

**Ecological, economic and financial transformation of Ukraine in cooperation
with the EU: challenges and prospects**

**ANALYSIS OF THE STATE OF PAYMENT SYSTEMS IN UKRAINE IN
THE CONTEXT OF THE EUROPEAN VECTOR OF ENERGY
EFFICIENCY**

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The payment system and infrastructure is a sector that is not given enough attention today in the context of energy efficiency. This sector plays a big role in organizing and ensuring money circulation and funds. It has its value consisting on the one hand of the cost of payment equipment, infrastructure, payment instruments. On other hand, its value consists of the cost of energy for their manufacture and maintenance.

The European Commission has proposed raising the target for reducing greenhouse gas emissions, including emissions and removals, to at least 55% by 2030 compared to 1990.

The EU's ambitions to improve energy efficiency can be enhanced either by improving the energy efficiency of each sector or by improving some sectors more than others. And there are thousands upon thousands of areas in which energy efficiency can and should be improved: from matchmaking to, in fact, payment transactions. The payment system and money circulation seem to be not the biggest problems in the energy sector. However, this is a very delicate topic, because often people pay in supermarkets the money earned, buying food and basic necessities. They spend their energy in vain, waiting in line for a payment transaction.

Modern means of payment and payment methods do not address the problem of reducing the time for servicing payments, which entails the overuse of time, energy, and mon-ey. And the latest method of payment using cryptocurrencies can not change the situation for the better today. The use of new and advanced technologies such as new generation data transmission systems, the use of modern computers' computing power, the replacement of means of payment with "faster" ones, the use of more efficient cashiers, or their replacement by functional machines can reduce these indicators [1].

Ukraine's accession to the European Union and integration into the global economy creates a need to analyze and improve national payment systems. The global payment services industry is irreversibly moving towards "open banking" (Open ARI), as evidenced by the adoption and implementation of the Second Payment Services Directive (PSD2) in the European Union [2].

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European Central Bank (ECB) structures its work on European financial integration around three main elements.

First, the ECB has adopted a definition of financial integration: it considers the market for a given set of financial instruments or services to be fully integrated when all potential market participants in such a market are subject to a single set of rules when they decide to deal with those financial instruments or services, have equal access to this set of financial instruments or services, and are treated equally when they operate in the market.

Second, building on this definition, the ECB has sought to devise a way to capture, in quantitative terms, the state of financial integration in the euro area. Quantitative indicators of financial integration in the euro area provide the basis for a comprehensive assessment of both the current level of financial integration and its evolution over time. Analysis of the state of European financial integration and the monitoring of its progress over time are prerequisites for targeted action designed to foster financial integration. Moreover, in view of the envisaged extension of the report's scope, ECB staff are working on additional quantitative indicators, capturing for example measures of financial development.

Third, the Eurosystem contributes to furthering the financial integration process in four main ways:

- giving advice on the legislative and regulatory framework for the financial system and on direct rule-making;
- acting as a catalyst for private sector activities by facilitating collective action;
- enhancing knowledge, raising awareness and monitoring the state of European financial integration;
- providing central bank services that also foster European financial integration.

So, on the one hand, European integration requires Ukraine to comply with the standards and requirements of the European Union in the operation of payment systems. This implies the introduction of new technologies, standards, and rules in the field of cashless payments, personal data protection, and cybersecurity.

On the other hand, the conditions of European integration are an incentive for further development of payment systems in Ukraine. This process may include the creation of new payment services and products that meet the requirements of European standards and the needs of users in terms of security, reliability, and efficiency. The conditions of European integration can also stimulate cooperation between Ukrainian and European payment systems, which will allow for a more efficient exchange of payment transactions between countries. Modernization of payment systems to meet the best international standards, taking into account European integration and globalization, especially in the context of energy efficiency, is extremely important for Ukraine today.

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The growth of international trade and globalization processes is the main prerequisite for improving payment systems, which must be ready to make international payments and perform international financial transactions. Modifications to payment systems are also driven by changes in financial services regulations and legislation; growth in the number of electronic payment services and reduction in cash turnover; increase in the volume of payment transactions while improving the efficiency and speed of processing transactions; and introduction of new technologies, such as blockchain and artificial intelligence, which can improve the security and efficiency of payment systems.

Currently, the general principles of payment system operation in Ukraine are regulated by a number of legal acts. In particular, to integrate the Ukrainian payment market with the European one, the Law of Ukraine "On Payment Services" was enacted [3] and the National Bank of Ukraine adopted a number of regulations, including: "On the Procedure for Issuing and Acquiring Payment Instruments", "On the Procedure for Oversight of Payment Infrastructure in Ukraine" and "On the Procedure for Disclosure of Information by Non-Bank Payment Service Providers". Modern legal norms bring Ukrainian legislation closer to EU legislation, promote competition, expand the capabilities of existing payment market participants and create conditions for the emergence of new ones.

According to the Payment Infrastructure Register [4], payment systems in Ukraine can be classified according to various criteria:

- depending on the type of owner, payment systems can be created by: the central bank; banks; non-bank financial and credit institutions;
- depending on the form of ownership: private, state (national);
- depending on the territory of the payment system and the location of its payment organization: domestic, international;
- depending on the residency of participants: with participation of only residents; with participation of residents and non-residents;
- depending on the average payment amount and service segment: retail payment systems (money transfer systems, card payment systems); wholesale payment systems.

In addition, the NBU, in accordance with international practice, divides payment systems into categories of importance (Table 1), with the criteria being the volume of transactions and types of services provided by these systems [4].

As of 01.01.2023, 54 payment systems were registered in Ukraine, including: two state payment systems (the System of Electronic Payments of the National Bank of Ukraine (SEP) and the National Payment System "Ukrainian Payment Space" (NPS "Prostir")); 36 established by residents (15 by banks, 21 by non-bank institutions); 16 established by non-residents. In addition, as of the beginning of 2023, the following participants were registered in Ukraine: 132 payment system participants (except for EPS) and 35 payment service providers.

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Table 1 – Distribution of payment systems in Ukraine by importance criteria in 2022

Categories of importance	Criteria for determining the importance	Payment systems
Systemically important	> 10% of interbank transfers in the country; execution of transactions with government securities on the open market; ensuring settlement of obligations of participants arising in other payment systems	System of Electronic Payments of the National Bank of Ukraine - SEP
Important	> 10% of payment transactions; > 10% of payment transactions with the use of electronic means of payment issued in this payment system; the only one by type of service	MasterCard, Visa, NovaPay, Financial World, Postal transfer

An analysis of payment systems over the past four years shows that the largest volume of payments within Ukraine is made through the NBU's SEP (UAH 107,0 trillion, or 95,7% of the total amount of transactions in payment systems for 9 months of 2022). The dynamics of SEP utilization in 2018-2022 is illustrated in fig. 1, which shows an increase in the volume of payments and a significant decrease in their number [4].

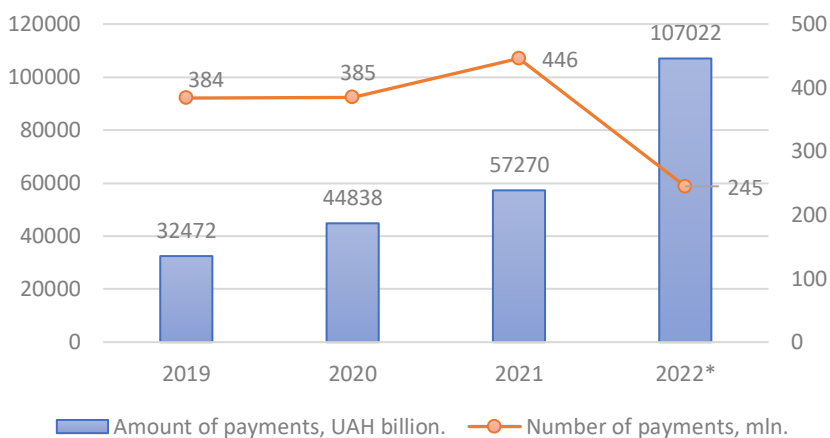


Fig. 1 – Dynamics of SEP utilization in 2019-2022

Notes*. The period of May - December 2022 was taken for analysis due to the suspension of statistical reporting on transactions with payment cards for February - April 2022 in accordance with the current Rules for Organizing Statistical Reporting

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In 2022, despite the full-scale war and missile attacks, the NBU's electronic payment system reliably and uninterruptedly performed its functions and fully met the needs of the Ukrainian banking system and its customers for settlements in the national currency. The resilience of the SEP was maintained through the effective measures designed to ensure the NBU's continuous operation, including the NBU's payment systems, in particular:

1) a business continuity management system has been established, within which the NBU organizes and plans, in particular, the continuity of the NBU's payment systems;

2) a disaster recovery plan has been created that is constantly being improved to take into account existing and emerging risks;

3) geographically distributed processing and backup centers and related infrastructure have been set up, and training sessions on deploying operations at backup locations have been conducted;

4) the composition of the evacuation (mobilization) team in case of a special period, etc. [5].

However, martial law and a sharp decline in economic activity in the first months of the war affected the number of transactions in the system, which decreased by 18,7% last year compared to 2021. According to the structure of SEP payments in the 2022, it should be noted that

- small payments were processed most often by number, namely: 51% of payments were from UAH 1 thousand to UAH 100 thousand, 45% - up to UAH 1 thousand, and 4% - from UAH 100 thousand and more;

- large payments accounted for the largest share of payments by amount. In particular, almost 98% were payments of UAH 100 thousand and more, 2% and 1% were payments of UAH 1 thousand to UAH 100 thousand and up to UAH 1 thousand, respectively.

In terms of the number of payments made, SEP accounts for the smallest share compared to money transfer systems and card payment systems. Thus, card payment systems are in first place in terms of the number of transactions in Ukraine, despite the decrease in transactions to 5,6 billion at the end of 2022 from 7,82 billion at the beginning of the year. Accordingly, the amount of transactions carried out in card payment systems in 2022 decreased by 35,3% to UAH 5058,2 billion (Fig. 2) [4].

Despite the quarantine and restrictive measures introduced in April 2020, which slowed down the development of the payment card market, the volume of transactions using payment cards continued to grow in 2020 and 2021. Almost all payment card transactions (about 99,9% by number and 99,6% by amount) in 2020-2021 were carried out in international systems, with the remaining volume of transactions accounted for by the NPS Prostir. In 2022, non-cash payments using payment cards decreased: the number of such payments decreased by 26,2% to 5194,4 million (86,9% of the total), while the amount of non-cash payments

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increased by 11,1% to UAH 3443,9 billion (55,8% of the total amount of card transactions) (Fig. 3).

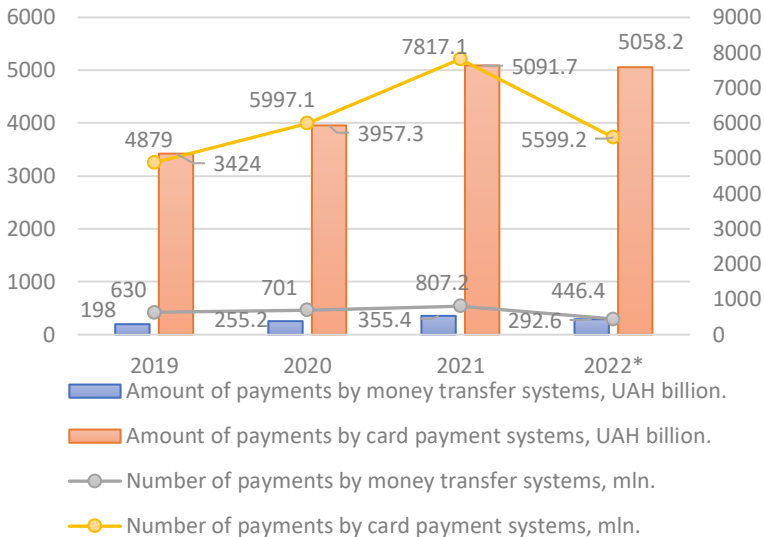


Fig. 2 – Dynamics of payments and their number made through money transfer systems and card payment systems in 2019-2022

Notes*. The period of May - December 2022 was taken for analysis due to the suspension of statistical reporting on transactions with payment cards for February - April 2022 in accordance with the current Rules for Organizing Statistical Reporting

It is important to continuously increase the share of non-cash transactions compared to cash receipts, which is in line with the NBU's strategic goals to reduce the share of cash in circulation. In 2022, the number of non-cash transactions with payment cards in Ukraine and abroad increased by 4.1% to 5,194.4 million (92,8% of the total number of transactions with payment cards), and the amount increased by 56,9% to UAH 3,443.9 billion (68.1% of the total amount of transactions with payment cards) compared to the same period in 2021. This demonstrates that the payment infrastructure, despite the active hostilities in Ukraine, ensures reliable servicing of non-cash payment card transactions and a high level of trust of Ukrainians in non-cash payments even in times of war thanks to the dedicated work of financial market participants.

In recent years, the volume of transactions and money transfer systems created by both residents and non-residents has been actively increasing (Figure 4).

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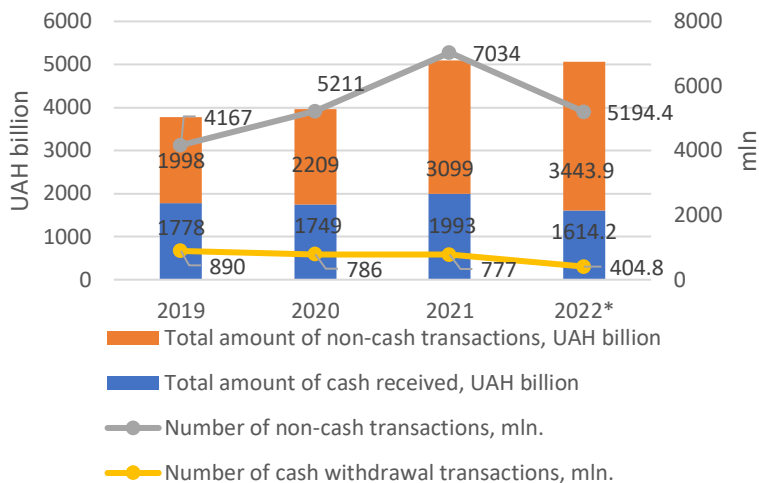


Fig. 3 – Dynamics of transactions made with payment cards in 2019-2022

Notes*. The period of May - December 2022 was taken for analysis due to the suspension of statistical reporting on transactions with payment cards for February - April 2022 in accordance with the current Rules for Organizing Statistical Reporting

It is worth noting that the Resolution of the Board of the National Bank of Ukraine No. 18 "On the Operation of the Banking System during the Period of Martial Law" dated February 24, 2022 prohibits transfers from Ukraine to foreign countries during the period of martial law.

At the same time, cross-border transfers were made mainly using systems created by non-residents, while the vast majority of transfers in systems created by residents were made through systems created by non-bank financial institutions. Ukraine remains a recipient country of cross-border remittances with a tendency to a significant decrease in the ratio of remittances received in Ukraine to those sent outside the country.

Despite the dynamic development of payment systems in Ukraine in the context of the coronavirus crisis and active hostilities, there are a number of systemic problems. Thus, among them are the following [6]:

- monopolization of the market by international payment systems;
- low level of electronization of payments compared to other countries, with a high share of cash in payments;
- high fees for using payment systems, which makes electronic payments less attractive to users;
- insufficient regulatory framework for payment systems, which may lead to unclear and ambiguous situations in this area;

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- vulnerability of payment systems to various types of abuse and fraud, which can lead to large financial losses for customers and payment systems;
- low level of financial inclusion and financial literacy of customers;
- lack of a unified payment system, which may create interoperability problems and impede rapid market development;
- increased transaction energy costs for payment processing.

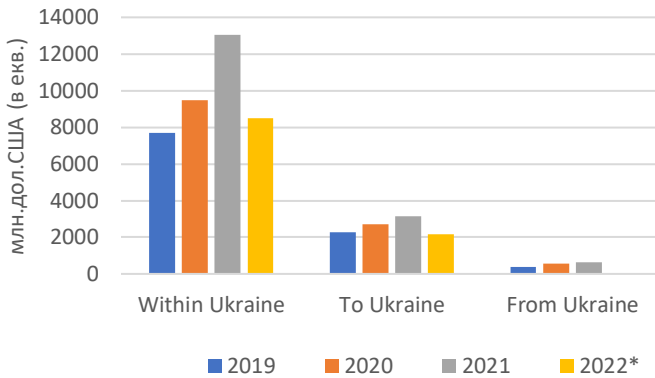


Fig. 4 – Amount of transfers made through money transfer systems in 2019-2022

Notes*. The period of May - December 2022 was taken for analysis due to the suspension of statistical reporting on transactions with payment cards for February - April 2022 in accordance with the current Rules for Organizing Statistical Reporting

The problem of energy efficiency in payment systems lies in the significant energy consumption associated with processing and storing data and transactions. The efficiency of a payment system refers to how well it optimizes resources and minimizes the costs and risks of transactions. To evaluate payment systems for quality and efficiency, you should consider factors such as speed, cost, scalability, and sustainability. Speed measures the time it takes from initiation to confirmation and delivery of funds. Cost looks at fees or charges imposed by the payment system. Scalability evaluates its ability to handle a large volume and variety of transactions. Sustainability looks at its environmental and social impact, as well as its contribution to reducing waste, energy consumption, and carbon footprint. A few aspects that impact the energy efficiency of payment systems:

1. Data centers: payment systems require powerful data centers to store large amounts of data. These data centers require substantial amounts of electricity to operate, including the cooling of servers.

2. Transaction operations: Processing transactions involves computations and data transmission over networks, which also require energy, especially when dealing with a large number of transactions, as in large payment systems.

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3. Security: ensuring the security of payment transactions involves complex cryptographic operations that may require significant computational resources, leading to increased energy consumption.

4. Security standards: payment systems must adhere to strict security standards, which can result in higher energy consumption due to additional security measures that need to be implemented.

5. Growing popularity of payment systems: as the popularity of payment systems grows, so does the load on their infrastructures, which leads to increased energy consumption.

Such conclusions about energy efficiency stem from a detailed look at the new technologies that are shaking up how global consumers make purchases and send money. Digital currencies often rely on distributed ledgers for validating and recording transactions. In those cases, how much energy they use mainly depends on two factors.

The first is how network participants agree on transaction histories. Some crypto assets like Bitcoin use a proof-of-work consensus mechanism that needs substantial calculation power, and energy, to obtain the right to update the transaction trail. Other crypto types use different approaches for their ledger updates that don't require as much computing muscle.

The second is access to distributed-ledger systems. Some of these are permissionless, allowing anyone to join and validate transactions. Entry to others requires permission from a central authority, which offers greater control over key aspects of energy consumption such as the number of network participants, their geographic location, and software updates.

The research shows that proof-of-work crypto uses vastly more energy than credit cards. The card payment leader Visa has 4 data centers located in Central US, East US, UK, and Singapore, with a private communication network of 10 million route miles (400 times earth circle). Although Visa 23 keeps confidential the exact energy required by its datacenters, it is possible to compute that Visa's they require on average 305 MW per data center to operate [7]. These calculations are based on Visa's annual report stating that Visa's datacenter energy consumption stayed stable between 2017 and 2020 totalling 446 million kWh. This estimation leads to an energy consumption by Visa \approx of 2,7 TWh/yr. Visa's market share can be estimated to be about 15% of total cards in the world. This can be obtained through Visa's declaration that it processes 3.8 Billion cards and we know that the total number of payment cards was 25.2 Billion cards in 2021. Now we can see that the total card schemes payments datacenter consumption is \approx 17,72 TWh/ yr to operate all card payments worldwide.

According to the University of Cambridge [8], cryptocurrency mining consumes approximately 127,24 TWh/yr. This is more than in such countries as: Argentina – 125,03 TWh/yr; Norway – 124,13 TWh/yr. But less than in: Ukraine – 128,81 TWh/yr; Sweden – 131,8 TWh/yr. According to a report from Deutsche

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Bank, the energy consumption per transaction for Bitcoin is high in comparison with other means of payment, for instance card payments. An individual Bitcoin transaction generates the same carbon dioxide emission as one person’s aircraft journey across Europe. On the other hand, transactions using the crypto currency Ripple have a very low energy consumption, which shows that the high energy consumption for Bitcoin does not necessarily apply to all crypto currencies. The report also shows that energy consumption for card payments is lower than for cash.

Table 2 – Bitcoin requires a lot of energy in relation to card payments

Payment methods	KWh per transaction
Ripple	0,00001133
Visa (USD)	0,00649
MasterCard (USD)	0,00649
Cash (printed euro banknote)	0,08
Ethereum	20,294
Bitcoin	118

But there’s more to payment systems than processing technologies. Total energy use varies by technology, payment-chain size, and other additional features.

Considerations like these resonate with central banks considering digital currencies [9]. Many central bank digital currencies projects build on energy efficient distributed-ledger systems under which only permissioned institutions like commercial banks can join and validate without proof-of-work.

Other options that don’t feature distributed ledgers are also being considered, and some of these are seen as promising from an energy-consumption standpoint. That means central bank digital currencies have the potential to reduce the power needs for digital payments, and even be more energy efficient than the credit card networks now widely used.

Central bank digital currencies are still in their early days, and it’s hard to know how far and how fast they might go, but it is clear that central banks will adopt new technologies that impact power use. Their energy-saving potential will depend on the use associated with other design features that may be added for compliance, to aid security and integrity, or to facilitate universal access.

For example, some central banks are considering whether central bank digital currencies should be accessible through physical cards, like credit cards. Card payments use more energy than those with digital wallets, which is how most crypto transactions are made. But cards can help adoption and inclusion, particularly when digital literacy or mobile network connectivity are a concern.

As payment systems increasingly use distributed ledgers, there’s a clear case for those more energy-efficient options that are permissioned and don’t rely

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on proof-of-work mechanisms. And though the debate on the future of money is still in its early stages too, power use is just one among many considerations.

The prospects for the development of the payment systems market in Ukraine are associated not only with further technological development of the payment infrastructure, improving the quality and efficiency of payment services, strengthening the protection of the interests of payment system participants and consumers, and increasing the financial literacy of the latter, but also, above all, with improving the regulatory framework for the functioning of this market in the context of European integration. In this regard, it was extremely important to adopt in mid-2021 the long-awaited Law of Ukraine "On Payment Services" [3], which took into account the provisions of the European Directive PSD2 to strengthen competition, protect the rights of payment service users and introduce new technologies.

PSD2 (Payment Service Directive 2) is the second EU Directive on payment services (2015/2366), the main purpose of which is to develop the electronic payment market and create favorable conditions for making secure payments and which offers wider payment options [2].

Whereas today in Ukraine only one type of payment service is regulated by law - the financial service of transferring funds - the new law introduces nine payment services, seven of which are financial (including services for issuing electronic money and conducting payment transactions with it, opening and maintaining electronic wallets) and two are non-financial (services for initiating a payment transaction and services for providing information on accounts).

The Law defines nine categories of payment service providers, which include: banks; payment institutions (including small payment institutions); branches of foreign payment institutions; electronic money institutions; financial institutions authorized to provide payment services; postal operators; non-financial payment service providers; the National Bank of Ukraine; state authorities and local self-government bodies.

Non-bank financial institutions will not be required to participate in payment systems for making transfers, which will simplify their operations and reduce the cost of their registration. Banks will be allowed to provide all financial services, while other providers will be allowed to provide only those services for which they are licensed. They have the right to provide the relevant services after being included in the Payment Infrastructure Register.

The Law creates the conditions for the introduction of open banking in Ukraine, which means that payment service providers are obliged to provide banks and other payment service providers with real-time access to their customers' accounts. It is worth noting that the NBU has already started cooperation with Ukrainian payment market participants to develop unified standards for open APIs (Application Programming Interface) and plans to launch open banking in Ukraine in 2023. The new generation of the NBU's interbank electronic payment system,

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SEP 4.0, based on the international standard ISO 20022 and operating around the clock (24/7), will increase the country's competitiveness and facilitate the integration of Ukraine's payment market with the global one.

The law provides that not only the NBU and banks may act as issuers of electronic money in Ukraine, but also: electronic money institutions; branches of foreign payment institutions; postal operators; state authorities and local governments. The NBU is authorized to issue digital money, an electronic form of the Ukrainian currency. The NBU is to develop rules for the circulation of digital hryvnia, as well as the procedure for its issuance, storage, and redemption. In addition, the NBU is authorized to create a regulatory platform for testing services, technologies, and instruments in the payment market based on innovative technologies.

Serious attention is also paid to protecting the rights of consumers of payment services, in particular, the requirements for information security, protection against cyber threats are standardized, and liability for illegal actions with payment instruments and means of accessing accounts is increasing. Payment service providers are subject to stricter requirements for providing consumers with information (on the amount of fees, additional payments, fines, and terms of service) and fulfilling their obligations to them. The NBU plans to improve methods of remote customer identification and verification, which will allow financial institutions to support the use of products both in Ukraine and abroad.

The introduction and development of alternative types of payments is an important part of the further development of payment systems. Such solutions are offered to expand non-cash payments and alternative transaction channels (mobile networks, cryptocurrencies, P2P platforms, M2M payments, cloud payments, etc.). Particular attention should be paid to the digital alternative to cash - virtual assets, in particular, cryptocurrencies and the blockchain technologies on which they are based.

A blockchain can be thought of as a distributed public ledger where groups of transactions or events are recorded and stored in a sequential, chain-like data structure. Such groups of transactions are called blocks and are organized in a chain by the time of the transaction. Further blocks, the number of which is unlimited, are added to the end of the chain, storing the hash of the previous block. A block can contain any information: about actions, people, objects, transactions, serial numbers, loans issued, etc. In this system, each participant has an identical copy of the ledger. If any particular node in the system is malfunctioning, the information will not be lost irretrievably, but will be preserved in full and complete, since every other participant has a copy of the exact same database. In addition, the transaction log is saved, not just the final results (for example, data on current balances), which protects the system from manipulation or falsification of data. The digital signature of the parties to the transaction certifies the validity of the transactions. Signed transactions are sorted into separate blocks, and each block

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in this chain is assigned a unique, so-called "hash code" generated by computers using a complex mathematical formula. Making changes to transaction data will change the hash code of the block where it is stored. It is important that these changes are reflected simultaneously in all blocks of the chain. Thus, a possible change will be, firstly, immediately registered, and secondly, immediately identified and tracked by all network participants. As a result, the blockchain has a number of advantages, including authentication of peer-to-peer transactions and an automated, encrypted, real-time register of such transactions.

Along with the positive characteristics of blockchain, there are certain disadvantages of this technology. The widespread use of blockchain technologies faces unresolved technological, legal, regulatory and ethical issues. Technological problems are caused by the specifics of the blockchain. Encryption of records can make it impossible to access the system in case of password loss. The high energy intensity of so-called mining, which ensures the necessary decentralization of the blockchain ecosystem, remains unresolved. The lack of a mechanism for reversing erroneous transactions is still an issue. The advantages and disadvantages of blockchain for banking are summarized in Table 3.

Table 3 - Characteristics of the blockchain in terms of matching advantages and disadvantages

Advantages	Disadvantages
Reliability Efficiency	Energy consumption; Lack of standards; Novelty for the client; Complication of financial monitoring
Security; Transparency	Energy dependence; Lack of standards; New cyber vulnerabilities; Complication of financial monitoring
Confidentiality; Decentralization; Lack of standards	Energy dependence; Transparency
Controllability; Compromise	Energy dependence; Decentralization; New cyber vulnerabilities; Complications of financial monitoring

Modern means of payment and payment methods do not solve the problem of reducing the time required to service payments, which entails time, energy, and money overruns. And the newest payment method using cryptocurrencies cannot change the situation for the better today.

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Table 3 – Terminal maintenance costs for completing a transaction using a cryptocurrency based on blockchain technology [10]

Maximum	Minimum	The average	
86 691 000 000	86 691 000 000	86 691 000 000	operations
142380	600	2487,6	second for the operation
12 343 064 580 000 000	52 014 600 000 000	215 652 531 600 000	seconds
205 717 743 000 000	866 910 000 000	3 594 208 860 000	minutes
3 428 629 050 000	14 448 500 000	59 903 481 000	hours
342 862 905 000 000	1 444 850 000 000	5 990 348 100 000	Wh
342 862 905 000	1 444 850 000	5 990 348 100	Kwh
342 862 905	1 444 850	5 990 348	MWh
208,34	208,34	208,34	EUR/MWatt
71 432 057 628	301 020 049	1 248 029 123	EUR
29 480 903	124 235	515 077	tonne of oil equivalent (toe)

The use of the latest and most promising technologies, such as new-generation data transmission systems, the use of computing power of new-generation computers, the replacement of payment methods with faster ones, the use of more efficient cashiers or their replacement with functional machines, can help reduce these indicators.

Our research demonstrates the problem that too much time is spent on servicing payments made with currently available payment methods and means of payment. This results in time, energy, and cost overruns due to imperfect payment infrastructure and payment instruments.

Reducing the transaction energy costs of servicing payments by at least a third through investments in high-speed data transmission technologies, infrastructure, changes in the way customers and cashiers think and behave, etc. would reduce overall energy consumption worldwide. Such a step would not by itself contribute to solving an important social problem - reducing greenhouse gas emissions.

The study on the state and development directions of payment systems in Ukraine allows us to draw the following conclusions. The assessment of the state of Ukraine's payment systems, taking into account their structure and key participants, showed that by 2022 the amount and number of payments made through various money transfer systems will increase, especially within Ukraine.

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The largest number of payments was made through card payment systems, and the largest volume of payments was made through the NBU's SEP.

Ukraine's payment system is undergoing active development and modernization and has the potential to develop and improve in the future. It is expected that the new rules for the functioning of payment systems and the implementation of the provisions on European integration will give a positive impetus to the development of innovative business solutions in the payment services market, which will increase competition for customers and ensure equal cooperation between Ukrainian financial institutions and European ones, and, as a result, improve the quality of services, their energy efficiency and the level of user protection.

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