



# INTEGRATION VECTORS OF SUSTAINABLE DEVELOPMENT

## ECONOMIC, SOCIAL AND TECHNOLOGICAL ASPECTS

COLLECTIVE MONOGRAPH



**Integration vectors of sustainable  
development: economic, social  
and technological aspects**

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## PAYMENT SYSTEMS IN UKRAINE: VARIETIES, FUNCTIONAL AND OVERSIGHT

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**Abstract.** The purpose of the study is to substantiate the essence, role, and species diversity of payment systems and to analyze the efficiency of their functionality in Ukraine based on their oversight. On the basis of the study, the author's position on the interpretation of the concept of "payment system" is formed. The author substantiates the classification principles for distinguishing different types of payment systems and systematizes them. The current state, trends in the development of payment systems and their capacity, as well as the workload of payment systems in Ukraine are analyzed. The peculiarities of cross-border transfers of currency values from Ukraine during martial law in Ukraine are outlined. The principles of oversight of payment systems aimed at identifying and preventing risky activities that threaten the interests of users of financial market infrastructures are determined.

**Keywords:** payment system, types of payment systems, overseas payment systems.

Reliability and practicality of payment systems ensure efficient fulfillment of obligations to transfer funds and settle obligations arising during business activities. As the experience of developed countries shows, the rational organization of the payment system contributes to the improvement of monetary relations, the efficient functioning of the financial sector, and the effective operation of the financial sector. At the current stage of economic development, traditional paper money is no longer able to fully meet the needs of modern society, which increases the role of payment systems in the country's economic growth. Thus, the efficient functioning of payment systems is an important component of the positive development of the financial system. Analysis of recent research and publications. The works of the following researchers are of great theoretical and practical importance for the functioning of payment systems, their oversight, risk management inherent in payment systems, and the development of payment infrastructure in Ukraine: N. Arkhireyska (2021)<sup>170</sup>, O. Dzhusov (2020)<sup>171</sup>, O. Yermoshkina (2021)<sup>172</sup>, S. Pirig (2021)<sup>173</sup>, Y. Khudolii

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<sup>170</sup> Arkhireyska, N., Kuchkova, O.: Modern trends in the payment market of Ukraine - cashless payments and electronic wallets.

<sup>171</sup> Jusov O., Pilyak O. (2020). Current state, problems and prospects for the development of payment systems in Ukraine

<sup>172</sup> Yermoshkina O., Musaeva N. (2021). Payment system as a basic element of the digital economy: institutional and behavioral aspects.

<sup>173</sup> Pyrih S., Ischuk L., Olexandrenko I. (2021). Assessment of the payment card market and factors influencing its development.

(2021)<sup>174</sup> and others. Despite the significance of existing scientific achievements, the research of the functionality of payment systems and their oversight in the current conditions of development of the payment infrastructure of Ukraine remains relevant.

The purpose of the study is to substantiate the essence, role, and species diversity of payment systems and to analyze the effectiveness of their functionality in Ukraine based on their oversight.

Globalization processes in the economies of different countries of the world are gaining momentum today, and therefore the development of economic relations at both the national and international levels is becoming increasingly important. At the same time, settlement operations and payments play a significant role in the market economy of any country, serving the movement of money between economic entities and in the international economic space. After all, economic entities daily carry out many transactions for the exchange of goods, services and financial assets, which, in turn, are mediated by monetary settlements and transfers<sup>175</sup>. Obviously, efficiently functioning payment systems are the key to the stable functioning of the country's financial system, its financial market, and the economy. Today, the concept of "payment system" is one of the most important definitions of the banking sector and the financial market in general. The content characteristics of this concept are quite differentiated both at the level of international and national definitions and at the level of research results of economists.

Based on the results of the analysis of various interpretations of the essence of the payment system, it can be concluded that the ambiguity of scholars' opinions in disclosing the essence of this concept makes it possible to carry out a morphological decomposition of its definitions into components according to the following main comparison features:

- the essential component of the definition (key, narrowly specified definition of the payment system);

- subjective component of the definition (participants of payment system).

The identified morphological units characterizing the essential component of the definition of "payment system" are heterogeneous, however, they reveal the multidimensionality of this concept. Thus, in our opinion, the broadest expression of the essential component of the term "payment system" is revealed by such a morphological unit as "aggregate", which is interpreted as "an indivisible unity of something; the total amount, sum of something"<sup>176;177</sup>; "a set of elements which have some common properties essential for their characterization"<sup>178</sup>. Regarding the subjective component of the concept of "payment system", it is advisable to distinguish such a morphological unit as "payment organization, payment system participants and payment infrastructure service providers", which is the broadest and,

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<sup>175</sup> Kvasnytska R., Forkun I., Gordeeva T. (2022). Modern approaches to ensuring information security of payment systems and their cyber defense, p.48.

<sup>176</sup> Shemshuchenko. Y. (2007). Great Encyclopedic Legal Dictionary, p. 1214.

<sup>177</sup> Dictionary of the Ukrainian Language, p. 832.

<sup>178</sup> Dictionary of financial and legal terms, p. 314.

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at the same time, clearly specifies the subjects of the payment system functionality. The instrumental and procedural component of the concept of "payment system" cannot be disclosed by a single morphological unit, so we believe that the following morphological units are worthy of attention: payment instruments, software, hardware and other means, procedures, laws, rules and regulations for payments, transfers and settlements. The results of the morphological decomposition make it possible to specify the author's vision of the interpretation of the concept of "payment system" as an organizationally formed set of a payment organization, payment system participants, payment infrastructure service providers and relations between them regarding payments, transfers and settlements based on payment instruments, software, hardware and other means, procedures, laws, rules and regulations at the level of individual countries or at the international level.

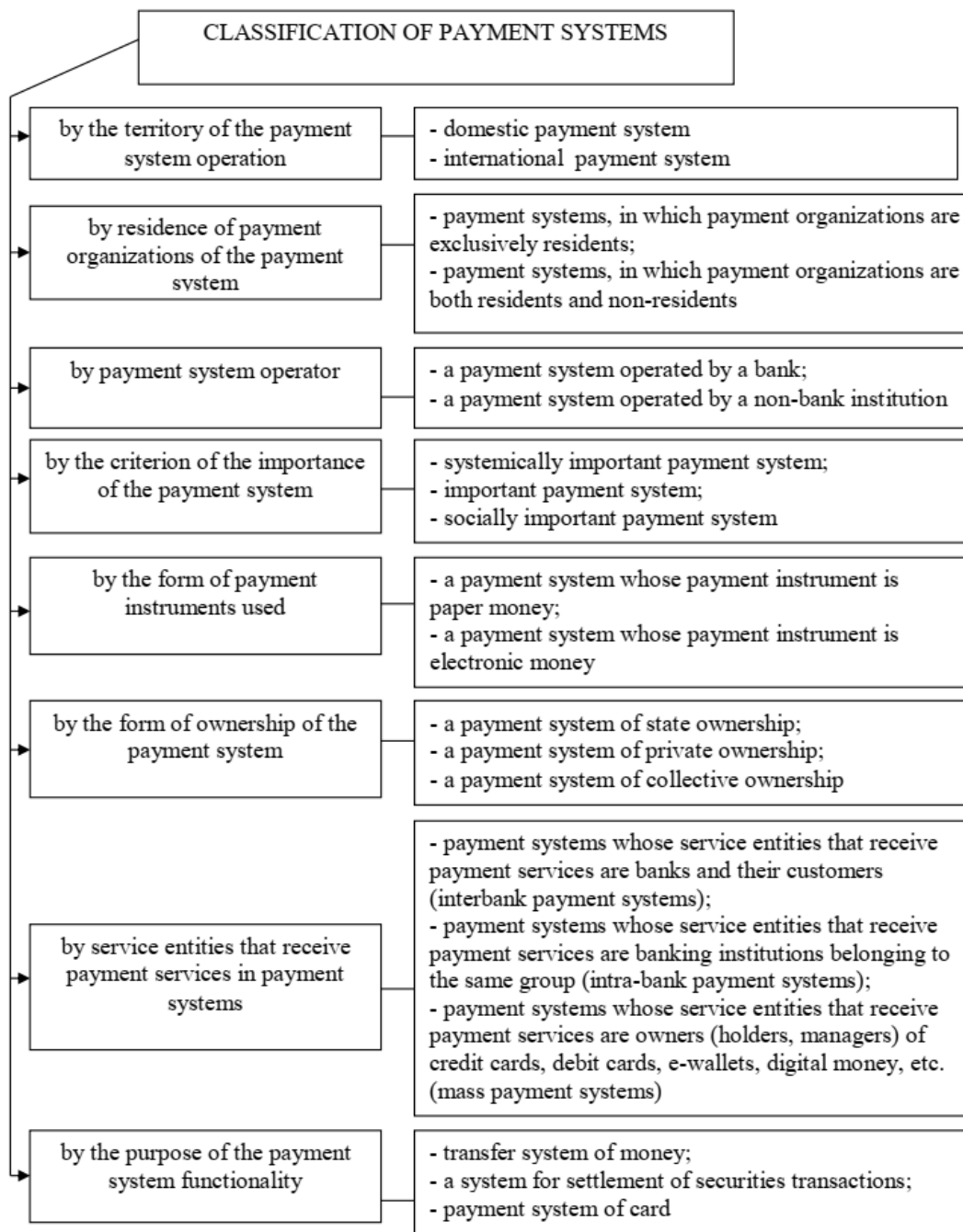
The essence and role of payment systems is revealed through the functions they perform. It should be noted that due to the wide functionality of payment systems, the range of functions they perform is also wide. At the same time, the functions of payment systems should still be grouped according to their key focus, namely: the function of ensuring the transfer of money, payment, or settlement; information function; regulatory function; control and supervisory function; automation function.

In general, payment systems solve such important tasks as: ensuring the smooth functioning of all elements of the system itself; ensuring the security of settlements and payments; insurance against any failures in financial transactions<sup>179</sup>.

Different organizational and legal bases for the functioning of payment systems have contributed to the formation of different types of these systems. Therefore, payment systems are classified both by various general features inherent in all payment systems and by specific features that outline specific features of certain types of payment systems. At the same time, the definition of the features of payment system classification by different authors varies significantly. The analysis of scientific papers made it possible to systematize the types of payment systems according to various criteria for their allocation. At the same time, it is noteworthy that among the variety of features proposed by researchers, there is no division of payment systems by service entities that receive payment services. Thus, according to this criterion, payment systems can be divided into: payment systems whose service entities that receive payment services are banks and their customers (interbank payment systems); payment systems whose service entities that receive payment services are banking institutions belonging to the same group (intra-bank payment systems); payment systems whose service entities that receive payment services are the owners (holders, managers) of credit cards, debit cards, e-wallets, digital money, etc. (mass payment systems). Payment systems should also be divided based on the functionality of the system itself into money transfer systems; systems for settling securities transactions; and card payment systems. A generalized classification of payment systems according to various features is shown in Figure 1.

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<sup>179</sup> Kvasnytska R., Forkun I., Gordieieva T. (2022). Realities of payment systems functioning in Ukraine and their impact on information security, p. 356.



**Fig. 1. Classification of payment systems**

The above classification of payment systems reflects the various essential characteristics of each type of payment system, which, in turn, contributes to a more complete disclosure of the specifics of a particular payment system.

Considering the payment systems of Ukraine in general, the following two types of payment systems can be distinguished: domestic payment systems, which include state and domestic payment systems; international payment systems. The state payment systems of Ukraine are the Electronic Payment System (EPS) of the NBU and the National Payment System "Ukrainian Payment Space" (NPS PROSTIR), which were created by the National Bank of Ukraine (NBU), which is their payment organization and settlement bank. The NBU is the main body of domestic payment systems, which regulates the operation of payment systems, registers and excludes them from the Register of Payment Infrastructure.

When analyzing the status and trends in the development of payment systems, their capacity, and workload, it is worth paying attention to the payment systems created by the NBU, banks, and non-bank institutions. For example, statistics show that the NBU's EPS is used to make the largest amounts of transfers and payments in Ukraine (in 2019, payments and transfers amounting to UAH 32472 billion were made through the NBU's EPS, which is almost 90% of all payments and transfers; in 2020 payments and transfers amounted to UAH 44838 billion, which is 91.4% of all payments and transfers; in 2021, payments and transfers amounted to UAH 57270 billion, which is 93.3% of all payments and transfers<sup>180</sup>. The number of payments made within Ukraine by the NBU's EPS in 2019-2021 amounted to 1215 million (from 384 million in 2019, their number increased to 446 million, i.e. by 16.14%). The average daily number of payments made through the NBU's EPS has been growing year after year. Thus, daily payments were made through the EPS in the amount of in 2019 - UAH 130 million; in 2020 - UAH 178 million (by 48 million more than in 2019 - by 36.92%); in 2021 - UAH 229 million (by 51 million more than in 2020 - by 28.65%). At the same time, the average daily balance of funds held on the accounts of the NBU's EPS participants has remained unchanged in recent years - UAH 82 billion<sup>181</sup>, which led to an increase in the average daily turnover ratio of funds on the accounts of EPS participants in 2020 compared to 2019 by 41.6%, and in 2021 by another 26.6%.

The NPS PROSTIR payment system is a national system of mass electronic payments. Today, the main product of the system is PROSTIR payment cards issued by Ukrainian banks to a customer's account. As of the beginning of 2021, the total volume of transactions carried out using NPS PROSTIR payment cards, as well as transactions with electronic money issued by NPS PROSTIR member banks, amounted to UAH 29647 million (88% - transactions using NPS PROSTIR payment

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<sup>180</sup> EPS. Facts and figures. 2019-2021.

<sup>181</sup> Ibid.

cards)<sup>182</sup>. The volume of non-cash transactions using NPS PROSTIR cards as of January 01, 2021, increased by 3.7 times compared to January 01, 2020. It is worth noting that in 2020, a combining payment card "PROSTIR - UnionPay International" appeared on the domestic market, combining the technologies of such payment systems as NPS PROSTIR and the international payment system UnionPay.

Analyzing the efficiency of payment systems whose payment organizations are banks and non-bank institutions, it can be noted that their total number in Ukraine in 2019-2021 has slightly increased (from 01.01.2019 to 01.01.2022, the number of payment systems in Ukraine increased from 42 to 51). At the same time, according to information from the NBU's official website, it is estimated that as of January 01, 2022, there were registered:

- 15 payment systems with banks as payment organizations (9 money transfer systems and 6 intra-bank systems)
- 21 payment systems whose payment organizations are non-bank institutions;
- 15 international payment systems created by non-residents (international money transfer systems and 6 international card payment systems)<sup>183</sup>.

Thus, in 2021, the following funds were transferred via money transfer systems:

- within Ukraine – 807.18 million transfers in the amount of UAH 355.4 billion or USD 13045.1 million. USD – 77.48% of the total amount of transfers;
- to Ukraine – 7.80 million transfers in the amount of USD 3157.1 million. USD – 18.75% of the total amount of transfers;
- outside Ukraine – 1.12 million transfers in the amount of USD 635.0 million. USD 3.77% of the total amount of transfers<sup>184</sup>.

The international transfer system Western Union holds a leading position in making transfers both to Ukraine and abroad. Although, in fairness, it should be noted that the share of transfers to Ukraine via Western Union has been decreasing from year to year over the analyzed period (in 2021, compared to 2020, the share decreased from 60.48% to 57.54%, i.e. by 4.86%). In general, Ukraine has been a recipient country of cross-border transfers for many years, i.e. the amount of transfers received in Ukraine from abroad through money transfer systems is many times higher than the amount of transfers sent outside Ukraine.

As of 01.10.2022, "35 money transfer systems were operating in Ukraine, including: 28 payment systems created by residents, 7 payment systems created by non-residents. In total, in the third quarter of 2022, payment systems created by both residents and non-residents transferred: within Ukraine – 162.72 million transfers in the amount of UAH 99.3 billion or USD 2,848.7 million (equivalent). USD (in equivalent); to Ukraine – 3.28 million transfers in the amount of USD 747.7 million

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<sup>182</sup> NPS "PROSTIR". Official site.

<sup>183</sup> Information from the NBU Register of Payment Infrastructure.

<sup>184</sup> Activities of money transfer systems in Ukraine.

(in equivalent). USD (equivalent)"<sup>185</sup>.

Currently, for the period of martial law in Ukraine, the NBU Board Resolution No. 18 dated February 24, 2022 "On the Operation of the Banking System during the Period of Martial Law" is in effect. Thus, authorized institutions are prohibited from carrying out cross-border transfers of currency values from Ukraine/transfers of funds to correspondent accounts of non-resident banks in hryvnia/foreign currency opened with resident banks, including transfers made on behalf of clients<sup>186</sup>. This resolution also defines the cases of cross-border transfers of currency values that can be made (banks' own transactions; transfers by residents under import transactions specified in the Resolution of the Cabinet of Ministers of Ukraine No. 153 "On Certain Issues of Ensuring Imports" dated February 24, 2022, provided that the delivery of goods under such transactions was made/is being made after February 23, 2021, etc.). To ensure the continuous, reliable, and efficient functioning of financial market infrastructures, including payment systems, the National Bank of Ukraine (NBU) conducts oversight aimed at identifying and preventing risky activities that threaten the interests of users of financial market infrastructures. Thus, the main subject of oversight in Ukraine is the NBU, which, to ensure financial stability, should cooperate with the central banks of foreign countries, international organizations, and other government agencies both within the country and internationally within the framework of joint oversight of payment and settlement systems<sup>187</sup>. The main purpose of oversight (oversight) of payment systems is to ensure the reliability and efficiency of payment systems in terms of transferring funds and settling financial instruments<sup>188</sup>. Oversight includes monitoring of the payment infrastructure; assessment of the payment infrastructure for compliance with the requirements of Ukrainian legislation and international oversight standards; setting requirements and restrictions on the operation of the payment infrastructure; providing recommendations for improving the operation of the payment infrastructure and/or applying enforcement measures<sup>189</sup>. The NBU also carries out joint oversight with the central banks of other countries, i.e., oversight of entities established by non-residents.

Oversight is carried out by the NBU using methods such as monitoring and

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<sup>185</sup> Activities of money transfer systems in Ukraine.

<sup>186</sup> On the operation of the banking system during the period of martial law: Resolution of the NBU.

<sup>187</sup> Vyshyvana B., Tereshko O. Oversight of payment and settlement systems: theoretical aspects and mechanism of implementation in Ukraine, p. 220.

<sup>188</sup> The concept of introducing supervision (oversight) of payment systems in Ukraine: NBU Resolution.

<sup>189</sup> Regulation on the Procedure for Oversight of Payment Infrastructure in Ukraine: NBU Resolution.

evaluation of payment systems. The NBU monitors payment systems in two ways<sup>190</sup>:

1) on-site monitoring of payment systems, which is carried out by authorized employees of the NBU by inspecting oversight objects to ensure their compliance with the requirements of Ukrainian legislation and assessing the adequacy of measures taken by them to ensure the continuous, reliable and efficient functioning of the payment infrastructure;

2) off-site monitoring of payment systems, which is conducted on a regular basis by the NBU employees remotely by collecting, systematizing, and analyzing information on the activities of oversight objects in terms of their payment services in order to ensure compliance with the requirements of the legislation of Ukraine regulating the activities of payment systems, use (maintenance) of payment instruments and payment schemes, issuance and use of electronic money, and determining the relations between oversight objects in the course of providing payment services.

When conducting oversight, the NBU also assesses payment systems and payment schemes of important payment service providers to prevent, detect, and eliminate violations in the operation of payment systems and payment schemes in accordance with Ukrainian law and to improve the operation of payment systems and payment schemes in accordance with international oversight standards<sup>191</sup>. The results of the assessment allow the NBU to formulate appropriate recommendations to the participants of the payment system (payment scheme), its operator, to bring its activities in line with applicable law and international oversight standards.

It is worth noting that when compiling the list of payment systems, payment system participants, payment service providers, e-money issuers, and technology operators that will be subject to oversight, the NBU assesses the importance of a particular payment system according to certain criteria and distinguishes the following payment systems from them<sup>192</sup>:

1) systemically important payment systems, if the payment system meets at least one of the criteria of systemic importance:

- the payment system ensures interbank payment transactions, the share of which is more than 10% of the total amount of payment transactions performed in the country by interbank settlement systems and through correspondent accounts of banks opened with other banks of Ukraine;

- the payment system performs payment transactions for transactions with

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<sup>190</sup> Regulation on conducting on-site and off-site monitoring of payment infrastructure oversight facilities: Resolution of the NBU.

<sup>191</sup> Oversight of financial market infrastructures of the NBU.

<sup>192</sup> Regulation on the Procedure for Oversight of Payment Infrastructure in Ukraine: NBU Resolution

government securities on the open market;

- the payment system ensures settlement of obligations of payment system participants arising in other payment systems;

2) important payment systems, if the payment system meets at least one of the importance criteria:

- the payment system performs payment transactions, the share of which exceeds 10% of the total amount of payment transactions performed within Ukraine, to Ukraine and abroad by payment systems established by residents and non-residents (except for interbank settlement systems and payment systems that issue electronic means of payment);

- the payment system performs transactions using electronic payment instruments issued in this payment system, the share of which exceeds 10% of the total amount of payment transactions performed in Ukraine by payment systems that issue electronic payment instruments.

As of January 1, 2022, one payment system (EPS), 6 socially important payment systems, and 5 important payment systems are systemically important payment systems in Ukraine<sup>193</sup>. To improve the reliability and efficiency of systemically important or important payment systems, the NBU applies enhanced requirements to their activities in terms of management and organization of their activities; access and participation in the payment system; risk management system; finality of settlements; cyber resilience; and business continuity management. Thus, it can be summarized that it is advisable to associate oversight with the action of an organizational and functional mechanism, the components of which should be considered: purpose, principles, subject; objects; functional areas; methods; support; results (decisions). It is this systematic approach to understanding oversight as an organizational and functional mechanism that is formed and used by the NBU that helps to achieve various qualitative characteristics of payment systems (their efficiency, security, economy, continuity, and effectiveness), which, in turn, helps to ensure that payment systems are maintained at a high level of trust by recipients of payment services, their protection, and economic growth and social welfare of the state.

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<sup>193</sup> Ibid.

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