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MANAGEMENT ACCOUNTING OF ELECTRONIC TRANSACTIONS WITH THE USE OF CRYPTOCURRENCIES

Abstract. The need to obtain prompt access to funds through electronic communications, protecting investment after the global financial crisis has led to the emergence of a new type of electronic money — the cryptocurrencies. The modern state and prospects for development of the cryptocurrency as a special kind of electronic money were expounded. Cryptocurrencies gain significant popularity due to the advantages of their use, such as: comfort, independence, accessibility, lack of engagement, confidentiality, no documents, full automation of accounting, and cost optimization for administration. Various scientific positions concerning the accounting and economic positioning of the cryptocurrencies in Ukraine were researched. The proposed order to display in accounting the processes of initial obtaining (mining) with the definition of a cost calculating method and operation of the cryptocurrencies most fully corresponds to the national accounting treatment. It was proposed to resolve to the problems of management accounting of electronic money and cryptocurrencies in Ukraine through the combination of functional capabilities of the blockchain technology, positive qualities of the «Internet Bank» and «Client-Bank» communications, which will enable to create a hybrid system of non-cash payments by the cryptocurrencies, electronic money, funds on accounts in a bank with free conversion of existing funds and possibilities for information exchange with all the participants in settlement operations. The article presents a methodology for collecting accounting information on settlements with the cryptocurrencies and other electronic money without the formation of traditional payment documents and bank statements. Electronic information from the hybrid communication system is the foundation for fully automated documenting, formation of accounting records, informing accountants and management of non-cash transfers. Automation of management accounting of electronic transactions helps to increase the level of internal and external control over execution of money operations due to timely and remote informing sharing about the parameters of payments.

Keywords: management accounting, automation of accounting, cryptocurrencies, electronic money, electronic transactions.

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УПРАВЛІНСЬКИЙ ОБЛІК ЕЛЕКТРОННИХ ТРАНСАКЦІЙ З ВИКОРИСТАННЯМ КРИПТОВАЛЮТ

Анотація. Необхідність отримання оперативного доступу до грошових коштів через електронні комунікації, захисту інвестицій після глобальних фінансових криз призвела до появи нового виду електронних грошей — криптовалют. Розкрито сучасний стан і перспективи розвитку криптовалюти як особливого виду електронних грошей. З'ясовано характерні переваги застосування крипто валют, такі, як: зручність, незалежність, доступність, дистанційність, конфіденційність, бездокументність, повна автоматизація обліку та оптимізація витрат на адміністрування. Досліджено варіативні наукові позиції щодо облікового та економічного позиціонування криптовалют в Україні. Розроблено порядок облікового відображення процесів первісного одержання (майнінгу) та оперування криптовалютами з визначенням методики калькулювання їхньої собівартості, що найбільш повно відповідає методиці обліку в Україні. Запропоновано розв'язання проблем управлінського обліку електронних грошей та криптовалют в Україні через об'єднання функціональних можливостей технології блокчейн, позитивних якостей комунікацій «Інтернет-банк» і «Клієнт-банк», що дасть змогу створити гібридну систему безготівкових платежів криптовалютами, електронними грошима, коштами на рахунках в банку з вільною конвертацією наявних грошових засобів і можливостей інформаційного обміну з усіма учасниками розрахункових операцій. Електронна інформація з гібридної системи комунікацій є основою для автоматизованого документування, формування облікових записів, інформування фахівців з обліку та управління щодо електронних грошових трансакцій. Автоматизація управлінського обліку електронних трансакцій сприяє зростанню рівня внутрішнього і зовнішнього контролю за виконанням грошових операцій завдяки своєчасному та дистанційному інформуванню про параметри безготівкових платежів.

Ключові слова: управлінський облік, автоматизація обліку, криптовалюти, електронні гроші, електронні трансакції.

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УПРАВЛЕНЧЕСКИЙ УЧЕТ ЭЛЕКТРОННЫХ ТРАНСАКЦИЙ С ИСПОЛЬЗОВАНИЕМ КРИПТОВАЛЮТ

Аннотация. Необходимость получения оперативного доступа к денежным средствам через электронные коммуникации, защиты инвестиций после глобальных финансовых кризисов привела к появлению нового вида электронных денег - криптовалют. Раскрыто современное состояние и перспективы развития криптовалют как особого вида электронных

денег. Исследовано вариативные научные позиции по учетному и экономическому позиционированию криптовалют в Украине. Предложено решение проблем управленческого учета электронных денег и криптовалют в Украине через объединение функциональных возможностей технологии блокчейн, положительных качеств коммуникаций «Интернет-банк» и «Клиент-банк», что позволит создать гибридную систему безналичных платежей криптовалютами. Электронная информация с гибридной системы коммуникаций является основой для автоматизированного документирования, формирования учетных записей, информирования специалистов по учету и управления электронными денежными транзакциями.

Ключевые слова: управленческий учет, автоматизация учета, криптовалюты, электронные деньги, электронные транзакции.

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Introduction. The progressive development of electronic money has led to the emergence of digital cash, where its active use is associated with an increase in the volume of electronic transactions for goods (work, services), implemented through the Internet. The latest trend in the development of the technology of electronic transactions is the emergence of cryptocurrency, the turnover of which takes place through telecommunication links between taxpayers' personal electronic wallets to recipients of funds [1]. Such features of the cryptocurrencies as complete confidentiality and lack of centralized control by state and a single issuer, distinctly differs them from other electronic payment systems. The technology of cryptocurrencies is based on the blockchain communication system, which is a union of public registers for accumulation of information on money transactions. The integrity of the blockchain is implemented through the duplication of the entire amount of information in each user of the electronic payment system. In other words, there is no shared data warehouse, no single server, which accumulates all the information. Therefore, the lost part of the information in one digital cash holder is offset by all other owners of electronic wallets.

A cryptocurrency called the «Bitcoin» [2] has become widespread and gained the rapid growth in capitalisation. Ukraine is among the top ten countries with the highest ratings of Bitcoin activity. The reason for the popularity of the cryptocurrencies in the country is the considerable financial and military-political instability. An effective way of levelling down the negative economic trends is to invest in the bitcoin and use it in cash transactions. There is no official recognition of the cryptocurrencies in the national statutory instruments. In the letter from the NBU No.29-208/7288908.12.2014, cash transactions with the «virtual currency/cryptocurrency «bitcoin» are classified as foreign exchange trading...» and it is stated that issuing of the bitcoin virtual currency has no security and no persons legally bound to this currency, it is not controlled by state authorities of any of the countries [3]. According to the NBU's letter, the bitcoin in Ukraine is a monetary surrogate that does not provide real value. The activity of exchange of the bitcoin has signs of the functioning of the so-called «financial pyramids», which may speak for the implementation of «dubious transactions» that were defined by legislation on counteracting the legalization (laundering) of proceeds from crime, as well as financing of terrorism. Despite the official non-recognition, the use of cryptocurrencies has become widespread, which has led to the initialization of research in the field of electronic transactions' accounting.

Analysis of recent research and publications. Domestic scientists have quickly responded to the emergence of a new object of accounting and submitted recommendations for display of the cryptocurrencies in accounting. Specifically, A.V. Nefyodov [4], O.M. Petruk [5], M.A. Radchenko [6], P.O. Sakharov [7], and T.V. Yatsyk [8] proposed methods for their display in the financial accounts depending on the scientific positioning of the cryptocurrencies. However, scientific proposals have been formed by the authors in the majority of cases according to the formal signs of cryptocurrencies that do not include the processes of their initial obtaining (mining), definition of the initial value, circulation in the system of electronic payments and impact on the organization of accounting. It is necessary to carry out a comprehensive study of the accounting of electronic

transactions with the allocation of cryptocurrency as a separate object, which radically changes the process of electronic mutual settlements.

The purpose of the article is to improve the management accounting of cryptocurrencies at the stage of obtaining (mining) and operating in the system of electronic transactions with the possibility of its integration into software for automation of accounting processes and operational management of settlement operations.

Research results. Evolution of the cryptocurrencies and their scientific positioning in the economy influenced the theory of accounting. One can establish the relationship between the development of the digital currency functions and the proposals of scientists regarding its display in the accounting system of an enterprise. Initially, with the advent of the electronic money phenomenon, the scientists proposed to display them as part of banking operations. The rationale for choosing the account 31 «Accounts in banks» was the non-cash form of electronic money, the issuers of which were only the banking institutions or state-owned financial institutions. The gradual development of digital cash, nominated by private organizations that functioned within the global network, resulted in a dilemma of accounting display of electronic transactions. Since the exchange of money took place directly between electronic wallets without the participation of banking institutions, it was expedient to display the digital cash in the account 30 «Cash». But accounting for electronic transactions takes place in a non-cash form, which contradicts the including of digital cash, despite its name, as a part of cash funds. A. Nefyodov has an alternative position: he offered to carry out accounting of electronic money as part of receivables, based on the obligations of the issuer (the operator of cash transactions) to exchange money to the national currency [4, p.195]. In our opinion, electronic money cannot be a receivable, where the account 37 is used for its accounting, since the issuer is not a debtor but a participant in exchange transactions.

As of today, most scholars are premised on the position of classifying the cryptocurrency as electronic money, which, in accordance with the Plan of bookkeeping accounts for assets, capital, liabilities and business operations of enterprises and organizations, should be reflected in the account 335 «Electronic money denominated in national currency». In terms of accounting, the account 335 is used to display information about electronic money as recorded, that is, stored in an electronic payment instrument and used by a business entity in exchange for non-cash funds and only for settlements with merchants for goods in electronic form, which are purchased for production (economic) needs, denominated in hryvnias. However, the account 33 does not corresponds with the accounts of the 2nd class and with the account 64 for accounting the VAT accrual or payment [6, p. 123], which does not line up with the semantic characteristic of modern electronic money, and especially of the cryptocurrencies.

Solving all the discussion points according to I.S. Nestsodsky involves using an account 32 called the «Electronic Money» [9, c. 50]. P.O. Sakharov has developed the idea of using a «free» account and proposed to display all electronic money on an additional account 321 «Software electronic money» [7, p.1193]. Actualization of the cryptocurrencies allowed to proceed to the non-program realization of money transactions by using a web page of cryptocurrency exchanges. Therefore, it is more consistent to use another system of sub-accounts to the account 32: 321 «Electronic money on accounts in banks», 322 «Digital cash and cryptocurrencies», 323 «Accumulated electronic money on bonus customer accounts», 324 «Other electronic money». The source of obtaining the initial volume of cryptocurrencies is their extraction (mining). The proposal of T.V. Yatsyk regarding the display of the generated cryptocurrency value on the account 425 «Other additional capital», while simultaneously including it as a part of intangible assets, is of interest. According to the scientist, accounting of digital cash on the account 127 «Other intangible assets» also solves the problem of forming the registered capital at the expense of electronic money [8, p. 352]. However, the accounting treatment of cryptocurrency payments under the conditions of its positioning as an intangible asset is obscure. O.M. Petruk and O.S. Novak are of the same opinion; they performed a critical analysis on recognition of the cryptocurrency as an enterprise asset, which allowed them to put together the recommendations for its accounting on the accounts 143 «Investments to unrelated parties» and 352 «Other current financial investments» without the

additional introduction of balance sheets and the development of new evaluation methods [5, p. 53]. The researchers analysed the essence of cryptocurrency from the functional, equivalent and portfolio scientific positions. If the cryptocurrencies are designated as money, then they should perform the functions of measure of value, means of circulation, means of payment, means of saving, world money. As O. M. Petruk and O. S. Novak prove, digital cash does not fully meet the functional characteristics of funds. Therefore, an investment of funds into the cryptocurrency by a business entity for more than a year in order to generate income through growth of the exchange rate of such an asset should be classified as a long-term financial investment to an unrelated party. If the cryptocurrency has been acquired for resale or to be used by a business entity for exchange in the period up to one year, it must be classified, according to the scientist, as another current financial investment [5, p. 53]. However, the phenomenon of cryptocurrency involves a much deeper transformation of economic and social processes.

Initial obtaining (mining) of the cryptocurrency is a rather labour-intensive and costly process that affects the accounting treatment of digital cash. Formation of a cryptocurrency unit requires significant energy costs, Internet access, salaries and social insurance of employees, depreciation of equipment and premises, which are economically similar to the cost of scientific, technological research, and development. Up to the moment of receiving the whole unit, in some cases its subsidiary part (for example, the «Satoshi» is a fractional currency of the bitcoin), it is advisable to accumulate such expenses on the sub-account 941 «Costs of research, development». After recognizing, it is advisable to include the cryptocurrency unit as electronic money with a simultaneous increase of an enterprise's income (sub-account 719 «Other income from operating activities»).

Given the limited amount of forecasted emission of cryptocurrencies, the process of its initial obtaining (mining) becomes ever more prolonged as time goes by. In case of under-productive computer equipment or the Internet, even now the formation of digital cash may last for more than one calendar month. In this case, it is expedient to preliminary generalize the costs of creating the cryptocurrencies on the account 39 «Costs of future periods». During the final formation of a digital cash unit, its fair value is displayed on the account 32 «Electronic money» with the simultaneous increase in income of future periods on the account 69 «Revenues of future periods». In case of conducting an electronic money transaction using the cryptocurrency, it is expedient to deduct expenses and profits of future periods for current expenses (account 941 «Costs on research, development») and income (account 710 «Income from initial recognition and from changes in the value of assets that are accounted for fair value»), with the following determination of financial results from the operations with digital cash on the account 79 «Financial results». In addition to accounting of the cryptocurrency and calculations with its help, it is imperative to exercise control and accounting of exchange differences in transactions with the cryptocurrency in the event of different rates of its purchase, sale and market price at the cryptocurrency exchange. It is proposed to use the following sub-accounts consequently for accounting of currency differences connected with the cryptocurrency: 942 «Costs of purchase and sale of foreign currency», 945 «Losses from operating exchange differences», 711 «Income from purchase and sale of foreign currency», 714 «Revenue from operating exchange rate difference». In case of using the cryptocurrency in non-operating activities, the enterprise's exchange rate differences should be reflected on the sub-accounts 974 «Losses from non-operational exchange rate differences» and 744 «Income from non-operational exchange rate difference». The costs, revenues and financial results associated with the cryptocurrency are mainly the commercial secrets for external users of accounting information, that is, the objects of management accounting.

The cryptocurrency exchanges and cash transaction systems are functioning based on the use of electronic communication channels for transfer of accounting data. Applying the «Internet Bank» and «Client-Bank» systems, which use communication relations to provide information about the status of an account and authorization to execute transactions, are the current trends in ensuring the management of cashless settlements. The main differences between the two systems are the need to use special software («Client-Bank») or web page with access to the Internet («Internet Bank») for the exchange of information.

The downside to banking via the Internet is a functional limitation of such an option of account management due to the preservation of all the accounting information in a banking institution and a possibility of working only in on-line mode. Internet banking is mainly used by individuals and legal entities with insignificant money turnover, which require periodic information on the status of an account. As such, information from the «Internet Bank» system cannot be used for further implementation of control and accounting procedures due to its incompatibility with the software of enterprises.

Modern software products for the accounting automation support the «Client-Bank» system for downloading bank account statements and sending payment documents in electronic form. However, the universal software is not able to take into account the individual features of communication technologies of different banking institutions and issuers of electronic money, which makes it impossible to use them freely. Also, the disadvantages of the «Client-Bank» system are the following: lack of ownership of the software installed in a workplace of an accountant; possible incompatibility of the software of the «Client-Bank» with other software systems at an enterprise; lack of mobility of the system usage (the software is installed on one or two computers of accounting staff, which creates restrictions on the system use through mobile devices and gadgets); need for presence of all persons, who must sign a payment document in one place with personal computers, on which the software is installed; significant expenses for installing the necessary software of the remote banking system and further maintenance by a banking institution [10, c.49-50]. The phenomenon of cryptocurrencies is based on the blockchain technology, the implementation of which involves uniting all the owners of electronic money directly with each other through a network of communication channels, which does not require the existence of a single centre for processing and accumulation of data.

The combination of functional advantages of the blockchain technology and the positive qualities of the «Internet-Bank» and «Client-Bank» communications will allow to create a hybrid system of non-cash payments with the cryptocurrencies, electronic money, money on bank accounts through payment cards and the possibilities of information exchange with all the participants in settlement operations (hereinafter - the hybrid system). Hybridization is also realized thanks to the free convertibility of all the existing monetary funds. Any cryptocurrency can be purchased for electronic money or funds on bank accounts. The process is also reverse, receiving digital cash from a payer provides for the possibility of its transfer to a bank account and cash withdrawal from an ATM network.

Receiving and possession of cryptocurrencies involves publishing of a software source code for general familiarization. Similarly for all electronic money, it is necessary to provide free access to the universal software module for non-cash settlements. Many e-money issuers already provide free applications on the «Internet Banking» that can be embedded in a web page for payment acceptance. Buyers gain a convenient mechanism of non-cash settlements for goods and services purchased through the Internet. However, the integration of payment systems should also be carried out in the direction of providing the information on cash transactions in accounting software.

Developers of computer programs for accounting automation will be able to embed a hybrid system into software of universal or individual application. Thanks to the hybrid system, the main disadvantage of the Client-Bank communication technology is solved, which is incidental to the inability to use the program at many workstations of accounting and management specialists. All employees of an enterprise, whose activities are related to money transactions, it is recommended to provide access to the account information on the receipt of funds to a current account. For example, in places of supply of goods, it is useful for employees to have information about the previous receipt of funds from a buyer, which will allow to initiate the issuance of an order. More generalized data is recommended to provide managers of various hierarchical levels with Internet access and allow manipulations through a web-based browser from an arbitrary workplace. There is an integration of the advantages of the systems «Internet Bank» and «Client-Bank» for the automated execution of control and accounting procedures over information about the status and changes in the balance of funds. Being territorially distant from an enterprise or place of transfer's

execution, a manager and an accountant will be able to monitor the process of executing a transaction through a personal mobile device. Also, it is expedient to preliminary assign the implementation of licensing functions for payment execution to the managers of different hierarchical levels. At the moment of initiating a non-cash transfer, a relevant manager will be notified of payment options and permission or prohibition of a transaction. It is advisable in the accounting policy of an enterprise to indicate the monetary threshold, the achievement of which requires a sanction of accounting and managerial staff. If the limit is not exceeded, then there is no request. To the contrary, in the case of a non-cash transaction for an over-limit amount, there is a need for a multiple authorization from several accounting and management specialists. This way, the control over the expediency and efficiency of an enterprise's expenditures is realized and personalization of the responsibility for monetary transactions is ensured.

Using a hybrid system eliminates the procedure of drawing up a paper primary document. It is not always possible to form a primary settlement document in a traditional, typical form. Given the confidentiality of cryptocurrencies, it is difficult to identify a payer, which prevents filling the basic details of any original document. Only a code of a monetary transaction, which certifies the repayment of the related debt, is indicated in the automated management accounting system. In our opinion, the role of a traditional bank statement, on the basis of which the account holdings were formed, is significantly reduced in the accounting in case of electronic transfers. All primary information about the movement of electronic money and cryptocurrencies for a certain period goes to an accountant, who has the opportunity to see, in an expeditious manner, the remaining balances of accounts.

The scheme of information flows in the conditions of automated management accounting and control of funds on the basis of applying the hybrid system of payment operations with electronic money, cryptocurrencies, funds on bank accounts with integration of the functions of the «Internet Bank» and «Client-Bank» blockchain technologies, are shown in Fig. 1.

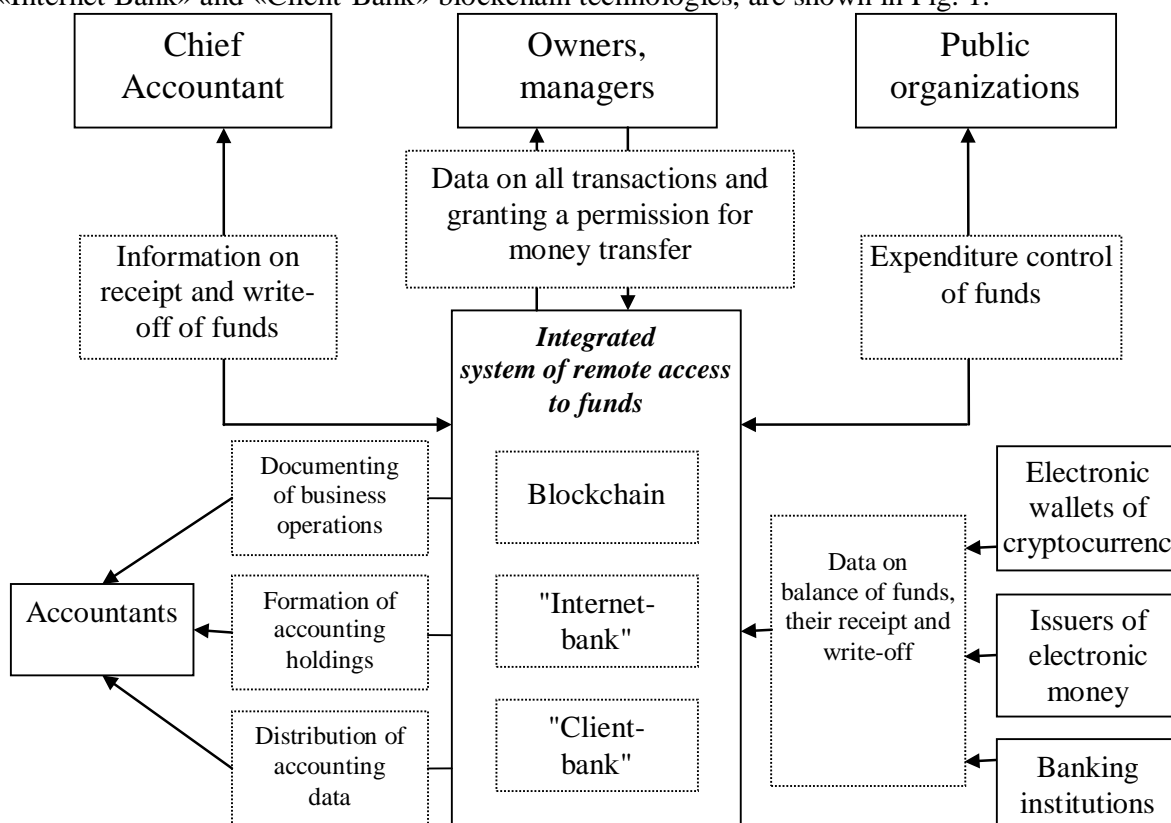


Fig. 1. The system of management accounting and control of non-cash transfers using the cryptocurrencies and other electronic money

The phenomenon of cryptocurrency and other electronic money opens up significant opportunities for automation of management accounting at an enterprise. The cryptocurrency

gradually acquires practical application and becomes an effective means of money turnover, which requires its recognition from the perspective of the theory of economics and accounting as an equivalent of monetary funds.

Conclusions. 1. The need to obtain prompt access to funds through electronic communications, protecting investment after the global financial crisis has led to the emergence of a new type of electronic money — the cryptocurrencies. Cryptocurrencies gain significant popularity due to the advantages of their use, such as: comfort, independence, accessibility, lack of engagement, confidentiality, no documents, full automation of accounting, and cost optimization. The evolution of digital cash generated considerable interest in the scientific community in recognizing it as an enterprise asset and including it as a part of monetary funds, receivables, financial instruments or financial investments.

2. Taking into account the monetary and settlement nature of the cryptocurrencies, digital cash is advisable to be recorded on the account 32 «Electronic money» with the subaccounts 321 «Electronic money on accounts in banks,» 322 «Digital cash and cryptocurrencies», 323 «Accumulated electronic money on bonus client accounts», 324 «Other electronic money». Due to the similarity of the process of initial obtaining (mining) of the cryptocurrencies with scientific and technical research, it is expedient to accumulate the expenses for formation of a digital cash unit on the subaccount 941 «Research and development costs». Value of the finished digital cash unit is displayed on the subaccount 719 «Other income from operating activities» after its completion. If the process of a cryptocurrency unit formation lasts for more than one month, it is necessary to use the transit accounts 39 «Expenses of future periods» and 69 «Revenues of future periods», which are redistributed after settlements by the originally received digital cash for the corresponding expenses and incomes of the reporting period. The proposed order to display in accounting the processes of initial obtaining (mining) and operation of the cryptocurrencies most fully corresponds to the national accounting treatment of settlement operations and the «Instructions on application of the Plan of bookkeeping accounts of assets, capital, liabilities and business operations of enterprises and organizations».

3. Evolutionary development of electronic money, international payment systems, information systems of remote notification and fund management requires adequate changes in the organization and methods of automated management accounting of non-cash transactions. Modern systems of remote management of the «Client-Bank» and «Internet-Bank» accounts are characterized by certain organizational constraints that do not meet the modern notions of non-cash transactions with help of the cryptocurrencies and other electronic money. Combining the functional capabilities of the blockchain technology, positive qualities of the communications «Internet Bank» and «Client-Bank» will allow to create a hybrid system of non-cash payments by cryptocurrencies, electronic money, funds on accounts in a bank with free conversion of existing funds and opportunities for information exchange with all the participants in settlement operations. Collection of accounting information on settlements with the cryptocurrencies and other electronic money is carried out without formation of the additional payment documents and bank statements. Electronic information from the hybrid communication system is the foundation for fully automated documenting, formation of accounting records, informing accountants and management of non-cash transfers.

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