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DeFi EXPERIMENT AS A FORM OF CRYPTOCURRENCIES MARKET TRANSFORMATION AND IN-DEPTH DECENTRALIZATION

Despite the technological advances of the present, which have a direct impact on the global financial system; the current state is still at the level of "stereotypes of the past", as its main components are extremely inefficient. The biggest paradox is that in the age of high-speed Internet, conventional banking instruments lead to expectations of transaction processing, charging high fees, inequality of payments for different countries and the work of financial institutions in the conditions of "closed schedules".

More than 1.7 billion people in the world still do not have the access to basic financial infrastructure, but this is what provides opportunities for improvement. Thanks to the accelerated development of blockchain technology and the ecosystems which have been created around it, states, banks, financial startups or individual users around the world can now use faster and much cheaper services, getting increased efficiency of payments. Connecting the rest of the non-banking world to this new economic efficiency via the Internet will be the most important strategic direction of digital transformation.

In early 2020, when the cryptocurrencies market was under the constant pressure of uncertainty about the future of its regulation, the American magazine Forbes began researching a new sector of "decentralized finance", called DeFi, and which provided new dynamics for the development of the cryptocurrency industry after a temporary decline in the period of 2018-early 2020 [1].

Decentralized Finance (DeFi) – refers to the ecosystem of financial applications (projects) developed on different blockchains. The most

popular projects have been built on the Ethereum, Tron, Kava network, however, DeFi systems on the Bitcoin blockchain are also found, which are made on the basis of RSK (Rootstock - smart contracts in the bitcoin network).

The goal of DeFi development is to transfer the existing financial system to the blockchain, which will make it accessible and open to the whole world.

In fact, DeFi – is a financial instrument in the form of services and applications created on a blockchain. The main task of decentralized finance is to become an alternative to the banking sector and to replace the traditional technologies of the current financial system with the open-source protocols. That is, to open access for a large number of people to decentralized lending and new investment platforms. Although DeFi is seen as a part of the speculative sector, which allows you to earn passive income from cryptocurrencies assets, as well as to save on fees for the transfers, loans and deposits, but the main idea of this area is to provide liquidity, which is so lacking in highly volatile cryptocurrencies assets.

The advantages of DeFi projects, for example in the lending system, include the Peer-to-peer algorithm, when a person from anywhere in the world can take a loan or deposit existing assets. The effectiveness of these actions is measured by the elimination of intermediaries whose work (whether a banker or an insurer) in the system of decentralized finance is performed by a code, the same law that sets the rules and resolves possible disputes. The guarantor of these operations is a decentralized protocol – a blockchain, on the basis of which a project is built, and all relations are regulated by smart contracts.

The necessity to use smart contracts arises along with the question "who should pay first?" Earlier, when making a deal with a person whose decency you are not sure about, the only possible way out was to find a third person, preferably specially authorized party, which will be able to protect you with its power, of course for a reward. The work is, in fact, mechanical, which in the smart contract system is solved automatically when the conditions are met by both parties.

Most of the existing DeFi is built on the Ethereum blockchain, and the number of new applications in the field of decentralized finance is growing steadily. Thus, in early February 2020, the number of Ethereum blocked on

smart contracts of DeFi applications reached the figure of 938 million US dollars and a year later, in early February 2021, this figure reached 42 billion dollars USA (see Fig. 1) [2].

Significant growth of the DeFi sector took place at the end of 2020, when the capitalization exceeded \$ 20 billion US dollars. At the same time, the dominance of the DeFi market decreased by 2.5% relatively to the entire cryptocurrency market, which was due to a significant increase in bitcoin (BTC) from 10 thousand US dollars up to 40 thousand US dollars within the last quarter period of 2020.

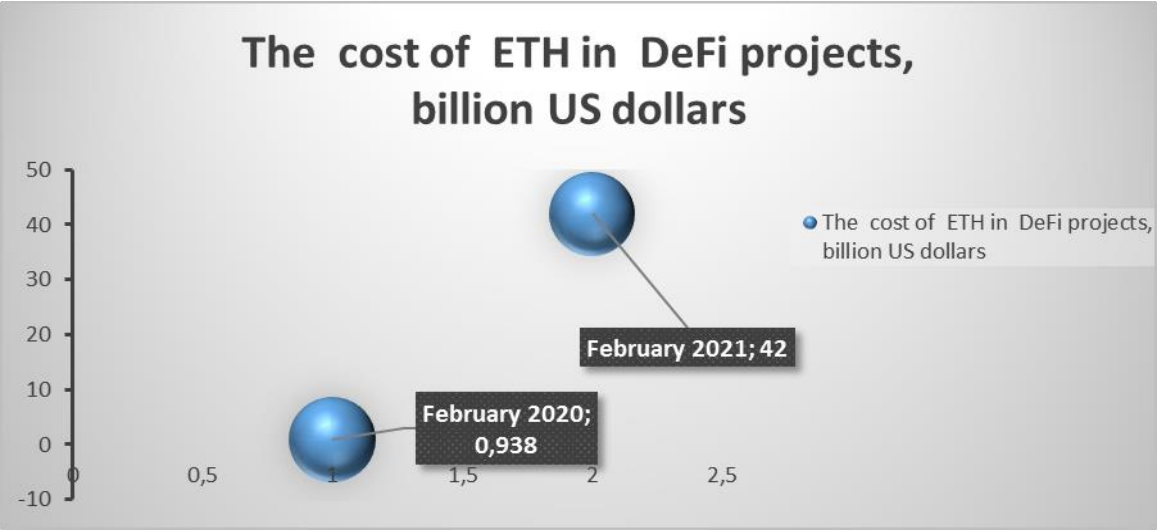


Fig.1. Capitalization of liquidity pools in Ethereum on DeFi projects in 2020-2021 [2]











Rising prices of DeFi tokens in 2020 was marked by significant growth rates with an average value of 718%. The main DeFi tokens with price dynamics are shown in table 1.

As we can see from Table 1, UMA and YFI (Yearn Finance) tokens became the leaders of growth on the market, the indicators of which were 2423% and 2788%, respectively. According to the date of appearance of DeFi tokens, we can see that 6 out of 10 tokens appeared exactly in 2020 on the wave of growth of the market itself, and the average volatility indicator of tokens reached 37% of the market correction [2].

The value of each platform in the DeFi space based on, which decentralized tokens are developed, is determined by a factor assessment (FDV), which indicates either the importance of the technology or the product or service implemented in the project development process, as well as its market capitalization.

Table.

Growth dynamics of the TOP 10 DeFi tokens in 2020 [3]

	Market Cap	2020 Returns	Largest Daily Drop	Largest Daily Drop Date	Return from 2020 Bottom
 Chainlink	\$4.47B	539%	-48%	03-Sep -20	550%
 Uniswap	\$1.10B	50%	-20%	19-Sep -20	168%
 Aave	\$1.06B	57%	-21%	11-Nov-20	219%
 Synthetix Network Token	\$0.99B	497%	-46%	03-Sep -20	1761%
 Yearn.Finance	\$0.68B	2788%	-20%	13-Sep -20	2788%
 Compound	\$0.62B	91%	-17%	21-Jun -20	123%
 Maker	\$0.53B	35%	-59%	12-Mar-20	189%
 UMA	\$0.42B	2423%	-37%	05-Sep -20	2423%
 Sushi Swap	\$0.36B	10%	-58%	05-Sep -20	484%
 Loopring	\$0.21B	685%	-45%	05-Sep -20	686%

In this context, the infrastructure protocols that provide data delivery in the DeFi ecosystem are leading. They are dominated by services connected with the money market, such as decentralized exchanges and lending platforms. It is noteworthy that decentralized exchanges (DEX) have become widespread due to the invention of the liquidity pool model, rather than due to DEX on order books.

Decentralized networks benefit and can win in the third era of the Internet for the same reason they won in the first: by gaining the trust of entrepreneurs and developers. A clear example of this is the competition between Wikipedia and its centralized counterpart Encarta. If you compare these two services in the early 2000s, Encarta had a better product. But Wikipedia has improved much faster thanks to an active community of users who have preferred decentralized management. And in 2005 Wikipedia became the most widely used source of information on the Internet, leading to the closure of Encarta in 2009 [4].

The conclusion from this is in a comparison of centralized and decentralized systems, which should always be considered not in statics but in dynamics. Centralized systems usually have advantages in the initial stages, but the pace of improvement depends on the work of employees and obtaining adequate funding. Decentralized systems, on the other hand, are more difficult to develop in the initial stages, but under favorable conditions can grow exponentially, attracting more and more participants and developers.

The question of who will win in the next era of the Internet, centralized or decentralized systems, comes down to who will be able to create the simplest conditions and useful services that will increase access to new financial services. To a large extent, this will also depend on whose side the most qualified developers and entrepreneurs will be on. Centralized platforms have many advantages, large financial reserves, user base, and infrastructure. Whereas decentralized crypto networks are more attractive to developers and entrepreneurs due to their neutrality and decentralization. Trust in them can lead to the mobilization of much more resources than those of centralized competitors and develop much faster [5].

The most famous DeFi project is considered MakerDAO – a decentralized lending protocol, which contains a fairly large functionality, but the main advantage of which is the presence of a special type of smart contracts called “Collateralized Debt Position”. With them, each user can send a certain amount of cryptocurrency Ethereum (ETH) in a smart contract based on the ERC20 protocol and issue their token, secured by the second most important cryptocurrency. In this case, the created markers DAI (stablecoin) – is, in fact, secured debt to MakerDAO. The platform is a kind of bank, but absolutely any user can take a loan from this bank. Borrowed funds are often used by clients of DeFi-services to fill the liquidity deficit, as an alternative to expensive bank money [6].

It can be stated that in 2020, due to global financial uncertainty and the decline in leading markets, the projects in the field of decentralized finance have received a huge impetus for development. In fact, they have become for many investors an alternative to access to the usual tools of insurance, management, forecasting, derivatives, but in a decentralized infrastructure, which is controlled not by intermediaries but by smart contracts. And this principle of investment will gain popularity due to the advantages of decentralization, which, despite the automation of processes, forms DeFi markets that obey the same laws as traditional ones. However, the main difference between decentralized systems is the lower cost of using tools and general availability. The disadvantages of these systems include certain risks associated with the constant conditions in smart contracts, as well as the possibility of errors in them, hacking of systems by hackers, failure of oracles.

Other the most well-known lending and deposit platforms in the field of decentralized finance are considered InstaDApp, BlockFi, Compound. The latter allows not only to take loans, but also to invest cryptocurrencies at 6% per annum, on the basis of which began to develop services such as staking and farming, which allow additional financial benefits to users of these decentralized systems. And BlockFi customers can borrow digital assets in terms of the usual credit scheme: credit cheques or intermediaries.

Staking is based on mechanisms that eliminate a number of risks in the DeFi market. In particular, under the conditions of participation in these contracts, payments are not affected by the current economic situation and other external factors, due to the peculiarities of PoS mining, a hacking attack does not make sense, and the owner can freely dispose of assets without loss of accumulated income, frequent remuneration minimizes operational risks. Staking is usually based on stable cryptocurrencies (stablecoins), which in this case gives it additional benefits. For example, thanks to an advanced stabilization mechanism, the price of USDT (Tether) or any other stablecoin is maintained at \$ 1 even when the rate of the token tied to it decreases. In this case, no centralized organization or company can seize users' coins or block the account [6].

However, it should be noted that the profitability of staking often does not exceed the indicators of DeFi instruments. This is due to the higher level of risk inherent in decentralized finance. On the other hand, with a fairly low level of risk, the profitability of staking is higher than most traditional financial instruments. Therefore, in this case, the choice is between a stable average income and the desire for rapid enrichment.

Thus, staking can be assessed as a digital analogue of traditional lending. Although in both cases the owner transfers his funds for use for a specific purpose without losing ownership and receives a reward for it, but these two concepts are very different. First of all, when staking, cryptocurrency does not leave the owner's wallet, so there is no risk of non-repayment, and there is no redistribution and replacement of capital with debt. The investor not only retains full control over his funds, but at any time can get complete information about the status of the smart contract.

Staking ETH 2.0 looks like keeping a certain number of broadcasts online in exchange for a reward. The approach is fundamentally different from Proof-of-Work (PoW), the consensus algorithm used today by ETH 1.0 and the main cryptocurrency, bitcoin. PoW gives the owners the largest

computing power (miners) the right to confirm the blocks – for which they are rewarded in the form of newly generated coins and commissions for processing transactions. This is a much more energy-intensive method of extraction compared to PoS, which consumes a lot of resources. In this sense, PoS has a future, as far as staking as an environmentally friendly alternative to Mining saves time, money and effort.

The size of the staking in the Ethereum network is 32 ETH. The staking process involves blocking the cryptocurrency in the deposit contract to participate in the blockchain. Any network user can participate in the placement of stakes. PoS gives the right to receive a reward for checking the blocks to those who have a share of coins that is a multiple of 32. As soon as the validator sends his coins to the stake, they are blocked. If the validator who received the right to confirm the blocks does not cope with this task, he is fined by taking part of the coins from his stake. Thus, the network encourages participants to show responsibility and perform quality work for which they receive a reward [6].

As noted, the work of DeFi projects is based on the creation (release) of their own tokens, for example: MakerDao – MKR, Synthetix – SNX, Kyber Network – KNC, Compound Finance – COMP. Such emission of own tokens pursues several purposes:

1. Minimization of transaction risks with the main coin (for example, Dai stablecoin in the MakerDao project)
2. Creation of a community of holders for decision-making and innovation on the platform
3. Attraction of new users and interest in DeFi platforms.

Along with intangible rights, token holders of DeFi projects have the opportunity to generate significant income as a result of increasing their price in the future.

The business model of earnings from the purchase of tokens is that the investor buys them for storage with the expectation of increasing their value. You can buy the most popular tokens of DeFi projects with the help of mobile services - electronic multi-currency wallets where their safe storage is guaranteed under the conditions of custodial activity.

The business model of investing in DeFi, mainly, is that the user (investor) contributes to the platform own cryptoassets at interest and for a certain period (deposit). The system works in the opposite direction too:

the user can get a loan in certain assets, leaving collateral in cryptocurrency.

Specific conditions for investing or obtaining loans, interest rates, terms are registered in the smart contracts of each project. As a rule, they are public and can be verified by users through the appropriate protocol for creating such a contract (ERC20, TRC20).

One of the most popular platforms in this direction is the Compound project, which provides the highest percentage of the deposit in stablecoins. The peculiarities of using DeFi platforms are that it is not enough to go to the project site or download the application to deposit or receive assets, as the work of Smart Contracts of most projects is based on Ethereum or Tron blockchain, and therefore to access these smart contracts it will be necessary to use the appropriate plugins or official wallets, such as Metamask, TrustWallet, Klever, Tronlink. They can be considered as a gateway for the transfer of assets to smart contracts DeFi projects [7].

For example, Metamask or Tronlink is a program that integrates with the Google Chrome browser to transmit ethereum (ETH), throne (TRX) or ERC-20 tokens in the Ethereum blockchain, or TRC-20 in the Tron blockchain. That is, to contribute cryptocurrencies to the DeFi project smart contract, you must first set them on the wallet balances.

DeFi projects also include platforms for issuing tokens shares, such as Polymath and Harbor; exchange protocols – Uniswap or Bancor, which allow you to instantly convert one cryptocurrency into another; forecasting services such as Augur; digital asset management platforms, such as Melonport and others.

The crypto-economy, which is based on De-Fi projects, is on its way to reforming the entire financial services sector, just as the Internet has transformed new media by discovering and showing freedom of choice and alternative. Current De-Fi projects are developing in several directions:

1. Decentralized exchanges (DEXes);
2. Lending platforms, one part of which is specialized in lending, the other – provides interest income on deposits. Some combine both directions;
3. Platforms for the creation, management and trading of derivatives, the basic tools of which are tokens;
4. Risk management platforms (alternative to insurance).

The lending system in De-Fi projects is slightly different from the usual banking. When issuing a loan, the bank bears risks, so it tries to insure itself as much as possible through the requirements for credit history, a lot of documents on solvency, the need for a guarantee. And the bank itself takes the money from reserves, which are formed by counter deposits of depositors.

Such an approach to lending in the crypto industry is unlikely to be safe and successful, especially for the platforms themselves. Cryptocurrency does not have the personal data of users, so it is almost impossible to determine at whose disposal this or that wallet is, the maximum you can see the list of all transactions.

Therefore, in De-Fi projects, the lending system is more like a pawnshop, where the loan amount depends directly on the pledged asset. In the decision to issue a loan or not, the key role is played not by who the loan is issued, or in what way and how much the client earns, but only what the borrower can offer as collateral for the loan.

The principle of the pawnshop is as follows: the customer can pledge any item (asset) or valuable thing and get a loan based on the value of the goods. A pawnshop can borrow 50% of the value of the item, while charging interest for service. Upon withdrawal from this "transaction", the client takes the pledged goods and pays only the assigned interest (conditional commission). The pawnshop always borrows amounts below the real value of the pledge, so that in case of insolvency of the client to sell the goods and repay the loan.

To get a loan in Maker DAO you need to pledge cryptocurrency (ETH, TRON, BAT, USDC, WBTC, USDT or other) at an already known interest rate and the platform pays you up to 66% of the value of the pledged assets. The loan is issued in DAI tokens, which the platform deliberately issues at your request. The issuance of DAI is regulated by the CDP smart contract (collateralized debt position) [8].

For example, betting 10 ETH at the rate of \$ 1800 (i.e. \$ 18000), you can get up to 11880 DAI, respectively 11880 \$. You can dispose of the received DAI tokens as you wish, at this time the pledged Ethereum (ETH) is securely protected by a smart contract. As soon as the customer decides to repay the obligation, he returns the borrowed DAI to the platform. In this case, the ETH that was pledged is automatically unlocked and returned to the address of its wallet tied to the smart contract. However, it is not

necessary to take the maximum possible amount of DAI, because the higher the percentage of the value of the pledge – the higher the liability.

When pledging any good in the pawnshop, the probability that it will fall significantly in price during the term of the debt obligation is extremely low and is rarely taken into account. However, such a possibility exists when a cryptocurrency is pledged as an asset. Thus, if the pledged asset falls sharply in price – the position may be liquidated, with the accompanying penalty. Liquidation occurs when the pledged cryptocurrency falls at a price close to the value of the debt obligation.

That is, if the client takes 55% of DAI when pledging ETH, the liquidation will occur when the cost of collateral (ETH) falls by 35% or more percent. This situation can be avoided by monitoring the exchange rate of the crypto-asset that secures the loan, and in the event of a drawdown, either repay the debt independently or increase the collateral by increasing the amount of ETH. Another solution may be to send a smaller share of DAI as collateral, and then the probability of liquidation of the position will decrease [9].

Another significant project that currently occupies a dominant position in terms of capitalization among DeFi projects is Compound. It is organized in the style of a cryptocurrency bank, where anyone can lend their coins or borrow funds, which are not enough for the interest calculated by the system. The interest rate on stablecoin deposits is always higher; in particular, the interest rate on DAI is 2.24%. The commission of the Maker DAO project has been fluctuating between 1-3% per year since 2017, which is much less than in traditional banking instruments. However, you can withdraw from the agreement and repay the debt obligations at any time.

In the DeFi ecosystem platforms for the derivatives are still poorly used outside the narrow community. Income farming aggregators are gaining in popularity, but after a period of DeFi downturn, when projects had difficulty gaining significant market share, probably due to high revenue instability and hacking attacks on projects because of which DeFi ecosystem lost in 2020 \$ 121 million USA [2]. It is also important to note the emergence of algorithmic stablecoins as a new DeFi-primitive, although their stability today remains unproven [10].

Thus, the experiment with the development of the DeFi market indicates that this direction is aimed primarily at maintaining the principle

of decentralization, which is crucial for cryptocurrencies. In recent years, the mining of the largest cryptocurrencies, including BTC and ETH, has become heavily dependent on a small number of large mining pools, competition with which is unpromising for independent participants in cryptocurrency mining. Avoiding the dangers of centralization and network dependency is a good reason for Ethereum and other cryptocurrencies to switch to PoS mining. The introduction of staking in DeFi projects allows any member of the network to become a validator, and this does not require expensive equipment and the relatively low barrier of entrance guarantees decentralization and prevents discredit of the blockchain network.

Moreover, ETH 2.0 introduces sharding, in which transactions in the blockchain will be checked not by each node sequentially, but by breaking into fractions. In this case, each of these fractions will be entrusted for processing to a specific validator. Thus, the ether solves the problem of network scalability, in which the speed of transactions increases many times, and the cost of commissions decreases, in contrast to the current situation in which the space growth of commissions essentially slows down the development of the DeFi market. Therefore, sharding is an additional guarantee that the experiment with the market of decentralized finance will be successful.

Based on the above, it should be noted that:

1. The DeFi direction may become a new milestone in the development of the cryptocurrency market, the main difference of which is the provision of liquidity, which is so lacking in highly volatile cryptocurrency assets. The rapid development of decentralized exchanges (DEX) is due to the invention of the liquidity pool model.

2. DeFi is becoming a serious alternative to the banking sector and can replace the traditional technologies of the current financial system with open source protocols (smart contract), i.e. to open-access to a large number of users to decentralized lending and new investment platforms.

3. The competition of decentralized systems with centralized ones will create additional conditions for the development of simple and useful services that will increase access to new financial services. Herewith DeFi in this context will have significant advantages due to flexibility and accessibility.

4. Such DeFi tool as staking, which is a digital analogue of traditional lending, provides additional benefits to investors in terms of risk reduction, through their control over their funds, but also provides access to information about the status of the smart contract at any time, and ensures redistribution and the replacement of capital by debt obligations.

5. Solving the problem of network scalability in the DeFi system, which can significantly increase the bandwidth of protocols and thus the speed of transactions, while minimizing the cost of commissions, through the sharding system is an additional guarantee that the experiment with the decentralized finance market will be successful.

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