

*L. Bondarenko,
PhD in Economics, Associate Professor of Finance Department,
National University "Lviv Polytechnic", Lviv
ORCID ID: 0000-0002-3313-3569*

*O. Kots,
PhD in Economics, Associate Professor of Finance Department,
National University "Lviv Polytechnic", Lviv
ORCID ID: 0000-0001-7123-3635*

*I. Lashchuk,
PhD in Economics, Associate Professor of Finance Department,
National University "Lviv Polytechnic", Lviv
ORCID ID: 0000-0002-1460-2534*

DOI: 10.32702/2306-6814.2020.2.49

UKRAINIAN CRYPTOCURRENCY IMPLEMENTATION AS A TOOL FOR THE DIGITAL ECONOMY DEVELOPMENT

Л. П. Бондаренко,
к. е. н., доцент кафедри фінансів, Національний університет "Львівська політехніка", м. Львів
О. О. Коць,
к. е. н., доцент кафедри фінансів, Національний університет "Львівська політехніка", м. Львів
І. І. Лащик,
к. е. н., доцент кафедри фінансів, Національний університет "Львівська політехніка", м. Львів

ВПРОВАДЖЕННЯ УКРАЇНСЬКОЇ КРИПТОВАЛЮТИ ЯК ІНСТРУМЕНТ РОЗВИТКУ ЦИФРОВОЇ ЕКОНОМІКИ

The article is devoted to a detailed analysis of the Ukrainian cryptocurrency implementation peculiarities and its impact on changes in economy. Additionally, the article gives a brief description of the world economy transformation processes, which are influenced by innovative instruments, primarily cryptocurrencies, blockchain technologies and smart contracts. These changes can fundamentally reshape current economic models and shape the new "digital economy". It's proved that Ukraine's economy must be open and flexible to such transformation processes, and therefore the national cryptocurrency development and implementation can prepare the domestic economy and give it considerable leading advantages over other countries.

Moreover, currently working Ukrainian cryptocurrency projects have been researched and the main limitations and pitfalls of their functioning have been studied. The main attention is paid to the private UCH project, which is not only based on the blockchain technology like previous projects, but also uses smart contract platforms in three different spheres of Ukraine's economy and has a great potential for launching significant positive changes for Ukraine's economy.

Furthermore, the advantages of the national cryptocurrency introduction and its possible functional features are considered in the article. These are: modernization of financial relationships — the national cryptocurrency is expected to improve, simplify and modernize the financial process; decentralization of financial relationships — the cryptocurrency is based on decentralized databases,

which can reduce the number of intermediaries and significantly optimize financial transactions; security improvement of financial relationships — new financial technologies are claimed to provide a higher level of protection against errors and fraud; financial transactions transparency and speed increase — cryptocurrency payments are more faster and more transparent to customers thanks to innovative instruments; the enhancement of currency functionality — the national cryptocurrency is able to extend the current functional characteristics of money; competitive advantages — the modernization of financial relations will allow to stimulate Ukraine's economy development.

As a conclusion, the main obstacle of the national cryptocurrency successful implementation is the lack of comprehensive legislative regulation of the crypto market, which would meet the new needs and challenges of the modern economy.

Статтю присвячено детальному аналізу особливостей впровадження української криптовалюти та її впливу на зміну економічних взаємовідносин. У статті здійснено коротку характеристика трансформаційних процесів світової економіки, на які впливають інноваційні інструменти, передусім криптовалюти, блокчейн технології і смарт-контракти. Ці зміни можуть докорінно перебудувати сучасні економічні моделі і сформувати нову "цифрову економіку". Доведено, що і українська економіка повинна бути відкритою та гнучкою до таких трансформаційних процесів, а отже, розроблення і впровадження національної криптовалюти може підготувати вітчизняну економіку і дати їй значні випереджувальні переваги перед іншими країнами.

Досліджено уже працюючі проекти української криптовалюти та вивчено основні обмеження та підводні камені їх функціонування. Опрацьовано базові характеристики таких проектів, як проект крипто-активістів "Karbo" і проект Національного Банку України "е-гривня". Особливу увагу звернено на приватний проект UCH, який не лише базується на блокчейн технології, як і попередні проекти, але й використовує платформи для смарт-контрактів у трьох різних сферах української економіки і має великий потенціал для започаткування значних позитивних змін у важливих для української економіки напрямках.

У статті розглянуто переваги та інноваційні вигоди впровадження національної криптовалюти та її можливі функціональні особливості. До основних переваг застосування національної криптовалюти віднесено такі: модернізація фінансових відносин, децентралізація фінансових відносин, підвищення безпечності фінансових взаємовідносин, підвищення прозорості та швидкості здійснення фінансових операцій, розширення функціональних можливостей грошової одиниці, конкурентні переваги.

Як підсумок зазначено, що основною перешкодою для успішного впровадження національної криптовалюти є відсутність комплексного законодавчого регулювання усіх аспектів крипто-ринку, що відповідало б новим потребам і викликам сучасної економіки. А також неготовність суспільства та економічних контрагентів та нових економічних реалій.

Key words: digital economy, national cryptocurrency, crypto exchanges, smart contracts.

Ключові слова: цифрова економіка, національна крипто-валюта, крипто-біржі, смарт-контракти.

PROBLEM DEFINITION AND ITS RELATIONSHIP WITH IMPORTANT SCIENTIFIC AND PRACTICAL TASKS

The economy current trends are characterized by the innovative digital technologies use: "big data", blockchain technology, cryptocurrencies. These are the latest tools to bring profound changes in the world economy, and some economists have already called the modern world economy a "digital economy." With blockchain and cryptocurrencies, transactions have become much faster, more secure, more transparent, more complex and independent, especially from the individual countries' Central Banks. Furthermore, such trends of the world economy transformation are

certainly positive, because they reduce the cost and simplify the economic relations between the market's individual counterparties.

In the wake of these inevitable changes and the cryptocurrency's continuing popularity wave, crypto-optimists have begun to talk about the new national currency concept, namely, national cryptocurrency. The national cryptocurrency introduction is seen not only as a replacement of the national currency, but more like the great potential for the national economy to increase its competitiveness in the international arena. Cryptocurrencies see the evolutionary future of monetary settlement, and so the national cryptocurrency should be

the foundation of a modern national economy based on new-made platform of economically free and secure payments.

That is why the detailed study of the Ukrainian crypto-hryvnia concept, its functional features and possible positive and negative influences on Ukraine's economy is indisputably important.

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

In Ukrainian academia there is almost no interest in sphere of the Ukrainian cryptocurrency development and implementation. Unlike Ukrainian crypto-practitioners and even the National Bank of Ukraine have been engaged in studying and discussing an area of digital instruments development for several years now. It's possible to note some scientists who have been researching this topic, among them Z. Dvulit, H. Peredalo, R. Tylypskaya [1], I. Doronin [2], V. Rysin, M. Rysin, I. Fedyuk [3], V. Soslovsky, I. Kosovsky [4], Y. Fedorova [5] and others. However, Ukraine's economy realities show that the national cryptocurrency has already emerged, consequently theoretical studies on its functional features, state regulation instruments, direction of influence and the possibility of Ukraine's economy existing model transformation are extremely relevant and necessary.

SETTING OBJECTIVES

The main task of the article is a thorough analysis of the functional and economic prospects of the Ukrainian cryptocurrency implementation.

THE MAIN MATERIAL RESEARCH

Some economists believe that bitcoin, as the first cryptocurrency, has initiated radical transformational processes of existing global economic relationships, and these changes are already outlining a new, almost utopian, global digital economy. For instance, economic relationships, without the involvement and control of financial intermediaries and regulators, where data is stored in a decentralized and secure manner, and transactions speed exceeds — are some of a new economy characteristic. On the whole, it's undeniable that cryptocurrencies have influenced and continue to influence changes in the digital transactions concept.

National cryptocurrency theory has been circulating in the economic environment for some time. The development of the national cryptocurrency was once claimed by Russia, China, the United Kingdom, Canada and other world powers. Venezuela was one of the first to implement such a project that, against a major economic crisis backdrop, only made the country's situation much more complicated.

That is to say, in Ukraine, the cryptocurrencies use and the crypto exchanges functioning are very actively developed. It's worth noting, for example, such a domestic stock exchange platform as KUNA, which today offers 28 pairs of currencies for trading and also undertook to develop its own token based on the hryvnia. KUNA's strategy is not only to become an efficient crypto exchange, but also to take over some of the banks' functions without violating any applicable laws.

Ukraine is one of the most active European countries by volume of crypto trade. That is why the idea of a national cryptocurrency could become a natural and logical continuation of the domestic crypto market development. Such a project should help to create a strong foothold for Ukraine's independence in the global crypto-space, while at the same time maintaining a dominant position in this area, given that there are no real successful projects of this level in the world for now.

Back in 2016, the National Bank of Ukraine and independent crypto-optimists announced parallel work on individual projects of the Ukrainian cryptocurrency. In 2016, the blockchain-based Karbo project was launched by crypto-activists. However, it didn't exert any significant influence on the market, this cryptocurrency lacked both functionality and support of the state and society as a whole.

In 2019, the NBU itself launched a pilot project of the national cryptocurrency — e-hryvnia, which was also developed on blockchain and set its rate to the standard hryvnia 1:1. However, almost immediately the NBU abandoned the national scale and decided to use e-hryvnia as just another digital tool. The reason for this is the lack of the e-hryvnia functionality and the lack of a legislative field for this instrument proper functioning and development. The NBU released the e-hryvnia too early, its specialized tools were not thought out, nor were the functions specifically stated to be performed by the e-hryvnia. However, the biggest limitation was related to legislative regulation, first of all legislative grounds for using e-hryvnia by other financial institutions. It was proposed to use e-hryvnia primarily as a means of paying citizens for goods, but all major transactions could be carried out only through crypto-exchanges. As a means of payment e-hryvnia still has quite limited possibilities: it's allowed to store only up to 14 thousand UAH in the e-wallet, the cumulative maximum permissible limit for annual payments is 62 thousand UAH. The e-hryvnia exchange limits for paper money or to other entities transfers are set at 500 UAH a day and 4 thousand UAH a month. These NBU restrictions impose additional barriers to e-hryvnia development and its attractiveness to users [9; 10].

Many issues of the crypto-market regulation are very debatable, the sphere is new and has not been completely studied yet, this is why the NBU delayed to clearly define the legislative boundaries of the crypto-market.

Another new crypto project of 2018 was the UCH — the Ukrainian crypto-hryvnia. The Ukrainian crypto-hryvnia concept is based on the fact that, as in bitcoins, its issue is limited to 40 million tokens, one thousand of which can be obtained by every citizen of Ukraine upon registration in the project. This cryptocurrency prospect and viability are based on three smart contract platforms [6; 7]:

1. Coal Trade — for the sale and purchase of coal.
2. Soil Rent — for land operations.
3. Intel Box — for the sale and purchase of intelligent products.

A smart contract is a kind of computer algorithm designed to validate and conclude blockchain-based business transactions and is therefore a tool for improving the reliability and regulatory nature of business operations. Because smart contracts exclude human involvement, this

makes it possible to carry out the contract as honestly, openly, without errors as inadvertent or deliberate, and also significantly reduces the number of intermediaries in such transactions. Smart contracts can also help to automate and unify some simple transactions.

The project team is still managing the crypto-hryvnia project, however, after transferring 80% of the UCH units to the population, all regulatory levers must go to the relevant state institutions [8].

It's worth saying, that the idea of building a national cryptocurrency on smart contract platforms is very innovative and progressive. First, the platforms themselves are capable of creating an open and transparent market for land, minerals and intellectual products. Blockchain technology is able to make all operations more secure, faster, cheaper and most importantly transparent. Thus, the UCH spread, and use will actively stimulate these three spheres of the Ukrainian economy development, and in the future it will also extend to other sectors.

Base on this, it's clear that the success of the UCH project requires the state support, first of all, in order to streamline the legislative field of the national cryptocurrency and the crypto-market functioning as a whole. Sooner or later, the national regulator will have to deal with this area regulation, but the time to stimulate Ukraine's economy development may be lost.

To sum up, an effective national cryptocurrency importance for Ukraine's economy is determined by the following positive factors:

1. Modernization of financial relationships — conceptual changes in existing economic relations globally affect Ukraine as well. Ukraine's economy ability to accord to these changes in a timely and effective manner and to respond to challenges may provide new opportunities for the domestic economy. Innovative tools like the national cryptocurrency are able to improve, simplify and modernize the financial relations process.

2. Competitive advantages — this advantage comes from the previous one, the modernization of financial relations procedure and its improvement will stimulate economic growth, and the national cryptocurrency introduction at the state level will be one of the first to give Ukraine an advantage not only in the crypto-market but also, quite possibly, at the world economy level. It's difficult for Ukraine to compete with world leaders in areas where competitive positions are already fully separated, while the crypto-market and the technologies that support it have great potential and promise, but clear leadership has not yet emerged here.

3. Financial transactions transparency and speed increase — Ukrainian cryptocurrency projects are all based on blockchain technology, which makes it possible to conduct financial transactions much faster and more transparent. The highest level of data protection in the blockchain system allows to build large volumes of database that can be used by several financial institutions, which allows to reduce the self-maintenance cost of such database and to increase its content due to other financial institutions' information. In general, the users themselves have access to the financial transactions results, which are recorded in a rollover register, that increases the trust and transparency level of work in the financial sphere.

Innovative technologies can not only significantly reduce transaction time, but also eliminate unnecessary intermediaries, making transactions not only faster but also much simpler and cheaper for both clients and financial institutions.

4. Security improvement of financial relationships — innovative technologies make it impossible for such operations to minimize system errors and guarantees a high level of security against external interventions and attacks, which is extremely important in the current situation of the problem of the information anonymity maintaining, including financial. For example, collecting and storing personal client data on a blockchain-based system has a much higher degree of security since the information is not contained on a single, hackable server.

5. Decentralization of financial relationships — crypto-calculations are based on decentralized databases, by their nature they are in a way an organized data set, in which data management in each of the database's nodes is performed independently, with all nodes equally important and independent. This ensures such databases network transparency, versatility and ease of use. Such decentralization eliminates the need for rigid government management, and it can focus on the legislative field of crypto-market activity and oversight its functioning. Due to more transparent and secure operations, not only the NBU but also other commercial financial institutions will be able to remove some regulatory functions for conducting financial transactions. Intermediaries will be eliminated due to their needlessness.

6. Enhancement of the currency functionality — the national cryptocurrency can accommodate both classic money functions and additional "non-monetary" functions. For example, to be the basis for smart contract operations, as it already in use in Ukraine. The national cryptocurrency may also contain information about the owner: his identification data, fingerprints, etc., which will not only accelerate the financial transactions execution by an individual, but also can help the state to create a unified comprehensive database of citizens, with a high level of protection.

THE RESULTS OF THIS STUDY AND FURTHER RESEARCH IN THIS AREA

All in all, the world economy transformation processes in general and in the economy of Ukraine in particular have already begun. Ukraine is actively presenting itself on the world stage and in the field of blockchain projects and cryptocurrency trading. The national cryptocurrency development and implementation is also an important innovation step for the Ukrainian economy. The existence of several parallel national cryptocurrency projects today prepares the market for inevitable changes in the economic paradigm and tests new cryptocurrency functionality and limitations. What is important now is full-scale and holistic state support for the country's only viable crypto-hryvnia project.

It's not clear yet whether the cryptocurrency is capable of completely replacing the current monetary system in Ukraine. However, it's undoubtedly possible to improve and simplify monetary relations with the national cryptocurrency at the same time.

In conclusion, that is why further scientific exploration in this area is needed to be carry out in order to provide Ukraine's economy with effective guidance on the wider potential of innovative technologies use and for their prospective effectiveness and efficiency analyzing.

References:

1. Dvulit, Z.P. Peredalo, H.S. and Tylypska, R.B. (2019), "Cryptocurrency: status and development trends", *Economika i derzhava*, vol. 1, pp. 10—14.
2. Doronin, I.M. (2017), "Cryptocurrencies: socio-economic factors, law and state functions", *Informacia i zakon*, vol. 3, pp. 85—93.
3. Rysin, V.V. Rysin, M.V. and Fedyuk, I.V. (2018), "Legal status of cryptocurrency as a financial instrument", *Efektivna ekonomika*, vol. 11, [Online], available at: <http://www.economy.nayka.com.ua/?op=1&z=6647> (Accessed 15 Jan 2020).
4. Soslovsky, V.G. and Kosovsky, I.O. (2016), "Cryptocurrency market as a system", *Finansovo-kredytna diyalnist: problem teorii i praktyky*, vol. 2, pp. 236—246.
5. Fedorova, Y.V. (2018), "Cryptocurrencies and their place in the financial system", *Economika i suspilstvo*, vol. 15, pp. 771—774.
6. Mashaj, B. (2019), "Advantages and disadvantages of cryptocurrency legalization", *Word and Action: an analytical portal*, [Online], available at: <https://www.slovovidilo.ua/2019/11/21/kolonka/boh-dan-mashai/finansy/bitkoyin-zakoni-perevahy-ta-ryzyky-lehalizacziyi-kryptovalyut> (Accessed 15 Jan 2020).
7. Selegrii (2018), "Is it possible to create a cryptocurrency in Ukraine", *The truth in Ukraine: an online news portal*, [Online], available at: <http://xn--80aafi6cg.in.ua/kripto-grivna-perva-natsionalnaya-kriptovalyuta-ukrainy/> (Accessed 15 Jan 2020).
8. ForkLog (2018), "National Cryptocurrency: Utopia or Reality?", *ForkLog: an online magazine about cryptocurrencies*, [Online], available at: <https://forklog.com/natsionalnaya-kriptovalyuta-utopiya-ili-realnost/> (Accessed 15 Jan 2020).
9. Etcetera (2018), "NBU is testing e-hryvnia. Do Ukrainians need a national cryptocurrency?", *Etcetera: online newspaper*, [Online], available at: <https://uk.etcetera.media/nbu-testuye-e-grivnyu-chi-potribna-ukrayintsyam-natsionalna-kriptovalyuta.html> (Accessed 15 Jan 2020).
10. Legalhub.online (2018), "Ukraine has completed a pilot project on the business model of digital hryvnia circulation", [Online], available at: <https://legalhub.online/bankivskyj-i-finansovyj-sektor/natsbank-zvituye-pro-zapusk-e-hryvnia-sut-ta-mozhlyvosti-kryptogryvni/> (Accessed 15 Jan 2020).

Література:

1. Двудіт З.П. Криптовалюта: стан та тенденції розвитку / З.П. Двудіт, Х.С. Передало, Р.Б. Тиліпська // *Економіка та держава*. — 2019. — № 1. — С. 10—14.
2. Доронін І.М. Криптовалюти: соціально-економічні фактори, право та функції держави / І.М. Доронін // *Інформація і право*. — 2017. — № 3. — С. 85—93.
3. Рісін В.В. Правовий статус криптовалюти як фінансового інструменту / В.В. Рісін, М.В. Рісін, І.В. Фе-

дук // *Ефективна економіка*. — 2018 — № 11 [Електронний ресурс] — Режим доступу: <http://www.economy.nayka.com.ua/?op=1&z=6647>

4. Сословський В.Г. Ринок криптовалют як система / В.Г. Сословський, І.О. Косовський // *Фінансово-кредитна діяльність: проблеми теорії та практики*. — 2016. — Вип. 2. — С. 236—246.

5. Федорова Ю.В. Криптовалюти та їх місцен у фінансовій системі / Ю.В. Федорова // *Економіка і суспільство*. — 2018. — № 15. — С. 771—774.

6. Переваги та недоліки легалізації криптовалют — Слово і діло: аналітичний портал. — 2019 [Електронний ресурс] — Режим доступу: <https://www.slovovidilo.ua/2019/11/21/kolonka/boh-dan-mashai/finansy/bitkoyin-zakoni-perevahy-ta-ryzyky-lehalizacziyi-kryptovalyut>

7. Чи реально створити криптовалюту в Україні — Правда в Україні: інтернет портал новин. — 2019 [Електронний ресурс] — Режим доступу: <http://xn--80aafi6cg.in.ua/kripto-grivna-perva-natsionalnaya-kriptovalyuta-ukrainy/>

8. Національна криптовалюта: утопія чи реальність? — ForkLog: онлайн журнал про криптовалюту. — 2018 [Електронний ресурс] — Режим доступу: <https://forklog.com/natsionalnaya-kriptovalyuta-utopiya-ili-realnost/>

9. НБУ тестує е-гривню. Чи потрібна українцям національна криптовалюта? — Etcetera: інтернет-газета. — 2019 [Електронний ресурс] — Режим доступу: <https://uk.etcetera.media/nbu-testuye-e-grivnyu-chi-potribna-ukrayintsyam-natsionalna-kriptovalyuta.html>

10. В Україні завершився пілотний проект від Національного банку стосовно бізнес-моделі обігу цифрової гривні — Legalhub.online. — 2018 [Електронний ресурс] — Режим доступу: <https://legalhub.online/bankivskyj-i-finansovyj-sektor/natsbank-zvituye-pro-zapusk-e-hryvnia-sut-ta-mozhlyvosti-kryptogryvni/>

Стаття надійшла до редакції 16.01.2020 р.

www.economy.nayka.com.ua

Електронне фахове видання

Ефективна
ЕКОНОМІКА

Виходить 12 разів на рік

Журнал включено до переліку наукових фахових видань України з ЕКОНОМІЧНИХ НАУК (Категорія «Б») Спеціальності – 051, 071, 072, 073, 075, 076, 292

e-mail: economy_2008@ukr.net

тел.: (044) 223-26-28

(044) 458-10-73