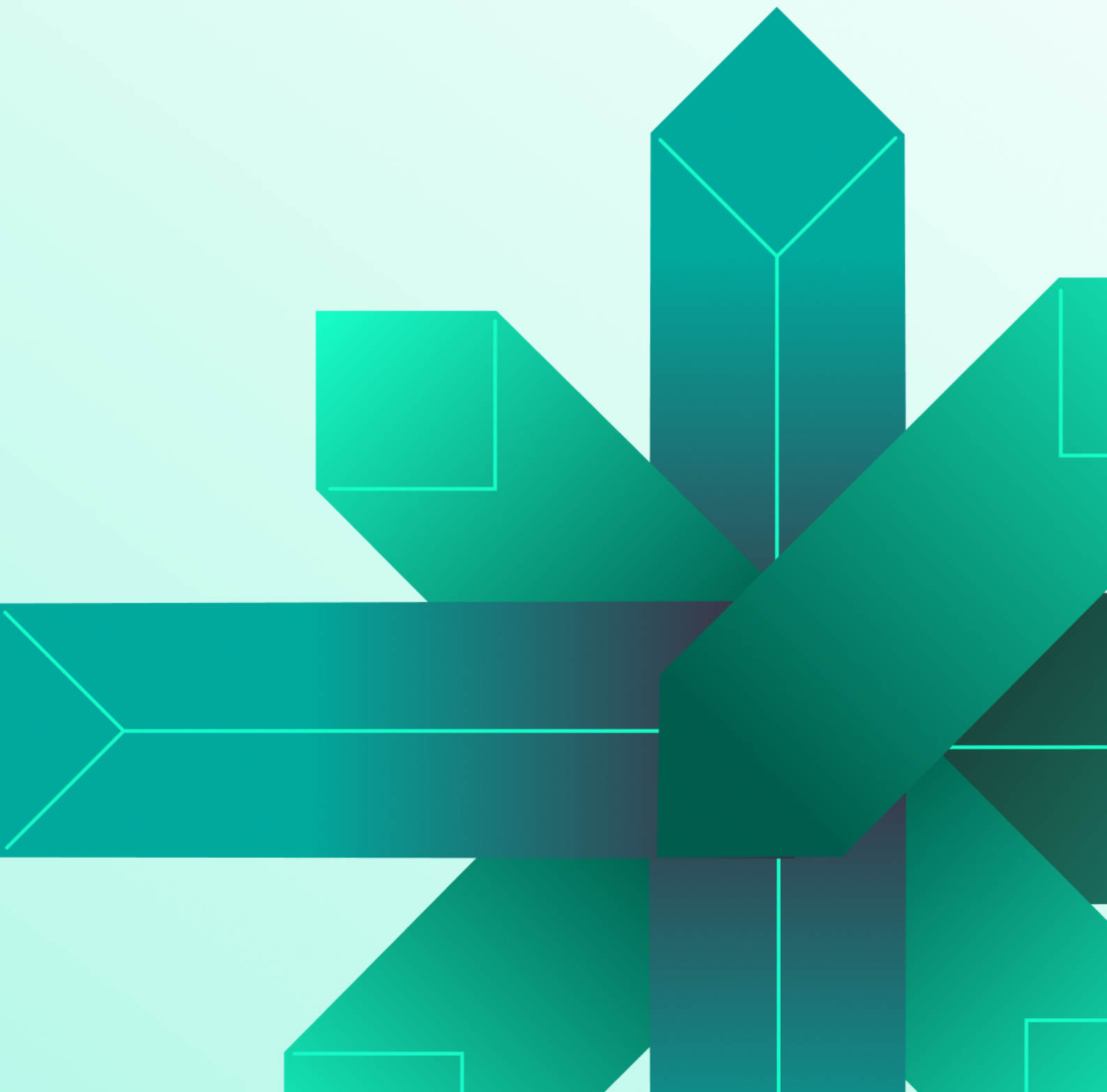
Creating a secure environment for the exchange of information between payment service providers through open program interfaces and the exchange of fraudulent transaction data.

The implementation of NDFI allows standardizing processes, eliminating infrastructure duplication and minimizing risks associated with market fragmentation. This results in more efficient operations, lower costs and greater access to financial services, including for small and medium-sized enterprises.

Therefore, Kazakhstan strengthens its presence in the global arena, creating conditions for further economic growth. A multifaceted approach including the development of technological infrastructure, improvement of legislation and active government involvement, has formed a solid foundation for the successful implementation of the NDFI, which provides a modern and sustainable financial ecosystem.

MAIN TASK

OF THE NATIONAL DIGITAL
FINANCIAL INFRASTRUCTURE



Main task of the National Digital Financial Infrastructure

The national digital financial infrastructure performs key functions aimed at developing and ensuring effective interaction of financial market participants. The following tasks stand out among the major tasks of NDFI:

1 Ensuring interaction of banks and other financial market participants with each other

NDFI is a significant contributor in interbank payments and transfers in national currency, supports mobile payments made through the National Payment System and transactions related to the use of national digital currency.

2 Carrying out biometric identification of clients

The infrastructure provides tools for secure and accurate biometric identification of clients of financial and payment organizations, which helps to simplify the process of interaction with users and increase the level of credibility.

3 Assistance in fraud management

In order to enhance the security of payment transactions, NDFI ensures that data is shared between market participants on payment transactions that show signs of fraudulent activity. It enables fast response to threats and minimize risks to users.

4 Processing of interbank payments and transfers using payment cards.

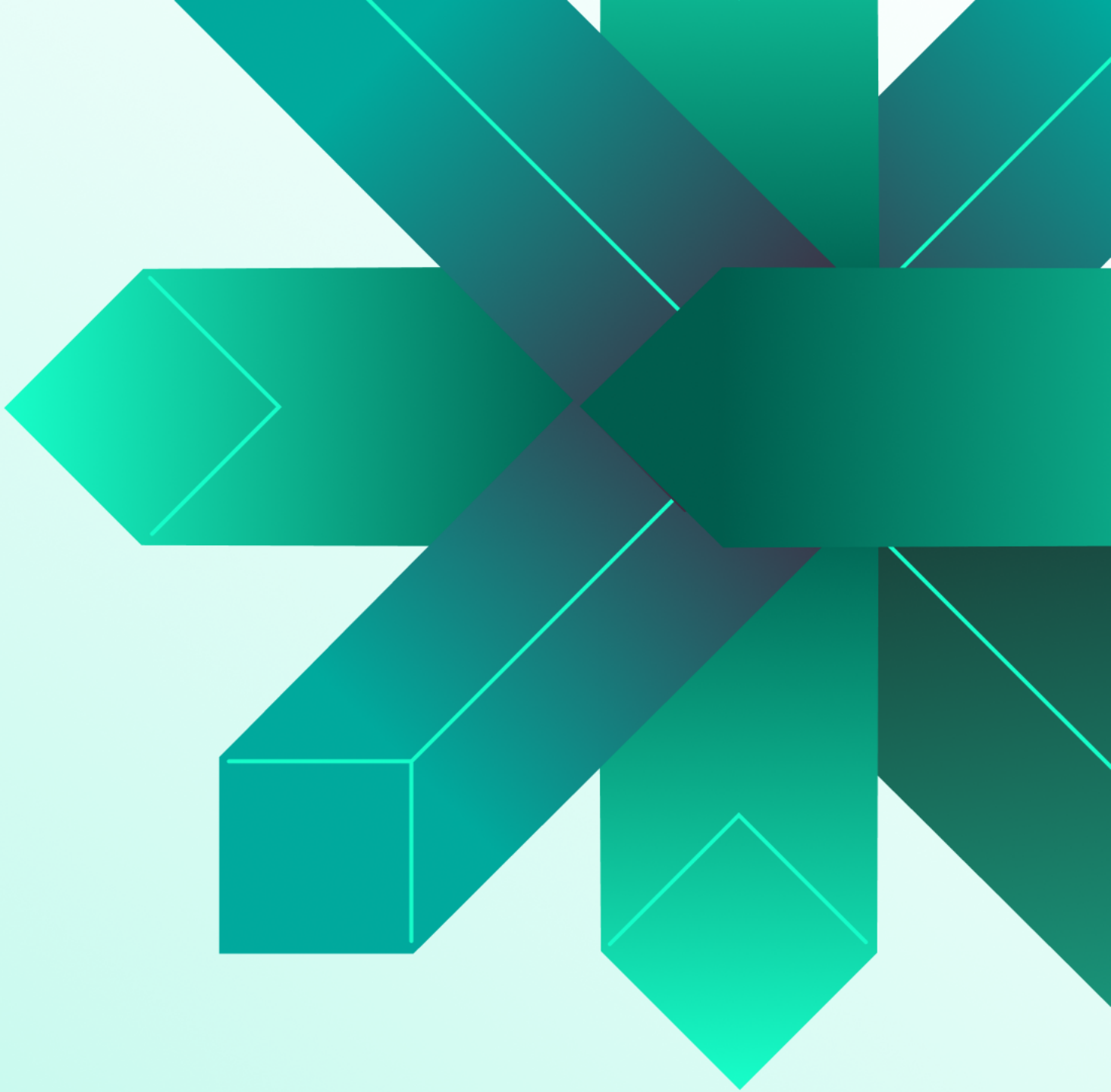
Processing in the territory of the Republic of Kazakhstan of interbank payments and (or) money transfers using payment cards issued by second-tier banks and organizations engaged in certain types of banking operations.

5 Providing a safe environment for data exchange

NDFI provides conditions for secure information exchange between payment service providers, using open program interfaces (Open API). This facilitates the development of new financial solutions and simplifies the integration of market participants.

6 Management of customer consents

The infrastructure ensures collection, storage and processing of consents of customers of financial and payment organizations to provide their data to third-party payment service providers. This is made in strict compliance with legislation and personal data protection requirements.

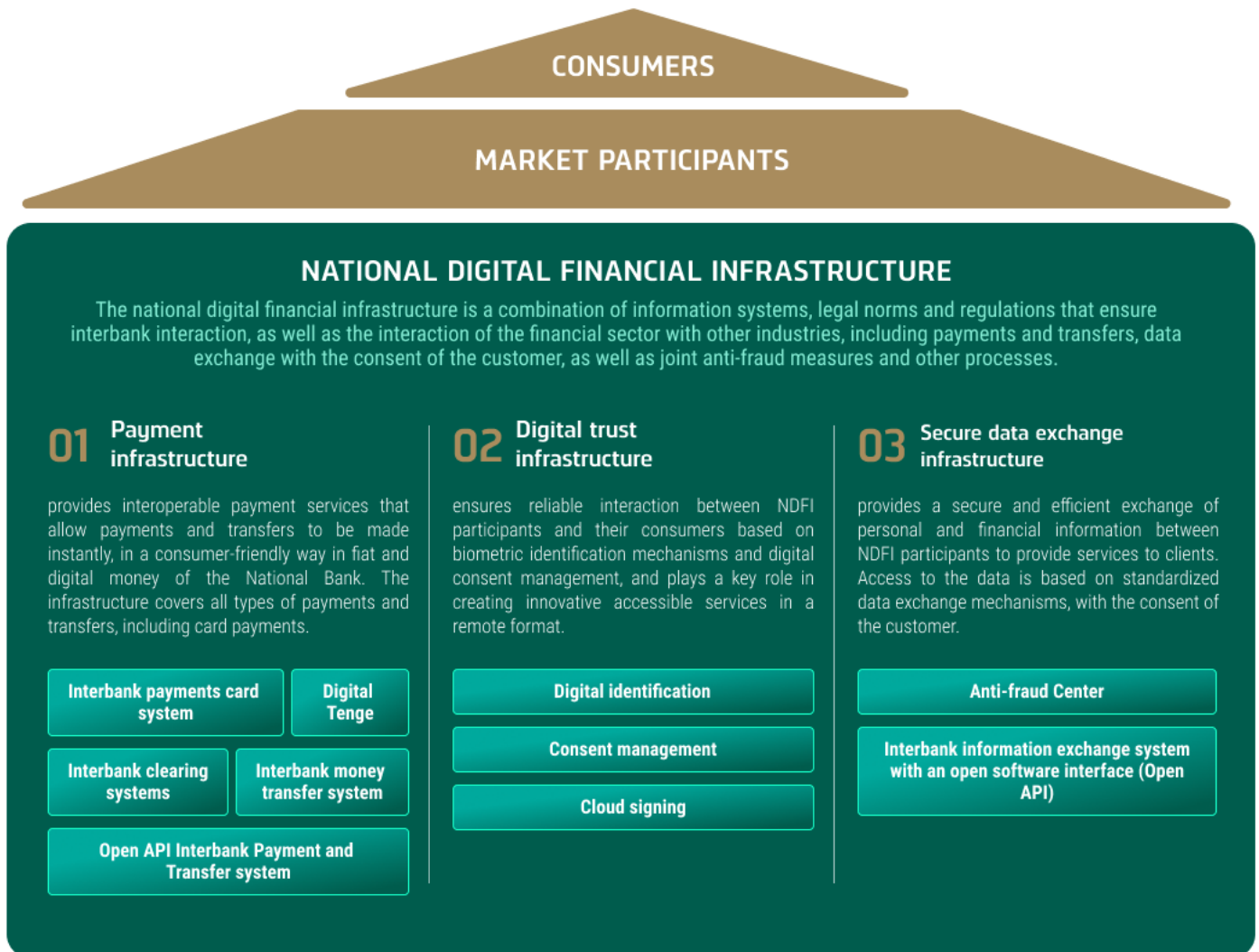


MAJOR ELEMENTS

OF THE NATIONAL DIGITAL
FINANCIAL INFRASTRUCTURE

Major elements of the National digital financial infrastructure

The national digital financial infrastructure creates a sustainable and flexible ecosystem that adapts to changing user needs and new technological challenges.



1. National payment system is a set of payment systems for interbank payments and transfers of money in tenge between financial organizations:

I. Interbank clearing system

Significant payment system - mainly small tax and pension payments, retail payments of individual customers, up to KZT 5 mln.

II. Interbank money transfer system

Systemically important payment system, real-time gross settlement system (RTGS) - MP, large-value, immediate financial market payments without a limit: mainly large payments by second-tier banks and their customers, payments on securities transactions.

III. Interbank payment card system.

The system ensures processing of all card transactions within the country, guaranteeing their continuity even in case of possible withdrawal of international payment systems. This enhances Kazakhstan's payment sovereignty and reduces dependence on external infrastructures.

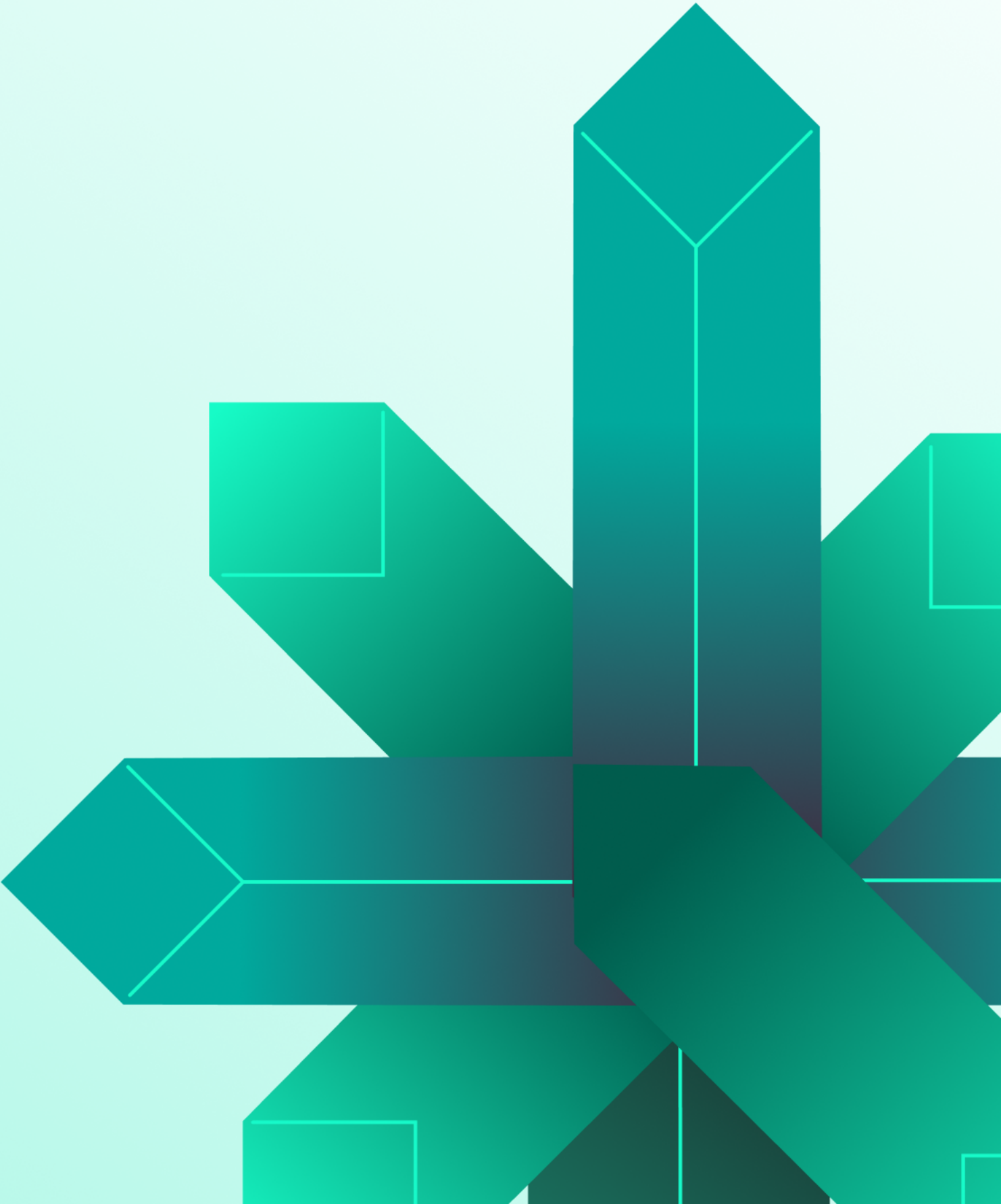
IV. Open API Interbank mobile payment and transfer system

A payment system designed for instant payments and (or) money transfers between clients of its members through mobile applications or other equipment (device) designed to accept payments using a bar code

- 2. Information exchange system over open program interfaces (Open API Platform)** - a specialized technological platform providing, on the basis of the customer's consent, the exchange of the customer's financial information between payment service providers. The system collects, stores and processes consents of clients of the Open Banking System participants for provision of payment services by third-party providers of payment services, on the basis of the customer's consent, identification of customers of the participants of the Open Banking System, authorization and maintenance of the register of authorized payment service providers providing payment services as third-party payment service providers, exchange of information between payment service providers and third-party payment service providers, as well as payments and transfers between the participating banks.
- 3. Anti-Fraud Center (Payment transaction data exchange center with fraud indications)** – a centralized database aimed at detecting and preventing fraudulent transactions. It enables market participants to respond quickly to incidents, minimizing risks to users.
- 4. Digital Tenge Platform** - A national digital currency serves as an additional tool for transparency of transactions and stimulating innovation in the marketplace. It also offers new features for programmable transactions.
- 5. Digital identification (Identity Exchange Center)** - A framework for identity verification, privacy and data protection that facilitates safe and secure interactions in the digital ecosystem

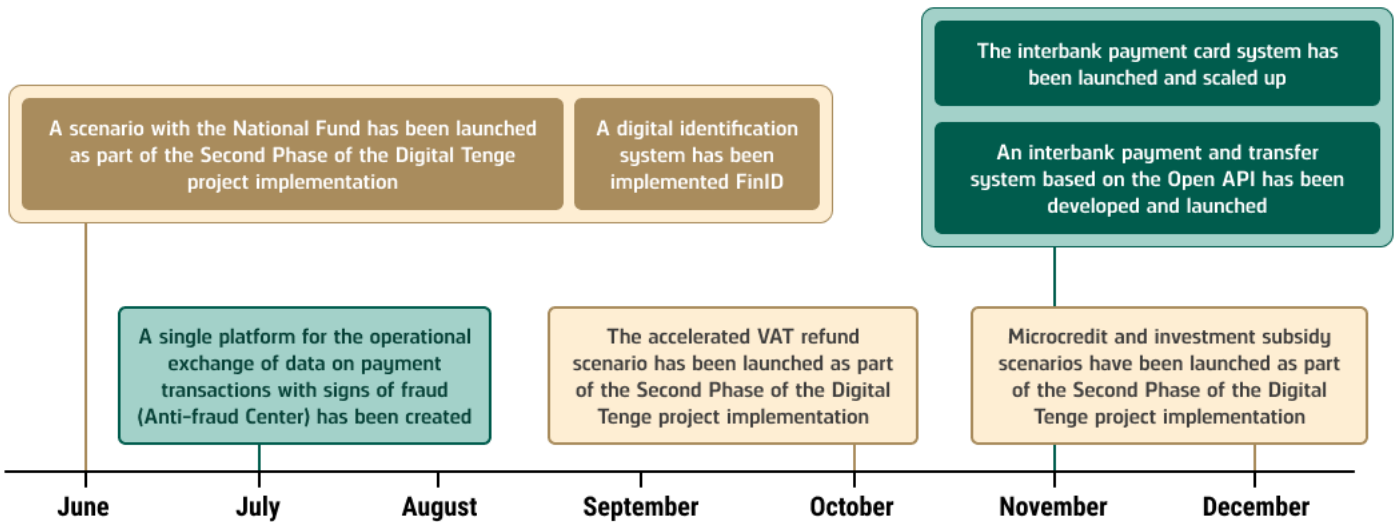
ACHIEVEMENTS

FOR THE REPORTING YEAR



Achievements for the reporting year

In 2024, the NBK has made significant steps in the development of the National Digital Financial Infrastructure by introducing key projects and continuing to implement strategic initiatives. These advances have laid a foundation for future innovations.



5.1. Implemented projects

IEC

Digital identification- FinID (IEC)

On June 3, 2024, the National Bank of the Republic of Kazakhstan launched into commercial operation the upgraded services of the Identity Data Exchange Center: services for two-factor authentication of client identity and signing documents using a cloud-based digital signature. The prerequisite for the development was the Concept for the Development of Open Banking and Open API for 2023-2025, developed jointly with the Agency for Regulation and Development of the Financial Market (ARDFM) with the participation of the Agency for the Protection and Development of Competition of the Republic of Kazakhstan.

The upgraded services within the NDFI form the basis for identity verification, ensuring confidentiality and data protection, facilitating safe and secure interaction in the digital financial ecosystem.

The two-factor authentication service includes a full cycle of identity verification: secure image capture, liveness verification (confirmation of the presence of a living person to exclude the use of a photo or deep fake), photo comparison based on a multi-vendor approach, citizen consent control and secure data exchange with government databases. This service provides the ability to sign documents using a cloud-based digital signature.

The services were developed using an updated technology stack and modern infrastructure, which ensured their high performance and scalability. In order to provide the financial market with access to reliable and proven biometric solutions, a process of testing biometric solutions to counter fraudulent attacks (2D, 3D, deepfake attacks) was additionally launched.

At present, financial market participants are actively connecting to new services.

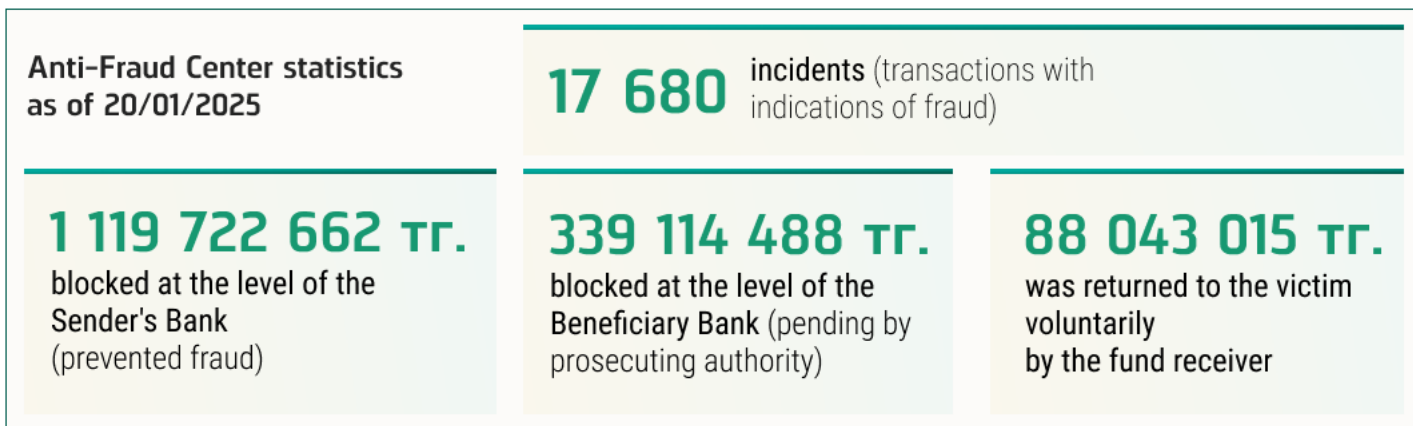
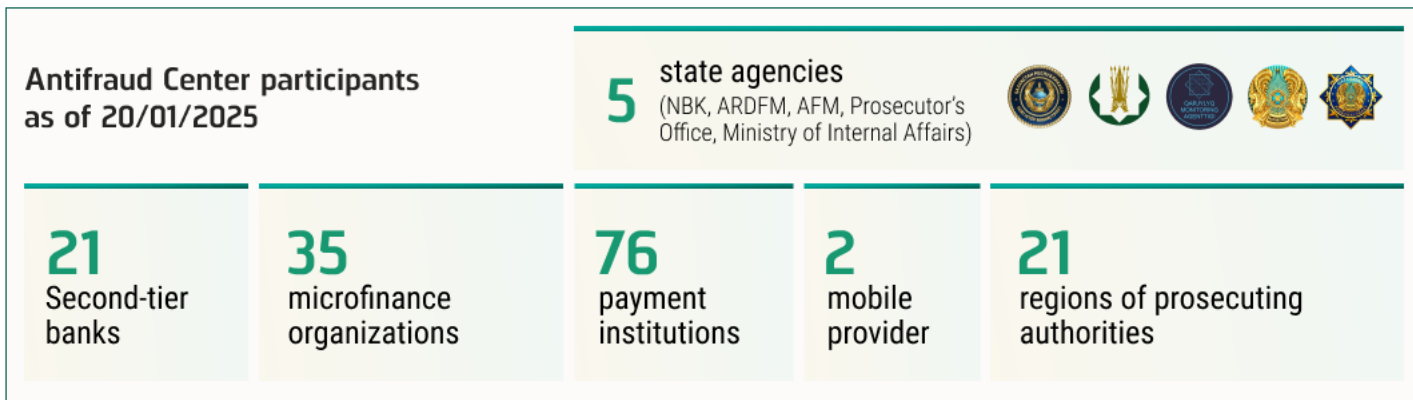
Anti-Fraud Center

Establishment of an anti-fraud center

In order to create a single platform for the prompt exchange of data on payment transactions with signs of fraud between financial market participants and criminal prosecution authorities, the National Bank launched the Anti-Fraud Center on July 22, 2024, based on JSC NPK (hereinafter referred to as the Anti-Fraud Center operator).

Currently, second-tier banks, the Ministry of Internal Affairs (hereinafter referred to as the Ministry of Internal Affairs of the Republic of Kazakhstan) are connected to the infrastructure of the Anti-Fraud Center system, and payment and microfinance organizations, as well as mobile operators, are being gradually connected. For a more effective fight against cybercrime and timely adoption of adequate response measures, JSC State Technical Service of the National Security Committee of the Republic of Kazakhstan and the Committee on Legal Statistics and Special Accounts of the Prosecutor General's Office of the Republic of Kazakhstan will be connected to the Anti-Fraud Center. The functioning of the Anti-Fraud Center is regulated by the legislation and by-laws of the National Bank of the Republic of Kazakhstan, which describe in detail the procedure for interaction between participants, their functions and tasks, as well as the terms of performance of duties in accordance with their competence:

- 1) The Law on Payments and Payment Systems (Article 25-1);
- 2) The Law "On Microfinance Activities";
- 3) The Law "On Banks and Banking Activities in the Republic of Kazakhstan";
- 4) Resolution of the Board of the National Bank of the Republic of Kazakhstan No. 43 dated July 16, 2024 "On approval of the Requirements for the procedure for the implementation of the data exchange center for payment transactions with signs of fraud and its interaction with persons participating in its activities."



Open API Development of interbank payment and transfer system

Open API interbank payment and transfer system is designed for instant processing of real-time payments and transfers. The core objective is to ensure speed, convenience and accessibility of financial transactions for individuals and legal entities within the country. The system is focused on local infrastructure and allows to transfer funds between accounts in different banks within a few seconds, in 24/7 mode, without participation of international payment systems, thus providing for independence and reduces operating costs. The key features include instant crediting, 24/7 availability and ease of use thanks to simplified credentials such as QR codes and mobile phone numbers.

There are 2 basic services developed within the system:

- 1. P2P transfer service:** a service that allows users to transfer funds between accounts in different banks, using the recipient's phone number as an account identifier.
- 2. QR code payment service:** service provides users with an opportunity to pay for goods and services using a single QR code, which can be scanned by any mobile application of the participating bank. This innovative solution is aimed at increasing the convenience and speed of payment, as well as the development of cashless payments.

Tariff Advisory Council has been established on the basis of NPCK JSC, within the framework of establishing a sustainable and transparent business model for the system. This agency ensures an open and constructive discussion of the NPCK's tariff policy with market participants. The main purpose of the Tariff Advisory Council is:

- making suggestions on determination and regulation of tariffs
- ensuring transparency of the tariff setting process, involvement of experts in the discussion and adoption of tariff decisions, justification of tariffs based on economic calculations and analysis
- ensuring transparency in setting system limits

Functionality of interbank QR payments and transfers, rules and technical documentation is developed and launched for connecting banks

An advisory tariff council was established with the participation of second-tier banks and the NBK, and the rules, standards, business processes and tariffs of the system were jointly approved

7 member banks started testing the service of transfers by phone number

and also 7 – in the process of analyzing business processes

2 banks have implemented the QR-payment scenario

as well as 2 banks at the testing stage, the rest are at the stage of business process analysis.

Launching and scaling up the interbank payment card system

IPCS project was initiated by the National Bank in November 2020., in 2021, international payment systems - Visa, Mastercard, UnionPay – have joined the project.

In October 2022, the National Bank has approved amendments to the existing regulations providing for mandatory participation of IPCS in processing card transactions (August 31, 2016 No. 216 “On Approval of the Rules for Interbank Payments and (or) Money Transfers on Transactions with the Use of Payment Cards in the Republic of Kazakhstan” and dated August 31, 2016 No. 217 “On Approval of the Rules for Operation of the Interbank Payment Card System”).

IPCS functions as a system for making interbank payments on domestic transactions in national currency made within the territory of the Republic of Kazakhstan, using payment cards issued by second-tier banks, branches of non-resident banks of the Republic of Kazakhstan and (or) organizations engaged in certain types of banking operations.




As of September 28, 2023, a pilot project was launched in the target model where, for Visa and Mastercard, card transactions, clearing and settlement are fully routed and processed in the IPCS loop. A participation of international payment systems is to provide additional information on each transaction (anti-fraud, tokens, etc.).

By November 01, 2024, 100% migration of all internal issuer traffic within the country was performed for all participants of the IPCS system.

By November 30, 2024, 100% migration of all internal domestic acquiring traffic within the country was performed for all IPCS system participants.

Key metrics

Full connectivity in a productive environment per IPS 16+ participants:

				
Number of participants	Acquiring	12	12	5
	Emission	15	13	4

> 50 000 000
payment cards

> 400 000 000
transactions processed

Digital Tenge

As part of the work on the Digital Tenge project in 2024, a number of significant results were achieved that were highly praised by independent observers. In particular, according to the International Monetary Fund, Kazakhstan has taken a leading position in the implementation of the central bank digital currency (hereinafter referred to as CBDC) among the countries of Central Asia and the Middle East. In 2024, the Digital Tenge project also won an award in the Leadership in the Adoption of Digital Currencies category from the international organization Currency Research.

The main focus of the work in 2024 was the direction of payments with the participation of the state. Within the framework of this direction, 5 scenarios were implemented using the programmability properties of the DT, at least 238 billion digital tenge were issued, and integrations with state information systems were carried out. Below is information on the results of the work on scenarios for making payments with the participation of the state.

The “National Fund” scenario

Ensuring the intended use of the National Fund allocated to finance the country's infrastructure projects.

Project perimeter for 2024:

Tranche of **~164 billion KZT** for construction of second railroad tracks “Dostyk - Moyinty”, and a tranche of **~74 billion KZT** for the construction of the Taldykorgan-Usharal gas pipeline.

Expected effects:

Transparent data on the flow of funds to final suppliers, development of a targeted scheme for processes in public procurement.

Current status:

Banks and legal entities are connected to the DT platform, both tranches for a total of 238 billion tenge with DT marking up to 3 (“Taldykorgan - Usharal”) and 5 (“Dostyk - Moyinty”) end suppliers have been carried out, preparations are underway for the second stage of implementation, improvements are being implemented in the IS ESF and integration with the DT system.

Mid-Life Road Repair Scenario (ensuring traceability of budget funds in the sphere of road construction and repair within the framework of public procurement processes; customer – JSC “NC “QazAvtoJol”))

Project perimeter for 2024:

Site- Atyrau region, Mukur - Kulsary road section, 11 km.

The purpose is to carry out medium road repairs for **~2 billion KZT**.

Expected effects:

Transparent data on the movement of funds to final suppliers, parallel sampling of improvements in the industry system (eQurylys) to build interaction from the customer to final performers.

Current status:

The Atyrau branch of JSC NC KazAvtoZhol made an advance payment to the general contractor in money programmed to the level of a subcontractor within the framework of the medium repair of the Mukur-Kulsary road (11 km) in the amount of 100 million tenge.

Purchase of farm animals Scenario (microlending within the framework of the project to increase incomes of rural population “Auyl Amanaty” for cattle and small ruminants through the authorized agent JSC “SEK “Kokshe” of the Akmola region (hereinafter – the SEK))

Project perimeter for 2024:

Site - Akmola region, Atbasar district.

At least 10 applications for the amount of **~100 mln KZT** are realized.

Expected effects:

Designated use of funds, abolition of monitoring procedures on the side of SEK and state authorities, quality lending (Only animals registered with the IFA are eligible for purchase).

Current status:

Within the framework of the Auyl Amanaty SEK Kokshe program, 7 loans were issued in the amount of 49 million tenge. The funds were sent to the accounts of 10 sellers of agricultural animals (160 heads), opened in the People's Bank using the event-based money programming function. The funds were unavailable to the sender and recipient (held) until the trigger was triggered. The funds were released after the agricultural animals were re-registered to the borrowers based on an event (trigger) received from the Ministry of Agriculture's information system "Identification of agricultural animals".

Invest-subsidies to agriculture Scenario (use of investment subsidies as an advance payment for the purchase of agricultural machinery and equipment; service provider – Department of Agriculture and Land Relations of the Akmola region (hereinafter – DALR))**Project perimeter for 2024:**

Site – Akmola region.

1 application for investment subsidy by advance payment method through the KazAgroFinance JSC (hereinafter - KAF) in the amount of ~ 1.87 million KZT is being implemented

Expected effects:

Automation of settlements with the financial institution, eliminating the need to return funds from the financial institution to DALR, in case of decrease in the value of the leased asset or failure to transfer the leased asset in due time.

Current status:

Opening of digital account of the KazAgroFinance JSC in second-tier bank (JSC Halyk Bank), testing was carried out, transfer of DT from DALR of the Akmola region to digital account of the KazAgroFinance JSC in the amount of 1.87 million KZT on application for investment subsidies was carried out, the leasing unit was transferred to the service recipient, funds were disbursed on the digital account of the KazAgroFinance JSC.

Digital VAT Scenario**Project perimeter for 2024:**

2 supply chains (from importer/manufacturer to exporter).

Expected effects:

Safeguarding VAT for payment to the budget and quick repayment, ensuring strength and elimination of VAT outflow schemes, reduction of control activities on the side of tax authorities.

Current status:

Payments were made between two pairs of taxpayers for goods using the money programming function - marking digital tenge with the VAT indicator based on data from the reference system of the State Revenue Committee IS Electronic Invoices (hereinafter referred to as EIF) in the amount of 37 million tenge. Sellers received the amount of the cost of goods in standard digital tenge and the amount of VAT calculated according to the EIF DT, marked with the VAT indicator, on digital accounts. DT, marked with the VAT indicator can be spent on making a payment by EIF to another taxpayer, or on paying VAT to the budget.

5.2. Plans for 2025

The national digital financial infrastructure is already under implementation, and will be developed including its individual components, services, and scaled for all citizens for further development

2023

- ✓ Launch of the digital tenge into commercial operation
- ✓ Implementation of 6 scenarios with Digital Tenge in the industrial and R&D loop
- ✓ Launch of the Open Banking & Open API platform
- ✓ Modernization and launch of biometrical identification services under the SaaS model
- ✓ Testing of account aggregation scenario in single application with the customer consent as part of Open Banking & Open API

2024

- ✓ Launch of the Anti-Fraud Center into commercial operation
- ✓ Completion of the IPCS scaling, localization of the processing of all card transactions within the country
- ✓ Launch of single QR and inter-bank transfers by phone number in pilot mode

2025

- Implementation of a system for automatic detection of new fraud patterns within the framework of the Anti-Fraud Center
- Implementation of the "Knowledge base" for information share between the Anti-Fraud center participants
- Introduction of analytical instruments for the effective decision-making by the Anti-Fraud center participants
- Scaling up of the C2C-transfers service
- Scaling up of the QR payments service (C2B)
- Development and implementation of dispute resolution subsystem as part of Open API
- Development and implementation of B2B-transfers service

2026-2027

- Development of new services and business models of remote digital identification
- Proactive identification of vulnerable segments of the population based on AI
- Widespread development of artificial intelligence technology in the financial market

Plans for 2025

✓ Scaling and launching new scenarios within the framework of the Open banking & Open API and Digital Tenge projects

✓ Legislative consolidation of the status of the NDFI and its components, and the conditions for their use by financial market participants

✓ Market Adoption of NDFI products by the market and end consumers



ANNEX

ITEMIZED STATEMENTS:

1. INTERBANK PAYMENT CARD SYSTEM
2. ANTI-FRAUD CENTER
3. OPEN API
4. DIGITAL TENGE

1

INTERBANK PAYMENT CARD SYSTEM



Interbank payment card system

1.1. Description, aims, objectives of IPCS

Interbank payment card system (IPCS) is a national infrastructure platform providing routing, processing and settlement of all in-country card transactions in the Republic of Kazakhstan. The system is designed to process transactions made in the national currency using payment cards issued by second-tier banks, branches of non-resident banks and organizations engaged in certain types of banking operations.

Initiated in November 2020 by the National Bank, the IPCS project was designed to strengthen the sovereignty of the country's financial infrastructure, enhance its independence and ensure technological stability. In 2021, Visa, Mastercard and UnionPay international payment systems have joined the project to support technological interoperability and provide access to advanced tools for antifraud, tokenization and other technologies.

In October 2022, the regulations were updated, making participation in IPCS mandatory for all market participants. The system ensures processing of interbank payments and transfers in national currency made in Kazakhstan using cards issued by second-tier banks and branches of non-resident banks.

On September 28, 2023, the pilot project has started in a targeted model in which all Visa and Mastercard transactions, including routing, clearing and settlement, are processed in the IPCS loop. The international payment systems provide additional data such as tokenization and anti-fraud analytics to enhance transaction security.

Objectives of the IPCS

Strengthening the sovereignty of the financial system: establishment of an independent platform for processing in-country transactions eliminates dependence on international processing centers.

Improving the efficiency of national infrastructure: ensuring high speed and reliability of operations, their processing in real time mode.

Preserving stability and security: ensuring compliance with national legislation and international security standards including the PCI DSS.

Tasks of the IPCS

Routing of in-country transactions:

- Ensuring processing of transactions with payment cards issued by Kazakhstani banks within the territory of the country.
- Full routing and settlement of all card transactions, including clearing between participants.

Development of national infrastructure:

- Implementation of a proprietary protocol for data interchange capable of integrating with existing participant systems.
- Support for a wide range of product ranges and functionality.

Compliance with regulatory and technical requirements:

- Compliance with national legislation and technical standards of international payment systems.
- Continuous improvement of data security and protection, including PCI DSS compliance.

Integration with international payment systems:

- Preserving participant access to global technologies such as anti-fraud, tokenization, and enhanced functionality for end users.
- Establishing effective interaction with Visa, Mastercard, UnionPay and other partners.

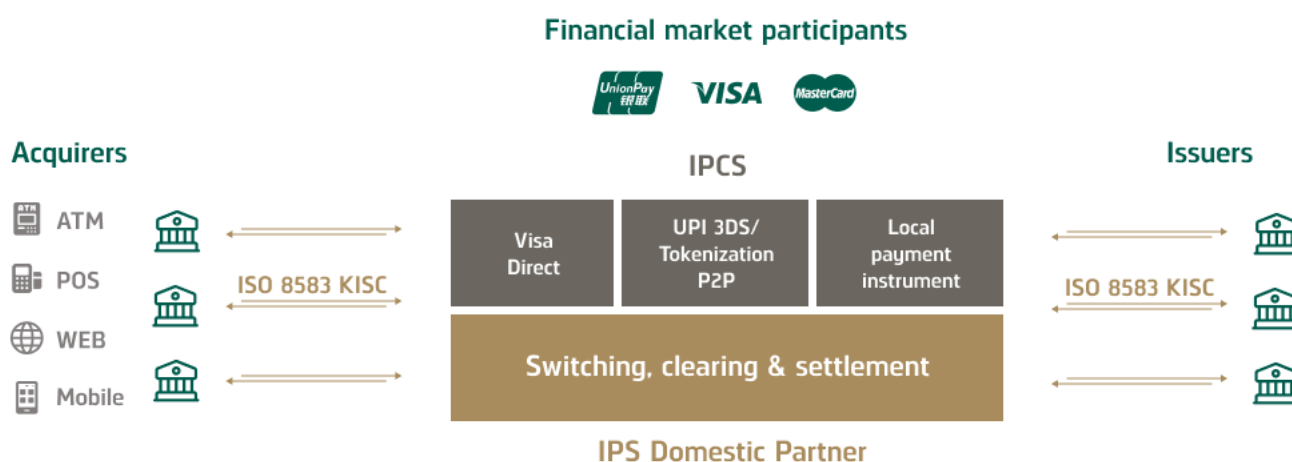
Ensuring round-the-clock availability and security:

- 24/7 system support for smooth operation of operations.
- Minimizing the risk of failures and developing a data backup system.

IPCS Interaction Architecture

IPCS architecture is designed to provide a full cycle of processing domestic card transactions and effectively unites acquirers, issuers and international payment systems creating a reliable and modern ecosystem for card transaction processing.

Fig.3. Financial market participants



Interbank payment card system (IPCS) is the central component of the architecture that performs the key functions of routing, clearing and settlement of card transactions. The main module of the system - Switching & Clearing - is responsible for routing transactions between acquirers and issuers, as well as for clearing and settlement, ensuring the accuracy, reliability and timeliness of transaction processing.

IPCS is integrated with international payment systems such as Visa, Mastercard and UnionPay which allows to process additional data, including tokenization, P2P transactions, 3DS authorization, and anti-fraud tools. In order to support exclusively internal operations, the system includes a local payment instrument, which helps preserve national sovereignty in the processing of financial data. An important element of IPCS is the dispute management module which allows to quickly and effectively resolve conflict situations between participants, ensuring their transparency and fairness.

The acquirers are key participants in the architecture of the Interbank Payment Card System (IPCS), providing transaction processing through various channels. These channels include the ATM machines (ATM), POS terminals, the Internet (WEB), as well as mobile applications, which makes the use of the system convenient and accessible to various categories of users. In order to interact with the ICS system, acquirers use the ISO 8583 KISS protocol, which guarantees standardized and reliable data transmission necessary for transactions. This approach ensures effective connection of acquirers with other elements of the system, including routing, clearing and settlements, which contributes to the fast and secure execution of all operations.

The issuers, as participants in the system, are engaged in issuing payment cards and providing their service. The issuers also use the ISO 8583 KISC protocol to interact with IPCS.

The international payment systems play an important role in providing enhanced opportunities for IPCS participants. They provide access to modern technologies and tools such as anti-fraud systems and tokenization which helps to increase the security and convenience of transactions, as well as supports the functionality of card products on a global level.

1.2. Progress for 2024

By November 01, 2024, the complete migration of internal issuer traffic to the IPCS infrastructure has been completed, and in December 2024 - full migration of acquiring traffic. Therefore, IPCS has become a single national platform for processing all in-country card transactions what strengthened the sovereignty of Kazakhstan's financial system and ensured its technological independence.

As part of the implementation of the target model of the Interbank Payment Card System (IPCS), a set of measures was carried out aimed at optimizing the system's operation, strengthening integration with international payment systems (IPS) and improving the effectiveness of interaction with participants. In 2024:

Visa IPS

- 15 issuing banks
- 12 acquiring banks

Mastercard IPS

- 13 issuing banks
- 12 acquiring banks

UPI IPS

- 4 issuing banks
- 5 acquiring banks

One of the key directions of 2024 was the renewal of tariffs for certain types of card transactions, including the Visa Direct service which made it possible to optimize the costs of the participants and create more competitive conditions for using the system. In parallel, active work was carried out on the development and updating of regulatory documents, which ensured compliance with legal requirements and technical standards.

An important stage of the work was the certification of system participants, as well as new services and software updates. The certification has made it possible to ensure that the participants meet the technical and operational requirements of the IPCS. The introduction of new services and software updates have enhanced the functionality of the system, providing a higher level of security, performance and convenience for all participants.

1.3. Development plans for 2025

The development of the national infrastructure for processing CICS card transactions, using its own interchange protocol, includes the following tasks for 2025:

Improvement and support of card transaction processing and clearing functionality in IPCS;	Scaling of Full financial transactions (Visa);
Implementation of 3D Secure (UPI);	Implementation of Visa Direct P2P transfer processing (Visa);
Implementation of P2P (UPI);	Participation in the development of changes to the statutory and regulatory enactments;
Implementation of tokenization (UPI)	Updating the procedures for the interaction of IPCS, IPS and participants;
Updating the strategy and business model (tariffication, development of settlement guarantee mechanisms, etc.);	Certification of participants, testing of new services in IPCS.

2

ANTI-FRAUD CENTER



About the project- main purposes, objectives, participants, interaction scheme, etc.

2.1.1. Purpose and objectives

The major purpose of the Antifraud Center development is to establish a unified ecosystem of participants capable of timely prevention, and to prevent financial organizations from conducting fraudulent transactions in conjunction with government agencies, bodies performing the functions of criminal prosecution, and cellular operators in order to protect the money of customers (individuals and legal entities).

In order to establish an infrastructure that ensures the rapid exchange of data between the participants of the Anti-Fraud Center, the participants have set goals as part of the implementation of the National Anti-Fraud Center, as well as the next.

The major objectives of the development of the Anti-fraud Center in Kazakhstan-

1. Establishment of a single window for data exchange between financial market participants and criminal prosecution authorities in the fight against fraud;
2. Ensuring prompt exchange of data between financial market participants and criminal prosecution authorities on transactions with signs of fraud;
3. Building analytical and static reporting by fraud type, fraud typology, participants and incident review status.

As part of the implementation of the established goals, the following tasks have been formed-

1. Improvement of legal framework:

- *Taking actions for mandatory participation in the Anti-Fraud Center of all second-tier banks, payment and financial organizations;*
- *interaction with government agencies and mobile operators;*
- *development of amendments to existing anti-fraud legislation;*
- *development of requirements for the infrastructure and activities of the participants;*
- *integration of anti-fraud banking systems into a single network;*

2. Technological accessibility of the Anti-fraud center:

- ensuring an equal and transparent mechanism for all participants of the Anti-Fraud Center to access the platform;
- ensuring the functioning of the secure technological platform of the Antifraud Center based on the NPC for data exchange
- maintaining a single database of fraudulent transactions;
- improving the functionality of the Anti-fraud Center;
- application of strict security standards and event monitoring;

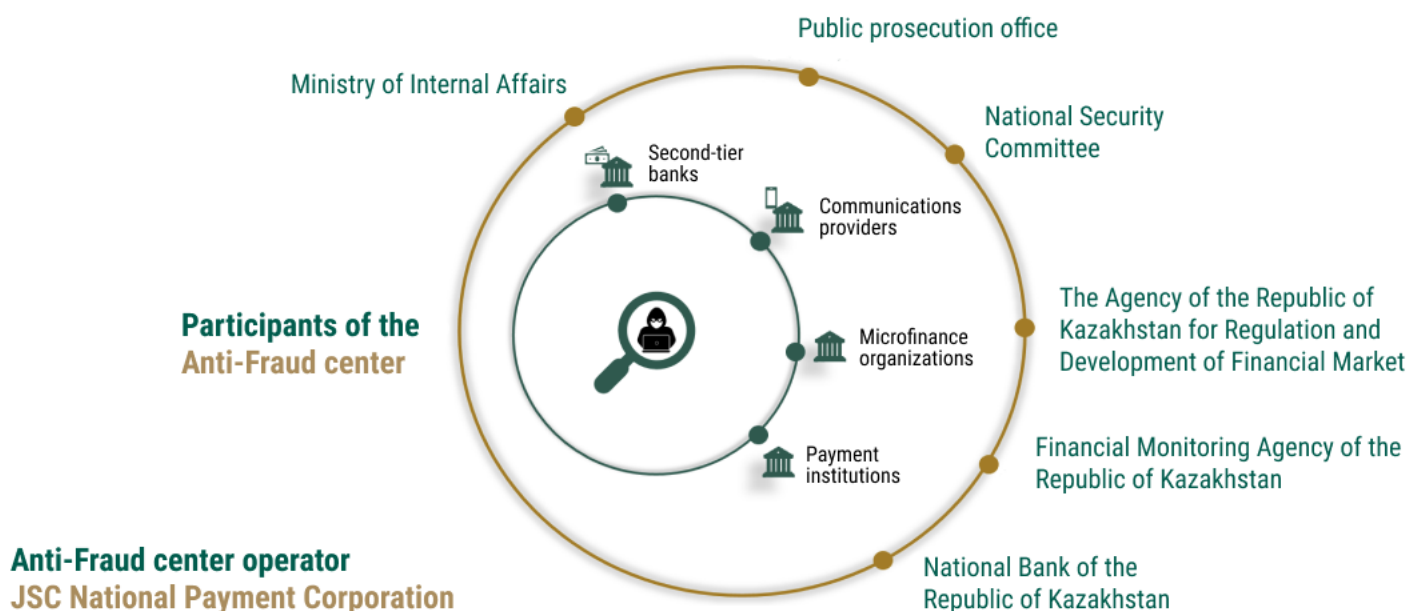
3. Providing qualitative and quantitative data in the databases of the Anti-Fraud Center:

- establishment of analytical reporting in the context of data from the Anti-Fraud Center for participants of the Anti-Fraud Center;
- identification of new patterns of artificial intelligence-based fraud and provision of an Anti-fraud Center to participants;
- establishment of a knowledge base of an Anti-fraud center for the exchange of information between regulators and financial markets, between participants on new types of fraud.

2.1.2 Participants and roles

The development of an Anti-fraud center with technological and organizational capabilities, optimizing the logic of processes, involves the participation of the following entities, including the regulator, financial and payment organizations, as well as relevant government agencies and mobile network operators. Each participant performs certain functions to the extent of competence.

Fig. 4. Participants of the Anti-fraud Center



Description of roles and functions of participants-

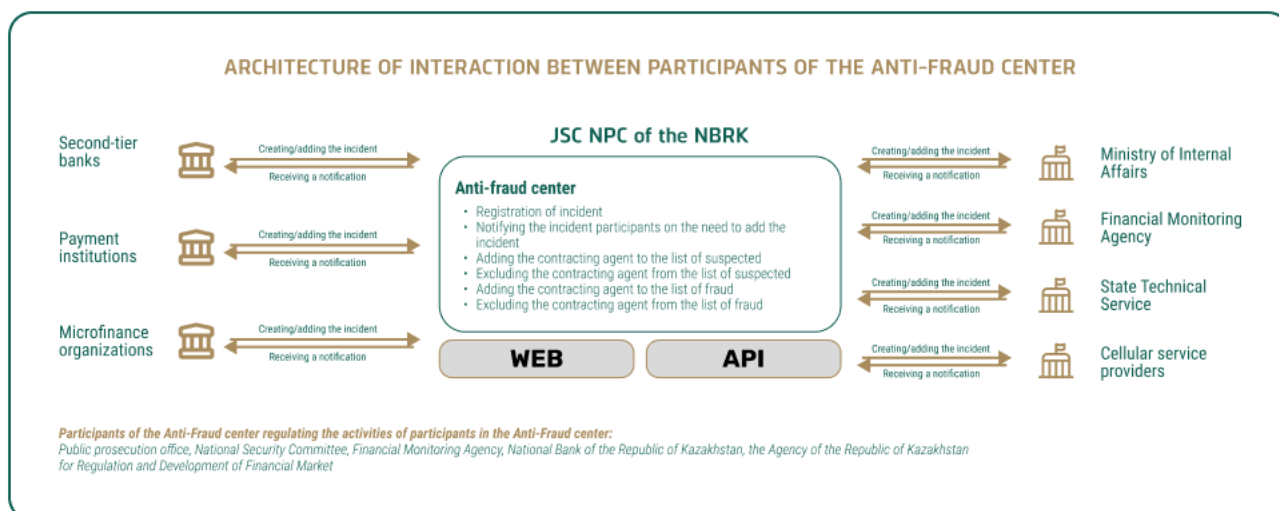
Participant	Role	Function
NBK, ARDFM	Regulatory authority	Implement the powers to control the development of the Anti-Fraud Center in its infrastructural, organizational and regulatory parts
Financial and payment institutions	Information Provider/Recipient	Provision and receipt of transaction information/data with signs of fraud. Measures to reject to execute instructions or suspend payment and/or money transfer if they match the lists of the Anti-fraud Center
Prosecuting authorities	Recipients/providers of information/data/lists	Providing information about events and incidents related to payment transactions with signs of fraud. Investigates the incident and makes a decision/assigns the official status of a fraudster. Ensuring the rule of law when working with an Anti-fraud center.
Mobile network operator	Recipients/providers of information/data/lists	Providing information about events and incidents related to telephone fraud, payment transactions, with signs of fraud. Carry out activities for the development of an Anti-fraud center within their competence
JSC National Payment Corporation of the National Bank of the Republic of Kazakhstan	Operator	Provides control over the Anti-Fraud Center platform, collects, consolidates and stores information about events and attempts to make a payment transaction with signs of fraud.

2.1.3 Scheme of interaction between the participants of the Antifraud Center

The Anti-fraud center receives incidents electronically in real time via a WEB interface or API.

In order to ensure the confidentiality of data transmitted over the network, end-to-end encryption of connections using the TLS 1.2 protocol is used. When exchanging electronic messages, cryptographic protection tools and registration certificates of the Anti-Fraud Center operator are used to ensure confidentiality, integrity, confirmation of authorship and authenticity. All transmitted information is encrypted using the cryptographic information protection facilities. The registration certificates with the GOST algorithm are used to establish/verify EDS and encryption. For this end, the TUMAR-CSP cryptographic information protection software is used.

Fig. 5. Scheme of participants interaction



Anti-fraud Center acts as a single coordination center that:

1. provides participants with the facilities to implement the main processes – creating an incident, completing an incident, viewing lists, viewing analytical reports, viewing the knowledge base;
2. provides technological data exchange between the participants.

Therefore, the centralized platform ensures the compatibility of participant systems and simplifies the process of their integration with a variety of technologies and services. The centralization unifies the management of resources, including infrastructure, data and applications. This reduces transaction costs and increases overall performance.

Throughout the entire lifecycle, the chosen approach allows for the management and control of security measures, including protection against unauthorized access and information leaks.

As a result, the Anti-Fraud Center provides the technical infrastructure for the interaction of participants, and represents a strategic approach that promotes standardization, safety and efficiency of processes.

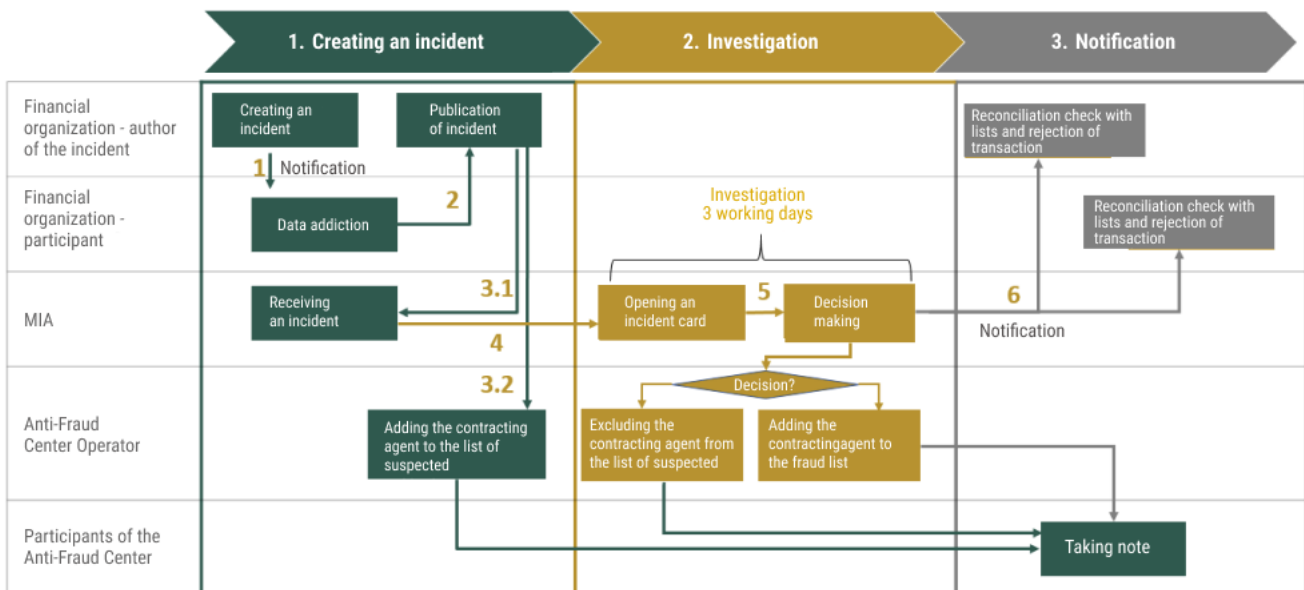
The Anti-fraud center consists of the following components:

- 1. The portal of the Anti-fraud Center** – a platform for interaction between financial organizations and criminal prosecution authorities;
- 2. Data base of the Anti-fraud Center** – a component responsible for storing transaction information with signs of fraud;
- 3. Lists of the Anti-fraud Center** – a component responsible for storing information about counterparties suspected of participating in a payment transaction with signs of fraud or about counterparties confirmed by criminal prosecution authorities to participate in a payment transaction with signs of fraud.

2.1.4 Incident lifecycle

Within the framework of the incident lifecycle established in the Anti-Fraud Center, the participant's functions, deadlines and a decision-making mechanism for the incident are defined.

Fig. 6. Life cycle of an incident at an Anti-fraud center



Creating an incident

The incident lifecycle starts with the creation of the incident participants. The participant sends a message to the Antifraud Center Operator about a prevented/completed payment transaction with signs of fraud based on the client's application and/or in accordance with the participant's internal regulatory documents.

Incident investigation

Based on the created incident card, the Anti-fraud center immediately automatically creates an appropriate entry in the database of attempts and in the list of suspects and if there are related participants, sends notification to related participants via API and WEB interface.

After receiving a notification from the Anti-Fraud Center, the concerned participants and the criminal prosecution authority take actions to supplement the incident card and investigate the incident, respectively.

Making a decision on the incident

The prosecuting authority makes a decision regarding the beneficiary regarding the recognition of the beneficiary as a fraudster or exclusion from the list of suspected:

1. If the beneficiary is recognized as a fraud, the incident card status is changed to "Fraud", indicating the grounds for assigning such status;
2. if the transaction is recognized as non-fraudulent, it changes the status of the incident card to "Not fraud", indicating the reason for assigning such status.

The Antifraud center continuously notifies participants of additions and/or changes to the incident status and the Antifraud Center's lists.

After receiving a notification from the Anti-Fraud Center, the participants carry out actions to update the lists in their information systems.

It is important to note that in the integration interaction of the participants, the key principle is infrastructural transparency with full confidentiality and security of the client's data.

2.2. Progress for 2024

In recent years, there has been an increase in fraudulent transactions due to the active development of digital services and the widespread transition to cashless payment methods.

To that end, the Association of Financiers of Kazakhstan (AFK) has initiated a question to the NBK and the ARDFM on the need to establish a Central anti-fraud unit for combating fraud under these government agencies.

In its turn, the NBK has supported the AFC's proposal to establish a single center based on JSC NPC. This is due to the fact that all financial institutions in the country (banks, infrastructure organizations) are currently connected to the NPC (exchange messages with each other in common formats, and make interbank payments). Accordingly, the established positive relationship between the NPC and the banking community will allow the NPC to flexibly build cooperation with banks on fraud issues.

Further, the suggestion of the NBK to establish a single data exchange center for fraudulent transactions based on the NPC was supported by the ARDFM and the Government of the Republic of Kazakhstan with the inclusion of the project in the Roadmap for the implementation of Anti-Credit Fraud mechanisms dated April 28, 2023 (hereinafter referred to as - the Roadmap).

In order to implement the project, the experience and anti-fraud initiatives of financial regulators from the United States, the European Union, Singapore and Russia have been studied on the basis of NPC JSC.

Considering the global experience, the following work was carried out:

1. Working group with interested participants has been established;
2. Concept of establishing an Anti-fraud center has been defined;
3. Determination of the lists of the Anti-fraud Center participants;
4. Mechanism of interaction of participants is determined;
5. List of information required for collection/storage/exchange has been determined;
6. Action plan for the phased launch of the Anti-fraud Center has been determined.

In order to consolidate the legislative powers of the NPC on the establishment of the Anti-Fraud Center, to consolidate the status and functions of the Anti-Fraud Center, to determine the algorithm of banks' work and the procedure of interaction between banks and the Anti-Fraud Center, the DPS of the NB RK has developed relevant amendments to the applicable legislation of the RK.

As part of the strategic plan for the phased implementation of the Anti-Fraud Center, the main milestones of the project, planned for 2023-2024, have been achieved and implemented:

1. On November 06, 2023, the first (pilot) phase of pilot testing of the software prototype "Fraud Data Exchange Center" (Antifraud Center) via **UI/UX interfaces** was launched into pilot operation.

The participants of the pilot project from STB were the following:

JSC Halyk Bank of Kazakhstan	JSC First Heartland Jusan Bank	JSC Nurbank
JSC Kaspi Bank	JSC Kazpost	JSC Altyn Bank
JSC Home Credit Bank	JSC Bank Freedom Finance Kazakhstan	JSC DB KZI Bank
JSC Bereke Bank	JSC ForteBank	JSC Otbasy Bank
JSC Bank Center Credit	JSC Eurasian Bank	JSC Bank RBK

As part of the operation of I (first) phase of the Anti-Fraud Center pilot:

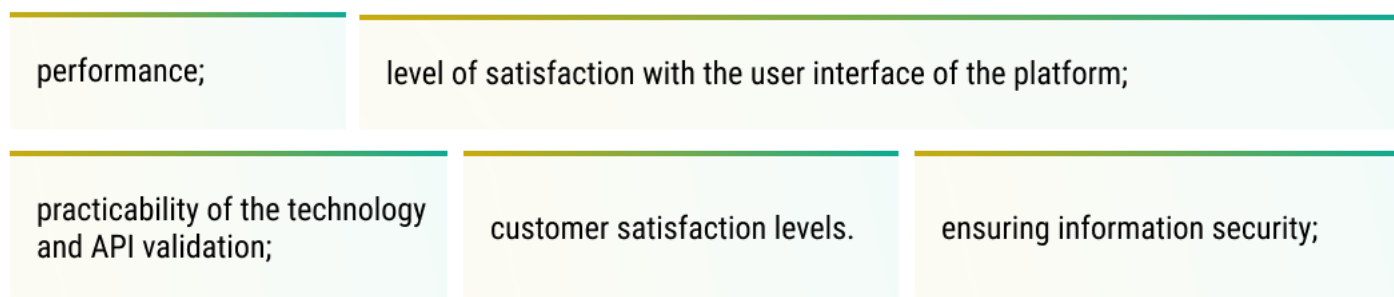
1. along with the second-tier banks, the metadata matrix has been supplemented in the context of transaction types, divided into "mandatory" and "optional";
2. test activities were carried out with the participating banks to create/edit/exclude incidents according to the approved data matrices. According to the results of the test activities, improvements were carried out with the supplier of the technological platform to eliminate errors and improve the service according to the proposals of banks;
3. organizational and explanatory work was carried out on an ongoing basis with second-tier banks and payment institutions to connect them to the project.

2. Meanwhile, in order to ensure the automated exchange of data on payment transactions with signs of fraud, attempts/ incidents and patterns with a technology partner (the private company Unified Antifraud Platform Ltd.) in May 2024, work was carried out on interaction with participants through the API.

Thus, as part of the API interaction with the participants of the pilot project:

1. a standard (requirements) for interaction via the API has been developed, as well as Instructions for connecting participants to the Anti-fraud Center via the API;
2. certificates have been issued to participants of the Anti-fraud Center;
3. monitoring of banks' activities on deploying the API client for testing automated data exchange and detecting real incidents in the software has been carried out;
4. capabilities of the Antifraud Center software for API interaction were tested in terms of generating test data for banks from the Antifraud Center software, and for creating/supplementing incidents from the banks.

The pilot project was tested for 8 (Eight) months. The implementation and introduction of the pilot project have demonstrated qualitative and practical results, which were grouped according to the following indicators:



On July 22, 2024, the National Bank of the Republic of Kazakhstan, as part of efforts to reduce fraudulent transactions, has put into commercial operation the system of the "Data Exchange Center for Payment Transactions with Signs of Fraud" (hereinafter referred to as - the Anti-Fraud Center) on the basis of JSC National Payment Corporation.

Currently, second-tier banks and the Ministry of Internal Affairs (hereinafter referred to as the MIA of the RK) are connected to the infrastructure of the Anti-Fraud Center system, and payment and microfinance organizations are being gradually connected. For a more effective fight against cybercrimes and timely adoption of adequate response measures, JSC State Technical Service of the National Security Committee of the Republic of Kazakhstan will be connected to the Anti-fraud Center.

The functioning of the Anti-fraud Center is regulated by the legislation and by-laws of the National Bank of the Republic of Kazakhstan, which describes in detail the procedure for interaction of participants, their functions and tasks, as well as the terms of performance of duties in accordance with their competence:

1. Law on Payments and Payment Systems (Article 25-1);
2. Decree of the Board of the National Bank of the Republic of Kazakhstan No. 43 dated 16/07/2024 "On approval of the Requirements for the procedure for carrying out the activities of the data exchange center for payment transactions with signs of fraud and its interaction with persons involved in its activities."

The main functions of the Anti-fraud Center include:

1. ensuring data exchange between financial market participants and criminal prosecution authorities for transactions with signs of fraud in 24/7 mode;
2. monitoring and technical support of the Anti-fraud Center system (installation, configuration, updating of server software; full system maintenance and operability; establishing backups (or automatic backups) and restoring data from them if necessary; technical support for users; development and optimization of software and infrastructure);
3. and other functions in accordance with the internal regulatory documents of the National Payment Corporation JSC.

Since the launch of the Anti-fraud Center into commercial operation, the following results have been achieved:

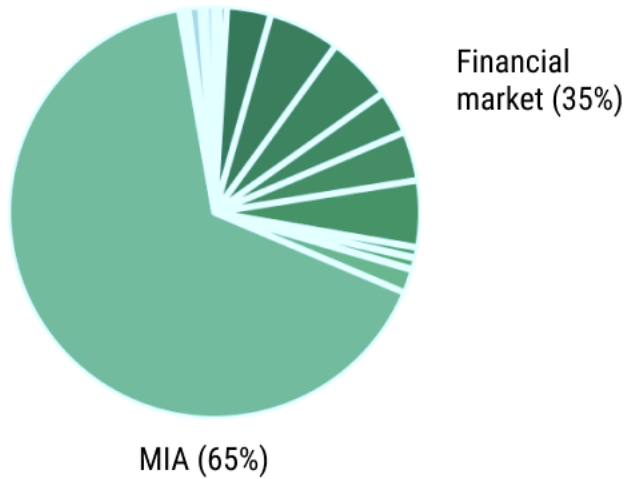
Statistics as of 20/01/2025

<p>1 119 722 662 m.</p> <p>Timely blocked (at the sending Bank's level)</p>	<p>339 114 488 m.</p> <p>Timely blocked (at the level of the recipient's Bank)</p>	<p>88 043 015 m.</p> <p>Returned voluntarily to the injured party</p>
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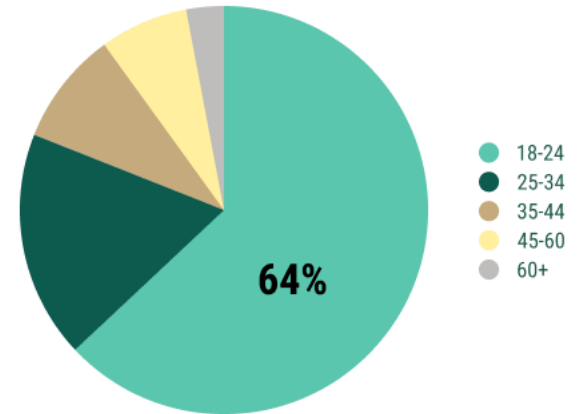
Ton-3 types of fraud

<p>False call from the NSC, the police, the National Security Service, and cellular operators</p>	<p>Fraud on social networks and messengers</p>	<p>False investment of funds (brokers, investment companies, pyramide schemes)</p>
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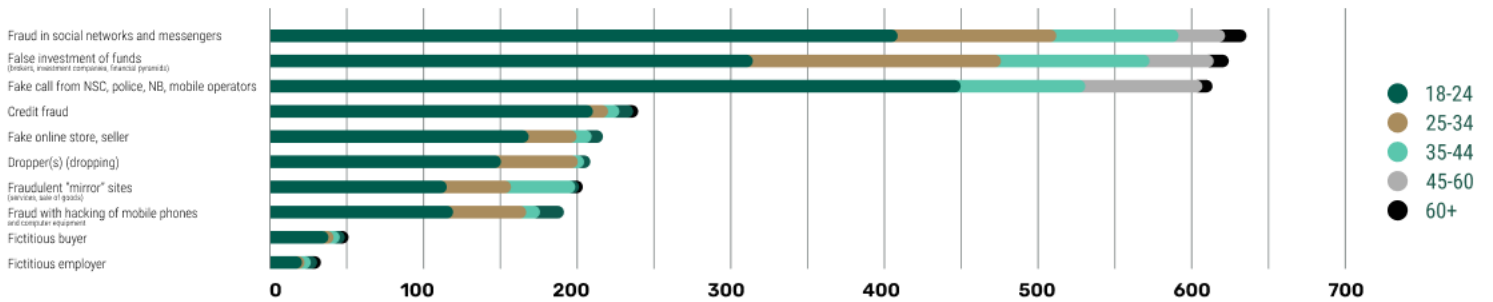
17 680 incidents



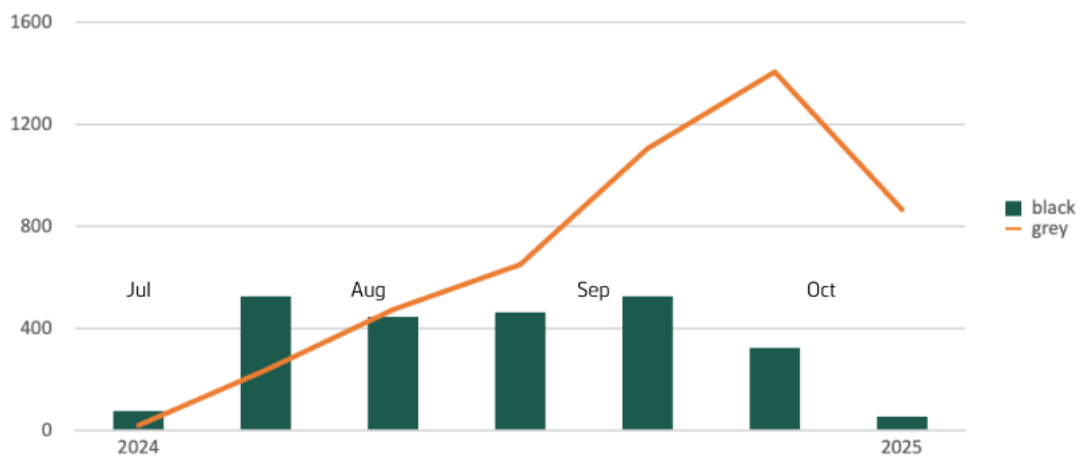
Incidents by age of funds receivers



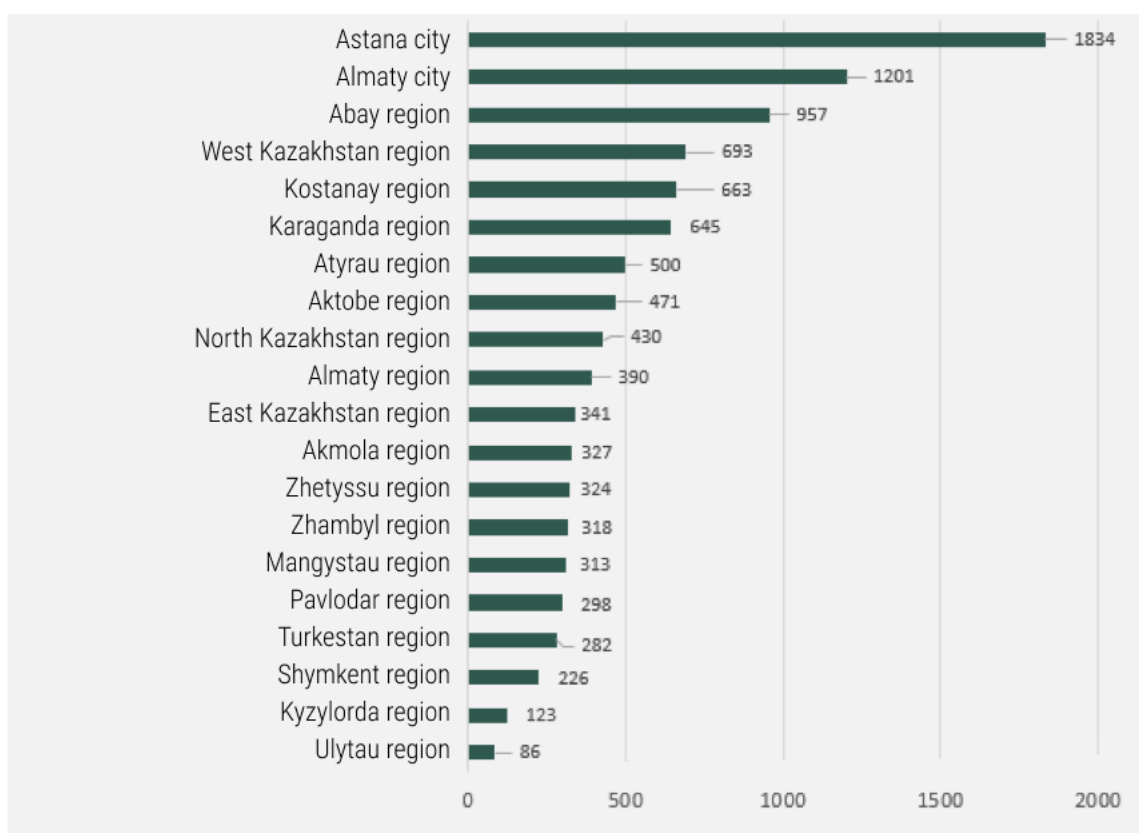
Incidents by type of fraud and age of funds receivers



Growth dynamics of the Anti-Fraud Center lists



Incidents by region



Meanwhile, based on the results of the work of the Anti-Fraud Center for the second half of 2024, a number of problematic issues were identified that arise on the part of the project participants during the investigation of reports of payment transactions with signs of fraud (hereinafter referred to as the incident), the addition of the incident information card, as well as the refund of funds to injured persons. This adversely affects the consumers of financial services, as well as affects the effectiveness of the Anti-Fraud Center.

2.3. Development plans for 2025.

The introduction of an Anti-fraud Center has substantial potential to counter fraud in the financial market.

During the pilot project period, as well as the results of the Antifraud Center's work for the second half of 2024, allowed to state the significance and success of this initiative.

The infrastructure and mechanisms developed within the framework of the project demonstrated the possibility of building a single platform that unites all participants of the Anti-Fraud Center. The standardization ensures compatibility and consistency of interaction between the various participants of the Anti-Fraud Center, which greatly facilitates the process of reviewing and deciding on fraudulent incidents.

The strategic scaling directions of the Antifraud Center are aimed at further deepening the integration of the Antifraud Center in the financial sector of Kazakhstan, creating broader opportunities for participants of the Antifraud Center and increasing the effectiveness of anti-fraud measures.

In 2025, it is planned to further expand the functionality and deepen cooperation within the framework of the Anti-Fraud Center. The plan for 2025 includes:

1. Implementation of an analytical center on digital fraud in the financial market:

- development and implementation of functionality for collecting and processing information on banking services and/or products with signs of fraud;
- development and implementation of digital fraud information analytics functionality.

2. Introduction of a knowledge base for participants of the Anti-fraud Center:

- development of fraud typologies and display of information for market participants on the site of the Anti-Fraud Center;
- development of a tool for participants to collectively data exchange on fraud typologies.

3. The use of artificial intelligence technologies to improve the efficiency of the Anti-Fraud Center:

- development of incident prioritization functionality for criminal prosecution agencies using AI
- use of AI in the development of typologies of digital fraud based on data from the Anti-Fraud Center.

4. Expansion of the participants of the Anti-fraud Center:

- Working out of the communication mechanism with the IFC crypto exchanges and mobile operators.

5. Technical refinement of the Anti-fraud Center system:

- creation of additional databases to expand the functionality of the platform (database of compromised payment instruments, etc.),
- refinement of the Anti-Fraud Center system in accordance with the needs of the participants of the Anti-Fraud Center

The proposed initiatives affect changes in the activities of all entities – the regulator, banks, payment organizations, government agencies and mobile operators.

In this respect, successful and effective implementation of the set directions can be achieved only with an integrated and multifaceted approach, in close cooperation and high involvement of all project participants.



3

OPEN API INTERBANK

PAYMENT AND TRANSFER SYSTEM

Open API Interbank payment and transfer system

3.1. About the system- purpose, functions, current status and principles of development

The financial market has been undergoing significant changes in recent years, driven by banks' desire to create their own ecosystems. The global trend has become an integral part of the strategy of almost all major players, and this desire is actively fueled by mergers and acquisitions of companies from various areas. The banks buy successful projects, including fantasy ones, integrate them into their structures and expand the boundaries of financial services to the daily lives of consumers.

On the one hand, it is obvious that such steps make banking services more integrated and better able to meet consumer needs. Due to such transactions and the integration of various services into a single ecosystem, banks provide their clients with a full range of services, from financial to everyday, which creates unsurpassed convenience and comfort. The services such as QR payments, instant transfers, personalized offers, and integration with e-commerce create new standards for the quality of service, reduce the time required to complete a single operation, and make interaction with the bank as simple and intuitive as possible. This not only improves the customer experience, but also consolidates the position of banks as key players in the lives of consumers, providing them with everything they need within one platform.

However, on the other hand, such ecosystems have their drawbacks. Firstly, they significantly limit competition in the market. The concentration of various services under the control of several major players creates the effect of a vicious circle, where consumers are forced to use the services of one ecosystem to receive a full range of amenities. This raises barriers to entry for new entrants and limits opportunities for smaller players.

Firstly, this model restricts the freedom of consumers, who are increasingly attached to a particular bank and its products. The users, being inside the "golden cage" of convenience, are deprived of the opportunity to freely choose and switch to alternative offers that could be more profitable or interesting. This raises important issues about freedom of choice and fair competition, which require close attention from regulators and society.

Thus, in December 2022, the National Bank of the Republic of Kazakhstan and the Agency for Regulation and Development of the Financial Market of the Republic of Kazakhstan, with the participation of the Agency for Protection and Development of Competition of the Republic of Kazakhstan, developed and approved the Concept for the development of Open API and Open Banking in the Republic of Kazakhstan for 2023-2025.

The main objective of the Concept is to ensure conditions under which competition could become a driving force for market development. The regulatory authority aims to provide conditions for healthy competition, where every player – from a large bank to a fintech startup - will be able to offer their unique solutions to the market.

As part of the implementation of this concept, an appropriate infrastructure has been developed, which is the Open API Platform (hereinafter referred to as - the Platform). The principal purpose of the Platform is to ensure standardized and secure interaction between financial institutions. The platform is part of the national digital financial infrastructure, which consists of the following components:

- 1. The information exchange system via open software interfaces** is a specialized technology platform that provides, based on the client's consent, the exchange of financial information between payment service providers. The system collects, stores and processes consents of clients of the Open Banking System participants for provision of payment services by third-party providers of payment services on the basis of the client's consent, identifies clients of the Open Banking System participants, authorizes and maintains a register of authorized providers of payment services providing payment services as third-party providers of payment services, exchanges information between providers of payment services and third-party providers of payment services, as well as payments and transfers between providers of payment services and third-party providers of payment services.
- 2. Open API Interbank mobile payment and transfer system** is designed for instant processing of payments and transfers in real time. The system allows to transfer funds between accounts in different banks within a few seconds, ensuring the availability of services 24/7. The key features are the instantaneous transfer of funds, round-the-clock availability and ease of use thanks to simplified banking details such as QR codes and mobile phone numbers. Developed based on the ISO 20022 standard.

The principles of the Platform's development are based on the implementation of the best international practices, including the use of the ISO 20022 standard, which ensures data structure and interoperability. The architecture of the system is scalable and built on a RESTful API, which makes it easy to integrate new participants, add new functional services and provide flexibility in adapting to future market needs. This approach ensures high speed, reliability and ease of use of the system for all financial market participants.

Therefore, the implementation of the Concept, as well as the construction of the appropriate infrastructure, has a significant impact on the economy, making changes to the financial ecosystem. This contributes to:

Promotion of competition through equal access of participants to infrastructure, creating conditions for a fairer and more transparent market.

Ensuring the sovereignty of the national payment space by increasing the reliability of the financial system and stimulating the development of the financial sector.

Determining common standards and rules of interaction aimed at achieving interoperability with existing systems, which will strengthen a single financial ecosystem and ensure the sustainable development of the payment space.

3.2. Implementation stages.

In accordance with the approved Concept, as well as the results of the analysis of international experience, development of the Open API and Open Banking takes place in stages, including the development of the Open API infrastructure, standards, and services based on this infrastructure. This includes open discussions on market readiness with the participation of regulators in addressing infrastructure and regulatory issues, as well as the implementation of pilot projects.

2023

In 2023, the development of the Platform as a key element of the entire infrastructure began, while the first service to implement the "Exchange of information on customer's current accounts" scenario was determined.

The scenario is the possibility of aggregating own accounts opened in different second-tier banks (STB) of Kazakhstan within the framework of a single banking application. The customer, logging into his bank's mobile application, initiates a request to connect information about his accounts with other banks. To do this, the client provides consent to access his data, which is transmitted through secure channels using Open API standards. After confirmation of consent and successful biometric authentication, the client's account information, including balances and transaction history, is transferred to the application. Thereby the customer can see all the information about their accounts in a single interface, which makes financial management convenient and centralized.

The pilot project was launched on November 01, 2023 with the involvement of:

- second-tier banks (JSC Bank RBK, JSC Altyn Bank, JSC Home Credit Bank, JSC Bank CenterCredit, JSC Otbasny Bank)
- focus groups with a limited number of real clients of participating banks, which included 128 people.

During the pilot project, according to the operating model, the participating banks were connected to the Open API platform, this allowed them, after appropriate checks, to publish the developed APIs and connect to the API of other participants. The banks acting as API users have successfully improved their mobile applications, provided focus group participants with the opportunity to view information about their accounts with other participating banks, as well as manage their data consent. The focus group has tested 3 mobile applications of banks (IOS/Android).

The implementation of the pilot project has shown qualitative and practical results, thereby confirming the hypotheses regarding the model of development and implementation of open banking:

- performance and scalability of the technological infrastructure;
- security and compliance with information security requirements;
- feasibility of Open API technology and validation;
- simple access for connecting participating banks to the platform;
- convenience of the design of the platform's user interface and consent management system.

As a result of the pilot project on open banking in Kazakhstan, important conclusions were drawn that emphasize the importance and success of this concept in the context of modernizing the country's financial sector. A detailed information is provided in the published Report "Open API and Open Banking: on the results of the pilot project".

2024

The next stage of development envisaged by the Concept was the introduction of payment scenarios. In 2024, the main focus has been on them. As part of this stage, the payment component of the Platform was developed on its own, that is, the Open API Interbank Mobile Payment and Transfer System. This was an important step that opens up the possibility of providing payment API, which will allow market participants to integrate with the platform to implement various payment scenarios.

Thereat, it was decided to develop the following payment services:

- 1. Transfers:** possibility to transfer funds between accounts in different banks through any banking application. This eliminates the need for intermediate services and greatly simplifies the process. The transfers include:
 - 1. C2C transfer service** by mobile phone number to any bank in Kazakhstan
 - 2. Me2Me transfer service** as part of a scenario for exchanging information about a client's current accounts. That is, the possibility to make transfers between own accounts within the banking application chosen by the customer.
- 2. QR-payments:** single QR code standard has been developed that allows customers to make payments for goods and services through scanning the code, regardless of the bank where the merchant's account is opened.

These scenarios have been chosen for several reasons:

- **High demand and fragmentation of the market:** C2C transfers and QR payments can be used by almost all market participants, including individuals, small businesses and large companies. This makes them versatile and easy to implement at the start. Me2Me transfer service is an extension of the data exchange scenario, when, after aggregating accounts, the client is given the opportunity to manage these accounts, that is, to move funds between their accounts.
- **Local operation processing:** the Open API interbank mobile payment and transfer system is aimed at ensuring full-fledged interbank interaction and the system operator is JSC NPC, while the National Bank, that is, the state, is a 100% shareholder of NPC. It should be noted that currently interbank interaction is mainly provided by international payment systems (Mastercard, Visa and others) and limited direct integrations between individual banks and private companies.

- **Social effect:** introduction of these functions increases the availability of financial services, especially for small businesses and the population in the regions.
- **Market fragmentation:** the most striking example is the inability to pay for an in-store purchase from any banking application. It is necessary to be a client of the bank that generated the QR, i.e. the bank that owns the POS terminal or use a bank card, as well as the service apple pay/google pay. This demonstrates the fragmentation of the market in terms of payment methods and systems used, creating inconvenience for consumers and limiting flexibility in choosing payment solutions. This emphasizes the need for a system that brings together the various banks and facilitates interaction between them at the national level. One of the key functional goals of the payment system is to eliminate fragmentation and ensure uninterrupted cash flow between banks, which will allow users to freely carry out transactions regardless of which bank they use.

As part of the implementation of the plans for 2024 and the launch of the developed services, on November 15, 2024, the National Bank (NBK) and the National Payment Corporation of Kazakhstan (NPC) launched a pilot project on introduction of interbank QR payments and held a demonstration of the first transaction within the framework of the Congress of Financiers of Kazakhstan in Almaty. The demonstration of interbank QR payments was organized in cooperation with RPC, RBK bank JSC as the Paying Bank (issuer) and Freedom Bank Kazakhstan JSC as the Receiving Bank (acquirer). To date, the service of interbank QR payments is ready and the step-by-step connection of participating banks is underway. The project is planned to be scaled up by 2025.

On the instructions of the President of the Republic of Kazakhstan regarding measures to improve the mechanism for providing social assistance to the population, taking into account the determination of the total incomes and expenses of really needy citizens, the National Bank, together with the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan, is working to organize a pilot project to improve the system of social assistance to the population. As part of the pilot project, it is planned to use the Consent Management Service of the Open API Platform to obtain consent from recipients of social assistance to provide data on the movement of money from their bank accounts, including their expenses. Currently, the Open API platform has been integrated with the MTZN systems, and a joint order from MTZN on conducting a pilot project has been approved with MTZN and ICRIAP.

Business model

As part of the formation of a stable and transparent business model, an Advisory Tariff Council was established on the basis of the National Payment Corporation (NPC). This agency ensures open and constructive discussion of the NPC's tariff policy with market participants. The main objective of the Tariff Advisory Council is to:

- making suggestions on the definition and regulation of tariffs
- ensuring the transparency of the tariff setting process, the participation of experts in the discussion and adoption of tariff decisions, the validity of tariffs based on economic calculations and analysis

Advantages of implementing interbank QR.

- The basic advantage of implementing interbank QR for customers is its convenience and ease of use. The interbank QR code will allow you to make payments regardless of which banking application is used by the buyer and which terminal is located at the seller (business representative) at the checkout. Therefore, the customer does not need to use a specific bank application, as QR codes will be recognized from any mobile application of the Kazakh Bank.
- For small and medium-sized businesses, the main advantage is, of course, the right to choose a bank to accept payments. With interbank QR, representatives of small and medium-sized businesses have the opportunity to choose the most suitable bank, depending on the commercial conditions provided (bank commission and other types of additional conditions), and not depend on the technical need to have POS terminals of certain banks. Additionally, the interbank QR code will not only be useful for physical stores, but also for online businesses that can use it to simplify the payment process. It also opens up new opportunities to engage with customers through digital channels.
- For banks, this is an opportunity to increase transaction activity and reduce operating costs by providing customers with a convenient and modern payment method. The implementation of interbank QR payments has the potential to significantly impact development and competition in the banking sector. Unifying the QR payment standard reduces customer dependence on specific banks, which opens up opportunities for smaller players to compete with larger banks. The standardization makes the conditions of competition more equal, forcing banks to compete with the quality of services and other conditions, not just the scale of infrastructure.
- For the regulatory authority, the introduction of an interbank QR code will ensure standardization and avoid market fragmentation in terms of payment acceptance methods in the C2B segment. This will also allow interbank interaction to be established at the local level, as transaction processing will be performed by the national payment system, unlike the current situation where these processes are provided by international payment systems.

In which case it should be noted that for buyers, all transactions will be carried out without additional fees. For the sellers (business representatives), commissions will be determined within the framework of tariff packages and individual conditions of second-tier banks.

3.3. Scaling perspectives. Open Banking

The Open Banking scaling involves further development of the platform and expansion of the number of market participants. The key directions of this process are:

- Expanding the account aggregation scenario: integrating new participants as third-party service providers.
- Scaling of transfer and QR payment scenarios.
- Expanding the functionality of the system, including the implementation of open API.

3.4. Planned improvements, plans for 2025

Open API interbank mobile payment and transfer system was developed based on the ISO 20022 standard, which opens up broad prospects for further expansion of functionality to new types of payments including the B2B payments between legal entities, mass payments, as well as settlements under contracts, etc. Additionally, the application of the ISO 20022 standard makes it possible to significantly simplify and accelerate the implementation of cross-border transfers and payments with other countries.

Therefore, the development of the payment system within the framework of ISO 20022 not only contributes to the strengthening of the internal payment infrastructure, but it also opens up new horizons for integration with foreign financial markets, creating more convenient, faster and more reliable channels for international payments and settlements.

In 2025, the focus will be on:

Expanding the functionality of the Open API Interbank Mobile Payment and Transfer System: launch of additional scenarios, including request to pay, B2B and B2C payments, as well as development of a work plan for cross-border payments realization.

1. Improvement of the regulatory framework: development of new standards for the implementation of open API, as well as the obligation of developed services
2. Establishing an API sandbox: an innovative environment for testing fintech companies' solutions, facilitating the rapid adoption of new technologies.

In 2025, the system should become a full-fledged tool that unites all aspects of interaction between financial institutions, businesses and customers. This will be an important step towards creating a sustainable and innovative financial ecosystem in Kazakhstan.



4

DEVELOPMENT OF THE DIGITAL TENGE.

RESULTS OF THE SECOND PHASE
OF THE PROJECT

4.1 Introduction

In 2021, the National Bank of the Republic of Kazakhstan (hereinafter – NBK) began studying the issue of the potential introduction of Central Bank Digital Currencies (hereafter – the CBDC). The principal result of the work of that period was the developed platform, which made it possible to confirm the possibility of technological implementation of the Digital tenge (hereinafter – DT) as the third form of money in the Republic of Kazakhstan. In 2022, the NBRK, in cooperation with market participants, the expert community and international partners, prepared a decision-making model for the introduction of the digital tenge, and tested the platform in an isolated circuit with a limited number of participants.

Based on the results of the study, at the end of 2022, it was decided to phase in the DT in three phases until the end of 2025. The first phase of implementation was carried out in 2023, when the digital tenge was put into pilot operation by the Joint-stock company (hereinafter - JSC) National Payment Corporation (hereinafter – NPC), jointly with second-tier banks (hereinafter referred to as – the STB) and international payment systems.

One of the most important milestones in the development of the Digital Tenge project in 2023 was the launch of a pilot project of “digital vouchers” for free meals in schools, carried out in cooperation with the Akimat of Almaty and JSC Kazpost. In addition, together with the Visa and Mastercard, as well as 4 STB (Halyk Bank of Kazakhstan, Altyn Bank, Bank CenterCredit, Eurasian Bank), the world's first bank cards linked to a digital account in DT were launched. In a separate experimental circuit, innovative scenarios of market participants, cross-border payments, and the issuance of DT-backed stablecoins were also tested.

The results obtained demonstrated the great potential of CBDC in general and DT in particular as an innovative payment instrument with fundamentally new properties. The issue of using DT for payments involving the state deserves special attention – from social assistance to public procurement. The activities planned for 2024 on the Digital Tenge project also includes further development of the platform's functionality through the implementation of new use cases for wholesale and retail payments, exploring potential applications of DT properties in the future, as well as expanding the number of participants and improving the technical parameters of the platform.

This document provides information on the current status of the Digital Tenge project and the 2024 deliverables. Along with implementing a number of scenarios together with market participants, the NPC also plans to continue exploring CBDC and its application possibilities in the future. In this regard, this document contains information about both the research in the field of potential development of the platform and the results of the work carried out in 2024.

4.2 About the Digital Tenge

The Digital Tenge is the third, digital form of money, which is used along with cash and non-cash funds. DT has the properties of both cash and non-cash money, while also opening up fundamentally new opportunities for all users.

Properties of cash at the DT.

- DT is an obligation of the NBK, so the DT is not burdened with the risks of financial intermediaries;
- DT has the technical ability to make payments without access to the Internet (offline), including in peer-to-peer format (from device to device) if there are improvements on the side of banking applications;
- DT has an increased level of anonymity compared to non-cash funds and is guaranteed by the state.

Properties of non-cash money at the DT.

- DT can be used for payments through existing infrastructure (Internet acquiring, mobile applications of the STB, POS terminals, QR codes, NFC, etc.);
- DT maintain the benefits of the digital format of non-cash payments: capacity for making payments without physical contact, ability to conduct transactions using a mobile phone, the ability to seamlessly embed payments in the user experience, as well as the convenience of storing and accessing funds in digital form;
- DT meets the new requirements of the digital economy for making payments that are both instant, smart, inexpensive, and secure and reliable.

From a regulatory perspective, DC meets CBDC definition as **a new form of non-cash money issued by a government issuer and is an obligation of that issuer to be used primarily as an instrument of payment.** The table below provides a more complete disclosure of the legal status of CBDC and other forms of currency transactions.

Tab. 1 - Differences between the public and private forms of money [1]

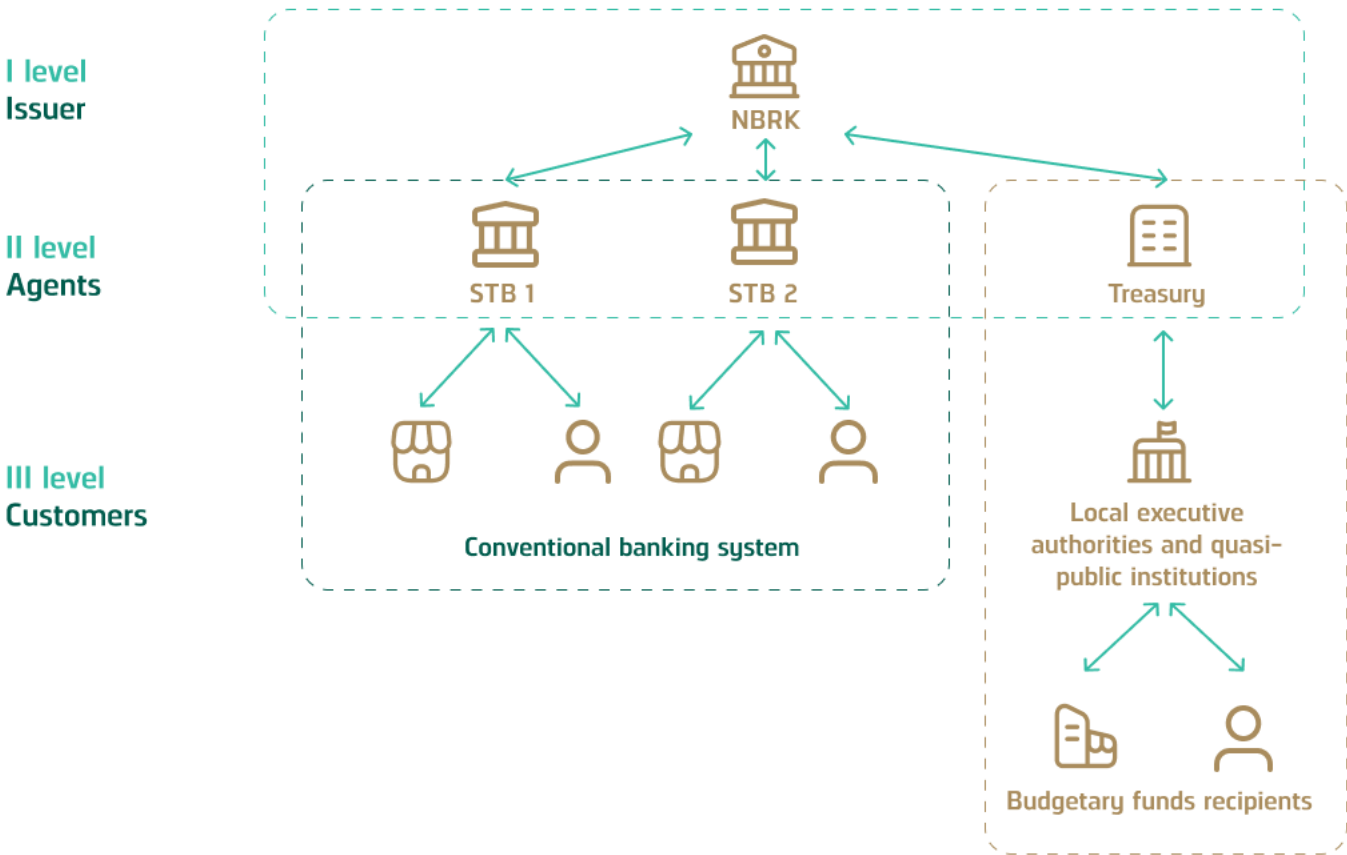
	Public funds	Non-public funds	
	Money from the central bank (hereinafter – the CB)	Money from commercial banks	Non-bank funds
Description	Obligations of the CB for settlements in physical and digital format	Obligation of a commercial bank in the form of deposits held in the bank, which can be used for settlements	Obligation of a non-banking financial institution under the supervision of the relevant authorities
Issuer	CB	Commercial banks	Payment service providers (hereinafter – the PSP), which are not the banks
Users	General public and financial institutions	Bank customers	General public and financial institutions
Examples	- Funds in the real-time gross settlements (hereafter – the RTGS); - Retail and wholesale CBDC; - Physical banknotes and coins.	- Tokenized deposits; - Customer's bank deposits; - Funds issued as loans.	- Stablecoins linked to fiat money; - Electronic money.

In addition to the above, DT is a lawful currency which is issued in the form of a unique digital sequence (tokens), information about which is stored on special digital accounts. The use of the token-based approach provides the technical capability of the built-in programmability of the DT, which in turn gives the DT a wide range of potential applications - from simplified integration with the world of decentralized finance due to a similar architecture to increasing the transparency of government spending using the token labeling mechanism.

It is important to note that **DT is created not as a replacement for cash and non-cash funds, but as an addition to them.** After the introduction of DT, cash and non-cash money in Kazakhstan will be used in the same mode.

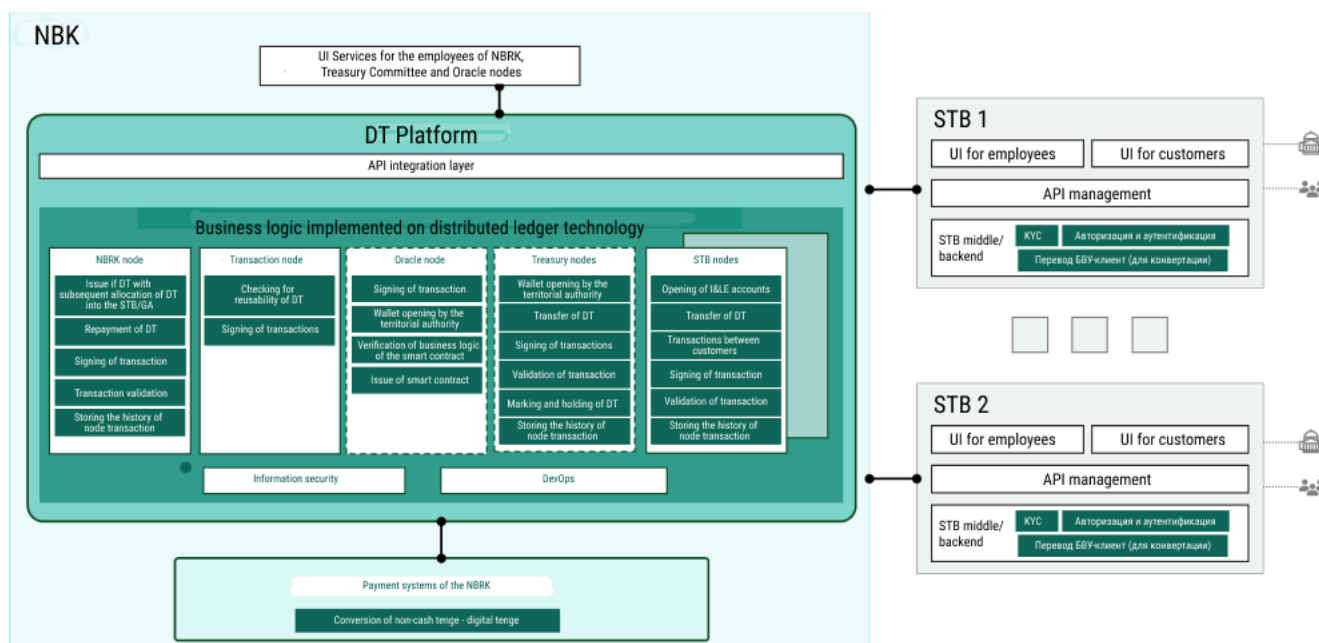
At the conceptual level of the DT architecture, it is implemented in accordance with a two-level model (Figure 1), in which the NBK (the first level) develops the design and basic functionality of the DT platform, and the STB and Treasury (second level) provide connection to the DCT platform and provision of service to individuals and legal entities (hereafter – I&LE).

Fig. 7 - Two-level model of the DT platform



The main purpose of the two-tier architecture model is to ensure effective interaction between all participants of the DT platform (NBK, STB, LE&I). STB connect to the DT platform through an API and provide customers with a user interface in mobile applications through which customers can open digital accounts on the DT platform, perform conversion from/to DT and perform operations with DT. The employees of the National Bank of the Republic of Kazakhstan can also interact with the DT platform to carry out operational control and receive reports. The top-level architecture of the platform is shown below (Figure 8).

Fig. 8 - Top-level architecture of the DT platform in 2024



Key participants of the DT platform-



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. In addition, as part of the management of the National Fund, the NBK performs the functions of an Agent: maintains and manages the funds of the NF on the basis of a discretionary management contract;



STB

provide individuals and legal entities with access to the DT platform and the capacity to open a digital account 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 (hereinafter referred to as - the EDS), 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;



Treasury Committee

provide government agencies (hereinafter referred to as - the GA) with access to the DT platform and the ability to open a digital account, perform the transfer DT into non-cash funds, sign and validate transactions involving GA, and also store the transaction history with the participation of the STATE; through the services of the Treasury Committee of GA and law firms under local executive bodies, DT is marked for targeted use, and also hold funds using a mechanism called "encumbrance".



Individuals and legal entities

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

Key components and services of the DT platform.

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

Node is a node of a distributed registry network that performs certain functions.

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

- **Nodes of financial organizations:** the 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&Legal entities 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 DT. All such nodes have the technical capability to carry out DT holding using a mechanism called "encumbrance", and the Treasury node is also capable of marking DT;

-
- **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 distributed ledger technology (hereafter – DLT) based on the unspent transaction output (hereafter – UTO) model;
 - **Oracle Node:** these network services provide smart contracts on the DT platform with information from the outside. They are the bridges between the DT platform and the outside world, expanding the possibilities of using smart contracts that require information outside the registry: 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.
 - **EDS signing and verification service:** service provides security by signing messages from the DT platform, as well as by verifying the signature when receiving messages from the STB. This ensures the legal value of the exchange between the DT platform and the participants.
 - **Service for interaction with the automated banking system (hereinafter – the ABS) of the NBRK:** service exchanges files with the NBK ABS in the scenarios of converting non-cash tenge to DT and converting DT to non-cash tenge at the STB-NBK level upon receipt of a corresponding request from the STB. After receiving confirmation from the NBRK ABS, the service initiates issue/repayment transactions on the DT platform;
 - **Integration layer of the API:** intended for interaction with participants and organization of exchange within the framework of the DT platform.

4.3 International practice of studying CBDC

Currently, at least 130 countries representing 98% of the world's gross domestic product are conducting research or work related to the capacity of creating a CBDC [2]. At least 67 jurisdictions have reached the advanced stage of study (development, piloting or launch) [ibid.]. According to forecasts of the Bank for International Settlements (hereinafter – the BIS), up to 15 retail and 9 wholesale CBDC may be in circulation by 2030 [3].

To date, only four jurisdictions have implemented CBDC at the industrial level – CB of the Bahamas, CB of the Eastern Caribbean (hereinafter referred to as – the ECCB), the Central Bank of Nigeria and the Bank of Jamaica.

It is worth noting that of all the above-mentioned CB, at least two are experiencing difficulties with the technical implementation and adoption of CBDC as a full-fledged means of payment. ECCB has announced the planned shutdown of the DCash project in January 2024, due to the need to upgrade to a new version of the CBDC pilot project (“DCash 2.0”) [4]. Whilst there are also a number of technical problems of the platform related to the lack of integration with the ABS of the STB and periodic outages [5, 6]. The project of the Central Bank of Nigeria “E-naira” has experienced great difficulties with initial adoption, despite its successful technical implementation and proven 24/7 stability: in the first year of launch, the number of connected retail customers did not reach even 1% of the total number of active bank accounts [7].

In 2023, the number of wallets and transactions increased significantly, but the popularity of e-naira as a means of payment remains low – CBDC in Nigeria accounts for no more than 0.36% of the total foreign exchange turnover, despite 13 million open wallets [8, 9]. The main reasons include strict regulatory measures to encourage the use of digital currencies (cash-out limits) and the similarity of e-naira and mobile money functionalities.

These examples clearly demonstrate the critical importance of detailed strategic planning before launching CBDC, the importance of integrating CBDC into the existing financial landscape and increasing the stability of platforms as well as the need to build effective communications with financial market participants to raise awareness and open dialogue.

Below is a summary table with information on the four CBDC that are or were in commercial operation:

Tab. 2 - Summary table with information about the launched CBDC in 2024 [4, 9-14]

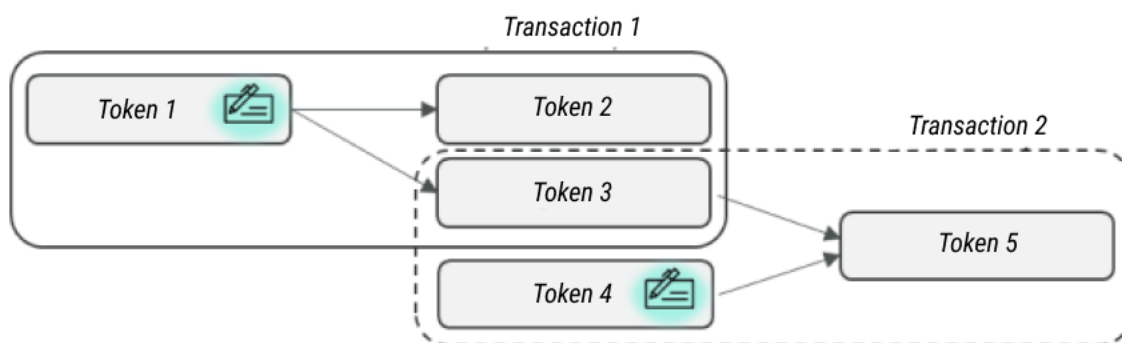
	Bahamas	Eastern Caribbean countries	Nigeria	Jamaica
Name of the CBDC	SandDolar	DCash	Е-наира	JamDEX
Year of launch	2020	2021	2021	2023
Technology use	Distributed ledger	Distributed ledger	Distributed ledger	Centralized system
Architecture model	Two-level	Two-level	Two-level	Two-level
Account-based or token-based access	Account	Account	Account	Account
Coverage	120,000 retail wallets in 2024	Decommissioned, Dash 2.0 is scheduled to be launched in 2024-2025	13,000,000 retail wallets in 2023	260,000 retail wallets in 2024

As can be noted all launched digital currencies rely on a two-tier architecture involving banks or other financial organizations to conduct KYC procedures, provide access to a wallet, and otherwise work with end users, however it is also worth noting that the distribution of powers and responsibilities between market participants depends on the specific jurisdiction.

For example, in the case of Nigeria, the Eastern Caribbean, and the Bahamas, it was the Central Bank that was responsible for developing a separate application for using digital currency, and in the case of Jamaica, access to DCB is provided through commercial banking applications; CB of the Bahamas also pays great attention to measures to anti- money laundering and combating the financing of terrorism (hereinafter referred to as AML/CFT) and is the owner of the relevant specialized platform, in other jurisdictions, banks and PSP, etc. play a major role [10, 12, 13]. It is also extremely important that all the CBDC described above use account-based access, and the Bank of Jamaica also uses a centralized registry as a technology platform. This fact is one of the arguments of the **ongoing discussion about the advantages of the account-based and token-based approaches.**

As the name suggests, the main difference between these two approaches is the fundamental essence that the CBDC platform operates on. In the case of a token-based approach, the system's operation relies on a "unit of value", that is, a token. A transaction in such systems is a change of token owners, and the terms of the smart contract are contained in the token itself. Below is a diagram showing the movement of tokens during transactions using smart contracts

Fig. 9 - Transactions in a smart contract with a token-based approach.



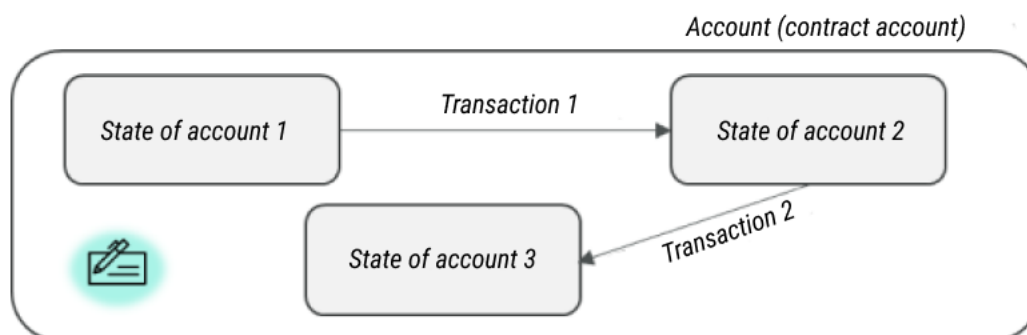
And it is also worth noting that this approach has its own special features in terms of programmability:

1. **Programmability refers to a specific token.** The token defines the terms of the contract under which the tokens can be spent.
2. **UTXO model does not have the ability to save information about its state.** This means that each transaction creates a new token, and different transactions cannot refer to the same token.
3. **Transactions do not reference any input data outside of the tokens used.**
4. **The token-based approach is best suited for smart contracts that relate to a specific token, where it is not necessary to "remember" previous interactions, store and manage complex data.**
5. **The terms of the contract are recorded in the token at the time of token creation, i.e. at the time of the transaction itself.**

These properties are most applicable for labeling and subsequent improvement of traceability of funds as well as for the implementation of scenarios with the holding of funds.

The account-based approach can be called more traditional: the vast majority of modern electronic and non-cash money systems use it. Therein, the account plays the main role as a conditional part of the registry that can store the state of the record on it. The transactions are carried out by changing the status of accounts, and the terms of the smart contract are tied to the accounts as entities.

Fig. 10 - Transactions in a smart contract in a token-based approach.



Programmability of such systems is different from those that use tokens:

- 1. In account-based approaches, the smart contracts are a type of account.** When a message (transaction) is received, such a specialized account is activated and executes the contract script code.
- 2. The account stores its previous states and transactions update them.** The different transactions interact with the same account
- 3. An account-based model is suitable for smart contracts where you need to remember previous interactions, store and manage complex data.**
- 4. The contract terms and conditions are created at the time of creation of the account with which customers interact.**

Such programmability is most effective for cases of allocation of funds according to receipts (e.g., for crowdfunding, corporate health insurance, or financial leasing).

Another important difference between the two approaches is the way in which the user is authorized: in case of token-based CBDC, the user proves his right to perform transactions by signing transactions with his unique digital signature and by the verifiable fact of originality of the transferred tokens themselves, and in the case of account-based CBDC, the user's eligibility is verified by verification of his/her identity by the bank, PSP or other organization. Each approach has its own set of advantages and disadvantages:

CBDC with token-based access

- Allows for a greater level of anonymity for the user
- Facilitates further potential integration with financial products from the world of decentralized finance

CBDC with account-based access

- Has a potentially higher level of performance
- Has an extremely low risk of counterfeiting or double spending due to the user's identity and the availability of funds in his/her account
- Based on widely accepted principles and mechanisms, which facilitates its further integration with PSP information systems.

The following table summarizes the characteristics of both access models:

Tab. 3 - Summary table of characteristics of account-based and token-based access models

Characteristics	Account-based access	Token-based access
Holder identification	Is compulsory (the principle "I am, therefore I own")	Not required (principle of "I know, therefore I own")
Method of transferring value	Changing account status	Token transfer
Transparency	The owner's identity is known	The owner's identity may not be known
Risk of double spending	Managed through account balance	Verified for each token

Due to the presence of substantial arguments for using one or the other approach, **research on the use of a hybrid approach** appears to be most attractive. It is worth noting that the difference between account-based and token-based access is becoming less and less tangible with time and the development of the fintech industry – for example, the proliferation of biometric identification systems allows the creation of services for storing the unique digital signature of a CBDC user (CBDC sign with token-based access), access to which is provided after the user is identified by the service (CBDC sign with account-based access). Another approach is to create platforms within which there can be two types of access provisioning (for example, token-based access for wholesale CBDC and account-based access for retail CBDC or vice versa). All this allows us to say that the choice of one or another approach, although it is one of the most important strategic forks in the creation of a national digital currency, does not finally deprive the regulator of the advantages of a non-chosen approach – **ultimately, the architecture and ecosystem of a particular CBDC prevails.**

The **cross-border payments based on wholesale digital currencies** remain another important aspect of CBDC exploration and implementation.

The issue of cross-border payments using CBDC is an extremely popular area of research – in particular, BIS surveys show that work on wholesale CBDC for most jurisdictions is driven primarily by a desire to improve cross-border payments [15]. Notably, it was with wholesale digital currencies that the first experiences with CBDC implementations were made: Jasper-Ubin and Stella in 2016 [16-17]. The further research has demonstrated the great potential of national digital currencies for cross-border payments by reducing the time it takes to receive funds and enabling new exchange models to be realized (in particular, payment versus payment, PvP, which involves the exchange of one digital currency for another, and delivery versus payment, DvP, which involves the exchange of securities for digital currency).

The most promising area of work in this area remains the creation of a common distributed registry platform for all participating countries – despite the complexity of decision-making regarding the system architecture and relatively high development costs, this approach allows to fully realize the benefits of CBDC including the exchange models described above. A striking example of this approach is the mBridge project, previously implemented by BIS in cooperation with the Digital Currency Institute of the People's Bank of China, the Central Bank of the United Arab Emirates, the Central Bank of Thailand, the Hong Kong Monetary Authority and the Central Bank of Saudi Arabia [18]. Under mBridge, participating CB provide access to their CBDC to non-resident PSP, which ultimately makes the platform as interoperable as possible, and payments on it - fast, reliable and transparent for the CB-participants. Currently the CB of the participating countries, based on a pilot project with real money transactions between PSP of the four above-mentioned jurisdictions conducted jointly with BIS, are implementing the transition of the mBridge platform to the status of a minimum viable product (minimum viable product, MVP) [ibid.]. The available results demonstrate the reliability and efficiency of the platform, which allows us to declare with a certain degree of confidence about the further development of the project.

The development of multiple cross-border payment projects using CBDC is gradually moving from the prototyping and pilot project stage to the pilot operation stage. At this stage, more and more attention is being paid **to organizational and regulatory issues rather than to the technical aspects of a particular platform**: creating or finalizing common rules for using the platform, standardizing approaches to determining exchange rates, attracting new participants, etc. Another important factor is the emergence of commercial projects aimed at providing interoperability between different DLT systems using so-called “third-party distributed ledger networks” (side chains).

All this indicates the continuing growth of relevance of cross-border payments in terms of the existence of national digital currencies.

The aforementioned transition of many CBDC systems from prototyping and pilot projects to the industrial or pilot operation stage also raised the **issue of realization of payments for the intended purpose**. An example of such a solution is the experiment with “purpose bound money” (PBM) of the Monetary Authority of Singapore.

The Purpose bound money project can be identified as the creation of a third form of programmable financial instruments in addition to programmable payments and programmable money. Below is a table of the main differences between the three instruments.

Tab. 4 - Summary table with information on the different targeting payment instruments [19]

	Programmable payments	Programmable money	Purpose bound money (PBM)
Programming logic is transferred along with the unit of value	No	✓	✓
Programming logic may be developed by a third party other than the issuer	✓	No	✓
Bearer instrument	No	✓	✓

As can be noted, the fundamental difference between PBM and realizing programmability with most CBDC based on distributed registry networks is the ability to develop programming logic by a third party (that is, PSP and banks). Meanwhile, the main focus is on interoperability: main functionality of PBM is the ability to create a so-called “wrapper” for the programmability of many types of financial instruments: CBDC, tokenized deposits, etc.

The e-commerce, contract automation (including property leasing), cross-border payments, trading, and charity are cited as the main areas of application. It is the latter area that is most consistent with the creation of earmarked funds – e.g. program the logic of the donated funds so that only a specific beneficiary can use them.

4.4 Results of the study of potential applications of digital tenge

The analysis of potential areas of application of DT was carried out taking into account the following architectural and conceptual properties of the national digital currency:

- 1. Two-tier architecture model**, maintaining the role of the STB and other PSP;
- 2. Token-based approach**, where any transaction involves the transfer of unique digital sequences (tokens) from one owner to another. In this case, the UTXO mechanism mentioned above is also implemented – at each transaction old tokens are redeemed and new tokens are issued. For example, if a user has a token with a face value of 5000 digital tenge and then pays 150 KZT for bus fare, the original 5000 KZT token is divided – service provider receives a token of 150 KT and the user is left with a change token of 4850 KZT. Additionally, it is also worth noting that the token origin data is known to the owner of the node – in this particular case, the STB may determine the “parent” token of 5000 KZT based on the change or payment token data.

-
- 3. Feasibility of self-executing contracts (smart contracts).** The smart contracts are a way to automate contractual relationships in digital form, designed to automatically execute transactions on a DT platform according to predefined contract terms and conditions;
 - 4. Feasibility of holding DT through an encumbrance mechanism.** The encumbered state of the token allows for additional programmability conditions: with each transaction, the platform checks whether the encumbrance condition is present in the transaction, and the contract code and encumbrance conditions will be checked at transaction execution time;
 - 5. Feasibility to mark the DT at the token level for intended use,** which allows transactions in such funds only for a predetermined purpose;
 - 6. Capacity to perform transactions with multiple end recipients,** which allows to organize payment splitting at the platform level;
 - 7. Availability of Node Oracles.** The use of Oracles allows smart contracts to obtain verified information from external sources.

The combination of all the above features allows the DT platform to achieve the best results in the following areas:

- **Real estate market and marketplaces.**

The capability to hold funds in a digital account using a smart contract allows for an agreement between the parties without adding the risk of an intermediary. The withdrawal of holdings can be accomplished by validating the fact that the property has been re-registered to the buyer by sending a Noda-Oracle request to the appropriate government databases. This mechanism is actually an automated version of an escrow account, actively used for various transactions.

In addition, marking of DT tokens for intended use can make participation in shared construction safer for the buyer: a certain part of the invested funds can be marked for intended use (for example, for the purchase of building materials), which in turn makes it impossible to illegally withdraw funds or embezzlement, and also positively affects the likelihood of timely disbursement of funds and commissioning of the facility under the contract.

The above described mechanism of safe transaction for real estate market is also applicable for various marketplaces. The delivery services can be the party validating the fact of service provision – after direct delivery of the goods and provision of the service, the STB node will receive confirmation with the help of the Oracle node. In both cases, automating the process through a DT platform reduces the number of intermediaries and costs, reducing the number of associated risks (including due to the status of the DT as a national digital currency), and provides greater transparency of the entire process.

- **Agency agreements.**

The most appropriate example to demonstrate the benefits of a DT platform in this area is delivery and cab services. When ordering delivery or transportation services, payment is made from the customer's digital account with multiple recipients for tax deductions, payment of commission to the operator/taxi company and transfer of the income part to the driver/courier himself/herself. Depending on the conditions, it is possible to set up tax deductions by means of a savings account and a checking smart contract, by means of which the initiator of the transaction will transfer the amount to the digital account of the relevant public authority at certain intervals (for example, once a month). As a result, the application of the DT platform will make it possible to achieve greater transparency of processes both for the executors themselves and for the state authorities, automate the process of tax payment and reduce transaction costs in the future.

A similar mechanism for tax payment has been successfully tested in the R&D loop of the DH platform as part of the 2023 works for value added tax (hereafter – the VAT). The source of information about the need for payment may be an electronic invoice (hereinafter referred to as - the “E-Invoice”), the information about which will be known to Noda-Oracle. An additional effect may also include simplifying the collection of reports: employee responsible for accounting only needs to compare the amount of turnover subject to VAT with the amount in the tax office. Such features of the DT platform can be useful for self-employed workers and small businesses due to the automation of a large number of accounting works and the absence of the need to manually double-check a large number of documents.

- **Utility bills.**

The possibility of payments with multiple end recipients, as well as obtaining information through node oracles allows to create a service of targeted use of funds on the part of the association of property owners. An important difference from existing mechanisms is the fact that transactions are made directly from users to service providers which significantly reduces the risks of misuse, reduces costs, and increases the overall transparency of the process.

- **Obligation/claims issuance operations of the STB.**

Such transactions include bank guarantees, letters of credit, factoring and other derivative financial instruments. For example, two LE choose a STB as an intermediary through which they issue obligations and authorize the right to make payments from their digital accounts after fulfilling the conditions recorded in the smart contract. The most interesting areas of potential application of smart contracts to simplify banking processes are cross-border payments, loan process automation and asset tokenization. All of these focus areas are being actively explored around the world.

It should also be noted that the application of DT may further optimize operational support in case of targeted lending to legal entities: token marking in combination with the use of smart contracts and Oracle node will maximize automation and simplify the procedure of collecting documents confirming the fact of receipt of funds and purchase for both parties.

- **State aid.**

The marking tokens for transactions with a certain counterparty (i.e., defining the conditions where and on what subsidized DT can be spent) will significantly reduce the risk of corruption abuse and ensure the transparency of payments with the participation of the state, and automate the very process of receiving government subsidies through the possibility of obtaining relevant documents (e.g., electronic invoices) through the Oracle node.

Ensuring the designated use of funds will allow the DT platform to become one of the tools for effective financial planning and spending of public funds in the future. In budget planning, public organizations can classify expenditure items without subjective intervention based on retrospective and real data and build financial models in an automated manner using the information obtained from the DT platform, and the Treasury, in turn, will be able to program the money so that planned funds are always spent only for their intended purpose. However, it is worth adding that in order to achieve such a goal, effective interagency cooperation is needed to create technical conditions (in particular for the establishment of classifications and cataloging of goods, works and services).

- **Procurement process for services and goods with instant confirmation of service provision and payment.**

The capacity to hold funds together with the wide integration potential of the DT platform allows for the realization of a smart procurement contract. The most appropriate example is the relationship between airlines and fuel suppliers. By initiating a smart contract through the DT platform, the airline transmits information to the fuel supplier about the planned refueling of a future flight, and records the preliminary fuel volume and its price. This data is later used to plan airport refueling procedures. On the day of refueling, the aircraft commander requests the specified fuel volume from the operator and sends an online application to the STB, to reserve the required amount on the digital account. A confirmation from the STB serves as a trigger for the aircraft refueling process. After the service is performed, the funds are debited from the airline's digital account, and the fuel supplier's and airline's commercial services are informed about the closure of the refueling request with all reporting documents.

A clear proof of the feasibility of such CBDC-based systems is the full-fledged supply chain finance platform unveiled in September 2023, developed by China's JD.com in conjunction with the Industrial and Commercial Bank of China, using smart contracts on the digital yuan platform [20]. Noting the advantages of the developed solution (automation of a large number of processes, speed of transactions and availability of state guarantees due to the status of the digital yuan), JD Group Vice President Li Bo also said that cooperation between industry, technology providers and financial organizations is needed to develop digital RMB-based supply chain finance systems [ibid.].

- **Charitable foundations and crowdfunding platforms.**

The capacity to create smart contracts with certain conditions can radically change the existing ways of collecting donations for various purposes. For example, by creating an additional service integrated with the DT platform, it is possible to realize a mechanism for accumulating an amount over a certain period of time, and if the required amount is not reached after the deadline, the service automatically returns the money to the benefactors. Such functionality is quite common (the well-known crowdfunding platform Kickstarter exists on the basis of such mechanics), but in the case of the DT platform, its implementation will allow to create a fully automated mechanism free from the risks of errors due to the human factor. However, it is worth noting that an additional add-on with account-based access is required to create such a mechanism - this is what will allow for the accounting of donation funds.

Another interesting area of research is the creation of a verified digital account for a charitable organization using smart contracts and the concept of "open API" - Such an account can be set up to transmit information to a web portal or a page in real time with the ability to track the charity's expenses to everyone which will increase the level of citizens' trust in such initiatives and reduce the likelihood of theft and misuse of donations.

- **Digital vouchers.**

The use of node oracles, third-party services and DT smart contracts allows for significant optimization of complex processes of identification, reporting and transaction support for non-monetary measures of state support by creating digital vouchers. A similar mechanism was tested jointly with the Almaty City Akimat and JSC Kazpost within the framework of the pilot project in 2023 for free meals in schools. While visiting the canteen, a student at the school swiped its transportation card at the terminal, thereby confirming that he had received meal services. Based on this confirmation, the smart contracts of the DT platform automatically settled from the digital account of the school to the digital account of the service provider (canteen). The digital voucher mechanism ensures targeting and transparency of government support, as well as convenience for service providers and consumers. Its further scaling up will allow to assist citizens by providing any non-monetary support measures without the risk of corruption schemes being realized: state assistance is not provided by allocating funds directly to the citizen, but by subsidizing providers to provide necessary services. As in the case of state subsidies, further development requires the creation of the necessary infrastructure in the form of classifiers and cataloging of goods, works and services.

It is important to note that the above cases are not exclusive to the Republic of Kazakhstan and the DT platform: similar business processes and relevant use cases can be found in many countries and jurisdictions. Moreover, there are examples of solving identical problems with existing cashless-based tools. However, the uniqueness of CBDC in general and DT in particular lies in a combination of factors: national digital currencies are an obligation of the Central Bank which means that the risks of financial intermediaries are eliminated or significantly reduced, while the token-based approach allows for innovative programmability mechanisms to be implemented on their basis, from labeling and targeting to holding and smart contracts. It is these factors that make token-based CBDC the **most appropriate and effective tool to address the above challenges.**

4.5 Archetypes and scenarios for 2024

2024 activities included 5 scenarios based on the three archetypes and one scenario based on the 2023 works. Below is a description of the three main archetypes used for the payment scenarios involving the state.

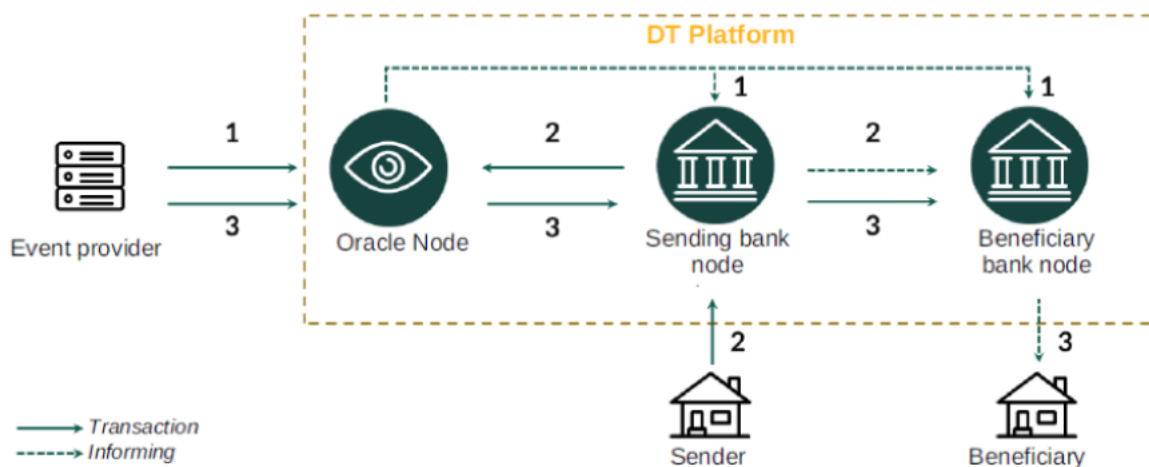
“Holding” Archetype

The preliminary event is registered on the node-Oracle - information about the sender, recipient, amount, time of holding validity, as well as the type of holding (for a single transaction or infinite). The holding is performed on the sender's wallet, 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 on the node oracle, 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 node oracle.

If the holding was infinite, the hold sign is transferred to the surrender, and when the event occurs again, Noda-Oracle 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 reholding is allowed, even if the holding was not for the full amount. In case of unholding not for the full amount, the balance is returned to the sender. In this case, Noda Oracle acts as a controller, i.e. it is impossible to conduct holding and unholding transactions without confirmation of the Oracle node.

Fig. 11 – Scheme of interaction between participants within the archetype “Holding”



Description of steps:

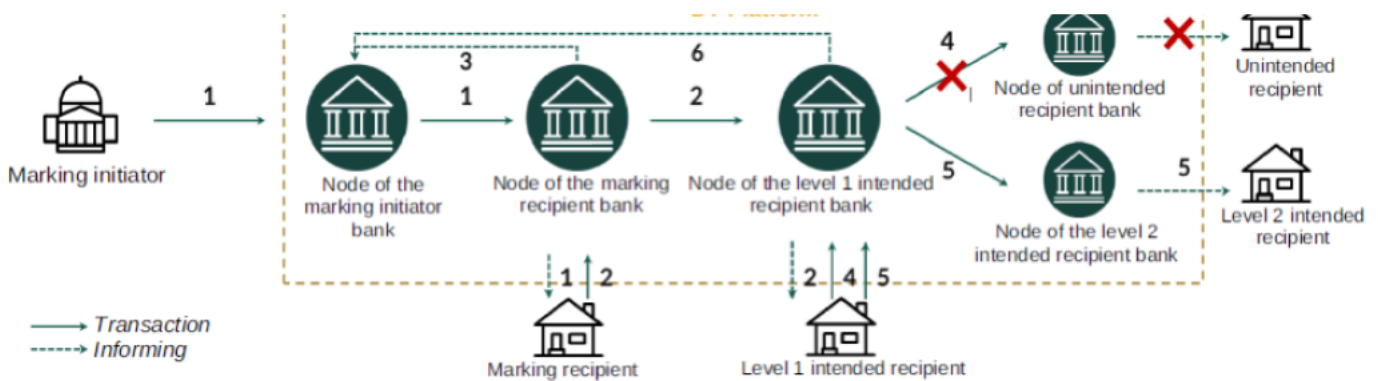
1. Event Provider sends a request to register the event on the Oracle node. The nodes of the Sending Bank and the Receiving Bank receive information about the event.
2. Sender initiates a hold request with the registered event identifier. The holding is performed on the sender's account with confirmation 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 unhold the funds. The funds are transferred from the sender's account to the recipient's account.

"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.

Fig. 12 – Scheme of interaction of participants within the framework of the "Public address marking" subarchetype



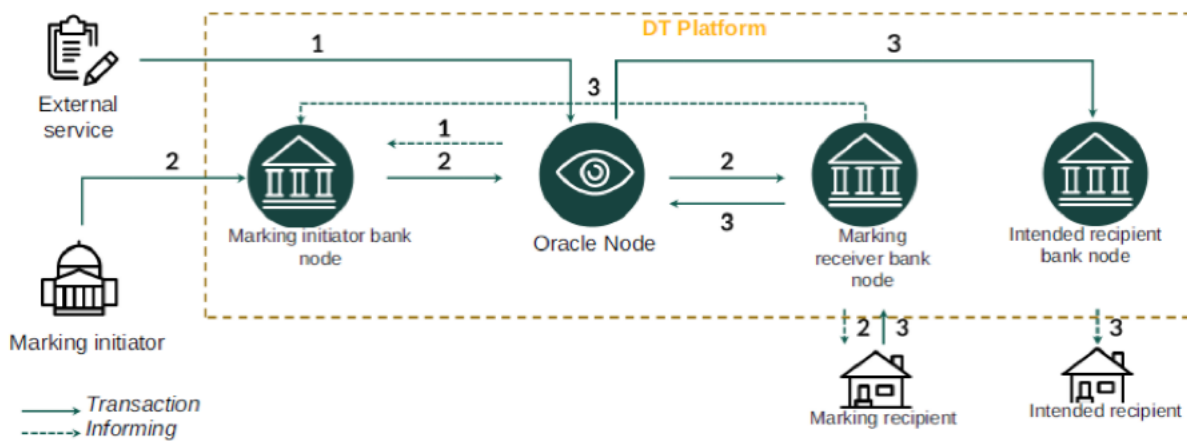
Description of steps:

1. Initiation of marking: transfer of funds to the account of the marking recipient. When marking, the initiator of the marking indicates the depth of the marking, the limits for each marking level.
2. The recipient of marking initiates the transfer of the marked funds to the target recipient of the first level. Intended recipient of the first level receives marked funds.
3. The transaction data is transmitted to the node of the Bank of the initiator of the marking for the possibility of tracking the marked DT
4. The intended recipient of the first level initiates the transfer of marked funds to the non-target recipient. The transfer transaction is not possible, the marked funds remain in the account of the intended recipient of the first level.
5. The intended recipient of the first level initiates the transfer of the marked funds to the target recipient of the second level. The second level intended recipient receives marked funds.
6. Transaction data is transmitted to the node of the Bank of the initiator of the marking for the possibility of tracking the marked DT

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 withdrawal to fiat, the duration of the marking. Transactions with tokens marked with the parameter pass through the Oracle node, that is, it monitors compliance with the registered terms of the agreement, particularly controls dynamically the amounts available for transfer to marked DT and withdrawal to fiat. Information about transactions with tokens marked with the parameter is transmitted to the marking initiator node and the Oracle node for traceability.

Fig. 13 – Scheme of interaction of participants within the framework of the "Marking with a parameter" subarchitecture



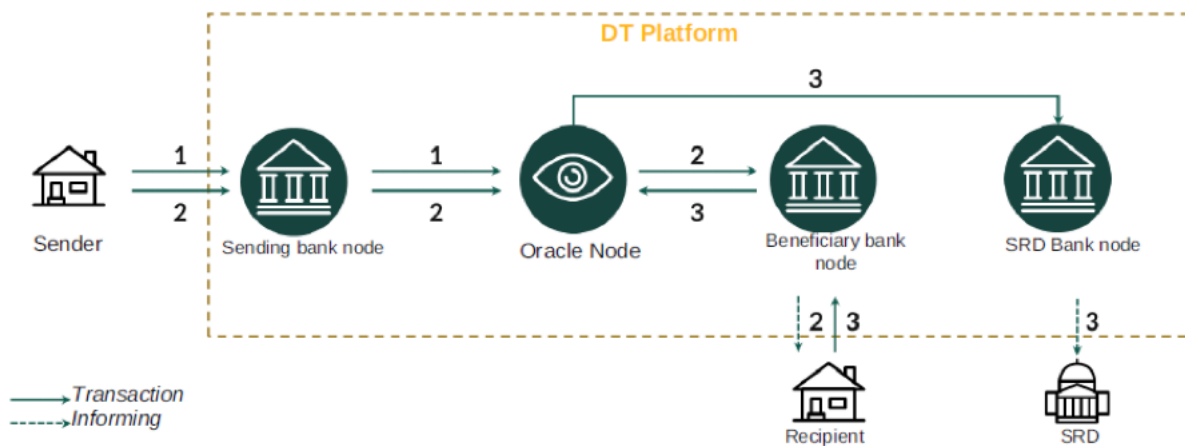
Description of steps:

1. An external service outside the DT platform sends a request to register a marking parameter on Node Oracle specifying the contracts within the framework of which settlements between clients can be made. Information about the parameter is sent to the marking initiator node.
2. The initiator of marking sends a labeling request indicating the registered labeling parameter, which is confirmed by the Oracle node. The recipient of the marking receives the marked funds.
3. The recipient of the marking initiates a transaction with the marked tokens, indicating the contract under which the calculations are performed. The funds are transferred to the intended recipient's account under the agreement after confirmation by the Oracle node. The transaction data is transmitted to the node of the marking initiator's Bank and to the Oracle node for tracking the marked DT.

VAT

When a taxpayer registers (issues) an electronic invoice, the services of the State Revenue Committee (hereinafter referred to as - the SRC) transmit the electronic invoice data to the Oracle node: EI ID, information about the sender and recipient, the amount of the payment without VAT, the amount of VAT. When making an electronic invoice payment, customers specify the invoice 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 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 marked VAT tokens, additional marking is performed in the transaction. The recipient always receives part of the standard tokens and part of the VAT tokens as part of the electronic invoice payment. The customers can only spend VAT tokens to settle accounts with other customers via an electronic invoice or to pay taxes to the appropriate authority. The VAT tokens have no expiration date and become standard only upon transfer to the tax authority.

Fig. 14 – Scheme of interaction of participants within the framework of the “VAT” archetype



Description of steps:

Prerequisite: electronic invoice data has been added to the Oracle node

Transfer of VAT to the recipient

1. The sender sends a request through the STB channels to receive data on an electronic invoice. Based on the data from the electronic invoice, the Oracle node provides the data.
2. The sender initiates a VAT deduction transaction with an electronic invoice. The Oracle node verifies that the data from the transaction matches the data from the electronic invoice. According to the electronic invoice data, the recipient receives standard tokens (the main part of the payment) and marked VAT tokens.

Transfer of funds to the Department of public revenues (hereafter – the DPR)

3. The recipient sends a request for the transfer of marked VAT tokens to the DPR, the request is verified by the Oracle node. In the transaction of VAT transfer to DPR, the marking is removed, the DPR receives standard tokens.

Based on the three archetypes listed above, the **“Targeted use of funds from the National Fund”, “Mid-life road repairs”, “Digital VAT”, “Purchase of farm animals” and “Investment subsidies from the Ministry of Agriculture”** scenarios were implemented. Below is a mapping of scenarios and archetypes, as well as a description of the scenarios themselves.

Tab. 5 – Matching scenarios and archetypes

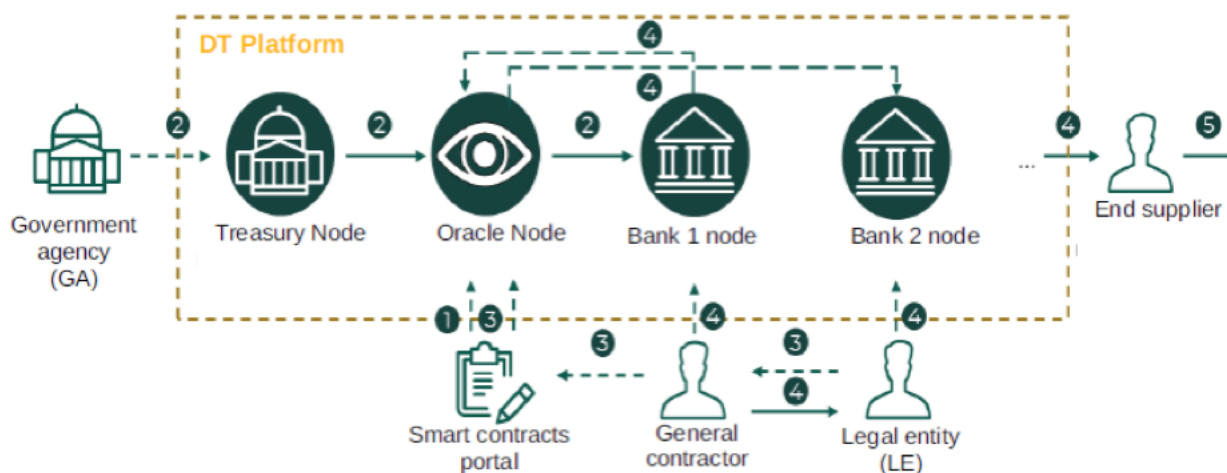
Сценарий/Архетип	Маркировка	Холдирование
Designated use of the National Fund's funds	V	
Mid-life road repairs	V	
Purchase of farm animals		V
Invest-subsidies from the Ministry of Agriculture		V
Digital VAT	V	

“Designated use of the National Fund's funds” and “Mid-life road repairs” scenario

The "Marking" archetype is used for these scenarios using targeted tools. The main objective of the scenarios is to ensure the targeted allocation of funds: targeted funds for road repairs and targeted funds from the National Fund to finance strategic infrastructure projects.

Below is a scheme for implementing scenarios with a new entity called the Smart Contract Portal. In the future, the Smart Contract Portal should become a main connecting link between the DT platform and GA/LE in the process of public procurement.

Fig. 15 – Scheme of interaction of participants in scenarios with the smart contract portal



Description of steps:

1. The smart contract portal sends a request for registration of the marking parameter (number or name of the state order) on the Oracle node.
2. GA on the Treasury node distributes and marks with the parameters of a specific project from the digital account of the GA (on the Treasury Node) to the account of the general contractor on the Bank Node 1.
3. All contracts within the framework of the state order are concluded on the Smart Contract Portal. The data of these contracts (the details of the customer / sender and the contractor / recipient, the amount of the contract and the amount of funds for withdrawal beyond the contours of the DT), as well as changes to them, are transmitted to the Oracle node.
4. The legal entities make payments from their digital account to the accounts of their contractors with transactions, the parameters of which are validated and confirmed by the Oracle node.
5. For the final recipients of DT, the marking of tokens is removed and the legal entity can convert standard tokens into cash/non-cash money.

Currently, under both scenarios, at least **84 billion digital KZT** was issued, and about **70** transactions were carried out between **14 legal entities**. The number of users and the number of transactions will grow due to the further scaling of scenarios in other areas.

Below are examples of interfaces for employees of the Treasury Committee to perform operations in the DT within the framework of the scenario:

Fig. 16 – Main page of the web interface for employees of the Treasury Committee

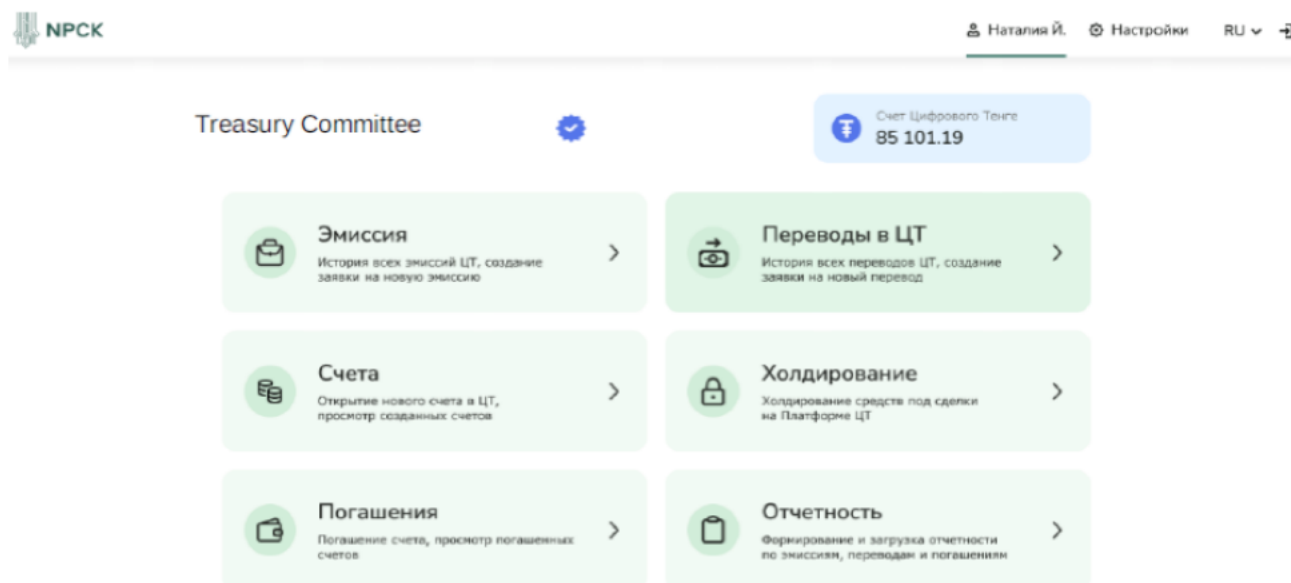


Fig. 17 – "Issue" tab of the web interface for employees of the Treasury Committee

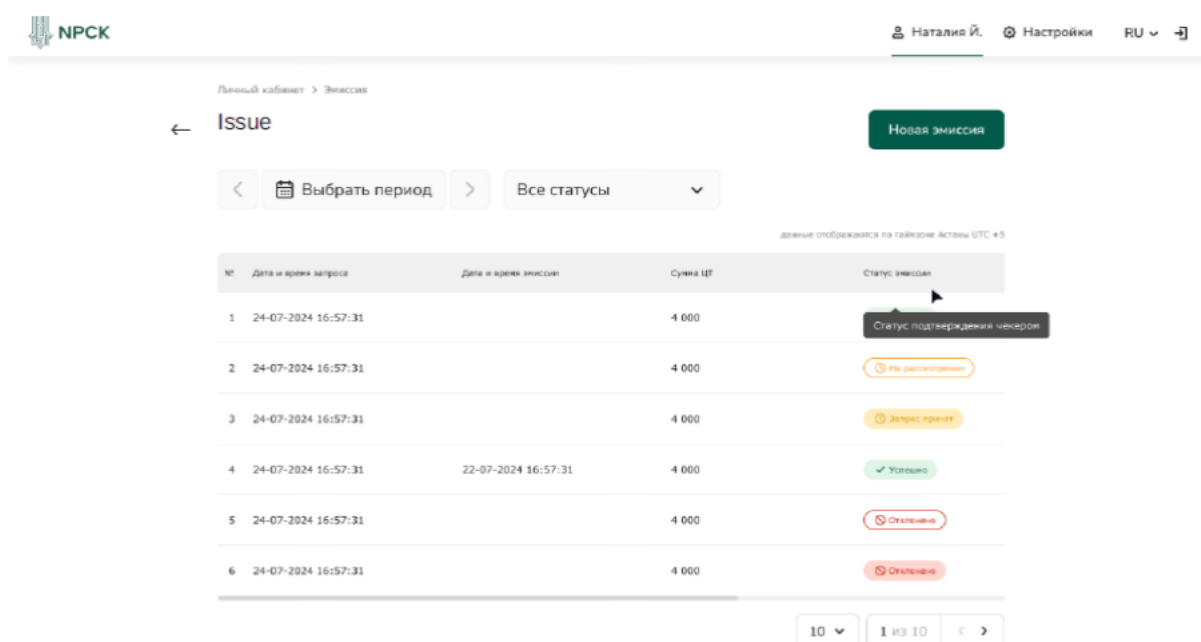


Fig. 18 – “Transfers to DT” tab of the web interface for employees of the Treasury Committee

Личный кабинет > Переводы в ЦТ

← **Transfers into DT** Новый перевод

Выбрать период | Все статусы | Тип перевода

данные отображаются по таймзоне Астаны UTC +5

№	Название	БВУ Получателя	Получатель	Сумма ЦТ	Статус перевода
1	Гос. контракт 1	БВУ 1	ЮЛ 1	4 000	Успешно
2	Гос. контракт 2	БВУ 1	ЮЛ 2	4 000	Отклонено
3	Гос. контракт 3	БВУ 2	ЮЛ 3	4 000	Запрос гранта
4	Гос. контракт 4	БВУ 3	ЮЛ 4	4 000	На рассмотрении
5	Гос. контракт 5	БВУ 1	ЮЛ 5	4 000	Отклонено
6	Гос. контракт 6	БВУ 1	ЮЛ 6	4 000	Успешно

10 | 1 из 10

Fig. 19 – “Accounts” tab of the web interface for employees of the Treasury Committee

Личный кабинет > Счета

← **Accounts** Открытие счета

Выбрать период | Все статусы

данные отображаются по таймзоне Астаны UTC +5

№	Дата и время запроса	БИН Юридического лица	Наименование Юридического лица	Статус авторизации
1	24-07-2024 16:57:31	011123715493	Юридическое лицо 1	Успешно
2	24-07-2024 16:57:31	011123715493	Юридическое лицо 2	Отклонено
3	24-07-2024 16:57:31	011123715493	Юридическое лицо 3	На рассмотрении
4	24-07-2024 16:57:31	011123715493	Юридическое лицо 4	Успешно
5	24-07-2024 16:57:31	011123715493	Юридическое лицо 5	Отклонено
6	24-07-2024 16:57:31	011123715493	Юридическое лицо 6	Успешно

10 | 1 из 10

Fig. 20 – “Repayment” tab of the web interface for Treasury Committee staff

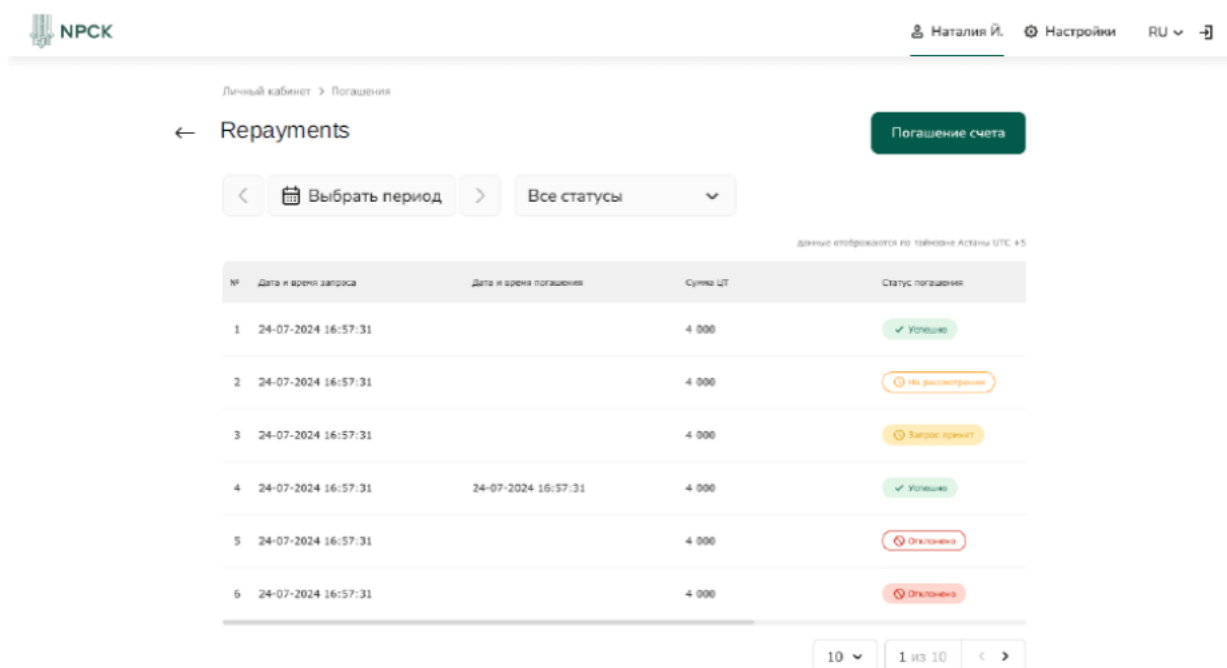


Fig. 21 – “Reporting” tab of the web interface for Treasury Committee staff

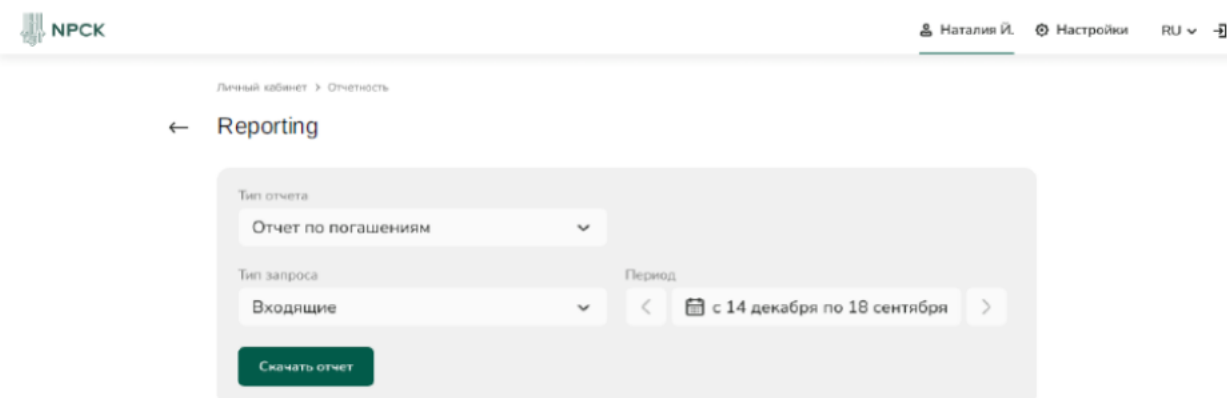
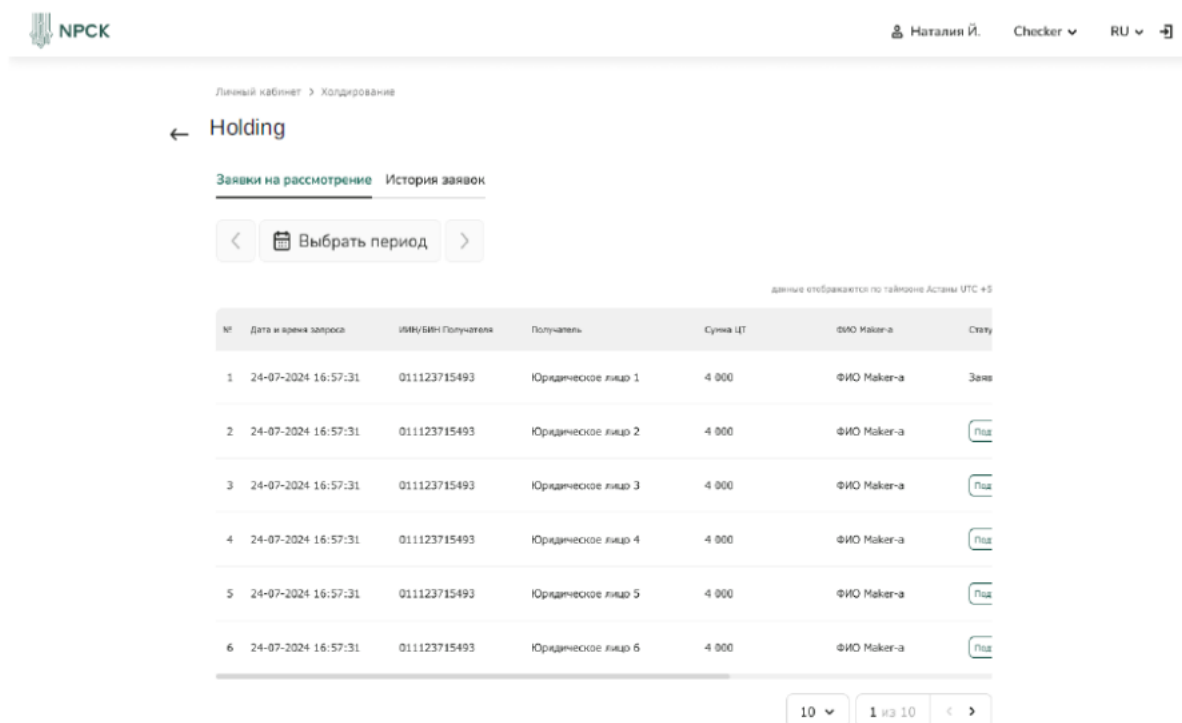


Fig. 22 – “Holding” tab of the web interface for employees of the Treasury Committee



A step-by-step implementation plan is provided for the use of DT in payments involving the state.:

- 1 stage (2024) – marking with a **public address** or a list of **public addresses**;
- 2 stage (2025) – marking with the **availability parameter in the registry of contracts from the Smart Contract Portal**;
- 3 stage (after 2025) – marking with the parameter of **availability in the register of contracts from the Smart Contract Portal integrated with other government information systems**.

Advantages of scenarios-

In both scenarios, through the use of labeled funds, designated use of public funds and automation of a number of payment processes involving the state are achieved. This makes the process of allocating public funds more controlled and efficient, which makes further exploitation of the scenario beneficial for all market participants and the state.

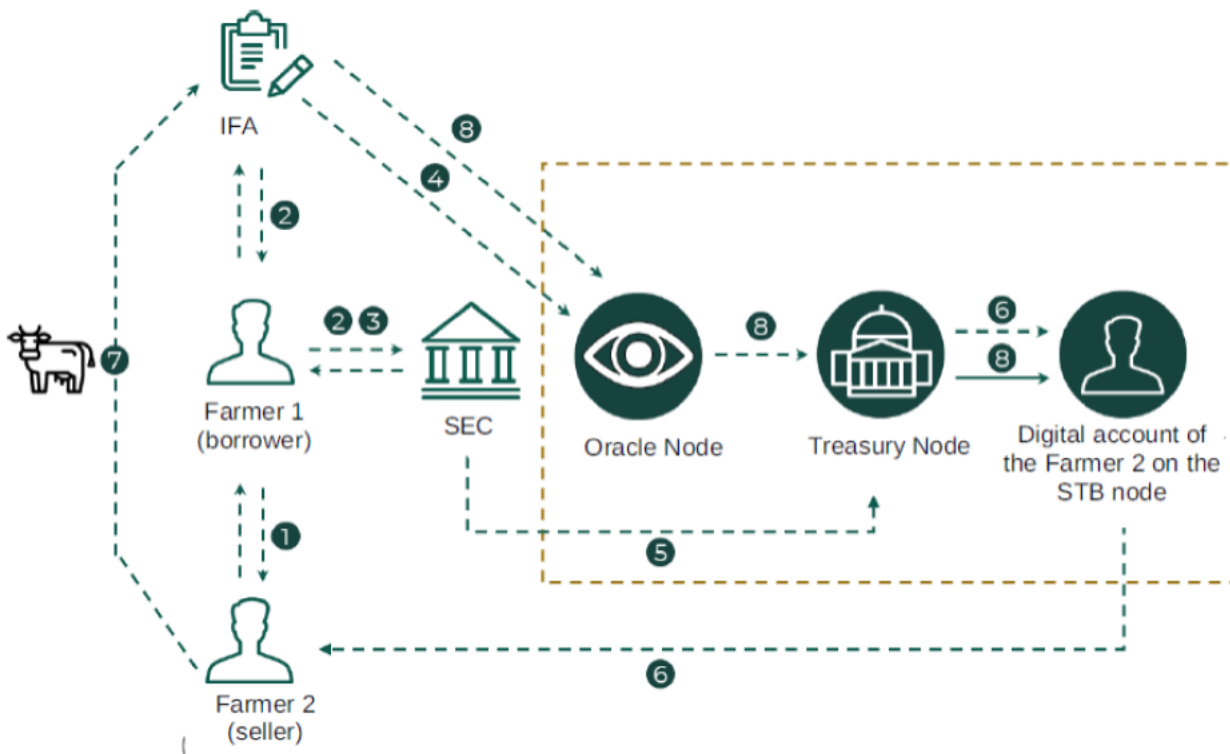
Benefits of using DT in a scenario-

Due to the “Marking” archetype implemented on the DT platform, it becomes possible to direct funds exclusively for their intended purpose. To date, marking by the legal entity identifier is provided, but in the future, it will be possible to create more integrated and comprehensive conditions for the use of funds, thereby eliminating the wrongful and improper use of public funds.

“Purchase of farm animals” scenario

This scenario utilizes the coding archetype to automate the process of purchasing farm animals with government participation. Below is an implementation diagram with a description of the steps:

Fig. 23 – Scheme of interaction of participants within the framework of the “Purchase of farm animals” scenario



Description of steps:

1. Farmers agree on the terms of the transactions.
2. Farmer 1 (borrower) provides a set of documents for obtaining a microloan for the purchase of farm animals to a socio-entrepreneurial corporation (hereinafter referred to as – the SEC) and supporting documents from Farmer 2 (Seller) on the ownership of animals for verification, through the information system “Identification of farm animals” (hereinafter - IFA) and the details of the digital account of Farmer 2 (Seller).
3. SEC concludes a loan agreement with Farmer 1 (the Borrower) and uploads the data to the accounting systems.
4. The event registration data is transmitted to the Oracle node.
5. SEC initiates a holding request at the Treasury node.
6. Information about the stolen funds is sent through the STB channels to Farmer 2 (Seller).
7. After receiving a notification that the funds have been bewitched, Farmer 2 (Seller) changes the owners of the animals through the IFA and transfers the animals to Farmer 1.
8. IFA sends a request to the Oracle node for the unblocking of funds. The funds are being transferred from the SEC account to the Farmer 2 (Seller) account. Farmer 2 can use or convert the received DT into cash/non-cash tenge.

The scenario is currently undergoing final testing before launch.

Scenario benefits

With the help of the “Holding” archetype, automation of the process of state subsidies to farmers is achieved, which in turn reduces the possibility of errors due to the human factor, guarantees the targeted use of funds and has a positive effect on the overall speed of allocation of subsidies, as well as on their transparency. This is important both for the source of subsidies (the state), which is interested in achieving the goals of subsidization, and for the recipients of funds due to the simplification and acceleration of the process itself.

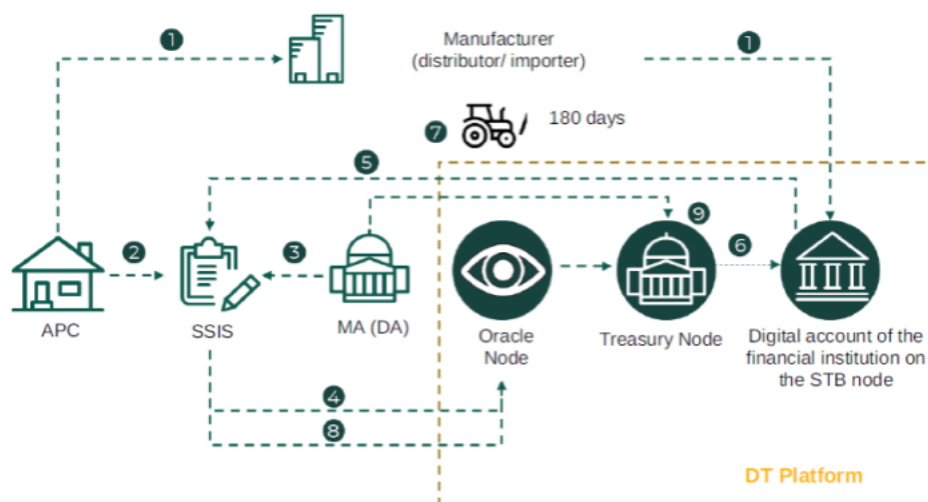
Advantage of using DT in a scenario

The feasibility of using the “Holding” archetype on the DT platform allows you to automate the blocking and transaction of public funds when certain conditions are met. The further development of the scenario and its scaling depends on the implementation of additional services and mechanisms outside the digital currency platform – for example, one of the most promising directions is the creation of a marketplace of farm animals with the possibility of receiving subsidies from the state.

“Invest-subsidies from the Ministry of Agriculture” Scenario

As in the case of the previous scenario, the holding archetype is used for implementation. Below is an implementation diagram with a description of steps:

Fig. 24 – Scheme of interaction of participants within the framework of the “Investment subsidies of the Ministry of Agriculture” scenario



Description of steps:

1. The farming company (hereinafter – the FC) preliminarily receives a price quotation from the Manufacturer and approval for financing (leasing) from a financial institution for the purchase of agricultural machinery.
2. FC submits an application for the purchase of equipment for leasing under the investment subsidy program using the advance payment method through the state subsidy information system (hereafter – the SSIS).
3. Ministry of Agriculture (hereinafter referred to as – the MA), represented by the Regional Department of Agriculture and Land Relations (hereinafter referred to as - the DALR), is reviewing the application in the SSIS.
4. The event registration data is transmitted to the Oracle node
5. ALR on the Treasury node initiates a holding request.
6. Information about the blocked funds is sent to the financial institution through the STB channels.
7. After the transfer of the leased item to the PH and receipt of the relevant documents from FC, the financial institution uploads supporting documents on the actual cost and the fact of transfer of the leased item to SSIS.
8. SSIS sends a request to the Oracle node for the unblocking of funds. The funds are being transferred from the DALE account to the account of a financial institution that can use or convert the received DT into cash or non-cash tenge.
9. In the absence of a trigger from SIS about the occurrence of an event within 180 calendar days, funds are unblocked on the DALR account (funds remain on the Treasury node).

The scenario is currently undergoing final testing before launch.

Scenario benefits

This scenario also makes it possible to automate the process of government investment subsidies, while guaranteeing the instantaneous execution of the transaction, subject to the conditions, as well as reducing the risk of errors due to the human factor. Such aspects are important for the source of the subsidy (the State) because of the guaranteed achievement of the disbursement objectives and for the recipients because of the speed of the whole process.

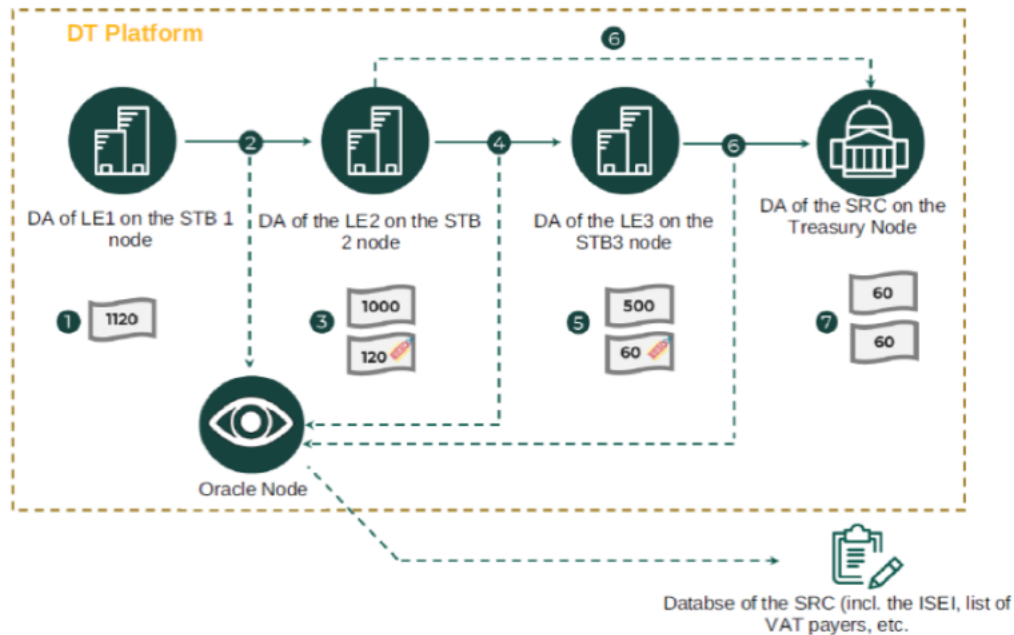
Benefits of using DT in a scenario

The use of the “Holding” archetype, coupled with certain features of the DT design (in particular, the status of the national digital currency as a means of payment), makes government subsidy processes more transparent and reliable, without creating risks to financial stability.

“Digital VAT” scenario

This scenario is based on a fundamentally new approach to the payment and refund of VAT through a substantially refined tokenization mechanism. Below is a diagram describing the steps:

Fig. 25 – Scheme of interaction of participants within the framework of the “Digital VAT” scenario



There are two types of tokens used in the scenario: **standard** (do not have any restrictions) and **marked** (can only be used in two cases: either to pay VAT to the state, or to pay part of the payment according to an electronic invoice to a counterparty from the list of VAT payers of the State Revenue Committee (hereafter - the SRC)).

Description of steps:

1. LE-1 has standard tokens in its account.
2. LE 1 initiates a payment using the identifier of an incoming e-invoice from LE 2 for 1120 C (including VAT in 120 DT). During the transaction, based on the information received in advance via the electronic invoice on the Oracle node from the SRC information systems, it is verified that the data from the transaction corresponds to the data from the electronic invoice and the tokens for the amount of VAT are marked. The payment information is forwarded to the SRC information systems via the Oracle node.
3. LE 2 receives 1,000 standard and 120 tokenized tokens to its STB 2 digital account.
4. LE 2 initiates a payment using the identifier of an incoming electronic invoice from LE 3 to 560 DT (including VAT in 60 DT), and uses 500 standard and 60 marked tokens. Therefore, information on the amount of VAT that can be offset for LE 2 is sent to the SRC information systems through the Oracle node.
5. LE 3 receives 500 standard and 60 marked DT to his digital account in STB 3.
6. LE 2 and LE 3 pay VAT (60 marked DTT in LE 2 and LE 3) to the digital account DPR on the Treasury node
7. When the DT is credited to the accounts of the tax authorities, the tokens become SRC standard.

Currently, as part of the “Digital VAT” scenario, DT was issued in the amount of **37 million digital tenge**, the first **3 transactions were carried out, 6 legal entities were connected to the platform**. The number of users and the number of transactions will grow **during the further implementation of the pilot project**.

Scenario benefits

With the help of the “VAT” archetype, this scenario guarantees the receipt of VAT into the state treasury and the impossibility of offenses with sham payments on fictitious electronic invoices, as well as a radical reduction in the number of desk audits of legal entities-participants becomes possible in the long term. In addition, with the introduction of the scenario it became possible to quickly refund the amount of excess VAT (within 15 working days), as well as to offset excess VAT against current tax debts or against future tax payments. Upon that it is possible for a taxpayer without existing debts to refund the excess VAT balance to his bank account. Such innovative features of the DT platform create a unique combination of benefits for both taxpayers and the government.

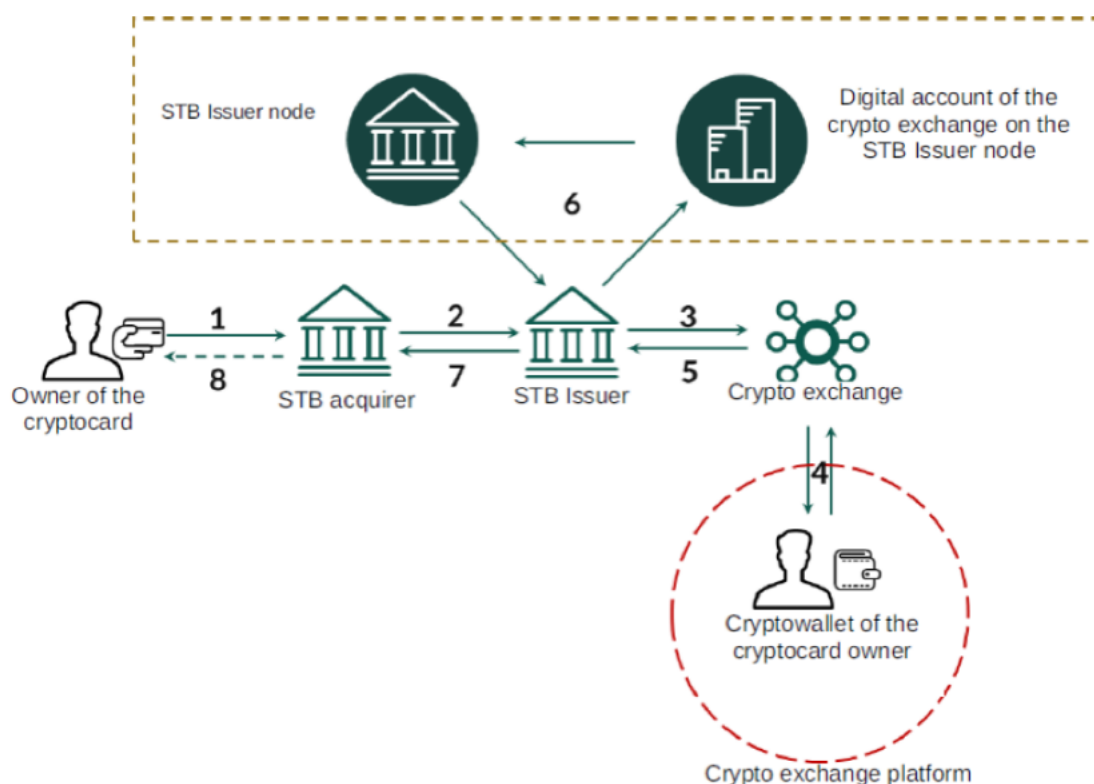
Benefits of using DT in a scenario

The implementation of the above advantages on the platform of the national digital currency makes it possible to achieve transparency of VAT payments and guaranteed VAT receipts to the treasury with minimal improvements on the part of banks.

“Cryptocard” scenario

This scenario is being developed based on the results of the 2023 work on integrating the DT platform with representatives of the world of decentralized finance (decentralized finance, hereafter - the DeFi). Its testing is supposed to be carried out within the experimental (R&D) circuit. Below is a scheme with a description of the steps:

Fig. 26 – Scheme of interaction of participants within the framework of the "Cryptocard" scenario



Description of steps:

1. A cryptocurrency holder, authorized at the Crypto Exchange Participant, who has given it access to its crypto wallet and has sufficient amount of cryptocurrency on his crypto wallet, make a purchase of goods or services using a POS terminal.
2. STB- acquirer processes the transaction as a normal operation and sends a request to the STB issuer. It is worth noting that the STB acquirer does not own and should not own any information about the experimentation of the scenario and the crypto card itself - for him this is a regular payment.
3. STB issuer determines that the payment is made using a cryptographic card, and sends a request to the cryptographic exchange.
4. The crypto exchange determines the Cryptocurrency DT at the time of payment and verifies the sufficiency of the balance in the cryptocurrency on the crypto wallet of the owner of the crypto card. If there is a sufficient balance, the crypto exchange debits funds from the crypto wallet at the time of payment or later.
5. The crypto exchange sends a response to the STB issuer's request ("balance is sufficient").
6. STB issuer verifies the adequacy of the balance of the digital account of the Crypto exchange on the DT platform and then debits DT from it to its account by calling the appropriate API method.
7. STB issuer confirms that the payment has been made and the funds have been debited accordingly by converting the DT into non-cash funds and then sending them to the STB acquirer's account later or at the time of payment.
8. The owner of the crypto card receives a notification about successful payment.

The work is currently underway to launch the scenario.

Scenario benefits

This scenario also allows to test the potential of the DT platform as a bridge between the world of traditional and decentralized finance. The experience gained in the course of development and testing will help clarify approaches to regulation and circulation of digital assets in the future, as well as contribute to wider application and adoption of the CBDC in Kazakhstan.

Benefits of using DT in a scenario

The regulatory status of the DT as a national digital currency, as well as the technological solutions used (in particular, the token-based access model) make it possible to realize this scenario without a large number of integration works, without creating additional risks for the country's financial stability.

4.6 Plans for 2025

The following areas are planned for 2025 as part of the development of the Digital Tenge project:

Approval of the legislative framework for the functioning of the DT

An appropriate regulatory framework is needed for the comprehensive implementation of the national digital currency and its benefits. It is planned to approve the legislative framework for the functioning of the DT in 2025 based on the work of 2023 and 2024.

Development of payment scenarios with the involvement of state

The scenarios described above based on the archetypes "Marking", "Holding" and "VAT" will develop both in terms of increasing the number of participants and the volume of payments being realized, as well as in terms of improving functionality and integrating with existing information systems and databases.

Conducting a pilot project on the use of DT for the implementation of payments with a specific purpose in the field of health insurance

The results obtained in the course of the 2024 work indicate the great potential of the DT in making payments for a specific purpose. The health insurance is the area in which the application of these properties of a national digital currency seems most justified.

Cross-border payments

In 2025, it is planned to test the basic scenario of cross-border payments in digital currencies under the conditions of full integration with all participants.

Scenario development within the R&D circuit

Such scenarios include the issuance of stablecoins, the development of the above-described "Cryptocard" scenario, as well as other scenarios to improve the functionality of the DT platform.

Integration with external data sources and NPC systems

This focus area provides for both the integration of the DT platform with government information systems (via the Oracle node) and with R&D systems (for example, with the Open API platform)

Preparation and subsequent commissioning of the DT platform

2025 is the last year in terms of the phased implementation of the national digital currency. Putting the DT platform into commercial operation will not only fulfill this plan, but will also create a critical component of the nation's financial digital infrastructure.

All of the above works will be carried out within the framework of the developed Roadmap of the Digital Tenge project for 2025.

4.7 Plans for 2025

The Digital Tenge project is the foundation for building an innovative and efficient national payment infrastructure. The development of the national digital currency is carried out taking into account international experience and current trends in the financial market, and the step-by-step implementation of the DT allows to simultaneously create new platform functionality for use in application scenarios and conduct pilot projects to test hypotheses. In particular, 2024 will be marked by the practical application of DT to increase the efficiency and transparency of government spending, but at the same time, issues of integration with the world of decentralized finance and cross-border payments are also being actively explored.

CBDC continue to be the driver of building a new type of economy. The further development of the programmability of digital currencies, as well as integration with public and private databases, will create fundamentally new financial products and instruments. It is also important that digital currencies around the world are becoming more and more interoperable, and their impact on public financial institutions makes payments involving the state fast, efficient and transparent.

Certainly, a range of work is needed to unlock the full potential of digital currencies. These include both improving the properties of technology platforms and building a full-fledged ecosystem. The experience of DT and other digital currencies clearly demonstrates that an open dialogue and the involvement of all stakeholders in a constructive discussion are important to achieve these objectives.