

Monetary Relations Transformation in the Digital Economy

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ABSTRACT

The digital economy influences all socio-economic life components. Monetary relations are also changing rapidly due to introduction of digital technologies. There are many causes of these changes. Ones are uneven in different countries; ones are influenced by both the internal environment of the country and globalization processes. The digital economy needs changes in the monetary system and one generates these changes itself. New-type companies (fintech companies) are introducing innovations that are capable of increasing the number of subscribers of money relations and accelerating the circulation of money in the economy. But this accelerating will be offset by the micro and small businesses growth. In some areas, competition between fintech companies and traditional banks will increase. Such competition has already exists in the payments and money transfer sector, and financial services consumers will benefit from it. Cryptocurrencies and other surrogate money will not affect monetary circulation globally, either today nor in the near future. Currency transactions will be simplified and made more accessible through new technologies and business models. This is particularly true for the population and small businesses. New financial instruments and new technologies will create new risks. Significant amounts on cybersecurity would need to be provided by the financial relations participants.

Keywords: *financial technology company, digital technology, monetary turnover, theory of money, digital currencies, financial services, digitalization*

banking functionality to cybercrime.

1. INTRODUCTION

In the last decade, the world has been changing rapidly under the influence of digital technology. Monetary relations were no exception. Ones are one of the main economic categories, so the digital economy directly affects them.

Technical changes are the current realities. The most prominent of these are:

- accelerating financial transactions;
- accessibility due to mobile and Internet technologies, financial services to large sections of the population;
- the emergence of non-bank payment systems.

We can expect further improvement of existing services and new ones on a permanent basis. New services make financial ones more accessible; ones increase the number of subscribers and gradually form new quality.

Digital technologies are also causing controversial phenomena such as contraction of employment in a lot of the economy sectors (including the financial sector), cryptocurrencies, vulnerability of payment systems and

1.1. Analysis of Previous Studies

Fundamental changes in the monetary system are manifested gradually, and their impact on economic processes requires detailed research.

The term «digital economy» was introduced to the scientific world by Canadian scientist Don Tapscott. The scientist characterized the content and basic characteristics of this concept in his work.

The influence of digital technologies development on socio-economic processes was investigated by such scientists as: R. Bukht., R. Heeks, who have formed the conceptual apparatus and characteristics of the modern digital economy.

F. Martin carried out a theoretical analysis of the robotization impact on socio-economic processes. In his work, he raised the issue of crowding people out by machines and technologies and their influence on consumer demand.

K. Skinner explored the greatest new digital technologies impact on financial processes. In particular, it showed a change in the financial paradigm, namely the transition from financial institution customer service to a personalized one. The author described existing digital banking models, highlighted the conflicts between traditional banks and financial companies, he has delineated fairly well the new digital technologies advantages in the financial sphere over those have been used in the last 20 years.

However, many issues need further study, especially those concerning the transformation of monetary relations in the digital economy. Such issues as the new business models formation of financial institutions; the financial market segments functioning in the new economic environment; employment in the financial sector in an automated process, need further research. The changes which will emerge from the rapid increase in mobile banking users in the global world are relevant and should be examined more thoroughly. An important issue is create a new approach to regulating and overseeing the financial market in the new realities of the digital economy.

1.2. Our Contribution

In this article, we show how the digital economy affects the monetary relations sphere. In our view, the priority of these processes is as follows:

- Digital economy is an objective reality and has a positive impact on social and economic life;
- In the monetary sphere, the main changes are related to the combination of Internet and mobile technologies for carry out payments and money transfer. These changes will accelerate the money turnover, but ones will not cause inflation. The turnover increase and the number of subscribers of financial services increase will be offset by the commodity mass growth;

- lending and investment technologies will change in the near future, and the role of traditional intermediaries will decrease in these processes. Large financial instruments increase will require improved financial regulation;
- a new class of financial institutions - a fintech company - has appeared and is constantly increasing. It is these companies that generate most of the new approaches to traditional financial transactions. The competition between them and traditional banks will be fragmented. Most relations will be based on cooperation;
- infrastructure for fintech development has been formed in Ukraine, but unlike Western banks, Ukrainian banks are practically not investing in financial startups;
- digital technologies will help in further liberalization of the financial market, and in particular its currency component.

2. THE DIGITAL TECHNOLOGY IMPACT ON THE FINANCIAL SYSTEM AND MONETARY RELATIONS

Modern socio-economic life is influenced by digital technologies, which have penetrated virtually all its spheres and led to the emergence of the concept of «digital economy».

The term «digital economy» was first introduced by Canadian scientist Don Tapscott [1]. The paper describes the characteristics of the digital economy as a phenomenon that combines the traditional economy with information flows and new digital technologies. The author also introduces the notion of the «era of network intelligence» as a new era of combining intelligence, knowledge and creativity to ensure the growth of social well-being.

R. Bukht and R. Heeks [2] define the characteristics of the digital economy (Table 1).

Table 1 Characteristics of the digital economy [2]

Characteristic	Description
The digital economy is unevenly distributed	The digital economy exerts unequal influence in the countries of the global North and the Global South. The distribution is also uneven within the regions (for instance, the United States is leading, by a large margin, in the global North).
The digital economy is growing faster than the real economy	The unanimity of the experts of international financial institutions and private consulting firms is that the growth rate of the digital economy is totally ahead of the overall economic growth rate. Accordingly, the share of the digital economy in a country’s economy is also growing. At the same time, the research results in the digital economy indicate that its growth rates are particularly high in the countries of the global South.
The digital economy contributes to a significant increase in employment	The figures are fairly approximate, given the severity of the difficulty of estimating them. Thus, in the digital economy, about 4% of the populations are employed on average. According to experts, the number of people involved in this field will increase every year.

Ford Martin carried out a detailed analysis of the problem of displacing people by robots and digital technologies [3]. The author concluded that the rapid development of robotics and the inevitable cheapening of robots in a reasonably short time. The introduction of robots is capable of destroying millions of fast food, warehousing and, later, public transport jobs. There is no less a problem in the field of activity of «white collar» - many professions in the field of data analytics and processing, jurisprudence, linguistics, hospital and pharmaceutical business may disappear.

Proponents of the digital economy rightly point out that the disappearance of certain professions or types of economic activity through process automation and robotization will be accompanied by the emergence of new ones (manufacturing robots, servicing automated and robotic systems, conducting previously impossible

research, new projects in education, healthcare, life safety, etc.).

Offers are already being worked on to tax robots to pay for pensions or income taxes to compensate for job losses (for example, the formation of the online industry and the fintech companies sector).

The Table 2 presents capitalization data of well-known real sector companies, banks and fintech companies in 2018.

Fintech companies and Internet companies have more capitalization per employee than existing banks and real-sector companies (especially the Instagram situation). These companies do not compensate for the disappearance of jobs associated with the introduction of digital technologies in social and economic life. But the availability of information and financial services to general public provides opportunities for the development of small and micro-enterprises.

Table 2 Capitalization of banks and companies, and number of employees in 2018

Company	Year of foundation	Number of employees	Market capitalization, billion
BMW	1916	134,682	euro 46B
UBER	2009	22,000	\$ 72B
AIRBNB	2008	12,736	\$ 38B
WALT DISNEY	1923	201,000	\$ 115B
FACEBOOK	2004	35,587	\$ 371B
APPLE	1976	132,000	\$741,37B
INSTAGRAM	2010	450	\$ 100B
PayPal	1998	21,800	\$98,1B
Paytm	2010	more 13,000	about \$10B
Bank of China	1912	310,000	\$125,6B
Citigroup	1998	204,000	\$129B
Bank of America	1998	204,000	\$248,8B
HSBC Holdings	1865	235,000	\$163,19B

**Compiled by the author according to the companies' websites*

This is precisely what should be done to compensate for the loss of jobs in traditional industries. Digital technologies are already affecting the financial system and monetary relations, and of course this impact will only grow over time.

Money, their movement, dominates the economic research, and economic science itself is largely due to the analysis of monetary relations. The importance of the subject matter of the study necessitates a continuous debate about the nature of money, its functional content and the laws of money turnover.

Despite a lot of number of money theories, there are three main areas of concern and can be summarized as follows:

- Keynesian money theory (J.M. Keynes) is a theory which envisages the creation of a handed over to the state

managed monetary system and its use to stimulate effective solvent demand. According to theory, the main impact on the economy is through fiscal instruments and the state influence on economic processes is decisive;

- Monetary (quantitative) money theory (I. Fisher, M. Friedman, A. Schwartz) is a theory in which monetary policy plays a major role in regulating the economy. In this case, money is the main tool for regulating the economy.

The state may exert a regulatory influence on economic activity by increasing or decreasing its money supply;

- Modern theory of money (G. Minsky, R. Ray) is a theory in which the main demand for money is formed by economic entities because of the need to pay taxes, compulsory payments and debt in favor of the state.

All theories have formed methodological bases, scientific substantiation, examples of practical implementation,

which causes the continuation of discussions. In our view, in the near future, the decisive issue of the money theory will be determining the impact on monetary relations of those global changes which are now observed in the economy. These are changes caused by the formation of the new century economy - the digital economy.

The first (though not essential) is the digital money appearance. The absolute majority of money theories assume that money is issued centrally, and that its turnover is regulated by the state and central banks. In this regard, all cryptocurrencies are radically different from any fiat money. They do not have an external or internal administrator. This makes it impossible to have any influence on the money turnover or forfeiture of it to tax, judicial authorities, other government agencies and traditional banks. Blockchain technology saves all the data

on previously made transfers, making counterfeiting of digital money a difficult task. Due to key manipulation, e-wallet owners can create banking-like products - from simple payments and money transfers to regular and international letters of credit. Cryptocurrency provides an opportunity to form completely anonymous transactions. This is both an advantage and a disadvantage. Money owners are always striving for more privacy, but such privacy can be used both to avoid taxation and to finance criminal activity, including terrorism.

Often, cryptocurrencies are referred to as «quasi-money» due to their unusual format and limited functions (Table 3).

In our opinion, the confrontation between fiat money and cryptocurrencies has just begun.

Table 3 Performance of money functions [6]

Function	Characteristics of fiat money in the traditional monetary system	Characteristics of cryptocurrencies in Internet
Measure of Value	Fiat money is tied to the mass of goods, one is regulated by the state and one provides a scale of prices in the whole society	The issue and amount of money in the system are not controlled. There is no anchorage to the commodity, which means that cryptocurrencies do not exist at this time, they cannot serve as a measure of value.
Medium of exchange	Fiat money provides the exchange of money for any product and the exchange of any product for money	Cryptocurrencies are a medium of exchange, but limited (only online and on select deals)
Store of value	A number of stable currencies (dollar, euro, Swiss franc, others) are a means of accumulation for citizens, organizations and countries, and it is governed by special rules (including the rules for accruing interest).	The high volatility of cryptocurrencies, the lack of common rules and standards do not allow them to be seen as a tool of accumulation and still make them a tool of speculative trading
Payment method	Fiat money allows for any payment transaction	Payment transactions are carried out among system members (there are exceptions, but they do not influence the overall picture)
World money	Most international agreements are made using the dollar and the Euro. There are also strong regional currencies such as Chinese Yuan and Japanese Yen. These currencies are fully functioning as world money	Cryptocurrencies in international payments only serve the illegal, and often absolutely criminal, turnover

The governments of the countries can not accept that the money is not issued by the state and the anonymity of money transactions. Instead, the digital movement, by its very nature, tends to self-regulate, and if switch to political terms one strive for anarchy. It is the cryptocurrency that becomes the flag of the forces spoken of (or spoken by a group of people) under the alias Satoshi Nakamoto [4]. The author's speech is technical in nature and is more about avoiding fraud. However, in its initial part, the purpose is to eliminate the intermediaries (banks) from monetary turnover.

The resistance of governments to the spread of digital currencies and the discharge of their functions of medium of exchange is not the only limiting factor. Money makes

money trust and the simplicity of use of it. Today, digital currencies are not available to the majority of the population, not only in developing countries but also in developed countries due to the complexity of their use. The important problem is the transfer of digital money to fiat. But these are technical issues and they will be resolved sooner or later. With trust everything is more complicated. According to cryptocurrency proponents, it is impossible to steal funds that are protected by blockchain technology. However, in practice, such cases occurred. The most famous of these was the crash of the Mt.Gox bitcoin exchange. The Exchange was founded in July 2010 in Tokyo and one was the largest operator of bitcoin exchange for three years.

In April 2014, the company started a liquidation process because of disseminate information about the theft possibility of 850,000 clients' bitcoin. At that time, their value exceeded \$ 450 million. Since, about 200,000 bitcoins have been returned [5].

The money demand and their amount needed has always been the subject of the study of money theory. The Keynesian money theory is based on an aggregate cost equation that looks like:

$$Y = C + I + G + NX, (1)$$

where C - is the current cost of businesses and households; I - is total investments; G - is public expenditure; NX - is a net export.

From the perspective of this theory, digitization in the financial sphere will affect monetary relations through the mechanism of increasing household, small and micro businesses' current cost. These costs will increase as a result of the availability of financial services, the reduction in the credit cost and fees associated with the monetary turnover servicing. This impact will increase with the higher number of users who had never before used financial services or had limited access to ones. The impact of other factors will not matter much in the short term.

Foundational idea in the monetary money theory is the exchange equation (the Fisher equation), which is represented by the next formula:

$$MV = PY, (2)$$

where M – is money supply; V – is money turnover velocity; P – is price level; Y - is the physical volume of goods and services produced.

Fisher's equation is based on the fact that money is a medium of exchange. Another formula for quantitative money theory is the famous A. Pigue's formula (Cambridge equation):

$$Md = KPY, (3)$$

where Md – is the real need for money; K - is a Cambridge coefficient showing how much of the financial assets are held as money; P - is the price of products (goods, services) sold; Y - is the volume of production in physical terms [6].

In this formula, money is considered not only as a medium of exchange, but also as a means of accumulation.

From the standpoint of monetarism, the influences of financial digitalization on monetary turnover will be determined by the following factors:

- the money supply will increase with the rapid spread of government-uncontrolled digital currencies and their widespread use in turnover. Making forecasts and scenarios is difficult right now. Surely the state will try to regulate and control the digital currencies turnover, but the question will it possible. On the other hand, the rapid growth in demand for digital currencies as a means a medium of exchange can also be questioned;
- large-scale use of digital currencies as a means of store of value seems unlikely;
- one of the tenets of monetarism is the invariability of the constituent money velocity. But the availability of

transactions and their cheapness for most smartphone users can accelerate the monetary turnover;

- with unchanged physical volume of goods and services, increasing the left side of the equation will necessarily lead to an increase in the price level and cause inflationary processes of varying depth and duration. But the access of the masses to financial services is able to accelerate the small businesses development, which will increase the goods mass and compensate for the money turnover velocity.

In general, the digitalization impact on inflationary processes will be limited from the standpoint of quantitative money theory. The modern money theory (represented by L. Randall Wray) [7] distinguishes taxation as the main function of national money, which most influences their demand. It is hard to disagree. Based on the above, the following should be said:

neither the tax rates nor the mechanism of their payment will change with the introduction of new digital technologies;

neither in the short nor in the medium term will cryptocurrencies be able to fully fulfill the money functions, since states will not allow them to pay taxes.

Therefore, from the standpoint of modern money theory, the finances digitalization will not be affected on monetary relations.

Overall, it can be noted that the finances digitalization will have an impact on the monetary turnover, mainly due to the increase in the higher number of users who will have access to financial services, expeditious and inexpensive cash transactions.

The impact of digitalization on the monetary relations will not be due to changes money supply and other money turnover parameters, but thought business models changes. The banking business model has begun to change with the Internet development. Banks have started introducing online customer service since the early 1990s. Now this is already total. Clients choose the bank from the standpoint of financial stability and from the standpoint of a convenient interface.

But banks will not be able to radically affect the future monetary relations, even with the new improved interface and electronic payment system. The reason for this is that almost every bank now has such functionalities. Most banks adapt mobile and Internet applications to their often outdated machine architecture. The business model itself remains the same [8].

The traditional business model of commercial bank activity involves obtaining income from providing loans to individuals and legal entities, and receiving commissions for various banking operations. The bank must maintain expensive infrastructure, have a large staff, spend a lot of money on security. Now fintech companies have the technical capability to carry out most of their banking operations at a lower cost, there is no need to support traditional banking infrastructure. In addition, fintech companies receive an additional compensation by combining cash transactions with others ones (for example, advertising).

Fintech companies occupy market niches where traditional

banks are not active. An example is lending to micro-enterprises or individuals with no credit history under P2P schemes. Fintech companies are able to provide lending at lower rates, while reducing the costs associated with credit risk assessment (through the use of Big Data and other modern information processing technologies). A positive thing is that such individuals had appeared a credit history after had been working with fintech companies.

Significant changes are also taking place in the investment business. Traditional trading robotization has emerged and one is rapidly developing. Algorithms analyze the investment portfolio and help its profitability is increased depending on how much the client wants to risk it. In this case, the commission fee for conducting operations is minimal or non-existent.

Digitization probably will change such a traditionally conservative activity as insurance. The spectrum is wide

enough - from connecting electronic services to insurance objects for the prevention and automatic compensation of losses by robots to new business models using platforms (P2P insurance). The processing of data on previously concluded insurance contracts with the help of Big Data technology will change the pricing models for insurance services, especially in the fields of health insurance and life insurance.

Money turnover will be transformed by fintech companies that will build business models from scratch based on state-of-the-art computer technologies such as Big Data, artificial intelligence, machine learning. Such models are based on the total personalization of customers and the satisfaction of all their needs by combining financial resources and state-of-the-art technologies. The range of fintech company activities is very diverse [9] (Table 4).

Table 4 The services range provided by fintech companies [5; 9]

Service	Brief description
Regulatory technologies	Application of modern digital technologies in public administration and regulatory activity.
Banking	Provision of almost full range of banking services exclusively in digital format. Initially, these are payments and P2P - lending. Subsequently, the list of services will expand.
Insurance	Formation of insurance protection with the help of new technologies (P2P insurance model), use of Big Data for risk assessment, modeling of insurance events).
Venture Financing	Technologies allow to better sort projects, evaluate their potential effectiveness, formulate optimal investment portfolios and manage them in the future.
Roboconsultant	An automated software service that works on the principle of an investment advisor
Financing of small and medium-sized enterprises	Wide range of financial transactions (P2P- lending, money ordering, crowdfunding, instant overdraft, information processing for projects).
Identification and access to financial services	Technologies will allow identifying and providing financial services to non-certified individuals. Access to financial services is provided to the poorest segments of the population anywhere in the world where there is no financial infrastructure.
Analytics	Using of Big Data, artificial intelligence, machine learning of other technologies to assess credit, investment and insurance risks, and processing of personalized data to identify customer needs.
Biometrics	Identification of a person by biometric data. Use of biometric data to confirm transactions.
Financial entertainment	MLM - games, cash withdrawal games, hypes, bookmakers, poker

The services offered by fintech companies provide transaction speed and low cost compared to traditional financial institutions. In addition, they offer a new, more qualitative, approach to risk assessment and access to the financial market for more participants. This applies to all traditional areas of the financial sector: banking; insurance; operations in the stock market. In the coming decades, there will be an increase in the number of financial services consumers who will receive them exclusively through mobile channels. Accordingly, the regulation of the financial sector should take this into account. But for a long time, there will be consumers who will need traditional office maintenance. Their interests should have to be considered by the state in the face of

regulators.

The range of fintech companies' services provided is wide and ones is to grow likely. Many companies work according to the scheme - a market niche is found and business processes are brought to perfection. Many companies work according to the scheme - to find a niche market and bring business processes to perfection. At the same time, most financial services become more affordable. Nowadays, many fintech companies are targeting non-bank clients, but later competition among banks and fintech companies will increase.

Conflicts among traditional banking institutions and fintech companies are widespread in the near future. Such conflicts have already existed, the question is only in their

depth and intensity. An example of this conflict is the conflict among M-PESA's mobile money transfer system and Kenyan banks, which took place in 2008.

M-PESA is the first and most advanced mobile money transfer system among Kenyas launched by Safaricom, a Vodafone subsidiary. The M-PESA system was created at the request of the Kenya's Government as a joint venture, 40% of which was owned by Kenya's Vodafone and 60% by the Kenya's Government.

Huge results were achieved for 7 years of existence of the system. So, almost 60% of Kenya's GDP goes through the M-PESA system, and the proportion of Kenyan adults who have access to financial services has increased from 40% to 70%. Such success has led to a full-blown conflict among M-PESA and Kenyan banks. It was accompanied by a request from the Banking Committee to the government to accuse M-PESA of fraudulent activity. But such lobbying failed because of the high service popularity and the significant public share of M-PESA. [5]

Perhaps, conflicts among fintech companies and commercial banks will not take on the format presented above. Probably, banks will either absorb competitors or set up joint ventures for digital technology into banking, using their capital. Today, the world's largest banks such

as ING, Citi Bank, Credit Agricole, BNP Paribas, Raiffeisen have established relationships with dozens of leading fintech companies and ones are constantly investing in promising startups.

Banking market competition will intensify. However, the main competitors will probably not be banks and fintech companies. These are banks that will be able to fully implement new business models and banks that will not be able to do it.

Real competition with global banks in the financial services market can be compounded by global companies specializing in IT - services, such as Apple, Google, Amazon. But now, the banks' interests are protected by a banking license and the governments' interest in maintaining the status quo. It is understood that the model of «Central bank - commercial banks» allows to influence to a considerable extent on monetary turnover and economic processes.

According to a study conducted by the Ukrainian Association of Fintech and Innovation Companies, Ukraine ranks 4th in the world in contactless payments. The main parameters characterizing the prospects for the development of digital financial technologies are presented in the table (Table 5).

Table 5 Characteristics of the Ukrainian fintech industry in 2018 [8]

Options	Value
Population, million	42
Percentage of Internet users, %	63
Technical specialists graduation by higher educational establishments (annually), thousand persons	36
The number of adults who have smartphones, % of the total population	45
Number of non-contact payment terminals,% of total payment terminals	79,4
Number of fintech companies that operate at the market	more 100
Number of fintech companies based in Kyiv, % of total	82
Number of fintech companies with more than 75 employees, % of total fintech companies	14
Total number of employees in fintech companies by state, persons	201
Number of fintech companies based in Kyiv, number of companies /% of total	28/27
Number of fintech companies founded in 2016-2018, % of total	58
Number of fintech companies that operate at the international market, % of total	43

Contactless payments in Ukraine and the availability of all conditions for their increase will not replace cash in the near future. Reducing cash is seen as a means of reducing the size of the underground economy, tax evasion, and reducing the monetary turnover cost. Sweden has had the greatest success in converting the economy to non-cash payments. In this country, cash payments are up to 5% of monetary turnover. Nowadays the government of this country has announced the testing of the country's first national digital - e-krona. In Ukraine, this figure is approaching 50%. The National Bank of Ukraine has repeatedly announced the aim of reducing cash payments. Mobile banking is technically capable of replacing cash, but it requires a high level of digital literacy and the necessary infrastructure.

The situation in Ukraine with the development of fintech is

ambiguously. On the one hand, there are a high level of coverage of the population with mobile communication and the Internet, the availability of qualified specialists, the interest in the introduction of digital technologies in the financial sphere by the government and the central bank. Many existing market participants are oriented towards working in foreign markets. The number of full-time employees in the industry is small. Almost half of the companies have 1-2 permanent staff. Freelancer relationships are common, which are in line with global IT trends. On the other hand, Ukrainian banks do not invest in startups at all, but work with profit-sharing fintech companies.

It also draws attention to the fact that half the population does not have smartphones, which makes it impossible for them to participate in mobile banking. And it is not the

main thing. Smartphones are becoming more affordable and will gradually crowd out other mobile devices away. The main thing is that half of the population who do not have smartphones one do not need the fintech companies' services today or have low digital literacy. it is information and educational nature calls for cooperation on the part of commercial and governmental structures coverage to include the modern financial services to the coverage to a lot of population. According to Ministry of Digital Transformation research, 53.5% of Ukrainians are below the average level of digital literacy. 15.1% of Ukrainians do not have digital skills, and 37.9% of citizens have low digital skills. The Government has announced the launch of a National Digital Literacy Program, which should remedy the situation in the coming years from 21 January 2020 [10]. But banks and fintech companies also need to take an active role in outreach and digital literacy education.

The transformation will definitely affect the currency market as well. In 2019, Ukraine has made a significant step towards currency liberalization. In particular, the Law of Ukraine «On currency and currency transactions» [10] and its subsidiary legislation [11], [12] have been enacted. Of course, the introduction of new currency legislation is positive for the Ukrainian economy. In particular, such unpopular measures as foreign exchange supervision for export-import transactions, penalties for failure to meet deadlines in foreign economic activity, limit to pay back external debt obligations were suspended. The Law On currency and currency transactions also contains many positive innovations, namely:

- the deadline for payments on export-import contracts has been increased to 365 days;
- currency swaps with residents and non-residents and forwards with and without delivery are allowed;
- simplified transactions on the accounts of legal entities of non-residents in banks of Ukraine;
- foreign currency payments for life insurance are allowed;
- currency accumulation is allowed to pay off external borrowings.

New rules of the game in the currency market provide for the use of modern technologies for more efficient transactions:

- individual currency licenses have been abolished and replaced by an e-limit system (EUR 2 million per year for legal entities and EUR 50 thousand per year for individuals);
- online purchase of foreign currency by individuals (up to UAH 150 thousand per day in equivalent) is allowed.

In 2019, Ukraine has joined the International Central Depository of Clearstream Banking Luxembourg (ICSD). Clearstream, a member of Deutsche Börse Group, has joined the Ukrainian market on May 27, 2019. Citibank will act as correspondent bank and operator of this account in Ukraine. Provided that securities may be credited to a securities account opened by a Central Depository in Clearstream. Depository institutions may get to their accounts with the Central Depository the following types of securities:

- stocks, bonds and ICI securities issued by foreign issuers;

- corporate bonds, the «actual» issuers of which are domestic companies;
- external government bonds;
- government bonds of foreign countries [13].

The operation resulted in a significant increase in demand for domestic government bonds from non-resident. Under this instrument, in 2019 UAH-denominated bonds were sold to non-residents 18.5 times more than in 2018 (from UAH 6.349 billion to UAH 117.72 billion). This has contributed to the UAH revaluation, the government debt reduction in foreign currency to 45% of GDP, the increase of international reserves for the year by \$ 4.482 billion (by 21.5%). In 2019, Ukraine has fulfilled all its external debt-servicing obligations. The results obtained are a synergy of positive foreign economic conditions and modern technologies that have facilitated the entry of non-residents to the Ukrainian borrowing market. Of course, the situation poses a number of risks that have already been or may be realized in the future. For example, in 2019, the budget shortfalls of income nearly UAH 40 billion due to the hryvnia revaluation, the decline in production in the last quarter and the drop in prices for products of the mining and metallurgical complex in the second half of the year. The potential risk associated with the possibility of early withdrawal of funds by non-residents will remain. To a large extent, it depends on whether the projections for the global recession in 2020-2021 will come true.

Analyzing the actions of the National Bank of Ukraine and the Ministry of Finance of Ukraine in 2019, we can note the ability to formulate tactics and medium-term strategy in the foreign exchange market, as well as to use the technological opportunities provided by Clearstream to service cross-border operations.

But there are also limitations and constraints. Thus, according to the Law of Ukraine «On payment systems and funds transfer in Ukraine» [14] only a banking institution can issue electronic money in Ukraine. It is understood that there is no opportunity to develop online payments and e-commerce outside the banking system.

In the world, financial non-banking companies perform many foreign exchange and cross-border money transfer transactions. The technologies for combining such transactions with traditional banking technologies are already in place. This simplifies foreign economic activity for small and medium-sized enterprises (transnational corporations and large enterprises generally do not have problems in this area). An example is the business model of The Currency Cloud startup. A visual representation of the business model is presented in Figure 1.

The Currency Cloud business is built on the fact that small and medium-sized enterprises today do not have the same access to quality cross-border payment services as large corporations. This niche was decided by the company and offered a comprehensive solution.

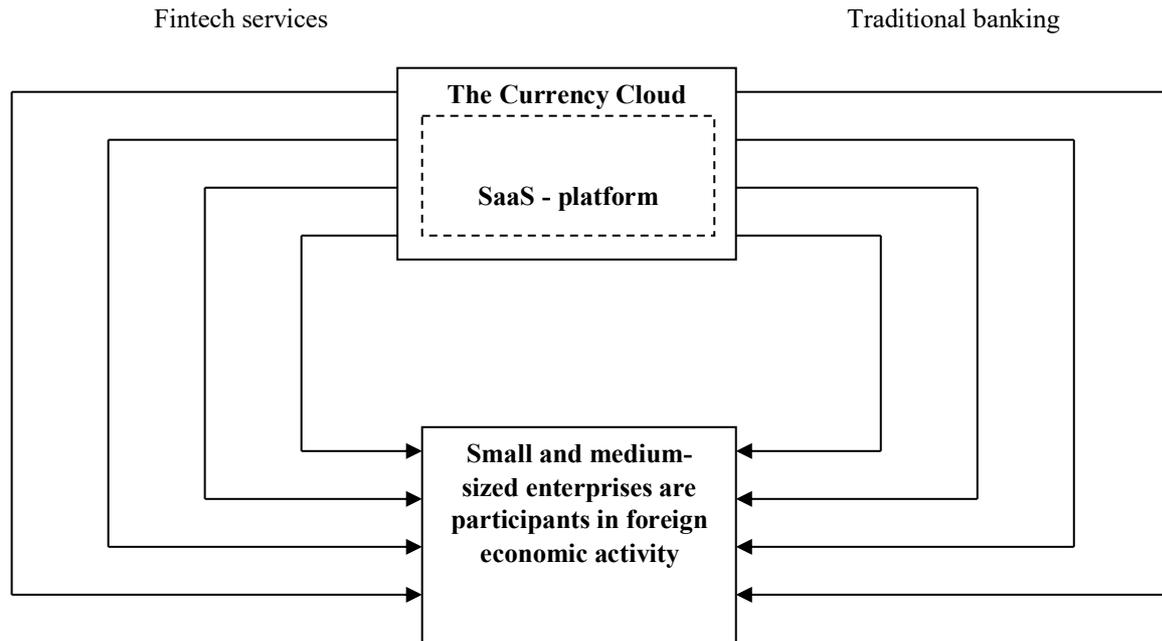
On the one hand, the company provides traditional banking. It solves the problem of liquidity for small and medium-sized enterprises, maintains accounts and payroll, makes corporate payments in foreign trade, helps hedge currency risks, and provides enterprise resource planning (ERP).

On the other hand, the company provides advanced financial technologies such as Big Data, Cloud computing, e-money transactions. The company integrates cross-border payments into the customer's business processes using its own Application Programming Interface (ARI) through various tools. When making cross-border payments, cloud technology is used that provides customers with a lot of services in many foreign exchange markets. The platform is integrated into the currency laws of EU, UK, US and Canada [15].

In Ukraine, an institution of this type is not yet able to operate, as the Ukrainian basic laws, in particular the Law

of Ukraine «On payment systems and funds transfer» and the Law of Ukraine «On E-commerce» are not adapted to transactions of this type.

Apart mention should be made of the hedging of currency risks. The transactions volume of banks' clients on the purchase of foreign currency under forward contracts in 2019 amounted to \$ 812.6 million. On the one hand, the urgent market is developing very fast since currency liberalization have begun in 2019.



- 1 - Electronic money transactions;
- 2 - Access to other payment systems;
- 3 - Cloud computing;
- 4 - Big Data;
- 5 - Account servicing;
- 6 - Cross-border transfers;
- 7 - Providing liquidity;
- 8 - Currency risk hedging.

Figure 1 The Business Model of The Currency Cloud [15, 16]

On the other hand, the market capacity of about \$ 1 billion for the metallurgical and agricultural country is very low. It takes a market volume of about \$ 20 billion to serve the demand for hedging risks from exporters in the country. There are no such funds in the national banking system. One of the tasks of banks and fintech companies in this area is to create the conditions and instruments that will

facilitate the inflow of foreign currency funds for fixed-term operations. Today, the Ukrainian urgent market does not affect economic risks either in terms of volume or in the list of instruments.

3. CONCLUSION

The digital economy has already changed and continues to change all spheres of socio-economic life. However, it is

almost impossible to predict further developments due to multifactoriality, lack of systematic changes and their nonlinearity. But today, with access to large amounts of information, it is possible to assess the opportunities and risks posed by the digital economy, including in the area of monetary relations.

Digital technologies in finance are affecting monetary relations through the mechanism of accelerating the turnover of money by increasing the availability of financial services and increasing the speed of transactions. But these processes will not have a significant impact on inflation. Compensators will increase the level of activity in the microbusiness and increase legal trade.

We can point out the main directions of influence of digital technologies on sphere of monetary relations in the near future.

1. It is state-of-the-art Internet technologies, mobile payments and money transfers. There will be more active competition among banks and fintech companies in this field;
2. It is improving state oversight and regulation of the financial sector. Many legislative and regulatory acts and technologies are needed to change, both nationally and globally;
3. It is the development of digital currencies that will be able to fulfill a number of functions inherent in fiat money. Digital currencies will be refined and governments will have to take a clearer stance on them;
4. It is access for large segments of the population to financial services such as deposit, lending, investing and insurance. This trend is very relevant for developing countries and where the population is not fully covered by banking infrastructure;
5. It is a possible waiver of cash. Reducing cash in turnover is an urgent task for many governments as a means of reducing the underground economy and evading taxes.
6. The digital technologies will contribute to further liberalize the foreign exchange market.

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